UNIVERSITY OF WESTERN MACEDONIA

School of Social Sciences and Humanities

# DEPARTMENT OF COMMUNICATION AND DIGITAL MEDIA

**Postgraduate Program**

**“Gaming and Multimedia Application Development”**

## STUDY GUIDE

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# A. University of Western Macedonia

## 1. History

The University of Western Macedonia was founded in Kozani in 2003, under the Presidential Decree No. 92 / 11-4-2003. The first members of the Interim University Administration / Body were appointed under the Ministerial Decision F. 120.61 / 132/61865 / B2 / 25.6.2003. In 2015, after the first elections for a Rector, the University of Western Macedonia became a self-governing institution, and ran courses in 2 cities, Kozani and Florina, with 3 Schools and 6 Departments.

In 2019, the University of Western Macedonia was merged with the Technological Education Institute of Western Macedonia (Law 4610/2019, Government Gazette 70 / A / 07.05.2019). The TEI of Western Macedonia, ran courses in 5 Schools and 11 Departments in 5 cities in Western Macedonia. The central campus was located in Kozani.

The new University of Western Macedonia runs 7 Schools and 21 Departments in 5 cities (Kozani, Florina, Kastoria, Ptolemaida, and Grevena). A new, state-of-the-art campus was constructed in the Active Urban Planning Zone (ZEP) of Kozani and started operating in September 2022. The new Campus houses the Rector's Office of the Institution, the Administrative Services, 3 departments of the Polytechnic School and a Library.

## 2. Structure

The University of Western Macedonia runs Schools and Departments in five cities in Western Macedonia (Kozani, Florina, Kastoria, Grevena, Ptolemaida). The main campus is located in the Active Urban Planning Zone (ZEP) in Kozani, and accommodates the University Administration authorities, 3 departments of the School of Engineering and a library. The second campus in Kozani, in the area of Kila, accommodates the School of Economics, 2 of the 5 departments of the School of Engineering, a library, the Hall of Residence, a student restaurant (there is a second restaurant in the city centre) and the university gym.

Three Departments of the School of Engineering (Departments of Mechanical Engineering, Electrical and Computer Engineering, and Chemical Engineering) are located in the main Campus, in the Active Urban Planning Zone (ZEP) in Kozani and two in the campus in the area of Kila in Kozani (Department of Mineral Resources Engineering and Department of Product & Systems Design Engineering). All Departments cater for cutting-edge training and research in state-of-the-art laboratories.

The School of Economics runs 7 Departments, of which 4 (Accounting and Finance, International and European Economic Studies, Regional and Cross-border Development Studies and Management Science and Technology) run courses in Kozani. The Departments of Business Administration, and Statistics & Insurance Science, and the Department of Economics run courses in Grevena, and Kastoria, respectively.

The School of Humanities and Social Sciences is located in Florina (3rd km Florina-Niki) and Kastoria. The School runs 4 Departments in Florina (Primary Education, Early Childhood Education and Psychology), and one in Kastoria (Communication & Digital Media), where there is also a student restaurant and library.

The School of Agriculture is located on the University farm in Florina, where there are the administration services building, the main building, the hall of Residence and student restaurant, the library and sports facilities.

The School of Fine Arts is located in Florina (3rd km Florina-Niki), and in the village Psarades, Prespes, where there are laboratories and exhibition areas. The School is going to be re-located in a new campus building in Florina.

The School of Science runs courses in Kastoria (Fourka) in 2 Departments, the Department of Mathematics and the Department of Informatics.

The School of Health Sciences is located in Ptolemaida and runs 2 courses in the Department of Midwifery and the Department of Occupational Therapy.

The University of Western Macedonia offers free meals to students in all cities. There are 2 student restaurants in Kozani (on Kila campus and at 20 Constantinople Street), 2 in Florina (in the buildings of the School of Humanities and Social Sciences and the School of Agriculture), in Ptolemaida, and on campus in Kastoria and Grevena.

Free accommodation is offered in the Halls of Residence in Kozani, Grevena and Florina.

## 3. University Vision, Mission, and Values

### 3.1. Vision

As part of its vision, the University of Western Macedonia: pursues excellence in education, research and innovation by attracting, supporting and employing young researchers, academic and administrative staff, who are highly competent and professionally consistent and develop significant scientific activity aspires, through up-to-date curricula, which promote state-of-the- art research and extrovert scientific activities, to gain a high academic status and potential and focus on social welfare based on democratic ideals, such as meritocracy, free thinking and promotion of scientific knowledge

promises to contribute, in as much as it is concerned, to prosperity, social progress and national and European culture, especially in the Balkans, through knowledge, scientific thinking and creativity.

### 3.2. Mission

UoWM's mission is to promote and consolidate knowledge and progress through its dynamic, reliable, and modern functions, both for the benefit of ts academic community and society.

**In particular, UoWM's mission involves the following three thematic axes:**

(1) Education – Research – Culture:

- development and implementation of curricula in disciplines that engage in sustainability in West Macedonia, Greece, and the wider area of the Balkans and Europe. In particular, curricula focus on fostering knowledge, critical thinking, and ethics, which aim at students' personal development, successful professional career, and social status,
- support and enhancement of scientific research, innovation, and extroversion with a view to increasing UoWM's international prestige,

- promotion of academic and scientific culture as well as scientific independence and ethics.

(2) Economy – Development:

- significant contribution to solving local and national development problems and assisting with regional development planning,
- development of business culture, ideas, and organisations in order to achieve positive results in employment and income, and offer new opportunities in research and the economy,
- lifelong education and training emphasizing the importance of human resources as a key component in production,
- exploitation of UoWM's assets and its intellectual, intangible, and innovative research outcomes.

(3) Just, responsible and open society

- shaping modern citizens via promoting knowledge, participation, and cooperation with an aim to foster a responsible scientific outlook to contemporary problems and avoid discrimination and social exclusion,
- promotion of scientific thinking, free dialogue, and exchange of ideas for the benefit of democratic values, tolerance, and societal progress,
- support and promotion of cultural work, creative thinking, and environmental awareness.

## 3.3. Values

The moral, social, cultural, and scientific values fostered by UoWM are the basic prerequisites and essential conventions of principles and ethics to meet mission and vision requirements. These values should be cherished by the entire UoWM academic community.

**Hard work, dedication, and passion**

UoWM members' hard work, competence, enthusiasm, and passion are the cornerstones for achieving the University mission. Educational, research, and administrative work as well as creativity and commitment require effort, dedication, and consistency beyond regular duties and responsibilities for the benefit of the University.

**Creativity and sustainability**

The development of new ideas, innovation, and actions towards radical change and improvement of both processes and outcomes requires encouragement, originality, and going beyond conventions, which are critical components of a culture of creativity. Creativity, however, must be inextricably linked to collective efforts to preserve and improve the environment, natural resources, and infrastructure for the benefit of future generations and to ensure consistent university planning and functions.

**Responsibility and consistency**

All University members are committed to their own duties, but they also undertake additional tasks, both in order to fulfill their institutional role, which is associated with the accomplishment of UoWM's mission and also create an academic setting in accordance with university principles and values.

**Integrity and transparency**

Decision-making processes and criteria, implementation of decisions, and management of several University-related issues are based on transparency, the widest possible consensus, and focus on consolidating meritocracy and justice in all aspects of academic life. Transparency and accountability in all University functions are crucial to the university members' integrity and provide a healthy work environment.

