

Medicine			
Bachelor	TR-NQF-HE: Level 7	QF-EHEA: Second Cycle	EQF-LLL: Level 7

Course Introduction and Application Information

Course Code:	UNI220		
Course Name:	Machine Learning and Data Science		
Semester:	Spring Fall		
Course Credits:	<div>ECTS</div> <div>5</div>		
Language of instruction:	Turkish		
Course Condition:			
Does the Course Require Work Experience?:	No		
Type of course:	University Elective		
Course Level:	<div>BachelorTR-NQF-HE:7. Master`s Degree</div> <div>QF-EHEA:Second Cycle</div> <div>EQF-LLL:7. Master`s Degree</div>		
Mode of Delivery:	E-Learning		
Course Coordinator:	Dr. Öğr. Üy. ALPER ÖNER		
Course Lecturer(s):	Ferzat Anka		
Course Assistants:			

Course Objective and Content

Course Objectives:	The aim of the course is to provide students with information on basic techniques and methods in artificial learning and to enable students to have the ability to use artificial learning methods in solving practical problems. At the same time, it is to understand the importance of machine learning in today's application areas.

Course	Machine learning basic concepts and methods. Problem solving using machine learning; methods
Content:	using and not using problem information. Data analysis, To examine various algorithms. To explain the importance of artificial intelligence methods in different fields with examples

Learning Outcomes

The students who have succeeded in this course;

- 1) • Recognize the problems that can be solved by machine learning methods.
- 2) • Understanding the importance of artificial intelligence in solving various problems
- 3) • Can choose the appropriate machine learning method for the given problem.
- 4) • Can solve the given problem with the appropriate machine learning method.
- 5) • Knows the ways of representing information, its advantages and disadvantages.

Course Flow Plan

Week	Subject	Related Preparation
1)	Machine learning history and philosophy	
2)	Basic concepts	
3)	Basic concepts-Intelligent Agents	
4)	Introduction to machine learning and problem solving and search algorithms	
5)	Expert systems and machine learning	
6)	Optimization methods in machine learning	
7)	Homework-Presentation	
8)	Homework-Presentation	
9)	Homework-Presentation	
10)	Data science and analysis	
11)	Machine learning	
12)	Data science and methods	
13)	Machine learning	
14)	Search algorithms and their importance (Definite, greedy, heuristic, meta-heuristic)	

Sources

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Course Notes / Textbooks:	<ul style="list-style-type: none"> • Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, Third Ed., Prentice Hall, 2010, • Michael Negnevitsky, Artificial Intelligence: A Guide to Intelligent Systems (3rd Edition) 3rd Edition • Vasif Nabiyeve, Yapay Zeka: İnsan ve Bilgisayar Etkileşimi 4. Baskı • Yalçın Özkan, Veri Madenciliği Yöntemleri, Papatya, 2008 • Cemalettin Kubat, Matlab Yapay Zeka ve Mühendislik uygulamaları, Pusula, 2009 • İlker Arslan, R ile İstatistiksel Programlama, Pusula, 2020 • Zafer Demirkol, Herkes İçin Yapay Zeka, Genç Destek, 2021 • S.Nematzadeh et al. Rationalized Statistics for Biosciences Analysing bioinformatics data using the R, LAP Publishing, 2021
References:	<ul style="list-style-type: none"> • Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, Third Ed., Prentice Hall, 2010, • Michael Negnevitsky, Artificial Intelligence: A Guide to Intelligent Systems (3rd Edition) 3rd Edition • Vasif Nabiyeve, Yapay Zeka: İnsan ve Bilgisayar Etkileşimi 4. Baskı • Yalçın Özkan, Veri Madenciliği Yöntemleri, Papatya, 2008 • Cemalettin Kubat, Matlab Yapay Zeka ve Mühendislik uygulamaları, Pusula, 2009 • İlker Arslan, R ile İstatistiksel Programlama, Pusula, 2020 • Zafer Demirkol, Herkes İçin Yapay Zeka, Genç Destek, 2021 • S.Nematzadeh et al. Rationalized Statistics for Biosciences Analysing bioinformatics data using the R, LAP Publishing, 2021

