ΔΗΜΟΚΡΙΤΕΙΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΘΡΑΚΗΣ
DEMOCRITUS UNIVERSITY OF THRACE

**ΔΗΜΟΚΡΙΤΕΙΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΘΡΑΚΗΣ**

**ΣΧΟΛΗ ΘΕΤΙΚΩΝ ΕΠΙΣΤΗΜΩΝ**

**ΤΜΗΜΑ ΠΛΗΡΟΦΟΡΙΚΗΣ**

# *MSc in*

# *Immersive Technologies- Innovation in Education, Training and Game Design* (IMT)

## *Πρόγραμμα ΠΜΣ*

# 1st Semester

## IMTC1: Fundamentals on Technology Enhanced Learning

**COURSE OUTLINE**

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Sciences | | |
| **ACADEMIC UNIT** | Department of Computer Science | | |
| **LEVEL OF STUDIES** | Postgraduate, MSc on Immersive Technologies | | |
| **COURSE CODE** | | **SEMESTER** | 1st |
| **COURSE TITLE** | IMTC1: Fundamentals on Technology Enhanced Learning | | |

| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | |
| | | |
| Total | | 7.5 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | No special background or general knowledge is needed |
| **PREREQUISITE COURSES:** | None |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | English |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

### (2) LEARNING OUTCOMES

| **Learning outcomes** |
|---|
| *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* |
| *Consult Appendix A* |

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The course is designed as an easy way to introduce undergraduate students to theory, methods and techniques of technology enhanced learning. Technology enhanced learning is necessary for any online teaching or learning activity. Topics covered include basic concepts of technology enhanced learning and educational technologies, including online learning concepts, learning theories, information systems for learning and teaching and some enhanced topics.

Upon successful completion of the course the student will be able to:

- Describe concepts related to theory, methods and techniques used in technology enhanced learning.
- Understand different learning theories and methods regarding how online teaching and learning can occur.
- Identify different kind of educational technologies and how they can be used.
- Develop concepts for online learning and teaching scenarios
- Understand basic concepts of instructional design and how to use it
- Investigate with goal to find relevant material in the international literature, writing a scientific report, planning a project, working collectively and to solve related problems.

**General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

*Search for, analysis and synthesis of data and information, with the use of the necessary technology*
*Adapting to new situations*
*Decision-making*
*Working independently*
*Team work*
*Working in an international environment*
*Working in an interdisciplinary environment*
*Production of new research ideas*
*Project planning and management*
*Respect for difference and multiculturalism*
*Respect for the natural environment*
*Showing social, professional and ethical responsibility and sensitivity to gender issues*
*Criticism and self-criticism*
*Production of free, creative and inductive thinking*
*……*
*Others…*
*…….*

Search for information
Working independently
Team work
Project planning and management
Production of new research ideas

## (3) SYLLABUS

The taught modules concerning:

1. Introductory Concepts
2. Basic Concepts in technology enhanced learning
3. History of Online Education
4. Learning theories
5. Information systems for teaching and learning
6. Multimedia Theory
7. Microlearning – learning objects (videos)
8. Open Educational Resources
9. Research methodologies / research design in the field of technology enhanced learning
10. Future of educational technologies

## (4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Distance Learning (synchronous and asynchronous)</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>Online-presentation with the help of slides, Website of the course with supporting and auxiliary material, Contact by e-mail / discussion forum. In Seminars, implementation of learning and teaching concepts for using technology in education.</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.<br><br>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>39</td></tr>
<tr><td>Tutorial Exercices: Selected exercises are solved concerning different topics in technology enhanced learning. Implementation of methodologies and concepts of how to use technologies for education.</td><td>39</td></tr>
<tr><td>Individual or team project</td><td>55</td></tr>
<tr><td>Individual Study</td><td>54.5</td></tr>
<tr><td>Course total</td><td>187.5</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure</td><td>Final mark is calculated based on the following:<br>• (20%) High-quality contributions to the Discussions</td></tr>
</table>

| | |
|---|---|
| *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • (80%) Written essays-reports/ Individual or Group Projects (or any combination) |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

*- Related academic journals:*


- Licklider, J. C. R. & Talyor, R. W. (1968). The Computer as a Communication Device. In: Science and Technology, 76, 21-44.
- Anderson, L.W. & Krathwohl, D.R. (2001). A taxonomy for learning, teaching, and assess-ment. A revision of Bloom´s taxonomy of educational outcomes. New York: Longman
- Branch, R.M. (2009). Instructional design: The ADDIE approach. New York: Springer.
- Salmon, G. (2002). E-tivities. Der Schlüssel zu aktivem Online-Lernen. Zürich: Orell Füssli.
- British Journal of Educational Technology
- Computers and Education
- The International Review of Research in Open and Distributed Learning

## IMTC2: Fundamentals of Augmented Reality

**COURSE OUTLINE**

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Sciences | | |
| **ACADEMIC UNIT** | Department of Computer Science | | |
| **LEVEL OF STUDIES** | Postgraduate, MSc on Immersive Technologies | | |
| **COURSE CODE** | | **SEMESTER** | 1st |
| **COURSE TITLE** | IMTC2: Fundamentals of Augmented Reality | | |

| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | |
| | | |
| | | |
| Total | | 7.5 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialised general knowledge,<br>Skills development |
| **PREREQUISITE COURSES:** | None |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | English |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

### (2) LEARNING OUTCOMES

| **Learning outcomes** |
|---|
| *The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.* |
| *Consult Appendix A* |

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

This course presents an introduction to Augmented Reality, with emphasis on designing and developing Augmented Reality applications. The course covers Spatial Computing, Human Computer Interaction, Perception, Design Thinking, and Application Development. As part of the course, students will be tasked with designing, developing, and evaluating their own Augmented Reality application.

Upon successful completion of the course the student will be able to:

- Demonstrate knowledge and understand: State the conceptual origins, advantages, and disadvantages of various methods used for solving problems for the given application domain of Augmented Reality. The core topics include:
  - 3D content acquisition and handling including 3D modelling, photogrammetry, animation, mesh optimisation
  - Object recognition using image targets and fiducial markers
  - Environment mapping and spatial understanding
  - AR-specific interaction such as methods gaze, voice, gestures
- Brainstorm, review, and select use cases and match them to the range of AR toolkits and platforms available
- Develop iteratively, and in a team, an application utilising AR toolkits and platforms
- Apply AR-specific User-Centred Design and Software Engineering approaches

Based on the knowledge and skills acquired they should be able to (Key Competences):

- Present technical work, a use case and project progress, either verbally or in written reports
- Enact a variety of roles in a technical project team, as determined by the requirements of agile project management approaches
- Plan projects and meet milestones

**General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

| | |
|---|---|
| *Search for, analysis and synthesis of data and information, with the use of the necessary technology* | *Project planning and management* |
| *Adapting to new situations* | *Respect for difference and multiculturalism* |
| *Decision-making* | *Respect for the natural environment* |
| *Working independently* | *Showing social, professional and ethical responsibility and sensitivity to gender issues* |
| *Team work* | *Criticism and self-criticism* |
| *Working in an international environment* | *Production of free, creative and inductive thinking* |
| *Working in an interdisciplinary environment* | *……* |

| | |
|---|---|
| *Production of new research ideas* | *Others…*<br>*…….* |
| Search for, analysis and synthesis of data and information, with the use of the necessary technology<br>Working independently<br>Team work<br>Working in an interdisciplinary environment<br>Production of new research ideas<br>Project planning and management | |

**(3) SYLLABUS**

The taught modules concerning:

