

COURSE SYLLABUS

| Course Title | Course Code | Semester | Course Hour/Week | | Credit | ECTS |
|-------------------------------|--------------------------------|---------------------|-----------------------------|---------------------|--|-------|
| Data Structures and Algorithm | GAME 211 | 3 | Theory 3 | Practice 0 | 3 | 5 |
| Course Type | Compulsory Course | Department Elective | Faculty Elective | University Elective | CoHE (YÖK) Elective | Other |
| | - | YES | - | - | - | - |
| Level of Course | Associate Degree (Short Cycle) | | Undergraduate (First Cycle) | | Graduate/ Doctoral (Second /Third Cycle) | |
| | - | | Yes | | - | |
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| Language of Instruction | English |
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| Course Instructor(s) | Dr. Masoud Moradi | E-mail : masoud.moradi@arucad.edu.tr | |
| | | Office : TI-OFF18 | |
| Course Objectives | The objective of this course is to introduce students to fundamental data structures and algorithms, focusing on their importance in solving computational problems efficiently. Students will learn how to design, analyze, and implement algorithms using C/C++ and understand the principles behind different data structures like arrays, stacks, queues, and linked lists. The course emphasizes critical thinking, problem-solving, and algorithmic design for game development applications. | | |
| Course Learning Outcomes | Students will able to: | Teaching Methods | Evaluation Methods |
| | Apply core C/C++ constructs (variables, loops, control structures). | - Lectures - Practical labs - Project-based learning | - Midterm Exam |

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| Course Content | Implement and use fundamental data structures (arrays, stacks, queues, linked lists). | - Lectures - In-class | Final Exam |
| | The course covers the following topics: <ul style="list-style-type: none"> • Introduction to programming in C/C++ • Variables, arithmetic operations, loops, and conditional statements • Arrays, pointers, and memory management • Pre-defined functions and user-defined functions • Data structures: Stacks, queues, and linked lists • Object-oriented programming concepts and their use in game development • Algorithm analysis: Time and space complexity | | |

| COURSE OUTLINE/SCHEDULE | | | |
|--------------------------------|---|---|--|
| Week | Topic | Implementati on (theory/practi ce) | Required Reading, Preliminary preparation |
| 1 | Curriculum Overview. | T | <i>Instructor course notes.</i> |
| 2 | Introduction to C/C++ Programming: program flow, basic input and output operations. | T | <i>Instructor course notes..</i> |
| 3 | Variables, arithmetic and logical operations, logical Operations and selection - If / If else / Switch-case | T | <i>Instructor course notes.</i> |
| 4 | Loops - For / While | T | <i>Instructor course notes.</i> |
| 5 | Nested loops (For/While) | T | <i>Instructor course notes.</i> |
| 6 | Pre-defined Functions | T | <i>Instructor course notes.</i> |
| 7 | Arrays in Computer Programming (1D arrays and 2D arrays). | T | <i>Instructor course notes.</i> |
| 8 | Pointers | T | <i>Instructor course notes.</i> |

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| 9 | Mid-Term | - | |
| 10 | Structures | T | <i>Instructor course notes.</i> |
| 11 | Queue | T | <i>Instructor course notes.</i> |
| 12 | Stack | T | <i>Instructor course notes.</i> |
| 13 | Characters and Strings | T | <i>Instructor course notes.</i> |
| 14 | Linked list | T | <i>Instructor course notes.</i> |
| 15 | Object Oriented definition | - | <i>Instructor course notes.</i> |
| 16 | Revision | | |
| 17 | Final Exam | - | |

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| Required Course Material(s) / Reading(s)/ Text Book(s) | <u>Beginning C++ through game programming / Michael Dawson.</u> by Dawson, Mike, 1947- Call number: QA76.76.C672.D395 2015 |
| Recommended Course Material(s)/ Reading(s) /Other | Students should bring their storage devices. i.e.: USB Flash Drive |

