Course Syllabus

Code - Course Title	**OKÖ515 - AI-Supported STEAM Implementations in Early Childhood**
Course Type	I. SEMESTER
Laboratory + Practice	3+0
ECTS	**6.0**
Language of Instruction	Türkçe
Course Type	Elective Courses
Course Instructor(s)	PROF. DR. NİL DUBAN

Mode of Delivery	Face to face course
Prerequisites	none
Courses Recomended	STEM Implementations, Subject Matter Education Courses
Recommended Resources	Abdelghani, R., Rebai, I., & Aloui, S. (2025). The impact of AI-basedpersonalized learning systems on students' performance: A systematicreview. Computers & Education: Artificial Intelligence, 8, Article100432. https://doi.org/10.1016/j.caeai.2024.100432AlAli, R., Alsoud, K., & Athamneh, F. (2023). Towards a sustainable future:Evaluating the ability of STEM-based teaching in achieving sustainabledevelopment goals in learning. Sustainability, 15(16), 12542.https://doi.org/10.3390/su151612542Alkhawaja, L., Idris, M., Al-Sayyed, S., & Al Jaber, A. M. (2025). Exploring theimpact of Artificial Intelligence on students' skills for sustainabledevelopment in education. Frontiers in Education, 10, Article 1691148.doi: 10.3389/feduc.2025.169114Arifin, M., Haris, M., & Liang, J. (2025). Artificial intelligence in adaptiveeducation: A systematic review. International Journal of EducationalResearch, 125, Article 102512.https://doi.org/10.1016/j.ijer.2024.102512AYDOĞDU BÜLENT,DUBAN NİL,YILMAZ SÜMEYRA, (2024). Sınıfın Geleceği: Öğretmen-Yapay Zekâ İş Birliği, Bölüm adı:(Yapay Zekâ ile Fen Bilimleri Öğretimi) , nobel Yayıncılık, Basım sayısı:1, Sayfa Sayısı 270, ISBN:978-625-386-039-4AYDOĞDU BÜLENT, DUBAN NİL, (2021). Disiplinlerarası Fen Öğretimi, (FEN ÖĞRETİMİNDE DİSİPLİNLERARASI BAKIŞ AÇISI GELİŞTİRME), Anı Yayıncılık, Editör:Prof. Dr. Bülent Aydoğdu; Prof. Dr. Nil DUBAN, Basım sayısı:1, Sayfa Sayısı 340, ISBN:978-605-170-701-3DUBAN NİL, (2025). Yeni Yüzyılda Fen Eğitimi , Berikan Yayınevi, Editör:DUBAN NİL, Basım sayısı:1, Sayfa Sayısı 80, ISBN:978-625-5893-08-6
Work Placement	none

Course Syllabus

Weeks	Learning Outcomes	Topics	Teaching Methods
Week - 1		Introduction to STEM: Definition, historical development, components, and importance of STEM in early childhood education	
Week - 2		STEM Education in Early Childhood: Goals, principles, and contributions of STEM education to developmental domains	
Week - 3		STEM Education Programs and Characteristics: STEM practices worldwide and in Türkiye, and key characteristics of STEM programs	

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Weeks	Learning Outcomes	Topics	Teaching Methods
Week - 4		Interdisciplinary Approaches in STEM: Connections between STEM, arts, entrepreneurship, and social studies; STEAM, E-STEM, and S-STEM approaches	
Week - 5		Introduction to STEAM: Definition, philosophy, and importance of STEAM in early childhood education	
Week - 6		STEAM Education Programs and Characteristics: Structure, principles, and learning outcomes of STEAM programs	
Week - 7		AI-Supported Learning Environments: Concepts of artificial intelligence, AI applications in education, and learning environment design	
Week - 8		Artificial Intelligence Applications in Early Childhood: Use of AI tools in preschool education, opportunities, and ethical considerations	
Week - 9		Teacher and Student Roles in STEAM Applications: Teacher as facilitator, student as active learner, and learning processes	
Week - 10		Structure and Characteristics of STEAM-Based Lesson Plans: Learning outcomes, interdisciplinary integration, and activity design	
Week - 11		The 5E Learning Cycle and STEAM: Engagement, exploration, explanation, elaboration, and evaluation stages in STEAM lesson planning	
Week - 12		Developing AI-Supported STEM and STEAM Lesson Plans: Designing STEM and STEAM lesson plans with AI tools	
Week - 13		Examples of STEAM Practices: Analysis of AI-supported STEM and STEAM activity examples for early childhood education	
Week - 14		Presentation and Evaluation of Original Lesson Plans: Presentation, discussion, and evaluation of AI-supported STEAM lesson plans	

Learning Outcomes

#	Learning Outcome
1	Analyze the theoretical foundations and interdisciplinary nature of STEM and STEAM approaches in early childhood education.
2	Evaluate AI-supported learning environments and STEAM practices from a pedagogical perspective.
3	Design and develop AI-supported STEM and STEAM applications for early childhood education.

Sustainable Development Goals

No content has been provided.

Course Theme

No content has been provided.

AKTS Workload

Activity	Duration (Hour)	Count	Workload
Teorik Derse Katılım	0	0	0
Sınıf Dışı Çalışma (Ön Hazırlık & Pekiştirme Amaçlı)	0	0	0
Ödevler	0	0	0
Proje - Rapor - Sunum Hazırlama	0	0	0
Ara Sınav Hazırlığı (sınav süresi dahil)	0	0	0
Final Sınavı Hazırlığı (sınav süresi dahil)	0	0	0
Uygulama (Laboratuvar, Müzik/Enstrüman Uygulaması, Atölye/Saha Çalışması vb.)	0	0	0
Staj Uygulaması	0	0	0
		Calculated ECTS	**0**

Assessment Method and Passing Requirements

No content has been provided.

Assessment Method and Passing Requirements	Quamtity	Percentage (%)
1.Midterm Exam	1	40
Final Exam	1	60
	Sum (%)	**100**