- Lectures:
  1. Introduction to AR
  2. Unity Basics
  3. HCl methodologies (Evaluation, Design Thinking)
  4. Perception
  5. Software Engineering
  6. History of AR
  7. Technology Overview
  8. Geometric Algebra
  9. Storytelling with AR
  10. Design Inspiration
  11. Careers in AR
  12. Research Directions
- Workshops:
  1. Modelling AR UI/UX
  2. Markers
  3. Gaze
  4. 3D modelling
  5. Gesture
  6. Voice
  7. 3D scanning and animation
  8. Spatial Understanding

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Distance Learning (synchronous and asynchronous) |

<table>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>Presentation with the help of slides, Website of the course with supporting and auxiliary material, Contact by e-mail. In Seminars, implementation of methodologies and algorithms in real problems in Unity 3D.</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.<br><br>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>39</td></tr>
<tr><td>Tutorial Exercises</td><td>39</td></tr>
<tr><td>Individual or team project<br>Feedback will be given as students attempt practical problems. The project builds on the knowledge from the lectures and workshops, and the feedback given during classes will inform the student in their attempts on the final project.<br><br>To provide formative feedback, students will be asked to present their project ideas (proposal elevator pitch), give an interim progress report (presentation), and demo.</td><td>52</td></tr>
<tr><td>Individual Study</td><td>31.5</td></tr>
<tr><td>Course total</td><td>187.5</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Final mark is calculated based on the following:<br>• (20%) High-quality contributions to the Discussions<br>• (80%) Written essays-reports/ Individual or Group Projects (or any combination)</td></tr>
</table>

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

*- Related academic journals:*

- The Open Augmented Reality Teaching Book - A foundation and good practices http://codereality.net/the-open-augmented-reality-teaching-book/
- Speicher, Hall, Nebeling (2019): What is Mixed Reality?, In: CHI 2019, May 4–9, 2019, Glasgow, Scotland, UK
- Augmented Reality: Principles and Practice. Tobias Höllerer, Dieter Schmalstieg.
- Handbook of Augmented Reality. Furht, B.
- Understanding Augmented Reality. Concepts and Applications. Alan Craig.
- ISMAR - The IEEE International Symposium on Mixed and Augmented Reality

## IMTC3: Immersive Software

**COURSE OUTLINE**

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Sciences | | |
| **ACADEMIC UNIT** | Department of Computer Science | | |
| **LEVEL OF STUDIES** | Postgraduate, MSc on Immersive Technologies | | |
| **COURSE CODE** | | **SEMESTER** | 1st |
| **COURSE TITLE** | IMTC3: Immersive Software | | |
| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | | **WEEKLY TEACHING HOURS** | **CREDITS** |
| Lectures | | 3 | |
| | | | |
| | | | |
| Total | | | 7.5 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | | |
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialised general knowledge<br>Skills development | | |
| **PREREQUISITE COURSES:** | None | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | English | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | | | |

### (2) LEARNING OUTCOMES

| |
|---|
| **Learning outcomes**<br>*The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| Augmented Reality, Virtual Reality and Voice Interfaces, are redefining Digital Experiences and reshape the way we engage with the world. The course is designed as an easy way to introduce students to the basic tools necessary, in order to build immersive software. The topics covered include basic concepts of Augmented Reality, Virtual Reality and Voice Interfaces. These technologies combined can offer immersive digital experiences that can be used in many fields, such as education, tourism, culture and industry.<br><br>Upon successful completion of the course students will be able to:<br>• Describe basic concepts of immersive software.<br>• Identify and compare various technologies used in building immersive software. |

- Design immersive software considering limitations of the environment.
- Bring together various innovative technologies in order to build digital experiences.

**General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

| | |
|---|---|
| *Search for, analysis and synthesis of data and information, with the use of the necessary technology* | *Project planning and management* |
| *Adapting to new situations* | *Respect for difference and multiculturalism* |
| *Decision-making* | *Respect for the natural environment* |
| *Working independently* | *Showing social, professional and ethical responsibility and sensitivity to gender issues* |
| *Team work* | *Criticism and self-criticism* |
| *Working in an international environment* | *Production of free, creative and inductive thinking* |
| *Working in an interdisciplinary environment* | *……* |
| *Production of new research ideas* | *Others…* |
| | *…….* |

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Working independently
Team work
Project planning and management
Production of new research ideas

## (3) SYLLABUS

The content of the course includes:

1. Introductory concepts of Immersive Software
2. Applications of Immersive Software
3. Augmented Reality applications and usages
4. Building Augmented Reality applications
5. Virtual Reality applications and usages
6. Building Virtual Reality applications
7. Designing Voice User Interfaces (VUIs)
8. Building applications for Voice Assistants (Amazon Alexa)
9. Immersive Software Engineering Best Practices
10. Combining innovative technologies to build immersive digital experiences

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Distance Learning (synchronous and asynchronous) |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | • Presentation with the help of slides.<br>• Website of the course with supporting and auxiliary material.<br>• Contact by e-mail, or Skype. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*<br><br>*The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 39 |
| Tutorial Exercises: Practical implementation of building immersive software in various programming environments. | 39 |
| Individual or team project | 55 |
| Individual Study | 54.5 |
| Course total | ***187.5*** |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br>*Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Final mark is calculated based on the following:<br>• (20%) High-quality contributions to the Discussions<br>• (80%) Written essays-reports/ Individual or Group Projects (or any combination) |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*
*- Related academic journals:*


- Jonathan Linowes, "Augmented Reality for Developers: Build practical augmented reality applications with Unity, ARCore, ARKit, and Vuforia", Packt Publishing, 2017, ISBN-10: 1787286436
- Tony Parisi, "Learning Virtual Reality: Developing Immersive Experiences and Applications for Desktop, Web, and Mobile", 1st Edition, O'Reilly Media, 2015, ISBN-10: 9781491922835
- Sam Williams, "Hands-On Chatbot Development with Alexa Skills and Amazon Lex: Create custom conversational and voice interfaces for your Amazon Echo devices and web platforms", 1st Edition, Packt Publishing, 2018, ISBN-10: 1788993489
- Augmented Reality Journal (Oxford Academic)
- Virtual Reality Journal (Springer)
- International Journal of Virtual and Augmented Reality (IGI Global)

## IMTC4: Security and privacy issues in Immersive Technologies

**COURSE OUTLINE**

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Sciences | | |
| **ACADEMIC UNIT** | Department of Computer Science | | |
| **LEVEL OF STUDIES** | Postgraduate, Msc on Immersive Technologies | | |
| **COURSE CODE** | | **SEMESTER** | 1st |
| **COURSE TITLE** | IMTC4: Security and privacy issues in Immersive Technologies | | |

| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | |
| | | |
| | | |
| Total | | 7.5 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialised general knowledge, Skills development |
| **PREREQUISITE COURSES:** | None |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | English |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

### (2) LEARNING OUTCOMES

**Learning outcomes**

*The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.*

*Consult Appendix A*

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

This course introduces the concepts and issues related to security and privacy as well, as safety issues for immersive technologies, necessary for establishing a robust environment for running applications and securely managing their data. Students will learn to build their applications following the security and privacy by design principles and therefore be able to identify the threats and needs for their virtual and augmented reality applications, choose the appropriate set of security mechanisms and enforce them.

Upon successful completion of the course students will be able to:

- Evaluate the information security and privacy needs of their applications.

- Assess cybersecurity risks to adequately protect the environment's critical information and assets.
- Identify and implement appropriate security and privacy solutions.
- Implement safety protection mechanisms for many types of systems, including safety-critical ones.