**Academic freedom and respect for diversity**

By showing respect for democracy and humanitarian values, UoWM defends the University members' right to prevent restrictive intervention in educational processes and scientific knowledge delivery. In addition, it protects the human and constitutional rights of the academic community members and encourages freedom of expression, constructive argumentation, and respect for diversity of views and attitudes. Non-discrimination policies, which prevent individuals' exclusion from access to knowledge due to different economic and social status or origin (gender, religion, disability, etc.), are indisputable and enduring University values.

## 4. Student Welfare Service

The Student Welfare service provides administrative support in all activities related to student welfare, in accordance with the current legislation, state funds and Governance decisions. The Student Welfare team coordinates and provides high quality services and information on issues related mainly to free meals, accommodation, and social welfare issues, such as student accommodation benefits. In detail, the Student Welfare service:

- monitors the implementation of the decisions taken by the UoWM Administration bodies concerning student welfare and, in general, undergraduate students' wellbeing,
- compiles legislation and decisions on student welfare issues,
- implements current legislation about student welfare,
- coordinates and monitors student welfare processes in all UoWM academic units (Kozani, Grevena, Ptolemaida, Kastoria and Florina),
- draws up instructions and circulars to ensure effective operation of student welfare services in all UoWM student welfare offices,
- examines financial support documents and applications for granting student accommodation benefits, free meals, and free accommodation on campus,
- operates a database of beneficiaries and collects data about student welfare at UoWM,
- supports students with disabilities,
- monitors and updates information about student welfare on the university website.

# B. Master's Program Regulations (M.Sc.) "Development of Digital Games and Multimedia Applications"

## 1. The Department of Communication and Digital Media - Brief Description

The Department of Communication and Digital Media, of the School of Social Sciences and Humanities, of the University of Western Macedonia, was founded in 2019 (Official Government Gazette 70/2019). Although recently founded, the academic identity of the department can be traced back to a long journey that begins with the foundation of the first Department of Public Relations and Communication in Greece. Founded in the city of Kastoria, the department left a significant imprint on the country's academic community. With an established position in the field of Communication, the Department evolved throughout the years by addressing the complexities and the constant challenges in the Communication academic discipline.

In 2013, the Department incorporates in its name the Digital Media aspect (renamed to "Department of Digital Media and Communication") without however changing the scientific scope covered by its curriculum. Through this action the department strengthened its curriculum in the Digital Media domain, highlighting the important role of the new media developments in the science of Communication.

In 2010, the Department was included in the first 25 Departments in Greece that go through the HQA (Hellenic Quality Assurance and Accreditation Agency) external evaluation process. The main findings reported in the evaluation are:

- The Department Curriculum is equivalent to other similar curricula offered by accredited universities abroad.
- The employment rate in the labor market for the department graduates is high and many students get employed even before they obtain their degree.
- High-quality research is conducted in the Department, and the research findings are integrated into the curriculum content.

The external evaluation authorized the Department to design and organize an Interdepartmental Postgraduate Program (MA) entitled "Master's in Public Relations and Marketing with New Technologies", which was first offered in the academic year 2012-2013.

For many years, the Department has been one of the most attractive Departments of Higher Education, based on the preferences stated in the electronic applications submitted by the high school students taking part in the National Entry Examinations It is noteworthy that during the 2017 Entry Examinations, the Department ranks 2nd among all Departments of Higher Education concerning the number of students that included it in their preferences. Specifically, that year the Department was chosen by 13,300 candidates. Furthermore, over the past years, the Department is found with high statistical frequency amongst the first 30 departments in the country, again according to the candidate preferences stated in the electronic applications.

In 2017, the Lab of Digital Media and Strategic Communication (Official Government Gazzetta 459 / 16-2-2017) is founded and started operating within the Department. The Lab aims to conduct research and to implement development projects as well as to serve the Department's research and educational needs in the field of Digital Media and Strategic Communication.

In its short period of operation, the Laboratory has carried out substantial and important work, it has shown considerable extroversion and has developed collaborations with important institutions in Greece, such as the French Institute of Thessaloniki, the Hellenic Foundation for Culture, and the Thessaloniki International Book Fair. At the same time, the Lab is actively demonstrating its research orientation by submitting proposals to research program calls, aiming to utilize in their implementation academic knowledge, research expertise in business practice and innovation as well as an active interest in new research challenges.

In 2018, a new Postgraduate program is launched in collaboration with the Department of Preschool Education of the University of Western Macedonia entitled "Public Speech and Digital Media".

In 2019 and with the 4610/2019 law the Department of Communication and Digital Media is founded in the School of Social Sciences and Humanities. The newly established department incorporates the academic community, the equipment, and the Laboratory of the former Department of Digital Media and Communication. In this way, the Department and its successful course in the field of Communication that started in 1999 in the Technological Institution of Western Macedonia and continued over the years, is now reinforced with new opportunities and momentum by the School of Social Sciences and Humanities and the University of Western Macedonia.

## 2. Postgraduate Program “Gaming and Multimedia Application Development”

The Master's Program (M.Sc.) entitled “Gaming and Multimedia Application Development” of the Department of Communication and Digital Media, School of Social Sciences and Humanities of the University of Western Macedonia was designed during the academic year 2022-2023 by the faculty members of the Department of Communication and Digital Media of the University of Western Macedonia. The draft program was approved at the 10/04-05-2023 meeting of the Assembly of the Department of Communication and Digital Media of the University of Western Macedonia. Also, the Senate of the University of Western Macedonia in its meeting (no. 199/11-12-2023) approved the organization of the Master's Program entitled “Gaming and Multimedia Application Development”. The administrative support of UoWM is done by the Department of Communication and Digital Media of the School of Social Sciences and Humanities of the Foundation. The master’s website is the following: https://gamedev.uowm.gr/.

## 3. Object - Purpose

The M.Sc. "Gaming and Multimedia Application Development" aims to design and develop digital games for any device, emphasizing innovation, good design practices, development of programming skills and uses of appropriate digital tools. The said program is characterized by multidisciplinarity, connecting academic subjects such as programming, communication, storytelling, directing, image, video, animation, marketing, digital media, etc. The graduates of master’s program specialize and acquire the theoretical and empirical background as well as the skills that enable them to be employed in various professional and research fields related to the design and development of digital games and multimedia applications. Parallel to its research mission, the master’s program also aims at the training of senior executives and policymakers in professional and social sectors such as Education, Television,

Cinema, Businesses, and Organizations, for the strategic and efficient design of multimedia applications.

**Purposes of the master's program:**

- The provision of specialized knowledge in modern interdisciplinary developments in the wider field of Digital Games and multimedia applications and the offering of a high level of knowledge and skills related to all forms of such applications.
- The training of specialized graduates with a solid theoretical background, as well as the ability to deal with complex practical problems interdisciplinary in the wider fields of the development of digital multimedia applications and games.
- The promotion of interdisciplinary research in the design and development of digital games and multimedia applications with an emphasis on innovation, as well as the preparation of high-level relevant postgraduate theses.
- The development of critical and research skills required for further doctoral level studies.
- The training of scientists with the required skills for successful careers in the private, public, and academic sectors.

## 4. Quality Policy

According to the current legislation, each institution is responsible for ensuring and continuously improving the quality of its educational and research work, as well as for the effective operation and performance of its services, in accordance with international practices, especially those of the European Higher Education Area, and the principles and directions of the Hellenic Authority for Higher Education (HAHE).

The Department of Communication and Digital Media of the University of Western Macedonia has fully harmonized the quality assurance policy of the master's program with the quality assurance policy of the University of Western Macedonia. The Department's quality policy aims to provide high-level services in the following areas: education and teaching, scientific-research work, administrative services, society.

