

## COURSE SYLLABUS

Course Title	Course Code	Semester	Course Hour/Week		ourse Hour/Week Credit		
Discrete Mathematics	GAME103	1	TheoryPractice30		3	5	
Course Type	Compulsory Course	Department Elective	Faculty Elective	Universit y Elective	CoHE (YÖK) Elective	Other	
	Х	-	-	-	-	-	
Level of Course	Associat (Short	e Degree Cycle)	Undergraduate Graduate/ (First Cycle) (Second /T			e/ Doctoral Fhird Cycle)	
	-	-	Σ	X			

Language of Instruction	English	
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Course Instructor(s)	Vic Grout	E-mail: vic.grout@arucad.edu.tr Office: TIOFF18					
Course Objectives	Discrete Mathematics is the programming and game writ including data science, mac students will explore basic symbolic logic, sets and combinatorics, and probabili	Mathematics is the language of Computer Science, and consequentially of ming and game writing. One needs to be fluent in it to work in many fields g data science, machine learning, and software engineering. In this course, will explore basic number theory and representation, propositional and c logic, sets and relations, sequences, functions, algorithms, matrices, torics, and probability theory in games.					
	Students will able to:		Teaching Methods	Evaluation Methods			
	Define and describe essentia mathematics principles	l discrete	Class material and discussion	Midterm assignment			
Course Learning Outcomes	Interpret and apply mathema and formulae	Interpret and apply mathematical notation and formulae		Midterm assignment			
	Select appropriate solutions for discrete mathematical problems		Class material and discussion	Final exam			
	Apply appropriate mathematical solutions in the field of video game design		Class material and discussion	Final exam			



	• Numbers and numerical representation
	• Set theory
	• Relations
	• Functions and algorithms
	Logic and propositional calculus
<b>Course Content</b>	Permutations and combinations
	• Graph theory
	• Vectors and matrices
	• Geometry
	• Probability

COURSE OUTLINE/SCHEDULE						
Week	Торіс	Implementation (theory/practice)	Required Reading, Preliminary preparation			
1	Introduction: Course structure. Numbers and how to represent them	Т	Class notes.			
2	Number bases and representation. Mathematical relationships	Т	Class notes. Discrete Mathematics – by Gary Chartrand and Ping Zhang (Chapter 5). "Discrete Mathematics and Its Applications" Kenneth H Rosen			
3	Algebra and equations	Т	Class notes			
4	Mathematical functions	Т	Class notes. Discrete Mathematics – by Gary Chartrand and Ping Zhang (Chapter 5).			
5	Introduction to algorithms	Т	Class notes. Discrete Mathematics – by Gary Chartrand and Ping Zhang (Chapter 6). "Discrete Mathematics and Its Applications" Kenneth H Rosen			
6	Set theory and practice	Т	Class notes. Discrete Mathematics – by Gary Chartrand and Ping Zhang (Chapter 2).			
7	Propositional logic and Boolean Algebra	Т	Class notes. Discrete Mathematics – by Gary Chartrand and Ping Zhang (Chapter 1). "Discrete Mathematics and Its Applications" Kenneth H Rosen			
8	Midterm					
9	Permutations and combinations	Т	Class notes. Discrete Mathematics – by Gary Chartrand and Ping Zhang (Chapters 8 & 9).			



10	Probability for games	Т	Class notes. Discrete Mathematics – by Gary Chartrand and Ping Zhang (Chapter 10). "Discrete Mathematics and Its Applications" Kenneth H Rosen
11	Graph theory and practice	Т	Class notes. Discrete Mathematics – by Gary Chartrand and Ping Zhang (Chapter 12).
12	Vectors	Т	Class notes. Discrete Mathematics and Its Applications – by Kenneth H Rosen.
13	Matrices	Т	Class notes. Discrete Mathematics and Its Applications – by Kenneth H Rosen.
14	Game geometry	Т	Class notes.
15	Game algorithms	Т	Class notes.
16	Exam revision		
17	Finals		