**General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

| | |
|---|---|
| *Search for, analysis and synthesis of data and information, with the use of the necessary technology* | *Project planning and management* |
| *Adapting to new situations* | *Respect for difference and multiculturalism* |
| *Decision-making* | *Respect for the natural environment* |
| *Working independently* | *Showing social, professional and ethical responsibility and sensitivity to gender issues* |
| *Team work* | *Criticism and self-criticism* |
| *Working in an international environment* | *Production of free, creative and inductive thinking* |
| *Working in an interdisciplinary environment* | *……* |
| *Production of new research ideas* | *Others…* |
| | *…….* |

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Working independently
Team work
Project planning and management
Production of new research ideas

## (3) SYLLABUS

The taught modules concerning:

1. Introduction to Information Security
2. Threats and Security Management
3. Cryptography
4. Authentication and access control mechanisms
5. Communications security
6. Data Privacy
7. Privacy enhancing technologies
8. Safety protection
9. Safety-critical systems

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Distance Learning (synchronous and asynchronous) |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Presentation with the help of slides, Website of the course with supporting and auxiliary material, Contact by e-mail. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*<br><br>*The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 39 |
| Tutorial Exercises | 39 |
| Individual or team project | 55 |
| Individual Study | 54.5 |
| Course total | ***187.5*** |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br>*Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Final mark is calculated based on the following:<br>• (20%) High-quality contributions to the Discussions<br>• (80%) Written essays-reports/ Individual or Group Projects (or any combination) |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*
*- Related academic journals:*


- Charles P. Pfleeger, Shari Lawrence Pfleeger, Jonathan Margulies. Security in Computing, 5th Edition, Prentice Hall
- William Stallings. Information Privacy Engineering and Privacy by Design: Understanding Privacy Threats, Technology, and Regulations Based on Standards and Best Practices, Addison-Wesley Professional; 1st edition, 2019
- William Stallings. Effective Cybersecurity: A Guide to Using Best Practices and Standards. Addison-Wesley Professional, 2018.
- Douglas J. Landoll. Information Security Policies, Procedures, and Standards: A Practitioner's Reference, Auerbach Publications, 2016

# 2nd Semester

## IMTC5: Cross-Platform Game Development

**COURSE OUTLINE**

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Sciences | | |
| **ACADEMIC UNIT** | Department of Computer Science | | |
| **LEVEL OF STUDIES** | Postgraduate, MSc on Immersive Technologies | | |
| **COURSE CODE** | | **SEMESTER** | 2nd |
| **COURSE TITLE** | IMTC5: Cross-Platform Game Development | | |
| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | | **WEEKLY TEACHING HOURS** | **CREDITS** |
| Lectures | | 3 | |
| | | | |
| Total | | | 7.5 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | | |
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialised general knowledge, Skills development | | |
| **PREREQUISITE COURSES:** | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | English | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | | | |

**(2) LEARNING OUTCOMES**

**Learning outcomes**

*The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.*

*Consult Appendix A*

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The course is designed to introduce postgraduate students to theory, methods and techniques of game development by exploiting popular game engines. Game development is very popular ICT research and development area, focusing in applications of diverse fields including entertainment, cultural heritage, education, artificial intelligence, sociology, military and health systems. The main goal of this course is to enable students to understand the importance and the capabilities of specific software packages referred to as game engines (GameMaker, Stencyl) for the implementation of cross-platform games. Also, will involve students in the development of complex virtual environments that simulate the real world, which will highlight the importance of these tools. Students will gain experience and technical know-how in game systems and technologies and will be introduced to the process of developing cross-

platform games or applications for a variety of purposes. Topics covered include first-person shooter, third-person shooter, physics, lightening, rendering, graphical user interface, animation, particle systems and cross-platform development.

Upon successful completion of the course the student will be able to:

- Describe concepts related to theory, methods and techniques used in game development.
- Develop interactive games for a variety of OS including web (cross-platform) development.
- Deal with graphical and realism issues for game purposes including lightening, effects, rendering, sound, particle systems etc.
- Implement algorithms for the creation of dynamic content.
- Investigating relevant material in the international literature, writing a scientific report, planning a project, working collectively and to solve complex game development problems.

**General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

| | |
|---|---|
| *Search for, analysis and synthesis of data and information, with the use of the necessary technology* | *Project planning and management* |
| *Adapting to new situations* | *Respect for difference and multiculturalism* |
| *Decision-making* | *Respect for the natural environment* |
| *Working independently* | *Showing social, professional and ethical responsibility and sensitivity to gender issues* |
| *Team work* | *Criticism and self-criticism* |
| *Working in an international environment* | *Production of free, creative and inductive thinking* |
| *Working in an interdisciplinary environment* | *……* |
| *Production of new research ideas* | *Others…* |
| | *…….* |

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Working independently
Team work
Working in an interdisciplinary environment
Project planning and management
Adapting to new situations
Production of new research ideas

## (3) SYLLABUS

The taught modules include:

1. Introductory Concepts, Type of Games, Game Engines
2. Game development with traditional programming languages
3. Development based on engine: Scene design, Actors' management, Dashboard, Tiles, Behaviours, Gravity Screen Management, Cameras, Collisions, Enemies, Sensors, Events, Randomness, Timers, Decisions, Animation, Fonts, Attributes, Backgrounds, Special Effects, Progression, Messages, Buttons, Menus, Sounds, Shooting, Transitions, Loading and Saving
4. Case Studies
   I. A first person shooter game
   II. A word Search puzzle
   III. A card game

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Distance Learning (synchronous and asynchronous) |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Interactive web-based learning management systems and dynamic conferencing systems. Multimedia based presentation. Website of the course with supporting and auxiliary material. Contact by e-mail. In Seminars, |

<table>
<tr><td></td><td>implementation of methodologies and algorithms in real problems by exploiting game engines like Unity and their assets.</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.<br><br>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>39</td></tr>
<tr><td>Tutorial Exercises: Selected exercises are solved concerning different topics in game development processes. Implementation of methodologies and algorithms to real problems exploiting game engines like Unity and their assets.</td><td>39</td></tr>
<tr><td>Individual or team project</td><td>55</td></tr>
<tr><td>Individual Study</td><td>54.5</td></tr>
<tr><td>Course total</td><td>187.5</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Final mark is calculated based on the following:<br>• (20%) High-quality contributions to the Discussions<br>• (80%) Written essays-reports/ Individual or Group Projects</td></tr>
</table>

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*
*- Related academic journals and conferences:*


- "Education: Learning to Program | Blog | YoYo Games." [Online]. Available: https://www.yoyogames.com/blog/540/education-learning-to-program. [Accessed: 26-Dec-2019].
- "FREE Book: Creating Games with Stencyl - Level 01." [Online]. Available: http://community.stencyl.com/index.php?topic=50069.0. [Accessed: 26-Dec-2019].
- "Game Development with GameMaker Studio 2: Make Your Own Games with GameMaker Language 1st ed., Sebastiano M. Cossu, eBook - Amazon.com." [Online]. Available: https://www.amazon.com/Game-Development-GameMaker-Studio-Language-ebook/dp/B07X8TZQ14. [Accessed: 26-Dec-2019].
- "Introduction To Game Design & Programming in GameMaker Studio 2 (LearnGameMakerStudio Book 1), Ben Tyers, eBook - Amazon.com." [Online]. Available: https://www.amazon.com/Introduction-Design-Programming-GameMaker-Studio-ebook/dp/B07N591SJ5. [Accessed: 26-Dec-2019].
- "Learning Stencyl 3.x Game Development: Beginner's Guide: Innes Borkwood: 9781849695961: Amazon.com: Books." [Online]. Available: https://www.amazon.com/gp/product/1849695962/ref=as_li_tf_tl?ie=UTF8&camp=1789&creative=9325&creativeASIN=1849695962&linkCode=as2&tag=stencylbook-20.
- "The Computer Games Journal - Springer." [Online]. Available: https://link.springer.com/journal/40869. [Accessed: 26-Dec-2019].