Course - Program Learning Outcome Relationship

Course Learning Outcomes	1	2	3	4	5
Program Outcomes					
1) The graduate integrates the knowledge, skills, attitudes, and behaviours acquired from basic and clinical sciences, behavioural sciences, and social sciences in the form of competencies and uses them for the provision of rational, effective, safe health care services in accordance with quality standards in the prevention, diagnosis, treatment, follow-up, and rehabilitation processes, and during the process considers protection of both patient's health and healthcare workers health including her/his own.					
2) The graduate shows a biopsychosocial approach in patient management that considers the sociodemographic and sociocultural background of the individual without discrimination of language, religion, race, and gender.					
3) The graduate prioritizes the protection and development of the health of individuals and society in the provision of health care services.					
4) The graduate, considering the individual, social, public, and environmental					

factors affecting health; works towards maintaining and improving the state of health. Course Learning Outcomes	1	2	3	4	5
5) In the provision of health care services, the graduate considers both the changes in the physical and socioeconomic environment on a regional and global scale that affect health, as well as the changes in the individual characteristics and behaviours of the people who apply to her/him.					
6) The graduate recognizes the characteristics, needs and expectations of the target population and provides health education to healthy/sick individuals and their relatives and other health care workers.					
7) While carrying out her/his profession, the graduate fulfils her/his duties and obligations with determined behaviours to provide high-quality health care within the framework of ethical principles, rights and legal responsibilities and good medical practices, considering the integrity, privacy, and dignity of the patient.					
8) The graduate evaluates and improves her/his own performance in professional practices in terms of emotions, cognitive characteristics, and behaviours.					
9) The graduate physician advocates improving the provision of health services by considering the concepts of social reliability and social commitment to protect and improve public health.					
10) To protect and improve health, the graduate physician can plan and carry out service delivery, training and consultancy processes related to individual and community health in cooperation with all components.					
11) The graduate physician evaluates the impact of health policies and practices on individual and community health indicators and advocates increasing the quality of health services.					
12) The graduate physician attaches importance to protecting and improving her/his own physical, mental, and social health, and does what is necessary for this.					
13) During the provision of health care, the graduate shows exemplary behaviours and leads within the health team.					
14) The graduate uses the resources cost-effectively, in the planning, implementation, execution, and evaluation processes of the health care services in the health institution she/he manages, for the benefit of the society and in accordance with the legislation.					
15) The graduate communicates positively within the health team with whom she/he provides health care services, being aware of the duties and obligations of other health workers and shows appropriate behaviours to assume different team roles when necessary.					

16) The graduate works harmoniously and effectively with her/his colleagues and other professional groups in her/his professional practice.	1	2	3	4	5
17) The graduate communicates effectively with patients, patient relatives, health care workers and other professional groups, institutions, and organizations, including individuals and groups that require a special approach and have different sociocultural characteristics.					
18) The graduate shows a patient-centred approach in the protection, diagnosis, treatment, follow-up, and rehabilitation processes that involve the patient and patient's caregivers as partners in the decision-making mechanisms.					
19) When necessary, the graduate plans and implements scientific research for the population she/he serves, and uses the results obtained and/or the results of other research for the benefit of the society.					
20) The graduate reaches the current literature information related to her/his profession, evaluates critically, and applies the principles of evidence-based medicine in the clinical decision-making process.					
21) The graduate uses information technologies to improve the effectiveness of her/his work in health care, research, and education.					
22) The graduate effectively manages individual study and learning processes and career development.					
23) The graduate demonstrates the ability to acquire, evaluate, integrate new knowledge with existing knowledge, apply it to professional situations, and adapt to changing conditions throughout professional life.					
24) The graduate chooses the right learning resources to improve the quality of the health care service she/he provides, organizes her/his own learning process.					

