Course Syllabus

Code - Course Title	**OKÖ603 - Educational Neuroscience Research in Early Childhood**
Course Type	I. SEMESTER
Laboratory + Practice	3+0
ECTS	**7.5**
Language of Instruction	Türkçe
Course Type	Elective Courses
Course Instructor(s)	PROF. DR. SERAP ERDOĞAN

Mode of Delivery	It will be done face to face.
Prerequisites	There are no prerequisites for the course.
Courses Recomended	there is none

Recommended Resources	Archer, C., & Siraj, I. (2015). Measuring the quality of movement-play in early childhood education settings: Linking movement-play and neuroscience. European Early Childhood Education Research Journal, 23(1), 21–42. https://doi.org/10.1080/1350293X.2014.890351Bonacina, S., Huang, S., White-Schwoch, T., Krizman, J., Nicol, T., & Kraus, N. (2021). Rhythm, reading, and sound processing in the brain in preschool children. NPJ science of learning, 6(1), 20. https://doi.org/10.1038/s41539-021-00097-5 Brown, E.D., Holochwost, S.J., Palmer Wolf, D., Allen, A.A., Garnett, M.L., Velazquez-Martin, B., Varnell, S., & Malatesta, J.L. (2024). Music education and neurophysiological regulation in early childhood: Should teachers guide or get out of the way?. Mind, Brain, and Education, 18(3), 360-372. https://doi.org/10.1111/mbe.12370 De Witt, M. W., & Lessing, A. C. (2018). Concept formation and the neurological executive function underlying a training programme to improve pre-reading skills. Early Child Development and Care, 188(12), 1635–1649. https://doi.org/10.1080/03004430.2017.1403435Dedyukina, M., Ivanova, M., Popova, L., & Semenov, Y. (2021). On the development of cognitive skills and behavior regulation of five-and six-year-old children. Revista on Line de Política E Gestão Educacional, 25(3), 2340-2360. https://doi.org/10.22633/rpge.v25i3.15926 Dias, N. M., & Seabra, A. G. (2017). Intervention for executive functions development in early elementary school children: Effects on learning and behaviour, and follow-up maintenance. Educational Psychology, 37(4), 468–486. https://doi.org/10.1080/01443410.2016.1214686 Gajos, J. M., & Beaver, K. M. (2016). The development of self-control from kindergarten to fifth grade: The effects of neuropsychological functioning and adversity. Early Child Development and Care, 186(10), 1571–1583. https://doi.org/10.1080/03004430.2015.1111881 Girard, C., Bastelica, T., Léone, J., Epinat-Duclos, J., Longo, L., & Prado, J. (2021). Nurturing the reading brain: Home literacy practices are associated with children's neural response to printed words through vocabulary skills. npj Science of Learning, 6, 34. https://doi.org/10.1038/s41539-021-00112-9 Holochwost, S.J., Coffman, J.L., Wagner, N.J., Gomes, L.A., & Propper, C.B. (2024). Parasympathetic nervous system activity during measures of volitional self-regulation predicts school readiness. Mind, Brain, and Education, 18(3), 333-345. https://doi.org/10.1111/mbe.12376 Immordino-Yang, M. H., Darling-Hammond, L., & Krone, C. R. (2025). Nurturing nature: How brain development is inherently social and emotional, and what this means for education. In Social and emotional learning (pp. 63-83). Routledge. Karmiloff-Smith, A. (1998). Development itself is the key to understanding developmental disorders. Trends in Cognitive Sciences, 2(10), 389-398. Mas, M., Jiménez, L., & Riera, C. (2018). Systematization of the psychomotor activity and cognitive development. Psicología Educativa. Revista de los Psicólogos de la Educación, 24(1), 38-41. https://doi.org/10.5093/psed2018a5 McLaughlin, K. A., Weissman, D., & Bitrán, D. (2021). Childhood adversity and neural development: A systematic review. Annual Review of Developmental Psychology, 1(1), 277–312. https://doi.org/10.1146/annurev-devpsych-121318-084950 Nelson, C. A. (2017). Hazards to early development: The biological embedding of early life adversity. Neuron, 96(2), 262–266. https://doi.org/10.1016/j.neuron.2017.09.027 Presentación Herrero, M. J., Siegenthaler Hierro, R., Pinto Tena, V., Mercader Ruiz, J., & Miranda Casas, A. (2015). Math skills and executive functioning in preschool: Clinical and ecological evaluation. Revista de Psicodidáctica, 20(1), 65-82. https://doi.org/10.1387/RevPsicodidact.11086 Romeo, R. R., Leonard, J. A., Robinson, S. T., West, M. R., Mackey, A. P., Rowe, M. L., & Gabrieli, J. D. (2018). Beyond the 30-million-word gap: Children's conversational exposure is associated with language-related brain function. Psychological Science, 29(5), 700-710. https://doi.org/10.1177/0956797617742725 Shlomov, I., Levit-Binnun, N., & Horowitz-Kraus, T. (2023), Neurodevelopmental effects of a mindfulness and kindness curriculum on executive functions in preschool children - a randomized, active-controlled study. Mind, Brain, and Education, 17(2), 132-148. https://doi.org/10.1111/mbe.12348 Ursache, A., Noble, K. G., & Blair, C. (2015). Socioeconomic status, subjective social status, and perceived stress: Associations with stress physiology and executive functioning. Behavioral Medicine, 41(3), 145-154. https://doi.org/10.1080/08964289.2015.1024604 Watanabe, N. (2021). Easy abacus calculation in early childhood to support executive function: An educational pilot case study of comparing brain activity in the prefrontal cortex. Frontiers in Education, 6, 757588. https://doi.org/10.3389/feduc.2021.757588 Wilson, A., Ahmed, H., Mead, N., Noble, H., Richardson, U., Wolpert, M. A., & Goswami, U. (2021). Neurocognitive predictors of response to intervention with GraphoGame Rime. Frontiers in Education, 6, 639294. https://doi.org/10.3389/feduc.2021.639294Zhou, D., Lydon-Staley, D. M., Zurn, P., & Bassett, D. S. (2020). The growth and form of knowledge networks by kinesthetic curiosity. Current Opinion in Behavioral Sciences, 35, 125-134. https://doi.org/10.1016/j.cobeha.2020.09.007
Work Placement	There is an application assignment

Course Syllabus

Weeks	Learning Outcomes	Topics	Teaching Methods
Week - 1		Introduction and Basic Concepts	
Week - 2		Neuroanatomy and Brain Development	
Week - 3		Early Childhood and Educational Neuroscience	
Week - 4		Educational neuroscience research	
Week - 5		Educational neuroscience research	
Week - 6		Educational neuroscience models	
Week - 7		Plasticity and Critical Periods; Neurobiology of Executive Functions	
Week - 8		Socio-Emotional Brain	
Week - 9		Language Acquisition and Literacy	
Week - 10		Mathematical Cognition and Number Sense	
Week - 11		Attention and Motivation Systems	
Week - 12		Neuroimaging Techniques	
Week - 13		Neuro-Ethics and Policy	
Week - 14		Presenting Research Proposals.	

Learning Outcomes

#	Learning Outcome
1	Will be able to explain the definition, principles, importance, and benefits of early childhood period and educational neuroscience.
2	Educational neuroscience research will be able to discuss its development.
3	Educational neuroscience models will be able to recognize basic features.
4	Will be able to describe the neurobiology and characteristics of executive functions.
5	The socio-emotional brain will be able to recognize language acquisition and literacy; mathematical cognition and number sense; attention and motivation systems.

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**