## IMTC6: Immersive Systems IoT

**COURSE OUTLINE**

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Sciences | | |
| **ACADEMIC UNIT** | Department of Computer Science | | |
| **LEVEL OF STUDIES** | Postgraduate, MSc on Immersive Technologies | | |
| **COURSE CODE** | | **SEMESTER** | 2nd |
| **COURSE TITLE** | IMTC6: Immersive Systems IoT | | |
| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | | **WEEKLY TEACHING HOURS** | **CREDITS** |
| Lectures | | 3 | |
| | | | |
| | | | |
| Total | | | 7.5 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | | |
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Special background, Specialised general knowledge | | |
| **PREREQUISITE COURSES:** | None | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | English | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | | | |

### (2) LEARNING OUTCOMES

**Learning outcomes**

*The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.*

*Consult Appendix A*

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

This course covers the technical and experiential aspects of digital systems used for the realization of VR, AR and MR based immersive environments in current and future virtual, augmented and mixed reality platforms. The material covers a wide range of literature and practice following the evolution of all supporting technologies and including input and output 3D hardware interfaces, computer vision and optics related techniques, as well as motion tracking technologies. Furthermore, the course presents and analyses IoT oriented communication and embedded systems that enable connectivity of immersive devices.

Upon successful completion of the course the student will be able to:

- Describe the evolution and special characteristics of immersive systems

- Identify the available hardware technologies for implementing 3D user input interfaces and interaction techniques
- Explain computer vision concepts for scene understanding
- Describe light, optics, and motion tracking techniques
- Understand the networking technologies for immersive hardware interconnection
- Describe the types, components, and characteristics of embedded systems
- Realize what are the trends and future applications regarding xR-based systems

**General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

| | |
|---|---|
| *Search for, analysis and synthesis of data and information, with the use of the necessary technology* | *Project planning and management* |
| *Adapting to new situations* | *Respect for difference and multiculturalism* |
| *Decision-making* | *Respect for the natural environment* |
| *Working independently* | *Showing social, professional and ethical responsibility and sensitivity to gender issues* |
| *Team work* | *Criticism and self-criticism* |
| *Working in an international environment* | *Production of free, creative and inductive thinking* |
| *Working in an interdisciplinary environment* | *……* |
| *Production of new research ideas* | *Others…* |
| | *…….* |

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Working independently
Working in an international environment
Production of new research ideas
Production of free, creative and inductive thinking

## (3) SYLLABUS

The taught modules concerning:

1. Introduction to Immersive Systems
2. Hardware Technologies for 3D User Interfaces
3. 3D User Interface Input Hardware
4. 3D Interaction Techniques
5. Computer Vision for Scene Understanding
6. Light and Optics
7. Motion Tracking
8. Technologies for Immersive Hardware Interconnection
9. IoT Embedded Systems
10. xR Trends and Future Applications

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Distance Learning (synchronous and asynchronous) |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Presentation with the help of slides, Website of the course with supporting and auxiliary material, Online Sessions, contact by e-mail. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 39 |
| Tutorial Exercises: Selected exercises are solved concerning different topics of the course. | 39 |
| Individual or team project | 55 |
| Individual Study | 54.5 |
| Course total | ***187.5*** |

| | |
|---|---|
| *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS* | |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br>*Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Final mark is calculated based on the following:<br>• (20%) High-quality contributions to the Discussions<br>• (80%) Written essays-reports/ Individual or Group Projects (or any combination) |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*
*- Related academic journals:*


- Steven M. LaValle, "Virtual Reality", Cambridge University Press, 2017.
- Kelly S. Hale (Editor), Kay M. Stanney (Editor). 2014. Handbook of Virtual Environments: Design, Implementation, and Applications, Second Edition (Human Factors and Ergonomics) ISBN-13: 978-1466511842
- Jason Jerald. 2015. The VR Book: Human-Centered Design for Virtual Reality. Association for Computing Machinery and Morgan & Claypool Publishers.
- Gerard Jounghyun Kim, "Designing Virtual Systems: The Structured Approach", 2005.
- Doug A Bowman, Ernest Kuijff, Joseph J LaViola, Jr and Ivan Poupyrev, "3D User Interfaces, Theory and Practice", Addison Wesley, USA, 2005.
- Oliver Bimber and Ramesh Raskar, "Spatial Augmented Reality: Meging Real and Virtual Worlds", 2005.
- Burdea, Grigore C and Philippe Coiffet, "Virtual Reality Technology", Wiley Interscience, India, 2003.
- William R Sherman and Alan B Craig, "Understanding Virtual Reality: Interface, Application and Design (The Morgan Kaufmann Series in Computer Graphics)". Morgan Kaufmann Publishers, San Francisco, CA, 2002.
- Virtual Reality, Springer
- International Journal of Virtual Technology and Multimedia, Inderscience
- International Journal of Virtual and Augmented Reality, IGI
- IEEE Internet of Things
- PRESENCE: Virtual and Augmented Reality, The MIT Press

## IMTC7: Fundamentals of Virtual Reality

**COURSE OUTLINE**

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Sciences | | |
| **ACADEMIC UNIT** | Department of Computer Science | | |
| **LEVEL OF STUDIES** | Postgraduate, MSc on Immersive Technologies | | |
| **COURSE CODE** | | **SEMESTER** | 2nd |
| **COURSE TITLE** | IMTC7: Fundamentals of Virtual Reality | | |
| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | | **WEEKLY TEACHING HOURS** | **CREDITS** |
| Lectures | | 3 | |
| | | | |
| | | | |
| Total | | | 7.5 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | | |
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialised general knowledge, Skills development | | |
| **PREREQUISITE COURSES:** | None | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | English | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | | | |

### (2) LEARNING OUTCOMES

| |
|---|
| **Learning outcomes**<br>*The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| This course presents an introduction to Virtual Reality, with emphasis on designing and developing Virtual Reality applications. The course is designed for students who are new to virtual reality and want to learn about the principles of VR technology including optics, displays, stereopsis, tracking, and major hardware platforms.<br><br>Upon successful completion of the course the student will be able to:<br>• Demonstrate knowledge and understand the physical principles of VR, state the conceptual origins, advantages, and disadvantages of various methods used for solving problems for the given application domain of Virtual Reality. The core topics include: |

- Created and deployed a VR application.
- Setup and use Unity
- You will understand and you will use that knowledge to create a comfortable, high-performance VR application using Unity.

- Brainstorm, review, and select use cases and match them to the range of VR toolkits and platforms available
- Develop iteratively, and in a team, an application utilising VR toolkits and platforms
- Apply VR-specific User-Centred Design and Software Engineering approaches

Based on the knowledge and skills acquired they should be able to (Key Competences):

- Present technical work, a use case and project progress, either verbally or in written reports
- Plan projects and meet milestones

**General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

| | |
|---|---|
| *Search for, analysis and synthesis of data and information, with the use of the necessary technology* | *Project planning and management* |
| *Adapting to new situations* | *Respect for difference and multiculturalism* |
| *Decision-making* | *Respect for the natural environment* |
| *Working independently* | *Showing social, professional and ethical responsibility and sensitivity to gender issues* |
| *Team work* | *Criticism and self-criticism* |
| *Working in an international environment* | *Production of free, creative and inductive thinking* |
| *Working in an interdisciplinary environment* | *……* |
| *Production of new research ideas* | *Others…* |
| | *…….* |

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Working independently
Team work
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management

## (3) SYLLABUS

The taught modules concerning:

1. Introduction to VR
2. Unity Basics
3. History of VR development
4. Physical principles of VR
5. Architecture of VR systems
6. Platforms & Paradigms
7. Explore native, game engines, and web platforms
8. Experiment with tracking in VR works
9. Experiment with Haptic senses and feedback
10. Explore different platforms (SDK) currently available for VR development
11. Open an app in Google cardboard
12. Challenges in VR