## 5. Learning Outcomes

Upon the successful completion of their studies, the graduates of the master's program will be able to:

- To identify, describe and evaluate contemporary applications of new technologies.
- To combine prior knowledge from their 1st and 2nd cycle of studies with knowledge around available multimedia technologies to create gamification applications.
- To combine various emerging ICT technologies available today to create multimedia gamification applications (e.g., websites, multimedia, interactive environments, virtual and augmented reality, etc.). Also, be able to combine available educational technologies with various learning theories to achieve learning objectives.
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- To create original, modern, and multidimensional multimedia content (images, vector and 3D graphics, video, animation, augmented, virtual and mixed reality) and applications for educational purposes compatible with the theories of multimedia learning.
- To use various research methods to develop and evaluate innovative digital content and applications.
- To use collaborative environments and other online tools to implement group activities and tasks.
- To understand the principles of gamification and utilize them in teaching scenarios using ICT.
- To approach the various multimedia tools and new technologies with critical thinking.
- • Have a critical understanding of the value of interactive multimedia as tools for creating digital games.
- To have a critical understanding of the processes involved in creating integrated interactive multimedia.
- To promote digital skills and creativity in all areas of modern multicultural society and culture.
- To solve problems related to the correct use of ICT in the Greek and International environment (e.g., copyright, technical issues, etc.).
- To use their knowledge and analytical skills to adapt to a constantly changing environment where new technologies are constantly emerging.
- To develop the scientific field of the development of digital games and multimedia applications at a national and international level respecting the principles of ethical communication, democracy, and the public sphere
- To have a successful career in the fields related to Computer science, Communication and the Development of Digital Games and Multimedia Applications.
- To acquire the necessary knowledge to advance their academic studies to further studies in the subject of the Department and related scientific fields.

At the same time, the graduates of master's program acquire the following abilities and skills:

- **Personal**: communication through oral and written language, flexibility and adaptability to the dynamic work environment and rapidly evolving digital technologies, skills to integrate new technologies in their work, approach work issues with critical thinking and creativity, professional responsibility and social sensitivity, ability in analyzing and synthesizing data and using appropriate technologies to make decisions about complex problems in the field of computer science and communication, ability to design and manage projects as well as generate research ideas.
- **Social**: ability to work in a team, respect for human rights, diversity, and multiculturalism.

## 6. Administration of the Master's Program

Competent bodies for the administration, organization, and operation of the Master's Program are:

1. The Assembly of the relevant Department as defined in paragraph 3 of article 31 of Law 4485/2017.

2. The Coordinating Committee (C.C.) of the master's program is made up of five (5) faculty members of the Department of Communication and Digital Media, who have undertaken a postgraduate project and are elected by the Assembly of the relevant Department for a two-year term.
3. The Director of master's program is a faculty member of level of professor or of the level of the associate professor, of the same or related academic subject, is appointed together with his deputy, by decision of the Department's Assembly for a two-year term and must meet the conditions of paragraph 8 of article 31 of Law 4485/2017. The Director is also a member and President of the C.C., cannot have more than two (2) consecutive terms and is not entitled to additional remuneration for his administrative work.

## 6.1. Coordinating Committee of the Master's Program

Competent bodies for its establishment, reformation, organization, and operation are the following:

a. The Senate of the University
b. The Assembly of the Department
c. The Coordinating Committee (CC) of the master's program
d. The Director of the master's program

**Director of the master's program:** Domna Michail, Professor
**Deputy director of the master's program:** Georgios Lappas, Professor

Composition of Department Assembly:
**Coordinating Committee:**

| | |
|---|---|
| Domna Michail, Member | (Professor) |
| Georgios Lappas, Member | (Professor) |
| Alexandros Kleftodimos, Member | (Associate Professor) |
| Michalis Vrigkas, Member | (Assistant Professor) |
| Maria Matsiola, Member | (Assistant Professor) |

## 7. Academic and Teaching Staff

The academic and teaching staff of the master's program consists of the following members:

***Domna Michail*** *Professor*
Subject: Anthropology of Education, Migration, and Minorities
Department of Communication and Digital Media, University of Western Macedonia
Director of the Social and Migration Studies Laboratory
Director of the Master's Program "Digital Games and Multimedia Application Development"
https://scholar.google.com/citations?hl=el&user=XhKKSsMAAAAJ
https://www.researchgate.net/profile/Domna_Michail

***Georgios Lappas*** *Professor*
Subject: Informatics with an emphasis on Social and Political Sciences
Department of Communication and Digital Media, University of Western Macedonia
Director of Digital Media and Strategic Communication Laboratory
Associate Director of the Master's Program "Digital Games and Multimedia Application Development"
Associate Director of the Interdepartmental Master's Program "Public Speaking and Digital Media"
Member of the Regional Council for Research and Innovation of the Western Macedonia Region, Head of the Digital Transformation Sector
https://scholar.google.gr/citations?user=m0cjr5YAAAAJ&hl=el&oi=sra
https://www.researchgate.net/profile/Georgios_Lappas

***Amalia Triantafillidou*** *Associate Professor*
Subject: Communication with an emphasis on Public Relations
Department of Communication and Digital Media, University of Western Macedonia
Holder of the Jean Monnet Chair in Risk and Crisis Communication in European Union
https://scholar.google.com/citations?user=oxJ_BroAAAAJ&hl=en
https://www.researchgate.net/profile/Amalia-Triantafillidou

***Alexandros Kleftodimos*** Associate *Professor*
Subject: Online Technologies in Communication and Education, with an emphasis on Video-Training and Behavioral Analysis from Usage Data
Department of Communication and Digital Media, University of Western Macedonia
https://scholar.google.com/citations?user=mwzU_nMAAAAJ&hl=en
https://www.researchgate.net/profile/Kleftodims_Alexandros

***Michalis Vrigkas*** *Assistant Professor*
Subject: Development of Virtual and Augmented Reality Applications
Department of Communication and Digital Media, University of Western Macedonia
https://scholar.google.com/citations?user=hixpxHsAAAAJ&hl=en
https://www.researchgate.net/profile/Michalis_Vrigkas

***Maria Matsiola*** *Assistant Professor*
Subject: Journalism and New Media
Department of Communication and Digital Media, University of Western Macedonia
https://scholar.google.com/citations?user=znGFvh0AAAAJ&hl=el&oi=ao
https://www.researchgate.net/profile/Maria-Matsiola

***Anastasia Yannacoloulou*** *Assistant Professor*
Subject: Linguistics with an emphasis on Computational Linguistics
Department of Communication and Digital Media, University of Western Macedonia
https://scholar.google.com/citations?hl=en&user=mdUBTUkAAAAJ
https://www.researchgate.net/profile/Anastasia_Yannacopoulou

***Nikolaos Ploskas*** *Associate Professor*
Subject: Algorithms for Combinatorial Problems
Department of Electrical & Computer Engineering, University of Western Macedonia
https://scholar.google.com/citations?hl=en&user=jcEBJNwAAAAJ

***Minas Dasygenis*** Associate *Professor*
Subject: Computer Systems Architecture
Department of Electrical & Computer Engineering, University of Western Macedonia
https://scholar.google.com/citations?hl=en&user=05cDd-MAAAAJ

***Stamatia Bibi*** Associate *Professor*
Subject: Software technology
Department of Electrical & Computer Engineering, University of Western Macedonia
https://scholar.google.gr/citations?user=LxjdeV0AAAAJ&hl=el&oi=ao

***Kostas Karpouzis*** *Assistant Professor*
Subject: Cultural informatics
Department of Communication, Media and Culture, Panteion University
https://scholar.google.com/citations?hl=el&user=12olpHgAAAAJ

***Elina Roinioti*** *Assistant Professor*
Subject: Interactive Digital Storytelling in Video Games
Department of Performing and Digital Arts, University of Peloponnese
https://scholar.google.com/citations?hl=el&user=SyEd8EEAAAAJ

***Antonis Protopsaltis*** *Laboratory Teaching Staff*
Subject: Graphics
Department of Electrical & Computer Engineering, University of Western Macedonia
https://scholar.google.gr/citations?hl=el&user=-COFDBMAAAAJ

## 8. Administrative Staff

| | |
|---|---|
| ***Athena Doume*** | *Head of Secretaria* |
| ***Panagiota Terzi*** | *Secretarial Support* |

Telephone +30 246-744-0020 και +30 246-744-0022, email: sec-cdm@uowm.gr

## 9. Regulation of Operation of the Master's Program

### 9.1. Postgraduate Degrees

The master's program awards a Master's Degree (M.Sc.) with the title: "M.Sc. in Gaming and Multimedia Application Development".