ASSESSMENT

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

| CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME LEARNING OUTCOMES | | | | | | |
|---|---|---|---|---|---|---|
| No | PROGRAMME LEARNING OUTCOMES | Level of Contribution (1-lowest/ 5-highest) | | | | |
| | | 1 | 2 | 3 | 4 | 5 |
| 1 | Knows the historical development of the field of communication, basic concepts, theories. | ✓ | | | | |
| 2 | Knows the basic concepts and terminology related to the field of game design. | | | ✓ | | |
| 3 | Has knowledge about the history of computer and video games and developments in this field. | | ✓ | | | |
| 4 | Knows game design processes and related applications. | ✓ | | | | |
| 5 | Has the ability to utilize various disciplines such as communication, art, music, psychology, mythology, cinema, etc. in the game design process. | | | ✓ | | |
| 6 | Has the ability to analyze analog and digital game genres. | | | | | ✓ |
| 7 | Has the ability to use contemporary game engines and problem solving skills. | | | | ✓ | |
| 8 | Has the knowledge of questioning the game designs with an analytic and critical perspective. | | | | ✓ | |

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| 9 | Has knowledge about media literacy. | ✓ | | | | |
| 10 | Has the competence to prepare projects based on ethical principles in game development processes. | | ✓ | | | |
| 11 | Has the competence to evaluate games as an art form. | ✓ | | | | |
| 12 | Has the competence to use game design concepts and methods in related fields such as design, software development and media. | | | | | ✓ |
| 13 | Has the competence to take part and responsibility in game development teams. | | | | ✓ | |
| 14 | Has the competence to collect, analyze and interpret analytical data about games and players. | | | | ✓ | |
| 15 | Has the competence to develop and present a digital game project by using game design practices effectively. | | | ✓ | | |
| 16 | Evaluates artificial intelligence applications in their studies with a critical approach in terms of aesthetics and originality, and uses them in accordance with ethical rules. | | | ✓ | | |

| ECTS / STUDENT WORKLOAD | | | | |
|---|--------|------|------|------------------|
| ACTIVITIES | NUMBER | UNIT | HOUR | TOTAL (WORKLOAD) |
| Course Teaching Hour (X weeks * total course hours) | 15 | | 4 | 60 |
| Preliminary Preparation and self- study | 15 | | 2 | 30 |
| Mid-Term | 1 | | 10 | 10 |
| Quiz | | | | |
| Assignment | | | | |
| Project | | | | |
| Field Study | | | | |
| Presentation / Seminar | | | | |
| Studio Practice | | | | |
| Final Examination/ Final Project/ Dissertation | 1 | | 20 | 20 |
| Other | | | | |
| TOTAL WORKLOAD | | | | 120 |
| TOTAL WORKLOAD / 25 | | | | 5 |

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|-------------|--|--|--|---|
| ECTS | | | | 5 |
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| ETHICAL RULES WITH REGARD TO THE COURSE |
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| <p>Plagiarism Disclaimer</p> <p>Detected and undetected plagiarism is a serious offence at any time and it could have devastating effects on your degree result and future professional life.</p> <p>Plagiarism is easy to avoid if you make sure you thoroughly identify and recognize your sources and do not copy from visual examples, designs or notes taken directly from your sources word for word. The maximum citation limit cannot exceed 20%. Artificial intelligence citations are also considered within this scope. If proven otherwise, the student will fail the course.</p> |

| ASSESSMENT DETAILS AND EVALUATION CRITERIA: | |
|---|-------------------|
| <p>Final Grades will be determined according to the Course Learning Activities and Final Examination/ Project/ Dissertation Assessment Details as below, and comply with the Education and Examination Regulation set forth by the University.</p> <p>During the class sessions, participation is a very important input for the learning process for the students.</p> <p>70% attendance to courses is compulsory. Health reports belong to 30% absenteeism right.</p> | |
| PREPARED BY | Dr. Masoud Moradi |
| UPDATED | 12/04/2025 |
| APPROVED | |