



UNIVERSITY "UKSHIN HOTI" PRIZREN
International Summer School (ISS)
Faculty of Computer Sciences

SYLLABUS					
Faculty:	Faculty of Computer Science	ISS edition:	2022		
Course title:	Artificial Intelligence (AI) and engineering for smart cities				
Course status:	Obligatory	Code:		ECTS credits:	4
Teaching days/weeks:	14 days / 2 weeks	Teaching hours:	Lectures:	Exercises:	
			3	1	
Office hours:	15:00-16:00 (Monday-Friday)				
Course mentor / Supervisor:	Mustafa Karhan	E-mail:	mustafakarhan@karatekin.edu.tr mustafakarhan@gmail.com		
		Tel.:	+90 376 213 42 01 - 6168		
Course co-mentor / Co-supervisor:	Ercan Canhasi	E-mail:	ercan.canhasi@uni-prizren.com		
		Tel.:	+383 45542501		
COURSE DESCRIPTION:					
<ul style="list-style-type: none"> ▪ The definition of the term smart city, major domains in the smart cities ▪ Artificial Intelligence (AI) ▪ Categorization of artificial intelligence technologies in modern smart cities ▪ An overview of current AI-based applications deployed in different domains of smart city ▪ An overview of AI-based deployments in major smart city domains ▪ AI for energy in smart cities – (Smart Energy) ▪ AI for education in smart cities – (Smart Education) ▪ AI for mobility and transportation in smart cities – (Smart Mobility and Smart Transportation) ▪ AI for agriculture and irrigation in smart cities – (Smart Agriculture and Irrigation) ▪ AI for healthcare in smart cities – (Smart Healthcare) ▪ AI for security, rescue and environment in smart cities ▪ Analysis and comparison of different AI algorithms used in major smart city domains ▪ Challenges and future research directions 					

Course objectives:		Course learning outcomes:	
<p>The graduate of the course will be able to perform analyzes and produce solutions based on AI for energy, education, mobility, transportation, agriculture, irrigation, healthcare, security, rescue, and environment in smart cities.</p> <p>After taking the course students will have a sufficient and the basic level background in the relevant platforms in terms of both software and hardware for engineering and artificial intelligence applications in smart cities.</p>		<p>The graduates will be knowledgeable about recent smart cities' research trends and development regarding AI-based applications deployed in different domains of smart cities.</p> <p>The graduates will be knowledgeable about artificial intelligence algorithms used for current artificial intelligence and engineering applications in smart cities.</p>	
TEACHING METHODS:			
Lectures, exercises, discussions, course projects, homeworks, office hours (consultations) etc.			
CONDITIONS FOR COURSE IMPLEMENTATION:			
Classroom equipped with computer, projector and other IT devices.			
STUDENT EVALUATION METHODS AND GRADING SCALE:			
<p>The course is subject to continuous evaluation. At regular intervals we also ask students to participate in a more comprehensive evaluation. Student evaluation is done by exam, and the final grade consists of the following components:</p> <ul style="list-style-type: none"> ▪ Regular and active attendance: 20%, ▪ Course project: 30%, ▪ Final exam: 50% 	GRADING SCALE		
	Evaluation in %	Final grade	
	91 – 100	10	(ECTS – A)
	81 – 90	9	(ECTS - B)
	71 – 80	8	(ECTS - C)
	61 – 70	7	(ETCS - D)
	51 – 60	6	(ETCS - E)
0 – 50	5*	(ETCS – FX)	
LANGUAGE OF EXAMINATION:			
The examination tests are provided in English language, and students submit response in English.			
STUDENT DUTIES AND OBLIGATIONS:			
Lectures	Exercises and other study activities		
<ul style="list-style-type: none"> ▪ Regular and active lecture attendance ▪ Active participation in discussions ▪ Respect of the University Code of Ethics etc. 	<ul style="list-style-type: none"> ▪ Regular attendance of exercises and study activities ▪ Respect of the University Code of Ethics etc. 		
STUDENT WORKLOAD:			
Activity	Hours	Days	Total hours
Lectures	3	10	30
Exercises	1	10	10
Field work visits	3	4	12
Reading (Own study time)	3	10	30
Assignments (project, presentation, homework)	2	10	20
Total student workload:			102

Note: 1 ECTS credit = 25 hours, for example if the course has 4 ECTS credits a student must have workload of at least 100 hours during the International Summer School (ISS).