## 9.2. Categories of Candidates

In the master's program graduates from the country or foreign equivalent institutions of Polytechnic Schools, Positive Schools, the Department of Communication and Digital Media, and graduates of higher education who have successfully attended programming courses with at least eight (8) cumulative ECTS are accepted.

## 9.3. Number of Entrants

The number of admissions to the master's program is set at fifty (50) postgraduate students per year.

## 9.4. Duration and Terms of Study

The duration is defined in three (3) academic semesters, which includes the time for preparing and evaluating the postgraduate thesis. The maximum time allowed to complete the studies is set at six (6) semesters. Beyond these time limits and in exceptional cases, following a decision of the Assembly, the postgraduate student will have the possibility of an extension, with a financial burden of four hundred and 400 euros per semester.

The possibility of partial study for working students is foreseen, after a decision of the Assembly, the duration of which cannot exceed twice the time of normal study. Partial study is also provided for non-working postgraduate students who are unable to meet the minimum requirements of the "full" study program and for special extremely serious cases, for which the Assembly decides (indicative: illness, serious family reasons, force majeure etc.).

In exceptional cases, it is possible to grant, by decision of the Assembly, permission to suspend studies for a period of time that may not exceed two (2) consecutive semesters. The time of suspension of studies is not counted towards the maximum duration of studies. After the end of suspension, the postgraduate student is obliged to attend all courses, seminars, practical exercises, etc. in which he has not been successfully assessed prior to his/her suspension.

The Assembly, following a proposal by the C.C., decides on matters of course review or cancellations. Indicatively, reasons for deletion can be: the insufficient progress of the student (non-participation in the educational process, attendance and examinations), defective fulfillment of other obligations, as defined by these Study Regulations (non-payment of tuition fees, exceeding the maximum prescribed period of study) and application of the same graduate student or behavior that offends academic ethics, e.g., plagiarism.

Postgraduate students are entitled to:

- Πρόσβαση σε ηλεκτρονική βάση δεδομένων, στις οποίες είναι συνδρομητής το Π.Δ.Μ. (Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών-Σ.Ε.Α.Β.)
- Academic ID.
- Academic e-mail account.
- Access to the libraries of the University
- Access to an electronic database, to which the University is a subscriber. (Association of Greek Academic Libraries)

The relevant Department must ensure facilities for postgraduate students with disabilities or special educational needs.

## 9.5. Tuition Fees

In the master's program tuition fees are foreseen which amount to the total amount of two thousand and four hundred (2,400.00) euros, paid in three equal installments: 800.00 euros with the registration of the candidates and 800.00 euros before the start of B and C semester, respectively. Tuition fees are paid on fixed dates, communicated in good time. In case of interruption of studies, the fees paid are not refunded.

The imposition of tuition fees is considered necessary because the necessary conditions for the operation of the program and the provision of high-quality services are not ensured by other resources. The amount of the fee is determined based on the reciprocity between the fee and the services (tuition, access to material and platforms, scholarships).

Postgraduate students whose income (individual or family) does not exceed one hundred percent (100%) and family seventy percent (70%) of the national median equivalent income are exempt from tuition fees. Exempted students should not exceed thirty percent (30%) of the total number of students admitted to the master's program and concerns participation in a single master's program. According to article 35 of Law 4485/2017, if the beneficiaries exceed the above percentage, they are selected in ranking order starting with those with the lowest income. The application for exemption from tuition fees is submitted by the interested party to the Secretariat of the master's program after the completion of the student selection process at the master's program.

## 9.6. Obligations of Postgraduate Students

Postgraduate students enrolled in the master's program are obliged to:

- Continuously attend the lessons and activities of the current curriculum.
- Submit the required assignments of the courses on time and by the prescribed deadlines.
- Fulfill their financial obligations on the dates set by the Secretariat of the master's program.
- Respect and abide by the decisions of the bodies of the master's program as well as academic ethics.
- Participate in educational activities, conferences, workshops, symposia, etc. organized by the master's program.
- The scholarship students are additionally obliged, by decision of the Assembly, to offer supporting work in the courses, in the Laboratories, in the Research, etc.

# 10. Curriculum

In order to obtain the Diploma of Master Studies (M.Sc.), attendance and a successful examination in all compulsory courses and workshops of the 1st and 2nd semesters, as well as the preparation of a Master's Thesis in the 3rd semester, are required.

The Graduate Diploma is awarded after completing ninety (90) ECTS credits. In detail, the structure of the program is as follows:

## 10.1. Course Chart

| Semester A' | | | |
|---|---|---|---|
| **Code** | **Course Title** | **Course Type*** | **ECTS** |
| GDEV101 | Introduction to Game Development | T/L | 5 |
| GDEV102 | Algorithmic Thinking | T/L | 5 |
| GDEV103 | Object oriented Programming (C#), Software Engineering for Game Development | T/L | 7,5 |
| GDEV104 | Digital Multimedia Processing | T/L | 7,5 |
| GDEV105 | Creative Writing and Directing | T/L | 5 |
| **Total First Semester Credit Units** | | | **30** |

| Semester B' | | | |
|---|---|---|---|
| **Code** | **Course Title** | **Course Type*** | **ECTS** |
| GDEV106 | Development of Vector Graphics (2D), Models (3D) and Animation | T/L | 7 |
| GDEV107 | Marketing and Communication | T | 5 |
| GDEV108 | Advanced Game Development | T/L | 11,5 |
| GDEV109 | Augmented and Virtual Reality | T/L | 6,5 |
| **Total Second Semester Credit Units** | | | **30** |

| Semester Γ' | | |
|---|---|---|
| **Code** | **Course Title** | **ECTS** |
| GDEV1010 | Master Thesis | 30 |
| **Total M.Sc. Credit Units** | | **90** |

**Where: T = Theory, L = Laboratory*

The teaching language of M.Sc. it is Greek. The language of the thesis is Greek or English.

The teaching of the courses is carried out entirely using modern distance education methods in accordance with the written provisions of Law 4957/2022.

## 10.2. Time Scheduling of Courses

The start of the fall semester is set in October and the spring semester, respectively, in the beginning of March. Courses are held on Friday, Saturday, and Sunday in a condensed and intensive manner, for the convenience of working graduate students.

The educational work of each academic year is structured in two study semesters, the fall, and the spring, each of which includes 13 weeks of teaching and exams. Attending the courses/laboratories etc. is mandatory. The courses of the fall and spring semesters are re-examined during the September period. In the event of an obstacle to the conduct of a course, its reimbursement is foreseen. The date and time of replenishment are posted on the website of the master's program and in the e-class.