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | | |
|---|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Distance Learning (synchronous and asynchronous) | | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Presentation with the help of slides, Website of the course with supporting and auxiliary material, Contact by e-mail. In Seminars, implementation of methodologies and algorithms in real problems in Unity 3D. | | |
| **TEACHING METHODS** | | ***Activity*** | ***Semester workload*** |

| | | |
|---|---|---|
| *The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*<br><br>*The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS* | Lectures | 39 |
| | Tutorial Exercises | 39 |
| | Individual or team project. Feedback will be given as students attempt practical problems. The project builds on the knowledge from the lectures and workshops, and the feedback given during classes will inform the student in their attempts on the final project.<br><br>To provide formative feedback, students will be asked to present their project ideas (proposal elevator pitch), give an interim progress report (presentation), and demo. | 50 |
| | Individual Study | 33.5 |
| | Course total | ***187.5*** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br>*Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Final mark is calculated based on the following:<br>• (20%) High-quality contributions to the Discussions<br>• (80%) Written essays-reports/ Individual or Group Projects (or any combination) | |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*
*- Related academic journals:*


- Samuel Greengard (2019) Virtual Reality (The MIT Press Essential Knowledge series) MIT Press (September 10, 2019) ISBN-10: 0262537524
- Ajit Singh (2019) Virtual Reality: Human Computer Interaction. Independently published (June 26, 2019) ISBN-10: 1076340458
- Jesse Glover (2019) Complete Virtual Reality and Augmented Reality Development with Unity: Leverage the power of Unity and become a pro at creating mixed reality applications Packt Publishing (April 17, 2019) ISBN-10: 1838648186
- Penny de Byl (2019) Holistic Game Development with Unity 3e: An All-in-One Guide to Implementing Game Mechanics, Art, Design and Programming 3rd Edition ISBN-13: 978-1138480629
- Terry Taylor (2019) How Virtual Reality is changing Real Estate Marketing 2nd Edition. Independently published (August 19, 2019) ISBN -10: 1687252769

## IMTC8: Immersive Technologies for Business Intelligence

**COURSE OUTLINE**

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Sciences | | |
| **ACADEMIC UNIT** | Department of Computer Science | | |
| **LEVEL OF STUDIES** | Postgraduate, MSc on Immersive Technologies | | |
| **COURSE CODE** | | **SEMESTER** | 2nd |
| **COURSE TITLE** | IMTC8: Immersive Technologies for Business Intelligence | | |

| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | |
| | | |
| | | |
| Total | | 7.5 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialised general knowledge, Skills development |
| **PREREQUISITE COURSES:** | None |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | English |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

### (2) LEARNING OUTCOMES

**Learning outcomes**

*The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.*

*Consult Appendix A*

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Immersive technologies (IT) can contribute to business in various ways such as training, product promotion and/or presentation, after sales services, analytics presentation of business-related data etc. The main aim of the course is to introduce students in the potential and applications of immersive technologies to business.

The topics covered include a general analysis of various business limitations, the way immersive technologies can fill this gap and presentation of how IT can be applied to various business fields.

Upon successful completion of the course the student will be able to:

- Describe concepts related to the applications of immersive technologies in business.
- Understand the way in which immersive technologies can be used to solve current problems to business.

- Identify and compare various immersive technologies applications as these are used in business and select suitable applications to address a number of real problems
- Design and propose integrated solutions for various business-related applications
- Implement basic immersive applications for business problems
- Investigate with goal to find relevant material in the international literature, writing a scientific report, planning a project, working collectively and to solve related problems.

**General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

| | |
|---|---|
| *Search for, analysis and synthesis of data and information, with the use of the necessary technology* | *Project planning and management* |
| *Adapting to new situations* | *Respect for difference and multiculturalism* |
| *Decision-making* | *Respect for the natural environment* |
| *Working independently* | *Showing social, professional and ethical responsibility and sensitivity to gender issues* |
| *Team work* | *Criticism and self-criticism* |
| *Working in an international environment* | *Production of free, creative and inductive thinking* |
| *Working in an interdisciplinary environment* | *……* |
| *Production of new research ideas* | *Others…* |
| | *…….* |

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Working independently
Team work
Project planning and management
Production of new research ideas

## (3) SYLLABUS

The taught modules concerning:

1. Introductory Concepts of business and information technology
2. Applications of immersive technologies to business
3. Immersive training technology
4. Industrial application of immersive technologies
5. Immersive product promotion and presentation
6. Immersive after-sales and distant services
7. Business information visualization through immersive technologies
8. Immersive analytics
9. Immersive collaborative virtual environments
10. Designing business immersive applications
11. Building basic immersive business applications

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Distance Learning (synchronous and asynchronous) |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | • Presentation with the help of slides and interactive material.<br>• LMS course page with supporting and auxiliary material.<br>• Contact by e-mail, Enhanced communication channels of LMS platform, Skype and other teleconference systems meetings. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 39 |
| Tutorial Exercises: Selected exercises are solved concerning different topics of business | 39 |

| | | |
|---|---|---|
| *visits, project, essay writing, artistic creativity, etc.*<br><br>*The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS* | immersive technologies application | |
| | Individual or team project | 55 |
| | Individual Study | 54.5 |
| | Course total | ***187.5*** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Final mark is calculated based on the following:<br>• (20%) High-quality contributions to the Discussions<br>• (80%) Written essays-reports/ Individual or Group Projects (or any combination) | |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*
*- Related academic journals:*


- Virtual Reality, Springer
- International Journal of Human-computer Interaction, Taylor & Francis
- International Journal of Computer-Supported Collaborative Learning, Springer
- International Journal of Computing & Business Research.
- Business Horizons, Elsevier
- Computers & Education, Elsevier
- IEEE Transactions on Learning Technologies
- Fuchs, P., Moreau, G., & Guitton, P. (2011). Virtual reality: concepts and technologies. CRC Press.
- Harvard Business Review
- Computers in Human Behaviour, Elsevier
- Business Information Review, SAGE Journals

## MTP1: MSc Thesis Project Part I

**COURSE OUTLINE**

### (6) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Sciences | | |
| **ACADEMIC UNIT** | Department of Computer Science | | |
| **LEVEL OF STUDIES** | Postgraduate, MSc on Immersive Technologies | | |
| **COURSE CODE** | | **SEMESTER** | 2nd |
| **COURSE TITLE** | MTP1: MSc Thesis Project Part I | | |

| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| | | |
| | | |
| | | |
| Total | | 15 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialised general knowledge, Skills development |
| **PREREQUISITE COURSES:** | IMTC1, IMTC2, IMTC3, IMTC4 |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | English |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

### (7) LEARNING OUTCOMES

**Learning outcomes**

*The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.*

*Consult Appendix A*

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the MSc Thesis Project Part I, participants will be able to:

- To search, compare and synthesize scientific sources relevant to the subject of their MSc Thesis Project.
- Critically evaluate relevant literature and identify gaps and research perspectives.
- Formulate and present a coherent theoretical framework for their thesis.
- Use appropriate literature management tools and adhere to the principles of academic ethics.
- Produce a structured scientific text that forms the basis of the MSc Thesis Project

**General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

| | |
|---|---|
| *Search for, analysis and synthesis of data and information, with the use of the necessary technology*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
| Search for, analysis and synthesis of data and information, with the use of the necessary technology<br>Working independently<br>Project planning and management<br>Production of new research ideas<br>Promoting free, creative and inductive thinking | |

## (8) SYLLABUS

This course introduces postgraduate students to the methodology of scientific research, with emphasis on literature review and the development of the research framework of the MSc Thesis Project. The aim of the course is to familiarize students with the procedures of collecting, analyzing and synthesizing scientific literature, as well as to develop skills of critical reading and evaluation of scientific sources. At the same time, the course guides students in formulating their research question and in writing the first part of the thesis, which includes the review of the literature, the presentation of the research area and the documentation of the research problem.
Students will be trained in the use of bibliographic databases, reference management tools and the application of internationally recognized standards of scientific writing. The course promotes the development of skills in formulating research hypotheses, synthesizing theoretical frameworks and formulating research objectives, preparing students for the next stage of their research work.