DAY	LECTURES		EXERCISES	
	Topic	Hours	Topic	Hours
1.	The definition of the term smart city, major domains in the smart cities - Emerging smart cities - Smart cities of the world - Artificial Intelligence (AI) and engineering application for smart cities: A brief overview	3	Exercise 1 Discussion and distribution of the course project topics.	1
	Artificial intelligence (AI) - Categorization of artificial intelligence technologies in modern smart cities - Software platforms - Hardware platforms - AI involvement in different domains of smart city - Conceptual smart city-AI framework.		Exercise 2 Assignments, quizzes and case studies related to the topic of the first day lecture.	
3.	AI for energy in smart cities – (Smart Energy) - Implementation areas - AI algorithms used in smart energy - Approaches and implementations	3	Exercise 3 Assignments, quizzes and case studies related to the topic of the second day lecture.	1
	AI for education in smart cities – (Smart Education) - Implementation areas - AI algorithms used in smart education - Approaches and implementations		Exercise 4 Assignments, quizzes and case studies related to the topic of the third day lecture.	
5.	AI for mobility and transportation in smart cities – (Smart Mobility and Smart Transportation) - Implementation areas - AI algorithms used in smart mobility and transportation - Approaches and implementations	3	Exercise 5 Assignments, quizzes and case studies related to the topic of the fourth day lecture.	1
	AI for agriculture and irrigation in smart cities – (Smart Agriculture and Irrigation) - Implementation areas - AI algorithms used in smart agriculture and irrigation - Approaches and implementations		Exercise 5 Assignments, quizzes and case studies related to the topic of the fifth day lecture.	
7.	AI for healthcare in smart cities – (Smart Healthcare) - Implementation areas	3	Exercise 7 Assignments, quizzes and case	1

	- AI algorithms used in smart healthcare - Approaches and implementations		studies related to the topic of the sixth day lecture.	
8.	AI for security, rescue and environment in smart cities - Implementation areas - AI algorithms used for security, rescue and environment in smart cities - Approaches and implementations	3	Exercise 8 Assignments, quizzes and case studies related to the topic of the seventh day lecture.	1
9.	Analysis and comparison of different AI algorithms used in major smart city domains - Approaches - Evaluation of scores of used algorithms - Performances	3	Exercise 9 Assignments, quizzes and case studies related to the topic of the eighth day lecture.	1
10.	Challenges and future research directions - Future research and implementations - Future direction	3	Exercise 10 Assignments, quizzes and case studies related to the topic of the ninth day lecture.	1

LITERATURE:

Papers:

- Herath, H. M. K. K. M. B., & Mittal, M. (2022). Adoption of artificial intelligence in smart cities: A comprehensive review. *International Journal of Information Management Data Insights*, 2(1), 100076.
- Ullah, Z., Al-Turjman, F., Mostarda, L., & Gagliardi, R. (2020). Applications of artificial intelligence and machine learning in smart cities. *Computer Communications*, 154, 313-323.
- Muhammed, T., Mehmood, R., Albeshri, A., & Katib, I. (2018). UbeHealth: A personalized ubiquitous cloud and edge-enabled networked healthcare system for smart cities. *IEEE Access*, 6, 32258-32285.
- Bellini, P., Nesi, P., & Pantaleo, G. (2022). IoT-enabled smart cities: A review of concepts, frameworks and key technologies. *Applied Sciences*, 12(3), 1607.
- Park, E., Del Pobil, A. P., & Kwon, S. J. (2018). The role of Internet of Things (IoT) in smart cities: Technology roadmap-oriented approaches. *Sustainability*, 10(5), 1388.
- Allam, Z., & Dhunny, Z. A. (2019). On big data, artificial intelligence and smart cities. *Cities*, 89, 80-91.
- Bellini, P., Nesi, P., & Pantaleo, G. (2022). IoT-enabled smart cities: A review of concepts, frameworks and key technologies. *Applied Sciences*, 12(3), 1607.
- Zanella, A., Bui, N., Castellani, A., Vangelista, L., & Zorzi, M. (2014). Internet of things for smart cities. *IEEE Internet of Things journal*, 1(1), 22-32.
- Şerban, A. C., & Lytras, M. D. (2020). Artificial intelligence for smart renewable energy sector in europe— smart energy infrastructures for next generation smart cities. *IEEE access*, 8, 77364-77377.
- Rathi, V. K., Rajput, N. K., Mishra, S., Grover, B. A., Tiwari, P., Jaiswal, A. K., & Hossain, M. S. (2021). An edge AI-enabled IoT healthcare monitoring system for smart cities. *Computers & Electrical Engineering*, 96, 107524.

REMARKS FOR STUDENTS:

- Student should be aware of and respect the institution and Code of ethics.
- Student should respect the schedule of lectures, exercises and other study activities.
- Student should possess and show student ISS ID card during lectures/exercises/examination.
- Student course project/presentation/homework must comply with professor instructions.
- During the exam is strictly forbidden to use of mobile phone devices.