The teaching of the courses can be done with synchronous and/or asynchronous training or hybrid with flexible forms of learning using a combination of lifelong learning and the use of IT and communication technologies based on the limitations of the provisions of Law 4485/2017.

## 10.3. Evaluation of Graduate Students

The evaluation of the students for each course is done by the teacher in the way he/she has defined before the start of the lectures (exam/assignment/or a combination of these). Their performance is evaluated on a scale of 1-10 (base being 5). The student who fails the course exam/assignment submission repeats the exam/work submission process in June for the fall semester, in September for the fall and spring semesters.

If the postgraduate student fails the examination of one or more courses, and according to what is defined in the Regulations of Postgraduate Studies, it is considered that he/she has not successfully completed the program, he/she is examined, following his/her application, by a three-member examination committee comprised of faculty members of the Department, who have the same or related academic subject as the course being examined and are designated by the Department Assembly. The person in charge of the examination is excluded from the committee.

## 10.4. Master Thesis

At the beginning of the 3rd semester and after having been successfully examined in all courses, the postgraduate student applies to the master's program Secretariat for the approval by the Coordinating Committee of the subject of a diploma thesis, proposing, after consultation, a supervisor professor. The supervisor is designated by the teaching staff who are partially or fully assigned to teach a course at master's program. The supervisor has the responsibility of monitoring and controlling the progress of the work, if the goals and specifications of the research are met.

The maximum time for submitting the master thesis is eighteen (18) months from the date of its approval by the Assembly of the Department. In special cases, upon application by the interested party and approval by the Assembly, the time may be extended up to one (1) year and in any case shall not exceed the maximum permitted time for completing the studies.

## 10.5. Master's Degree

The general degree of the master thesis on the ten-point scale that is obtained as the weighted average of the grades of the individual courses and the postgraduate thesis (the weighting coefficients are calculated).

The grading scale awarded is:

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| Excellent | master's degree ≥ 8,50 |
| Very Good | 6,50 ≤ master's degree ≤ 8,49 |
| Good | 5 ≤ master's degree ≤ 6,49 |

## 10.6. Scholarships

The master's program by decision of the Department's Assembly may grant scholarships to postgraduate students based on academic, objective criteria.

## 11. Transitional Provisions

Any issues not regulated in this Internal Regulation, as well as special issues that arise during the operation of the master's program, will be regulated by decisions of the Assembly of the Department in accordance with the current legislation.

## 12. Infrastructure- Facilities

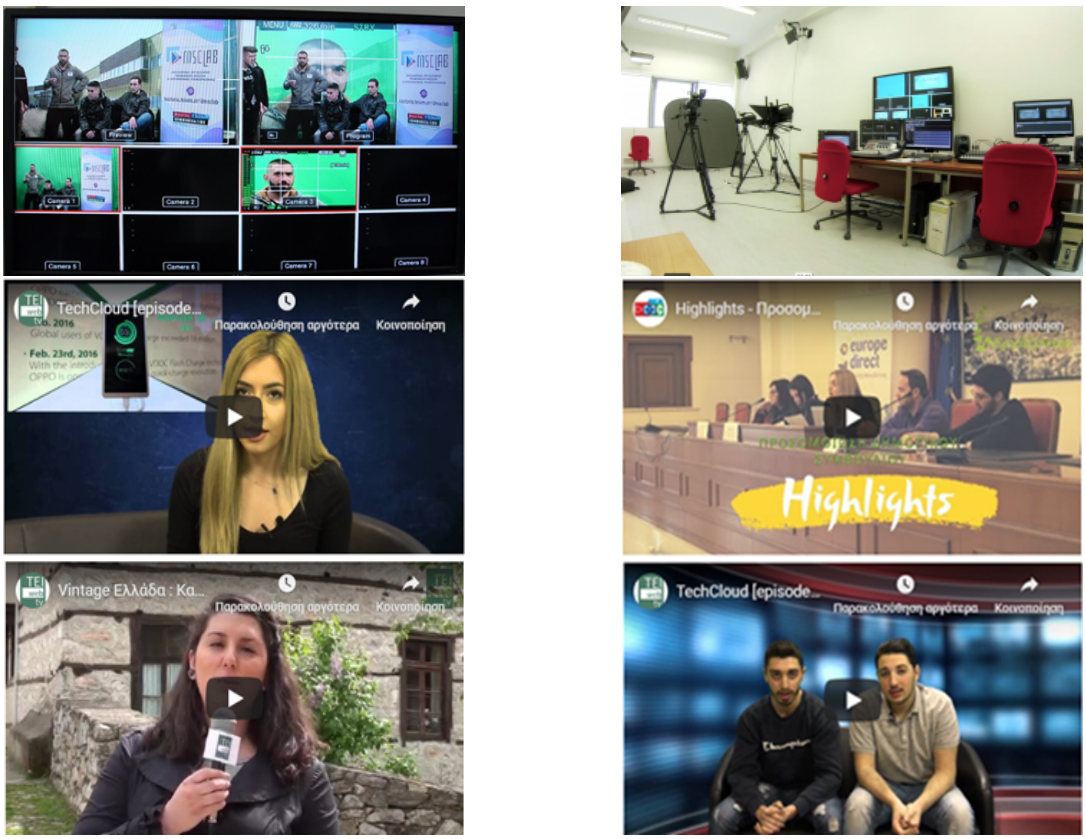


The Department owns state-of-the-art equipment that fully addresses the needs of the curriculum and its research activities. Particularly, the department holds 4 fully equipped PC labs, 3 classrooms fully equipped with audiovisual media, 1120-seat auditorium, an established Digital Media and Strategic Communication Lab with state of art equipment such as Web TV studio, Motion Capture cameras for Animation Production, 3D Scanners, 3D Cameras & 3D TV and Monitors, software for image and video editing, 3D editing and production, as well as equipment for mixed reality viewing and production. The Department infrastructure is presented on the Department web page: https://cdm.uowm.gr/infrastructure/?lang=en.

120 seat Auditorium

Computer labs


Motion Capture System -Animation creation by capturing human movement.




WebTV Studio facilities

3d – Scanners

3d Cameras

3d Printers

## 13. Laboratory for Social and Migration Studies

**Director of the Lab: Domna Michail, Professor**

The LSMS serves the teaching and research needs of the departments of the *School of Social Sciences and Humanities* as well as other Departments of the University of Western Macedonia in the following subjects: Social Studies, Migration Studies, Gender Studies, Education and Research in Social Sciences, and Law, Equal Opportunities and Citizenship. Indicatively, undergraduate and postgraduate research focuses on the following issues:

- Which immigration policies are implemented in Greece and internationally?
- Who and how do they migrate and how does this process affect sending and host countries?
- How do European countries react to the refugee flows from the Middle East?
- What are the ways of managing the new challenges facing Europe concerning the mass movements of displaced people, how do the different Member States react?
- How does the phenomenon of rising refugee flows affect the coherence of the European Union and the rise of far-right movements in Europe? What is provided by International Law?
- How is Greece affected as a transit place for refugee flows from the Middle East?
- What role is Greece to play at this juncture as the EU's south-eastern border within and outside Europe?
- What are the factors influencing the migrants' integration process at the individual and team level?
- What policies promote the integration of migrants and refugees in Greece and Europe?
- What is the role of NGOs and other organizations supporting migrants and refugees at a political, socio-economic, ethnic-cultural, and religious level?
- How do the conditions for the attribution of citizenship and state rights affect the integration of first and second-generation migrants in Greece and internationally? What does International Law provide on citizenship issues?
- How are immigrant children integrated into the host society and how do they combine their participation in a migrant community with that of the wider host society?
- How does the educational act relate to issues of immigration and citizenship?

