SENG 324 - NEW TRENDS IN SOFTWARE ENGINEERING

Course Code	Course Name		Semester	
SENG 324	New Trends in Software Engineering		Fall ☒ Spring ☐ Summer ☐	
Hours			**Credit**	**ECTS**
Theory	**Practice**	**Lab**	3	6
3	0	0		

Course Details	
Department	New Trends in Software Engineering
Course Language	English
Course Level	Undergraduate ☒ Graduate ☐
Mode of Delivery	Face to Face ☒ Online ☐ Hybrid ☐
Course Type	Compulsory ☒ Elective ☐
Course Objectives	This course aims to provide a comprehensive understanding of the evolution and latest trends in software engineering disciplines while introducing students to the tools, frameworks, and technologies shaping modern software development. Through assignments and projects, students will develop practical skills and foster analytical thinking by comparing traditional and modern approaches within various domains. The course enhances problem-solving abilities using cutting-edge technologies such as AI, Blockchain, and Cloud Computing and equips students with the knowledge to identify and implement best practices in software development, testing, and deployment. By exploring future trends and innovations, students will be prepared for emerging roles in the software industry
Course Content	This syllabus is designed to cover each branch of software engineering and the latest trends. The course content spans various domains including frontend and backend development, DevOps, software testing, embedded systems, data engineering, artificial intelligence, cybersecurity, cloud computing, mobile app development, blockchain, and game development. It highlights practical applications and emerging trends like microservices, serverless computing, AI-powered tools, and decentralized systems. Students will engage with tools, frameworks, and methodologies relevant to each discipline while exploring advanced topics such as quantum computing, low-code platforms, and the future of software engineering. The syllabus integrates assignments and resources to foster a hands-on and analytical learning experience.
Course Method/ Techniques	Lecture ☒ Question & Answer ☒ Presentation ☒ Discussion ☒
Prerequisites/ Corequisites	Corequisites : CENG 205 Data Structures and Algorithms, CENG 109 Programming and Computation I, CENG 110 Programming and Computation II, SENG 202 Introduction to Database Systems, SENG 312 Data Mining
Work Placement(s)	No work placement is required for this course

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Textbook/References/Materials

1. **Primary Textbook:**
   a. "Software Engineering: A Practitioner's Approach" by Roger S. Pressman and Bruce R. Maxim.
2. **References:**
   a. "Clean Code: A Handbook of Agile Software Craftsmanship" by Robert C. Martin.
   b. "Designing Data-Intensive Applications" by Martin Kleppmann.
   c. "The DevOps Handbook" by Gene Kim, Jez Humble, Patrick Debois, and John Willis.
   d. "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" by Aurélien Géron.
   e. "Mastering Blockchain" by Imran Bashir.
   f. Braude, E. J., & Bernstein, M. E. (2016). Software engineering: Modern approaches (2nd ed.). Waveland Press. ISBN-13.978-1478632306
   g.
   h. Valente, M. T. (2024). Software engineering: A modern approach. Self-published.
3. **Online Resources:**
   a. Coursera and edX courses on software engineering trends and technologies.
   b. Documentation for tools and frameworks such as React, Node.js, Docker, Kubernetes, and TensorFlow.
   c. Websites like Medium, Dev.to, and freeCodeCamp for articles and tutorials.
4. **Additional Materials:**
   a. Videos and tutorials from YouTube channels like Traversy Media, The Net Ninja, and Fireship.
   b. Research papers on software engineering trends from IEEE and ACM digital libraries.

Course Category

Mathematics and Basic Sciences	☐		Education	☐
Engineering	☒		Science	☐
Engineering Design	☐		Health	☐
Social Sciences	☐		Profession	☐

Weekly Schedule

No	Topics	Materials/Notes
1	Introduction to Emerging Trends in Software and Computer Engineering	
2	Advancements in Artificial Intelligence and Machine Learning	

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3	Cloud Computing: Modern Software Development and Deployment	
4	The Internet of Things (IoT), Embedded Systems, and Autonomous Technologies	
5	Quantum Computing: The Future of Computation	
6	Microservices Architecture: Scalable and Resilient Systems	
7	DevOps Practices and Continuous Integration/Continuous Deployment (CI/CD)	
8	Blockchain Technology and Smart Contracts: Decentralized Innovation	
9	**Midterm Exam**	
10	Data Science and Big Data: Extracting Value from Information	
11	Human-Computer Interaction (HCI) and UX Design: AR/VR Applications	
12	Cybersecurity and DevSecOps: Securing the Software Ecosystem	
13	Agile Software Development, Project Management, and Advances in Test Automation	
14	Green Computing and Sustainable Software Engineering	
15	**Final exam**	

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Assessment Methods and Criteria

In-term studies	Quantity	Percentage
Attendance		
Lab		
Practice		
Fieldwork		
Course-specific internship		
Quiz/Studio/Criticize		
Homework	6	50
Presentation / Seminar		
Project		
Report	7	50
Seminar		
Midterm Exam		
Final Exam		
Total		**100%**
Contribution of Midterm Studies to Success Grade		50
Contribution of End of Semester Studies to Success Grade		50
Total		**100%**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration (Hrs)	Total Workload
Course Hours	14	3	42
Lab			
Practice			
Fieldwork			
Course-specific Work Placement			
Out-of-class study time	14	3	42
Quiz/Studio/Criticize			
Homework	10	20	20
Presentation / Seminar	1	6	6
Project			
Report			
Midterm Exam and Preparation for Midterm	1	20	20
Final Exam and Preparation for Final Exam	1	20	20
Total Workload			**150**
Total Workload / 25			**6**
ECTS Credit			**6**

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Course Learning Outcomes	
No	**Outcome**
L1	Students will understand the evolution of software engineering and the impact of emerging technologies on software development processes.
L2	Students will learn how to integrate modern technologies such as artificial intelligence, machine learning, and cloud computing into software projects.
L3	Students will comprehend the contributions of the Internet of Things (IoT), embedded systems, and autonomous technologies to software engineering.
L4	Students will explore the advantages and challenges of approaches such as microservices architecture, DevOps, and CI/CD in software development.
L5	Students will gain in-depth knowledge of agile software development methodologies, software test automation, and sustainable software development.

Contribution of Course Learning Outcomes to Program Competencies/Outcomes

Contribution Level: 1: Very Slight, 2: Slight, 3: Moderate, 4: Significant, 5: Very Significant

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	**Total**
L1	5	5	5	5	0	0	0	5	4	0	0	39 %71
L2	5	5	5	5	0	0	0	5	4	0	0	43 %78
L3	5	5	5	5	0	0	0	5	4	0	0	38 %69
L4	5	0	5	5	0	0	0	0	0	0	0	45 %82
L5	5	5	5	5	5	0	0	0	0	0	0	45 %82
Total												127

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