COURSE OUTLINE

(1) GENERAL

SCHOOL	ENGINEERING
ACADEMIC UNIT	DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
LEVEL OF STUDIES	GRADUATE (MSc)
Study Programme	MSc By Research in Electrical and Electronics Engineering
COURSE CODE	B.01 **SEMESTER** 02
COURSE TITLE	Ethical and legal issues of emerging 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	6
Total	3	6
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*	General Background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK and ENGLISH
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES
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*

1. Understand emerging technologies: Gain a comprehensive understanding of various emerging technologies, such as artificial intelligence (AI), machine learning, blockchain, biotechnology, nanotechnology, robotics, and others.
2. Ethical considerations: Develop an understanding of ethical frameworks and principles related to emerging technologies. Analyze the ethical implications and challenges posed by these technologies and explore ethical decision-making in complex technological contexts.
3. Legal frameworks: Explore the legal frameworks and regulations governing emerging technologies. Examine the legal challenges and implications, including intellectual property rights, privacy, data protection, cybersecurity, liability, and regulatory compliance.
4. Critical analysis: Develop critical thinking and analytical skills to assess the ethical and legal dimensions of emerging technologies. Evaluate the potential risks, benefits, and societal impact of these technologies from ethical and legal perspectives.
5. Policy and governance: Understand the policy and governance structures required to address ethical and legal issues in emerging technologies. Explore different approaches to policy-making, regulation, and governance, and assess their effectiveness and limitations.
6. Responsible innovation: Explore the concept of responsible innovation and its application to emerging technologies. Examine strategies for integrating ethical and legal considerations into the development and deployment of these technologies.

   Interdisciplinary perspectives:
7. Recognize the interdisciplinary nature of ethical and legal issues in emerging technologies. Consider perspectives from philosophy, law, technology, sociology, economics, and other relevant fields to develop a holistic understanding of the subject matter.
8. Communication and collaboration: Develop effective communication skills to articulate ethical and legal concerns related to emerging technologies. Collaborate with peers to engage in discussions, debates, and projects addressing these issues
9. Ethical and legal frameworks in specific domains: Explore the ethical and legal challenges specific to certain domains of emerging technologies, such as AI ethics, biotechnology ethics, autonomous vehicles, digital ethics, and others. Understand the nuances and context-specific considerations within these domains.
10. Ethical leadership and decision-making: Develop skills to navigate ethical and legal dilemmas related to emerging technologies. Enhance your ability to make informed and ethical decisions, and cultivate leadership qualities to advocate for responsible and sustainable use of these technologies.

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…*
	…….

1. Ethical reasoning: Develop the ability to critically analyze and evaluate ethical dilemmas and make informed decisions in the context of emerging technologies. Apply ethical frameworks and principles to assess the moral implications of technological advancements.
2. Legal literacy: Acquire a solid understanding of the legal frameworks, regulations, and policies relevant to emerging technologies. Interpret and apply legal principles to address legal challenges and ensure compliance with applicable laws.
3. Interdisciplinary thinking: Foster the ability to integrate knowledge and perspectives from multiple disciplines, such as philosophy, law, technology, social sciences, and policy. Apply interdisciplinary approaches to understand and address complex ethical and legal issues arising from emerging technologies.
4. Critical thinking and analysis: Develop strong analytical skills to critically evaluate the societal impact, risks, and benefits of emerging technologies. Assess the ethical and legal implications of these technologies using evidence-based reasoning.
5. Communication and advocacy: Enhance communication skills to effectively articulate ethical and legal concerns related to emerging technologies. Engage in constructive discussions, debates, and advocacy to raise awareness and promote responsible and ethical use of these technologies.
6. Policy awareness: Gain an understanding of policy-making processes and governance structures related to emerging technologies. Evaluate the effectiveness of existing policies and contribute to the development of ethical and legal frameworks for emerging technologies.
7. Risk management: Develop the ability to identify and assess potential risks associated with emerging technologies from ethical and legal perspectives. Implement strategies to mitigate and manage these risks in accordance with ethical and legal principles.
8. Adaptability and lifelong learning: Cultivate a mindset of continuous learning and adaptability to keep up with the evolving landscape of emerging technologies and associated ethical and legal challenges. Stay updated with the latest developments, research, and debates in the field.
9. Ethical leadership: Demonstrate ethical leadership qualities by advocating for responsible and sustainable use of emerging technologies. Promote ethical decision-making, foster a culture of integrity, and contribute to the ethical and legal discourse surrounding these technologies.
10. Professional integrity: Develop a strong sense of professional integrity and ethical responsibility in the context of emerging technologies. Uphold ethical principles and legal obligations in research, development, and implementation processes related to these technologies.