## 14. Digital Media and Strategic Communication Lab

**Director of the Lab: Georgios Lappas, Professor**

The institutionalized "Digital Media and Strategic Communication" Lab further pursues the research and developmental activities of the Department. The purpose of the Lab is to undertake research and technological development projects as well as to serve research and educational needs at the undergraduate and postgraduate level in the field of Digital Media and Strategic Communication. The lab focuses on research areas such as the Internet, multimedia, hypermedia, and virtual reality technologies, digital communication, digital communication campaigns, computer-mediated communication, intelligent communication systems, customized and personalized communication systems, human-computer communication, Public Relations, and Internet Marketing, Advanced Web Mining, Opinion Mining, Online Communities, and Participatory Media in Communication, Social Media Research and Analysis, Digital Politics, E-Governance, Digital Journalism, and the Media, Web TV, Digital Education Technologies, Digital Cultural Technologies, Social Informatics, Public Relations, and Communication Strategies, Analyzing and Evaluating Digital Content, Research and Evaluation of Online Brand Reputation, Surveys and Opinion Polls using Digital Media.

# C. Description of Graduate Courses

The content of the courses during the academic year 2024-2025 is briefly described below.

## 1. First Semester Courses

| 1.1. Introduction to Game Development | |
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| **Course Code** | GDEV101 |
| **Course Type** | Introductory |
| **Course Description** | In this course, students are introduced to digital game development, studying and implementing the features that distinguish them from other IT applications and storytelling tools. They are also introduced to the roles in a game design and development team and the interactions between them, to forms of collaborative design and development of programming code, and to evaluating code for functionality and usability. The hands-on portion of the course uses Unity3D, the most popular game engine for game production – concepts discussed include the environment and entities of a Unity project, versioning, introductory game mechanics, and how to create game objects at runtime. The course offers a variety of pedagogical and instructional applications such as introduction to computational thinking, programming, and mathematical logic, designing and developing games that simulate natural phenomena/laws of physics and chemistry/mathematical concepts, designing and developing games for storytelling, using 3-dimensional reference systems and geometry concepts such as angles, distance, and how they are calculated. |
| **Learning Outcomes** | • Application of computational thinking.<br>• Understanding of 3D geometry and transformations.<br>• Object-oriented programming.<br>• Code debugging.<br>• Game development with Unity game engine. |
| **Webpage** | https://elearning.uowm.gr/course/view.php?id=820 |

| 1.2. Algorithmic Thinking | |
|---|---|
| **Course Code** | GDEV102 |
| **Course Type** | Specific background |
| **Course Description** | The course aims at a deeper understanding of algorithms, data structures, and algorithmic techniques used in the development of digital games. It covers topics on the analysis and design of algorithms, |

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| | algorithm complexity, data structures, and problem-solving techniques employed during the development of a digital game. In addition to classic topics such as random number handling, tournament creation and evaluation, and game trees, the course also explores graph algorithms, optimal path finding, and optimal decision-making, using the Python programming language.<br><br>The "Algorithmic Thinking" course targets a deeper comprehension of algorithms, data structures, and algorithmic techniques utilized in the development of digital games. Teaching approaches such as discovery and collaborative learning are applied in the course, and students receive valuable tools for teaching programming and algorithms in primary and secondary education. |
| **Learning Outcomes** | Upon successful completion of this course, students will be able to:<br>• perform algorithmic analysis<br>• study algorithms in terms of complexity<br>• use and implement data structures<br>• design and implement algorithms using a wide range of algorithmic techniques<br>• understand and apply graph and network algorithms<br>• incorporate algorithms into digital game development<br>• understand and apply optimization algorithms in digital games<br>• understand and apply artificial intelligence algorithms in digital games<br>• program in the Python programming language<br>• design and implement digital games in the Python programming language<br>• design and implement databases<br>• design and implement multiplayer digital games |
| **Webpage** | https://elearning.uowm.gr/course/view.php?id=824 |

| 1.3. Object oriented Programming (C#), Software Engineering for Game Development | |
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| **Course Code** | GDEV103 |
| **Course Type** | General Background |
| **Course Description** | The course aims to familiarize with object-oriented game design and development through the C# programming language. The course consists of three modules. First, a presentation of the basic structural elements of the C# language is made, such as classes, objects, inheritance, polymorphism. Then emphasis is placed on the elements of the language which allow the development of digital games with the |

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| | aim of implementing simple games. The course concludes with the presentation of techniques for effective game design through the UML systems description language.<br><br>The course aims to acquaint students with the principles of object-oriented programming and digital game software analysis and design techniques. During the course learners will develop proficiency in using object-oriented methodology to solve computational problems related to digital game development, and develop complex problem-solving skills. Through didactic approaches of collaborative and discovery learning, students receive valuable resources for teaching programming but also in general for understanding, analyzing and solving problems in primary and secondary education. |
| **Learning Outcomes** | Upon successful completion of the course students will be able to:<br>• Have a deep understanding of the fundamentals of Object-Oriented Programming.<br>• Design object-oriented applications.<br>• Have a deep understanding of the concepts of encapsulation, polymorphism and inheritance.<br>• Deeply understand the structure of classes, their members and their methods.<br>• Have a deep understanding of abstract classes and their usage.<br>• Understand the use and operation of arrays, strings and collections in the language C#.<br>• Design and develop simple and complex applications with the C# language.<br>• Deeply understand C#'s exception mechanism and create new exceptions.<br>• Identify errors in the code and correct them.<br>• Apply object-oriented programming logic to the Unity game engine<br>• Analyze and design games with the models of the object-oriented system description language UML.<br>• Derive key software quality metrics. |
| **Webpage** | https://elearning.uowm.gr/course/view.php?id=823 |

| 1.4. Digital Multimedia Processing | |
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| **Course Code** | GDEV104 |
| **Course Type** | General Background |

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| **Course Description** | The course presents and analyzes the basic concepts, methods and models related to the field of digital multimedia processing. The purpose of the course is to study the principles and practices involved in the creation of interactive image, video, and audio applications as part of digital games. The course delves into the study of the nature of the building blocks that are combined to develop gamified multimedia systems (audio, image, and video), the tools, software, and algorithms used as well as the processes followed to develop interactive applications with a focus on exploitation in the field of interactive game development (such as Premier software, OpenShot Video Editor, Gimp, Photoshop, Audacity, etc.). The course concludes with the presentation of multimedia processing techniques for effective game design and special emphasis is placed on the applications of multimedia in the field of modern digital forms of entertainment and in the field of software application development in fixed and mobile computing environments.<br>The aim of the course is to provide students with the knowledge and familiarity with the basic methods, concepts and models related to the field of digital multimedia processing. It is expected that at the end of the course students will be able to understand the processes involved in the creation of interactive games, to design, implement, and adapt to the technological developments of interactive multimedia and the future trends of their utilization. Also, students will be able to fluently use image, video, and audio processing algorithms by applying the relevant theory and gain an understanding and perspective on the main problems and research fields in digital multimedia processing.<br>In the Digital Multimedia Processing course, topics related to Multimedia in education are also covered, such as:<br>• Multimedia learning. The course covers Mayer's basic principles of multimedia learning and the cognitive psychology theories on which they are built. Mayer's principles are based on experimental studies and provide guidance on how to create effective multimedia (images, videos, web pages, interactive applications) for learning.<br>• Games and gamification in learning.<br>• Tools for creating multimedia learning activities such as:<br>  ○ H5P, online tool for creating multimedia educational activities (interactive videos, quizzes, games).<br>  ○ educational game creation tools (scratch, kodu, etc.)<br>  ○ Gamification and assessment tools (e.g. Kahoot, Quiziz) |
| **Learning Outcomes** | Upon successful completion of the course students will be able to:<br>• Have a critical understanding of the value of interactive media as digital game creation tools.<br>• Have a critical understanding of the processes involved in creating integrated interactive multimedia. |