## (9) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Distance Learning, Cooperation with the supervisor</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>• Presentation with the help of slides and interactive material.<br>• LMS course page with supporting and auxiliary material.<br>• Contact by e-mail, Enhanced communication channels of LMS platform, Skype and other teleconference systems meetings.</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.<br><br>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td><table><tr><th>Activity</th><th>Semester workload</th></tr><tr><td>Individual Study</td><td>125</td></tr><tr><td>Thesis Writing</td><td>125</td></tr><tr><td>Individual project</td><td>125</td></tr><tr><td>Course total</td><td>187.5</td></tr></table></td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical</td><td>All Master Thesis Projects are presented publicly. The details of the preparation, delivery, presentation and evaluation of the MTEs shall be determined by a decision of the Steering Committee.<br>The M.Sc. thesis is publicly supported by a three-member examination committee, appointed by the MSc Coordinating Committee, which includes the supervisor and two (2) other faculty members.</td></tr>
</table>

| | |
|---|---|
| examination of patient, art interpretation, other<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students. | The final grade is calculated on the basis of the following evaluation criteria :<br>• Scientific Originality and Research Contribution<br>• Structure and organisation of the work<br>• Methodological completeness<br>• Excellence and innovation of the deliverable/educational intervention<br>• Analysis and Evaluation of Results<br>• Adherence to Academic Ethics and Use of Literature Sources<br>• Presentation and Support of the Work.<br><br>Grading scale<br>Excellent (8-10)<br>Very good (6,5-7.99)<br>Good (5-6.5)<br>Fail (0-4.99) |

## (10) ATTACHED BIBLIOGRAPHY


*-Suggested bibliography:*
*- Transue, B. (2019). Apa style 7th edition.*
*- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. bmj, 372.*
*- Related academic journals:*
*Virtual Reality, Springer*
*International Journal of Human-computer Interaction, Taylor & Francis*
*Computers in Human Behaviour, Elsevier*

# Sumer Period

## IMTE1: Immersive Storytelling

**COURSE OUTLINE**

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Sciences | | |
| **ACADEMIC UNIT** | Department of Computer Science | | |
| **LEVEL OF STUDIES** | Postgraduate, MSc on Immersive Technologies | | |
| **COURSE CODE** | | **SEMESTER** | Sumer Period |
| **COURSE TITLE** | IMTE1: Immersive Storytelling | | |
| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | | **WEEKLY TEACHING HOURS** | **CREDITS** |
| Lectures | | 3 | |
| | | | |
| | | | |
| Total | | | 7.5 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | | |
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialised general knowledge<br>Skills development | | |
| **PREREQUISITE COURSES:** | None | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | English | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | | | |

### (2) LEARNING OUTCOMES

| |
|---|
| **Learning outcomes**<br>*The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| A storyteller's ultimate goal is to fully immerse the audience in the universe of their story, and technology can play an important part when it comes to immersive storytelling. This course takes a close look at the mechanics of immersive storytelling within dynamic media and equips students with tools and technologies to make their story an immersive experience. Students can explore experiential and immersive storytelling in Virtual Reality (VR), Augmented Reality (AR), Mixed Reality and 360 videos.<br><br>Upon successful completion of the course, students will be able to: |

- Describe basic concepts of immersive technologies.
- Understand the technologies that make stories immersive experiences.
- Understand basic principles in storytelling.
- Combine various innovative technologies in order to build immersive stories.

**General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

| | |
|---|---|
| *Search for, analysis and synthesis of data and information, with the use of the necessary technology* | *Project planning and management* |
| *Adapting to new situations* | *Respect for difference and multiculturalism* |
| *Decision-making* | *Respect for the natural environment* |
| *Working independently* | *Showing social, professional and ethical responsibility and sensitivity to gender issues* |
| *Team work* | *Criticism and self-criticism* |
| *Working in an international environment* | *Production of free, creative and inductive thinking* |
| *Working in an interdisciplinary environment* | *……* |
| *Production of new research ideas* | *Others…* |
| | *…….* |

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Working independently
Team work
Project planning and management
Production of new research ideas

## (3) SYLLABUS

The content of the course includes:

1. Traditional narrative
2. Introductory concepts of the technology behind storytelling
3. Storytelling principles for immersive space
4. Designing an immersive narrative
5. Sound design
6. Visual Montage
7. Codifying story elements
8. Combining technologies for immersive storytelling

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Distance Learning (synchronous and asynchronous) |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | • Presentation with the help of slides.<br>• Website of the course with supporting and auxiliary material.<br>• Contact by e-mail, or Skype. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*<br><br>*The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS* | |
| **STUDENT PERFORMANCE EVALUATION** | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 39 |
| Tutorial Exercises: Practical implementation of designing and building immersive storytelling experiences in various programming environments. | 39 |
| Individual or team project | 55 |
| Individual Study | 54.5 |
| Course total | ***187.5*** |

| | |
|---|---|
| *Description of the evaluation procedure*<br>*Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Final mark is calculated based on the following:<br>• (20%) High-quality contributions to the Discussions<br>• (80%) Written essays-reports/ Individual or Group Projects (or any combination) |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*
*- Related academic journals:*


- Kelly McErlean, "Interactive Narratives and Transmedia Storytelling", 1st Edition, Routledge, 2018, ISBN-10: 113863882X.
- John Bucher, "Storytelling for Virtual Reality", 1st Edition, Routledge, 2017, ISBN-10: 1138629669.
- Elmezeny, Ahmed, Nina Edenhofer, and Jeffrey Wimmer. "Immersive storytelling in 360-degree videos: An analysis of interplay between narrative and technical immersion." Journal For Virtual Worlds Research 11.1 (2018).
- Carolyn Handler Miller, "Digital Storytelling 4e: A creator's guide to interactive entertainment", CRC Press, 2019. International Journal of Virtual and Augmented Reality (IGI Global).

## IMTE2: Immersive Experiences and Technologies

**COURSE OUTLINE**

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Sciences | | |
| **ACADEMIC UNIT** | Department of Computer Science | | |
| **LEVEL OF STUDIES** | Postgraduate, MSc on Immersive Technologies | | |
| **COURSE CODE** | | **SEMESTER** | Sumer Period |
| **COURSE TITLE** | IMTE2: Immersive Experiences and Technologies | | |

| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | |
| | | |
| | | |
| Total | | 7.5 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialised general knowledge<br>Skills development |
| **PREREQUISITE COURSES:** | None |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | English |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

### (2) LEARNING OUTCOMES

**Learning outcomes**

*The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.*

*Consult Appendix A*

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The boundaries between the digital and the physical continue to blur and new kinds of immersive interactions become possible. Augmented reality, virtual reality and mixed reality can create experiences that flow freely across real and virtual spaces. This course takes a close look at the mechanics of immersive storytelling within dynamic media and equips students with tools and technologies to make their story an immersive experience. Students can explore experiential and immersive storytelling in Virtual Reality (VR), Augmented Reality (AR), Mixed Reality and 360 videos.

Upon successful completion of the course, students will be able to:

- Describe basic technologies used in building immersive experiences.
- Describe the basic elements of Immersion.

- Understand basic principles of immersive environments.