Required Course Material(s) / Reading(s)/ Text Book(s)	"Discrete Mathematics" Gary Chartrand and Ping Zhang (2021) McGraw Hill, ISBN: 978-1577667308 "Discrete Mathematics and Its Applications" Kenneth H Rosen (2013) Waveland Press, Inc., ISBN: 978-9390727353
Recommended Course Material(s)/ Reading(s) /Other	Mathematics: A Complete Introduction: The Easy Way to Learn Maths – by Hugh Neill and Trevor Johnson ISBN: 978-1473678378 BBC Bitesize Higher Maths: <u>https://www.bbc.co.uk/bitesize/subjects/z6nygk7</u>



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Learning Activities	NUMBER	WEIGHT in %
Mid-Term assignment	1	40
Quiz		
Assignment		
Project		
Field Study		
Presentation / Seminar		
Studio Practice		
Other		
Contribution of Final Examination to the Final Grade	1	60
TOTAL		100

CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME LEARNING OUTCOMES						
No	No PROGRAMME LEARNING OUTCOMES		Level of Contribution lowest/ 5- highest)			
		1	2	3	4	5
1	To know and explain the basic concepts, theories, institutional structures of communication.		X			
2	To know the history of the game industry and the foundational theories of game design, thus, to be able to explain the terms of professions, professional ethical roles and responsibilities of the profession.	X				
3	The ability to follow the technological and socio-cultural developments and understand the impact of these development on the game industry and observe the changes.	x				
4	The ability to take part in international working environments and be able to analyse the international game industry's needs.		x			
5	Knowledge of count design, pattern manipulation and terminology for game and production tools.				X	
6	Being able to produce, designs, create and program application works in the production processes related to this profession.		x			
7	Knowledge of the basic principles and processes related to the narrative, aesthetics, technical elements of audio-visual animated and interactive content, and distinguishing successful or unsuccessful works with these aspects.		X			



8	The awareness that each design involves social contexts and in some cases, ethical choices, being able to analyse and evaluate these situations.	X			
9	Ability to solve problems using resources to find the best solutions to game development challenges.				x
10	Ability to create, develop and manage professional workflows,		x		
11	Ability to communicate effectively with colleagues, customers, and colleagues in the industry, in a professional context, using written, oral, and up-to-date communication technology.		X		

ECTS / STUDENT WORKLOAD								
ACTIVITIES	NUMBER	UNIT	HOUR	TOTAL (WORKLOAD)				
Course Teaching Hour (X weeks * total course hours)	15		3	45				
Preliminary Preparation and self- study	15		2	30				
Mid-Term	1		20	20				
Quiz	-		-	-				
Assignment	-		-	-				
Project	-		-	_				
Field Study	-		-	-				
Presentation / Seminar	-		-	-				
Studio Practice	-		-	-				
Final Examination/ Final Project/ Dissertation	1		30	30				
Other	-		-	-				
TOTAL WORKLOAD				125				
TOTAL WORKLOAD / 25				5				
ECTS				5				

## ETHICAL RULES WITH REGARD TO THE COURSE



Detected and undetected plagiarism is a serious offence at any time and it could have devastating effects on your degree result and future professional lives. However, plagiarism is easy to avoid if you make sure you identify and acknowledge your sources thoroughly and do not copy directly from visual examples, designs, or notes that have in turn been taken word for word from your sources. The maximum similarity level is 20% in written assignments.

Important Note on Attendance: You must attend at least 70% of the sessions for this course or you will automatically fail. Students cannot be absent more than 30% of the time, *even if you have medical reports* or other forms of justification. Lecturers have no control over this rule: it will be rigorously applied by the system.

## ASSESSMENT DETAILS AND EVALUATION CRITERIA:

You will be assessed by a set of exercises leading up to midterm and a formal, timed written exam in the final week.

Mid-Term (40%)

Tasks/exercise related to:

- 1. Number systems
- 2. Basic algebra
- 3. Functions and algorithms
- 4. Propositional logic and set theory
- 5. Permutations and combinations
- 6. Geometry

Late work can only receive full credit in extreme circumstances and will be penalized otherwise as follows:

• Up to an hour late:

- 5% deducted 10% deducted
- Over an hour but less than a day late:
- Over a day but less than two days late:
- Over two days but less than a week late:
- A week or more late:

15% deducted 25% deducted Not accepted: 0%

Final (60%)

Formal written, timed exam: 1.5 hours

• Covering all aspects of the syllabus in the tables above

PREPARED BY	Vic Grout
UPDATED	20/09/2024
APPROVED	