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| | • Design and implement integrated interactive multimedia applications with an emphasis on web applications (e.g., HTML5).<br>• Use the knowledge gained from other courses in the curriculum to create digital games and integrated multimedia applications.<br>• Assess, evaluate, and select the multimedia technologies that can be used in the creation of digital games.<br>• Adapt to the technological developments of interactive multimedia and the future trends of their utilization. |
| **Webpage** | https://elearning.uowm.gr/course/view.php?id=822 |

| 1.5. Creative Writing and Directing | |
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| **Course Code** | GDEV105 |
| **Course Type** | Special Background |
| **Course Description** | Video games encompass more than just code or programming; they are rich spaces of content. As a narrative medium, digital games provide immersive audio-visual experiences that vary depending on factors such as genre, the scale of the development team, and available resources.<br>In this course, we delve into narrative as a fundamental element of game design, emphasizing key concepts like flow, immersion, presence, and identification. We explore various narrative styles across different game genres while also addressing recurring tropes and clichés.<br>We distinguish between player-driven narratives and traditional interactive storytelling, examining design considerations such as player agency and narrative progression. Furthermore, we prioritize narrative design techniques and conduct analyses of game cases to creatively and practically explore the architecture of game worlds.<br>Topics covered include the use of camera perspectives, player emotional engagement, the distinction between first-person and third-person narration, and the role of cinematics. The course comprises both theoretical discussions and hands-on exercises, utilizing accessible open-source tools like Twine.<br>**Educational objectives:**<br>Throughout the course, students will grasp the significance of storytelling in interactive experiences, such as video games. They will familiarize themselves with narrative structures and design frameworks, enabling them to construct and deconstruct game |

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| | narratives effectively. Activities include designing interactive scripts using open-source tools like Twine, designing intricate narrative worlds, and creating storyboards for original narratives. Additionally, students will enhance their understanding of basic filmmaking concepts such as point of view through practical exercises. |
| **Learning Outcomes** | After successfully completing the course, students will gain proficiency in the following areas:<br>• Understanding the structure and boundaries of narrative frameworks.<br>• Crafting and conceptualizing their unique stories.<br>• Revamping narrative-focused games.<br>• Analyzing games from a narrative perspective.<br>• Crafting interactive narratives tailored to their vision. |
| **Webpage** | https://elearning.uowm.gr/enrol/index.php?id=821 |

## 2. Second Semester Courses

| 2.1. Development of Vector Graphics (2D), Models (3D) and Animation | |
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| **Course Code** | GDEV106 |
| **Course Type** | General Background |
| **Course Description** | 2D and 3D graphics are fundamental components of digital games and multimedia applications in general. This course aims to introduce the basic concepts related to vector 2D graphics and three-dimensional models, as well as the presentation of basic concepts and techniques related to animation using these graphics. Additionally, the course aims to introduce students to the creation of 2D and 3D graphics (objects, characters, 3D-2D environments, etc.) and the creation of animations using appropriate software, including open-source software (e.g., Inkscape, Blender, Tinkercad, Synfig, etc.) and commercial software (Illustrator, After Effects, Adobe Animate, AutoCAD, etc.). Students will also learn to use open online resources (e.g., Pixabay, Freevector, Sketchfab, free3d.com) to find graphics and create new graphics from existing ones after editing. Regarding 3D graphics, the course will also cover concepts and techniques such as Parametric modeling, Solid modeling, Reverse Engineering, Skeleton models, Deformable models, and animation of skeleton models. Students will also learn to create basic elements in three-dimensional games using popular libraries and software.<br>The course will be project-based, with the aim of creating graphics that can be integrated into digital games and other digital media, such as interactive applications, websites, videos, etc.<br>In the course on the Development of Vector Graphics (2D), Models (3D), and Animation, topics related to the application of these multimedia in education are also covered, such as:<br>• Theories and research concerning vector graphics and Animation in learning.<br>• Evaluation of graphics and animations aimed at learning based on educational theories (e.g., Mayer's principles of multimedia learning).<br>• Creation of effective graphics and animations for learning using commercial software (e.g., Illustrator, Adobe Animate) and open-source software (e.g., Inkscape, Blender), as well as rapid development platforms (e.g., Animaker, Muvizu, etc.) that are suitable for all educators. |
| **Learning Outcomes** | Upon successful completion of the course, students will be able to:<br>• Understand the concepts of 2D and 3D graphics. |

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| | • Grasp the concepts of 2D and 3D animation as well as the various types of animation (e.g., cell animation, key frame animation, stop-motion, etc.).<br>• Create basic elements in three-dimensional games using popular libraries and software.<br>• Know, compare, and evaluate the various technologies for producing 2D & 3D graphics and animation.<br>• Know, compare, and evaluate the software for producing 2D & 3D graphics and animation.<br>• Produce 2D & 3D graphics and animation with open-source software.<br>• Understand the various forms of 3D objects for realistic animation such as skinned, rigged, deformable models.<br>• Use ready-made 2D & 3D graphics found on the internet to compose new creations.<br>• Understand how these technologies work today and are familiar with the historical development of these technologies.<br>• Understand the use and role of 2D and 3D graphics as well as animation in communication, education, and entertainment (e.g., animated videos, video games, virtual and augmented reality, etc.).<br>• Acquire skills in creating and programming three-dimensional spaces, using specialized software.<br>• Identify, compare, and evaluate good practices in the use of 2D graphics, 3D models, and Animation in the creation of digital games and broader in human communication.<br>• Be able to adapt to technological advancements in these fields. |
| **Webpage** | https://elearning.uowm.gr/course/view.php?id=4 |

| 2.2. Marketing and Communication | |
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| **Course Code** | GDEV107 |
| **Course Type** | General Background |
| **Course Description** | The purpose of the course is to acquaint the students in principle with the basic theoretical concepts of toy marketing and public relations as well as their application in professional practice. The responsibilities of marketing and public relations executives, the marketing mix, the marketing plan, the various theoretical models of public relations, the tools of public relations are presented. At the same time, special emphasis is placed on the way of utilizing the Internet and social |

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| | media. Examples of the application of marketing and public relations actions for the promotion of electronic games are mentioned. |
| **Learning Outcomes** | Upon successful completion of the course students will be able to:<br>• Understand the role of marketing and public relations in business.<br>• Adapt key concepts of marketing and public relations to professional practice.<br>• Understand the different needs of audience groups and consumers.<br>• Develop effective marketing and public relations programs.<br>• Understand the legal framework and the ethical and ethical issues that govern the responsible practice of marketing and PR.<br>• Judge and decide on the appropriateness of marketing and public relations actions through the analysis of case studies for the electronic games industry. |
| **Webpage** | https://elearning.uowm.gr/course/view.php?id=4 |

| 2.3. Advanced Game Development | |
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| **Course Code** | GDEV108 |
| **Course Type** | Specialization |
| **Course Description** | In this course, students will address advanced issues of game development and interaction of their virtual world with other computer technologies and subsystems, such as telecommunication systems (server-based and peer-to-peer), database systems (local and remote), security, etc. In addition, they study how machine learning architectures can be used to evaluate and test a game, predict player behavior and evaluate the player experience. Finally, they apply game design and development techniques to mobile devices, focusing on the characteristics of interaction on displays with limited size and specific ways of interacting with players.<br>Pedagogical and didactic applications include diverse educational and teaching concepts, such as introduction to AI, advanced mathematics in science, programming technologies, application design, etc. |
| **Learning Outcomes** | • Programming patterns.<br>• C# programming.<br>• Code debugging.<br>• Game development with Unity game engine.<br>• Network programming concepts. |