**General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

| | |
|---|---|
| *Search for, analysis and synthesis of data and information, with the use of the necessary technology* | *Project planning and management* |
| *Adapting to new situations* | *Respect for difference and multiculturalism* |
| *Decision-making* | *Respect for the natural environment* |
| *Working independently* | *Showing social, professional and ethical responsibility and sensitivity to gender issues* |
| *Team work* | *Criticism and self-criticism* |
| *Working in an international environment* | *Production of free, creative and inductive thinking* |
| *Working in an interdisciplinary environment* | *……* |
| *Production of new research ideas* | *Others…* |
| | *…….* |

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Working independently
Team work
Project planning and management
Production of new research ideas

## (3) SYLLABUS

The content of the course includes:

1. The Elements of Immersion
2. Popular Virtual and Augmented Reality Technology
3. Limitations of immersive environments
4. Applications of immersive experiences

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Distance Learning (synchronous and asynchronous) |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | • Presentation with the help of slides.<br>• Website of the course with supporting and auxiliary material.<br>• Contact by e-mail, or Skype. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*<br><br>*The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS* | |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br>*Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* | Final mark is calculated based on the following:<br>• (20%) High-quality contributions to the Discussions<br>• (80%) Written essays-reports/ Individual or Group Projects (or any combination) |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 39 |
| Tutorial Exercises: Evaluation of Immersive Experiences. | 39 |
| Individual or team project | 40 |
| Individual Study | 54.5 |
| Course total | ***187.5*** |

| | |
|---|---|
| *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*
*- Related academic journals:*


- Kelly McErlean, “Immersive Technology A Complete Guide - 2019 Edition”, 5STARCooks, 2019.
- John Bucher, “Storytelling for Virtual Reality”, 1st Edition, Routledge, 2017, ISBN-10: 1138629669.
- Pierre (Pete) Routhier, “Immersive Technologies”, Blurb, 2019.
- Suh, Ayoung, and Jane Prophet. "The state of immersive technology research: A literature analysis." Computers in Human Behavior 86 (2018): 77-90.

## IMTE3: Digital Innovative Industries and Media Marketing

**COURSE OUTLINE**

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Sciences | | |
| **ACADEMIC UNIT** | Department of Computer Science | | |
| **LEVEL OF STUDIES** | Postgraduate, MSc on Immersive Technologies | | |
| **COURSE CODE** | | **SEMESTER** | Sumer Period |
| **COURSE TITLE** | IMTE3: Digital Innovative Industries and Media Marketing | | |

| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | |
| | | |
| | | |
| Total | | 7.5 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialised general knowledge<br>Skills development |
| **PREREQUISITE COURSES:** | None |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | English |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

### (2) LEARNING OUTCOMES

**Learning outcomes**

*The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.*

*Consult Appendix A*

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Virtual Reality (VR) and Augmented Reality (AR) have changed the playing field dramatically for marketing, branding, and public relations professionals. This course provides the basic communication tools in order to engage effectively with the target audience with the use of VR and AR technology.

Upon successful completion of the course, students will be able to:

- Understand, create, and manage successful VR and AR campaigns
- Transform a campaign using innovative technologies
- Suggest digital innovation solutions to transform organisations
- Apply digital innovation frameworks to enhance strategy and competitiveness

**General Competences**

| *Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?* | |
|---|---|
| *Search for, analysis and synthesis of data and information, with the use of the necessary technology*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
| Search for, analysis and synthesis of data and information, with the use of the necessary technology<br>Working independently<br>Team work<br>Project planning and management<br>Production of new research ideas | |

## (3) SYLLABUS

The content of the course includes:

1. Business Process Innovation
2. Product Innovation and Design
3. Product launch strategy in the Digital Age
4. Digital Media and Innovation
5. Tools for enhancing strategy and competitiveness
6. Transition to the digital age

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Distance Learning (synchronous and asynchronous) |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | • Presentation with the help of slides.<br>• Website of the course with supporting and auxiliary material.<br>• Contact by e-mail, or Skype. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*<br><br>*The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS* | |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br>*Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* | Final mark is calculated based on the following:<br>• (20%) High-quality contributions to the Discussions<br>• (80%) Written essays-reports/ Individual or Group Projects (or any combination) |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 39 |
| Tutorial Exercises: Practical implementation of designing immersive media. | 39 |
| Individual or team project | 55 |
| Individual Study | 54.5 |
| Course total | ***187.5*** |

| | |
|---|---|
| *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*
*- Related academic journals:*


- Cathy Hackl, Samantha G. Wolfe, “Marketing New Realities: An Introduction to Virtual Reality & Augmented Reality Marketing, Branding, & Communications”, Meraki Press, 2017, ISBN-10: 0996510672.
- Richard A. Gershon, "Digital Media and Innovation: Management and Design Strategies in Communication", 1st Edition, 2016, ISBN-10: 1452241414

## IMTE4: Immersive Media Design Courses

**COURSE OUTLINE**

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Sciences | | |
| **ACADEMIC UNIT** | Department of Computer Science | | |
| **LEVEL OF STUDIES** | Postgraduate, MSc on Immersive Technologies | | |
| **COURSE CODE** | | **SEMESTER** | Sumer Period |
| **COURSE TITLE** | IMTE4: Immersive Media Design Courses | | |

| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | |
| | | |
| | | |
| Total | | 7.5 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialised general knowledge<br>Skills development |
| **PREREQUISITE COURSES:** | None |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | English |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

### (2) LEARNING OUTCOMES

**Learning outcomes**

*The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.*

*Consult Appendix A*

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Immersive Media is a category of media that effectively surrounds, or immerses, its audience. Rather than simply "watch" immersive media, participants often feel that they "experience" content. This course provides students with in-depth learning experiences, thorough instruction, and an understanding of theories, techniques and skills employed in designing immersive media content.

Upon successful completion of the course, students will be able to:

- Describe basic concepts of immersive media content.
- Design with various tools, immersive media content.
- To transform data into meaningful social and emotional communication using innovative technologies.

| **General Competences**<br>*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*<br>*Search for, analysis and synthesis of data and information, with the use of the necessary technology*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas*<br>*Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
|---|
| Search for, analysis and synthesis of data and information, with the use of the necessary technology<br>Working independently<br>Team work<br>Project planning and management<br>Production of new research ideas |

## (3) SYLLABUS

The content of the course includes:

1. Audio in Interactive and Immersive Environments
2. Video in Interactive and Immersive Environments
3. Image in Interactive and Immersive Environments
4. Designing an immersive experience
5. Limitations on designing media for immersive experiences
6. Compression of media
7. Combining media to create immersive experiences

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Distance Learning (synchronous and asynchronous) |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | • Presentation with the help of slides.<br>• Website of the course with supporting and auxiliary material.<br>• Contact by e-mail, or Skype. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*<br><br>*The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS* | ***Activity*** / ***Semester workload***<br>Lectures: 39<br>Lab Exercises: Practical implementation of designing immersive media.: 39<br>Individual or team project: 40<br>Individual Study: 54.5<br>Course total: ***187.5*** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br>*Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical* | Final mark is calculated based on the following:<br>• (20%) High-quality contributions to the Discussions<br>• (80%) Written essays-reports/ Individual or Group Projects (or any combination) |

| | |
|---|---|
| *examination of patient, art interpretation, other*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*
*- Related academic journals:*


- Jean-Luc Sinclair, “Principles of Game Audio and Sound Design: Sound Design and Audio Implementation for Interactive and Immersive Media”, 1st Edition, Routledge, 2020, ISBN-10: 1138738964.
- Kenneth C.C. Yang, “Cases on Immersive Virtual Reality Techniques (Advances in Multimedia and Interactive Technologies”, 1st Edition, IGI Global, 2019, ISBN-10: 1522559124.
- Chris Dede, "Immersive interfaces for engagement and learning." science 323.5910 (2009): 66-69.
- Stephen C. Bronack, "The role of immersive media in online education." The Journal of Continuing Higher Education 59.2 (2011): 113-117.