(3) SYLLABUS

The course is divided into the following sections that serve the basic principles of rights: Human agency and oversight, Technical robustness and safety, Privacy and Data governance, Transparency), Diversity, non-discrimination and fairness, Lawful ethical robustness:

a) Introduction to ethical and legal issues of emerging technologies - Overview of the course and its objectives - Introduction to the ethical and legal implications of emerging technologies. (1st week)

b) Artificial Intelligence - Overview of artificial intelligence and its applications. Ethical issues in the development and deployment of artificial intelligence, including bias and transparency - Legal issues related to artificial intelligence, including liability and data privacy. (2nd and 3rd week)

c) The Internet of Things - Overview of the Internet of Things and its applications - Ethical issues in the Internet of Things, including privacy and security - Legal issues related to the Internet of Things, including data ownership and liability. (4th and 5th week)

d) Robotics - Overview of robotics and its applications - Ethical issues in robotics, including the right to work - Ethical issues related to autonomous driving vehicles. (6th and 7th week)

e) Case studies - Analysis of real cases of ethical and legal issues in emerging technologies - Discussion of strategies to deal with these issues (8th, 9th and 10th week)

f) Final Research Presentations - FPs will present their final work on an ethical and/or legal issue related to an emerging technology of their choice. (11th, 12th and 13th week)

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Distance Learning (Synchronous, MS Teams)
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Online Resources: Provide access to online resources such as e-books, research papers, academic journals, and websites that cover topics related to ethical and legal issues in emerging technologies. This allows students to access up-to-date information and diverse perspectives. Learning Management System (LMS): Utilize an LMS platform to share course materials, lecture slides, assignments, and supplementary resources. The LMS can also facilitate online discussions, announcements, and submission of assignments. Virtual Classroom: Conduct synchronous online lectures and discussions using video conferencing tools. This enables real-time interaction between students and instructors, allowing for Q&A sessions, group discussions, and guest lectures from experts in the field. Multimedia Presentations: Use multimedia presentations, including slides, videos, and interactive simulations, to enhance student engagement and understanding of complex ethical and legal concepts related to emerging technologies. Online Collaboration Tools: Employ online collaboration tools, such as shared documents, wikis, or project management platforms, to facilitate group work and collaborative assignments. This enables students to work together on case studies, research projects, and presentations. Virtual Laboratories and Simulations: Provide access to virtual laboratories or simulations that allow students to experiment and explore the ethical and legal implications of emerging technologies in a controlled environment. This can include simulations related to AI decision-making, data privacy, or digital ethics. Online Discussions and Forums: Encourage students to participate in online discussions and forums to share their insights, ask questions, and engage in peer-to-peer learning. This fosters a collaborative and interactive learning environment beyond the confines of the physical classroom. Online Research and Data Analysis: Familiarize students with online research methods, including effective search strategies, database navigation, and critical evaluation of online sources. Introduce them to data analysis tools and techniques for examining ethical and legal issues in emerging technologies. Virtual Field Trips and Guest Speakers: Organize virtual field trips to relevant organizations or invite guest speakers from industry, academia, or regulatory bodies to share their experiences and insights on ethical and legal challenges in emerging technologies. This can be facilitated through video conferencing or pre-recorded presentations.

	Online Assessments and Feedback: Utilize online assessment tools, such as quizzes, assignments, or online exams, to evaluate students' understanding of ethical and legal concepts. Provide timely feedback to students using digital platforms, ensuring effective communication and progress tracking.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *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.* *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 40 Course material study 60 Bibliographic research 40 Case Study mini project. 20 Seminar. 10 Preparation for the exams. 10 **Course total 180**
STUDENT PERFORMANCE EVALUATION *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* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	The evaluation is based on the final mini project presentation (60%) and the ongoing study cases (40%). Project submission is in eclass. The evaluation can be either in Greek or in English.

(5) BIBLIOGRAPHY

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