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| | • Artificial Intelligence concepts.<br>• Design and development for mobile devices. |
| **Webpage** | https://elearning.uowm.gr/course/view.php?id=4 |

| 2.4. Augmented and Virtual Reality | |
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| **Course Code** | GDEV109 |
| **Course Type** | General Background |
| **Course Description** | The course presents the theoretical background and technological foundations of the field of augmented and virtual reality (AR/VR). The course will examine the parameters based on which virtual and augmented reality systems are designed and implemented, through the achievement of authentic three-dimensional audio-visual representation and mixing between the real and the virtual. Furthermore, the interaction techniques between the user and these systems are analyzed. Special emphasis is placed on AR and VR applications in the field of modern digital forms of entertainment and in the field of software application development in fixed and portable computing environments. The course is divided into two sections: (a) the theoretical part and (b) the laboratory part. In the theoretical part, there is a presentation of the basic concepts, systems and application areas of virtual and augmented reality, such as visualization, movement, interaction, design, development and evaluation of applications. In the laboratory part there is a presentation of topics concerning:<br>• Develop simple virtual and augmented reality applications using the Unity game engine.<br>• Modules.<br>• Advanced application development topics.<br>• Navigation and user view control.<br>• Interact / manipulate objects.<br>• Two-dimensional interface (HUD).<br>• Stereoscopy and immersion.<br>• Natural interfaces.<br>• Augmented reality.<br>• Composite characters.<br><br>The aim of the course is for participants to learn the basic concepts of virtual reality and related approaches, to understand the design issues and methodologies of design, development and evaluation in various application areas as well as to understand the basic hardware and |

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| | software technologies for application design virtual and augmented reality. Also, the purpose of the course is to provide students with the knowledge, necessary tools, and strategies needed to define the concepts of augmented and virtual reality, to explain the concept of telepresence and presence in a virtual environment as well as the use of virtual environments as means of representing reality, understand the theory of user perception and interaction in virtual and augmented reality environments, design interaction and visualization methods and make use of existing technologies and methodologies, develop and integrate content in these environments, and finally be able to prototype using a game engine and assistive technologies. This course presents an introduction to augmented reality, with an emphasis on designing and developing augmented reality applications. Recently, virtual and augmented reality applications are intensively applied in all stages of education, since they play an important role in the educational process, learning, but also in social life in general. Upon completion of the course, students will be able to:<br>• Recognize, describe, and evaluate modern applications of virtual and augmented reality in play and learning that are used in the classroom environment but also in various alternative learning environments (e.g., distance education, virtual educational environments, etc.). Examples of the use of AR/VR technology in education will be given, e.g., educational journeys that take you from the Great Wall to the planet Mars, technology education (how to do anything from cooking to medical operations), teamwork, and distance learning.<br>• Classify and evaluate educational activities where AR/VR applications are used according to Bloom's taxonomy and solve problems related to the proper use of AR/VR technology in teaching, learning, and developing digital games for this purpose.<br>• Iteratively and team-develop applications using AR/VR toolkits and platforms.<br>• Apply user-centered design approaches and software technology specifically for AR/VR. |
| **Learning Outcomes** | Upon successful completion of the course students will be able to:<br>• Understand the concepts of virtual, augmented, and mixed reality.<br>• Know, compare, and evaluate different virtual and augmented reality technologies.<br>• Understand how these technologies work today and know the historical development of these technologies. |

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| | • Understand the role of other technologies taught in other curriculum subjects such as Vector Graphics (2D), Modeling (3D) and Animation Development, Advanced Game Development and Object-Oriented Programming (C#), Game Development Software Technology in creating virtual reality applications and augmented reality.<br>• Create scenarios for virtual and augmented reality applications and create applications with special software.<br>• Integrate 3D graphics, 3D animation in virtual and augmented reality applications.<br>• Integrate video and other elements (e.g., 360° images) into virtual and augmented reality applications.<br>• Identify, compare, and evaluate virtual and augmented reality best practices in digital game creation.<br>• To be able to adapt to the technological developments concerning these sectors.<br>• Recognize, describe, and evaluate modern applications of virtual and augmented reality in play and learning.<br>• Iteratively and team-develop applications using toolkits and AR/VR platforms.<br>• Apply user-centered design approaches and software technology specific to AR/VR. |
| **Webpage** | https://elearning.uowm.gr/course/view.php?id=413 |

## 3. Third Semester Courses

| 3.1. Master Thesis | |
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| **Course Code** | GDEV110 |
| **Course Type** | Specialty |
| **Course Description** | The main purpose of the Dissertation is to deal with and solve, at a theoretical and applied level, issues that are included in the academic subjects of the master's Program by synthesizing and making use of the knowledge acquired in the previous two semesters of studies. Through the preparation of the Dissertation, postgraduate students are invited to acquire the competence.<br>to manage complex problems concerning the scientific field of the development of Digital Games and Multimedia Applications and/or to implement an idea in this field. It is a comprehensive work of weighting importance of distinct stages. At the same time, postgraduate students should be able to clearly present the study, research and/or implementation through an extensive scientific written text as well as through a complete presentation.<br>The Dissertation can belong to the following categories:<br>• **Research/Theoretical** where the focus is on expanding studied phenomena with potential applications in solving them.<br>• **Application** where the focus is on developing a new application in some area of interest using one or more software packages or tools.<br>The Dissertation is important and weighty. In this context, engagement in topics that are at the cutting edge of science, original and of research interest is encouraged.<br>The stages of preparing the diploma thesis can be summarized in the following:<br>• Description and analysis of the topic.<br>• Analysis of the existing situation, bibliographic review.<br>• Definition of research field (research questions or research hypotheses, objectives and perspectives).<br>• Description of the followed methodology and research tools for the implementation of the work.<br>• Data collection and/or application implementation.<br>• Results from the chosen form of analysis (statistics, content analysis, practical application). |

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| | • Conclusions derived from the results of the research combined with the prevailing theories.<br>• Writing text.<br>• Create a presentation. |
| **Learning Outcomes** | The purpose of the dissertation is the synthesis of knowledge, on a specific subject related to the cognitive objectives of the PMS, through a scientific and systematic approach. Through the process of preparing a diploma thesis, postgraduate students further develop their critical thinking, as they carefully study a specific topic but also apply the acquired knowledge in practice.<br>In particular, the objectives of the thesis are:<br>I. the postgraduate student's specialization in selected fields of knowledge,<br>II. the deepening of postgraduate students in research thinking and methodology through comprehensive study and in-depth investigation of a distinct topic, and<br>III. the application of the knowledge acquired during the courses of the previous semesters.<br>Upon successful completion of the thesis, postgraduate students will be able to:<br>• understand a scientific topic in depth<br>• clearly recognize its limits to be examined and studied upon and recognize all its aspects<br>• describe and document knowledge related to the subject to be studied<br>• present critical and original thinking<br>• select the required bibliography<br>• choose and plan the theoretical and research that they will develop when dealing with the issue<br>• use methodological practices and tools to analyze the topic<br>• draw scientific conclusions<br>• summarize existing knowledge and synthesize it with their own findings<br>• acquire the learning elements that will allow them to continue their studies. |