## MTP2: MSc Thesis Project Part II

**COURSE OUTLINE**

### (11) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Sciences | | |
| **ACADEMIC UNIT** | Department of Computer Science | | |
| **LEVEL OF STUDIES** | Postgraduate, MSc on Immersive Technologies | | |
| **COURSE CODE** | | **SEMESTER** | Sumer Period |
| **COURSE TITLE** | MTP2: MSc Thesis Project Part II | | |

| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| | | |
| | | |
| | | |
| Total | | 15 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialised general knowledge,<br>Skills development |
| **PREREQUISITE COURSES:** | IMTC1, IMTC2, IMTC3, IMTC4, MTP1 |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | English |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

### (12) LEARNING OUTCOMES

**Learning outcomes**

*The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.*

*Consult Appendix A*

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon successful completion of the Master's thesis, participants will be able to:

- Develop and document a prototype or technological solution within the context of their MSc.
- Design and implement educational or technological interventions based on research evidence.
- Conduct an evaluation of the intervention using appropriate methodological approaches.
- Analyse and interpret the results of the implementation of their project.
- Synthesise their research findings into a final report that meets academic criteria.
- Present and defend their work before an examination board.

- The course concludes with the submission of the final dissertation and its oral support, where students are required to argue for their research approach, the methodology followed and the results produced.

**General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

| | |
|---|---|
| *Search for, analysis and synthesis of data and information, with the use of the necessary technology* | *Project planning and management* |
| *Adapting to new situations* | *Respect for difference and multiculturalism* |
| *Decision-making* | *Respect for the natural environment* |
| *Working independently* | *Showing social, professional and ethical responsibility and sensitivity to gender issues* |
| *Team work* | *Criticism and self-criticism* |
| *Working in an international environment* | *Production of free, creative and inductive thinking* |
| *Working in an interdisciplinary environment* | *……* |
| *Production of new research ideas* | *Others…* |
| | *…….* |

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Working independently
Project planning and management
Production of new research ideas
Promoting free, creative and inductive thinking

## (13) SYLLABUS

The course is the second and final part of the Master's Thesis (M.Sc.), focusing on the development of an original project and its implementation through educational or technological intervention. The aim of the course is to guide students in the implementation of their research proposal, which may include the creation of a new methodology, software, tool or application, and the evaluation of its effectiveness in real or simulated environments.
Students are required to turn their theoretical research into a tangible outcome, test their intervention in an educational, professional or research context and analyse the data resulting from its application. Particular emphasis is placed on evaluating the prototype, analysing the results and drawing conclusions that contribute to improving scientific knowledge and the practical application of the technologies studied.
The course concludes with the submission of the final thesis and its oral support, where students are invited to argue for their research approach, the methodology followed and the results produced.

## (14) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Distance Learning, Cooperation with the supervisor |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | • Presentation with the help of slides and interactive material.<br>• LMS course page with supporting and auxiliary material.<br>• Contact by e-mail, Enhanced communication channels of LMS platform, Skype and other teleconference systems meetings. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*<br><br>*The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Individual Study | 125 |
| Thesis Writing | 125 |
| Individual project | 125 |
| Course total | ***187.5*** |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>Description of the evaluation procedure<br>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students. | All Master Thesis Projects are presented publicly. The details of the preparation, delivery, presentation and evaluation of the MTEs shall be determined by a decision of the Steering Committee.<br>The M.Sc. thesis is publicly supported by a three-member examination committee, appointed by the MSc Coordinating Committee, which includes the supervisor and two (2) other faculty members.<br>The final grade is calculated on the basis of the following evaluation<br>Evaluation criteria :<br>• Scientific Originality and Research Contribution<br>• Structure and organisation of the work<br>• Methodological completeness<br>• Excellence and innovation of the deliverable/educational intervention<br>• Analysis and Evaluation of Results<br>• Adherence to Academic Ethics and Use of Literature Sources<br>• Presentation and Support of the Work.<br><br>Grading scale<br>Excellent (8-10)<br>Very good (6,5-7.99)<br>Good (5-6.5)<br>Fail (0-4.99) |

## (15) ATTACHED BIBLIOGRAPHY


*- Suggested bibliography:*
*- Transue, B. (2019). Apa style 7th edition.*
*- Related academic journals:*
*Virtual Reality, Springer*
*International Journal of Human-computer Interaction, Taylor & Francis*
*Computers in Human Behaviour, Elsevier*

## IS: Independent Study

**COURSE OUTLINE**

**(16) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Sciences | | |
| **ACADEMIC UNIT** | Department of Computer Science | | |
| **LEVEL OF STUDIES** | Postgraduate, MSc on Immersive Technologies | | |
| **COURSE CODE** | | **SEMESTER** | Sumer Period |
| **COURSE TITLE** | MTP2: MSc Thesis Project Part II | | |
| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | | **WEEKLY TEACHING HOURS** | **CREDITS** |
| | | | 15 |
| | | | |
| | | | |
| | | | |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | | |
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialised general knowledge,<br>Skills development | | |
| **PREREQUISITE COURSES:** | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | English | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | | | |

**(17) LEARNING OUTCOMES**

| **Learning outcomes**<br>*The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
|---|
| Upon successful completion of the Master's thesis, participants will be able to:<br>• Develop and document a prototype or technological solution within the context of their MSc.<br>• Design and implement educational or technological interventions based on research evidence.<br>• Conduct an evaluation of the intervention using appropriate methodological approaches.<br>• Analyse and interpret the results of the implementation of their project.<br>• Synthesise their research findings into a final report that meets academic criteria. |

- The course concludes with the submission of the final dissertation and its oral support, where students are required to argue for their research approach, the methodology followed and the results produced.

**General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

| | |
|---|---|
| *Search for, analysis and synthesis of data and information, with the use of the necessary technology* | *Project planning and management* |
| *Adapting to new situations* | *Respect for difference and multiculturalism* |
| *Decision-making* | *Respect for the natural environment* |
| *Working independently* | *Showing social, professional and ethical responsibility and sensitivity to gender issues* |
| *Team work* | *Criticism and self-criticism* |
| *Working in an international environment* | *Production of free, creative and inductive thinking* |
| *Working in an interdisciplinary environment* | *……* |
| *Production of new research ideas* | *Others…* |
| | *…….* |

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Working independently
Project planning and management
Production of new research ideas
Promoting free, creative and inductive thinking

## (18) SYLLABUS

The Independent Study course provides students with the opportunity to conduct an independent, in-depth literature research on a specialized topic related to the subject of the MSc. Independent Study focuses on the collection, analysis and synthesis of contemporary scientific literature, with the aim of understanding the theoretical and methodological approaches that have been developed in the specific scientific field.
Students, under the guidance of a faculty member, develop critical thinking, evaluate existing research papers, identify gaps in the literature, and propose new research directions. At the end of the course, they produce a documented academic paper, which can form the basis for further research or for the development of a future thesis.
The course promotes students' academic independence, the development of literature review skills and the application of academic writing and documentation standards.

## (19) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Distance Learning, Cooperation with the supervisor |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | • Presentation with the help of slides and interactive material.<br>• LMS course page with supporting and auxiliary material.<br>• Contact by e-mail, Enhanced communication channels of LMS platform, Skype and other teleconference systems meetings. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*<br><br>*The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Individual Study | 125 |
| Thesis Writing | 125 |
| Individual project | 125 |
| Course total | ***187.5*** |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>Description of the evaluation procedure<br>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students. | All Independent Studies are implemented and submitted for scoring by the supervisor.<br>The final grade shall be calculated based on the following Evaluation criteria :<br>- Scientific Originality and Research Contribution<br>- Structure and organisation of the work<br>- Methodological completeness<br>- Analysis and evaluation of results<br>- Adherence to Academic Ethics and Use of Bibliographic Sources<br><br>Grading scale<br>Excellent (8-10)<br>Very good (6,5-7.99)<br>Good (5-6.5)<br>Fail (0-4.99) |

## (20) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*


- Transue, B. (2019). Apa style 7th edition.
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. bmj, 372