Course - Learning Outcome Relationship

No Effect	1 Lowest	2 Average	3 Highest

	Program Outcomes	Level of Contribution
1)	The graduate integrates the knowledge, skills, attitudes, and behaviours acquired from basic and clinical sciences, behavioural sciences, and social sciences in the form of competencies and uses them for the provision of rational, effective, safe health care services in accordance with quality standards in the prevention, diagnosis, treatment,	

	follow-up, and rehabilitation processes, and during the process considers protection of both patient's health and healthcare workers health including her/his own.	
2)	The graduate shows a biopsychosocial approach in patient management that considers the sociodemographic and sociocultural background of the individual without discrimination of language, religion, race, and gender.	
3)	The graduate prioritizes the protection and development of the health of individuals and society in the provision of health care services.	
4)	The graduate, considering the individual, social, public, and environmental factors affecting health; works towards maintaining and improving the state of health.	
5)	In the provision of health care services, the graduate considers both the changes in the physical and socioeconomic environment on a regional and global scale that affect health, as well as the changes in the individual characteristics and behaviours of the people who apply to her/him.	
6)	The graduate recognizes the characteristics, needs and expectations of the target population and provides health education to healthy/sick individuals and their relatives and other health care workers.	
7)	While carrying out her/his profession, the graduate fulfils her/his duties and obligations with determined behaviours to provide high-quality health care within the framework of ethical principles, rights and legal responsibilities and good medical practices, considering the integrity, privacy, and dignity of the patient.	
8)	The graduate evaluates and improves her/his own performance in professional practices in terms of emotions, cognitive characteristics, and behaviours.	
9)	The graduate physician advocates improving the provision of health services by considering the concepts of social reliability and social commitment to protect and improve public health.	
10)	To protect and improve health, the graduate physician can plan and carry out service delivery, training and consultancy processes related to individual and community health in cooperation with all components.	
11)	The graduate physician evaluates the impact of health policies and practices on individual and community health indicators and advocates increasing the quality of health services.	
12)	The graduate physician attaches importance to protecting and improving her/his own physical, mental, and social health, and does what is necessary for this.	
13)	During the provision of health care, the graduate shows exemplary behaviours and leads within the health team.	
14)	The graduate uses the resources cost-effectively, in the planning, implementation,	

	execution, and evaluation processes of the health care services in the health institution she/he manages, for the benefit of the society and in accordance with the legislation.	
15)	The graduate communicates positively within the health team with whom she/he provides health care services, being aware of the duties and obligations of other health workers and shows appropriate behaviours to assume different team roles when necessary.	
16)	The graduate works harmoniously and effectively with her/his colleagues and other professional groups in her/his professional practice.	
17)	The graduate communicates effectively with patients, patient relatives, health care workers and other professional groups, institutions, and organizations, including individuals and groups that require a special approach and have different sociocultural characteristics.	
18)	The graduate shows a patient-centred approach in the protection, diagnosis, treatment, follow-up, and rehabilitation processes that involve the patient and patient's caregivers as partners in the decision-making mechanisms.	
19)	When necessary, the graduate plans and implements scientific research for the population she/he serves, and uses the results obtained and/or the results of other research for the benefit of the society.	
20)	The graduate reaches the current literature information related to her/his profession, evaluates critically, and applies the principles of evidence-based medicine in the clinical decision-making process.	
21)	The graduate uses information technologies to improve the effectiveness of her/his work in health care, research, and education.	
22)	The graduate effectively manages individual study and learning processes and career development.	
23)	The graduate demonstrates the ability to acquire, evaluate, integrate new knowledge with existing knowledge, apply it to professional situations, and adapt to changing conditions throughout professional life.	
24)	The graduate chooses the right learning resources to improve the quality of the health care service she/he provides, organizes her/his own learning process.	

Assessment & Grading

Semester Requirements	Number of Activities	Level of Contribution
Presentation	1	% 40
Final	1	% 60

total		% 100
PERCENTAGE OF SEMESTER WORK		% 40
PERCENTAGE OF FINAL WORK		% 60
total		% 100

Workload and ECTS Credit Calculation

Activities	Number of Activities	Workload
Course Hours	16	48
Study Hours Out of Class	16	53
Presentations / Seminar	5	10
Final	1	2
Total Workload		113