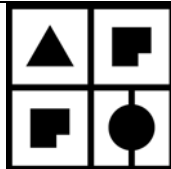


	UNIVERSITY OF BANJA LUKA				
	Master academic studies Civil Engineering, Structural Engineering				
Course title	Contemporary Concrete Composites				
Acronym	Status	Semester	Number of lectures	Number of tutorials/practical	ESPB
SBK-KU-OTG	mandatory	1	2L	2P	5.0
Lecturer	prof. dr Gordana Broćeta				
Prerequisites			Type of prerequisites		
None			None		
Aim of the course					
To acquire advanced knowledge of contemporary concrete composites and the enhancement of concrete performance through modification of its microstructure, analysis of governing parameters, and the application of sustainable development principles in the design and execution of concrete works.					
Learning outcomes					
The acquired knowledge is applied to solving complex problems in the theory and technology of concrete, as well as to advancing scientific research in the field of contemporary concrete composites.					
Course content					
Introduction to the importance of systematic understanding of contemporary concrete composites as a prerequisite for improving the quality and performance of concrete structures. Fundamental terminology in the field of modern concrete composites. Self-compacting concretes of powder-type, viscosity-modified, and combined types (constituent materials; mix design; properties in fresh and hardened states; testing methods for fresh properties; classification of fresh self-compacting concrete properties; advantages of application; representative case studies). Recycled aggregate concrete – recycled aggregate produced from waste concrete, recycled masonry (brick), recycled rubber, and recycled glass (methods of recycling construction waste; properties of recycled aggregates; specific aspects of mix design; properties of concrete in fresh and hardened states; advantages and limitations of application; representative case studies). Fiber-reinforced concrete – FRC – application of steel, polymer, mineral, carbon, and natural fibres (constituent materials; mix design and production; properties in fresh and hardened states; advantages and limitations of application; representative case studies). High-strength concrete; ultra-high-strength concrete; ultra-high-performance concrete and reactive powder concrete (constituent materials; mix design and production; properties in fresh and hardened states; performance characteristics, advantages and limitations; representative case studies). Translucent concrete (constituent materials; mix design and production; properties in fresh and hardened states; advantages and limitations; representative examples of prefabrication). Principles of designing concrete composites from the perspective of sustainable development, environmental protection, and efficient use of energy resources.					
Teaching methods					
Lectures and practical exercises. Preparation of elaborates under the supervision of teaching staff. Work conducted in classrooms, laboratories, and on-site.					
Literature					
1. G. Broćeta, A. Savić: Contemporary Concrete Composites (textbook manuscript in preparation), Faculty of Architecture, Civil Engineering and Geodesy, University of Banja Luka, 2026. 2. A. Savić, M. Škondrić: Savremeni materijali u građevinarstvu, Građevinski fakultet Univerziteta u Beogradu; Akademska misao, Beograd, 2025. (Original title) 3. M. Muravljov, D. Zakić, A. Radević: Tehnologija betona – Teorija i praksa, Građevinski fakultet Univerziteta u Beogradu; Akademska misao, Beograd, 2022. (Original title) 4. G. Broćeta, M. Malešev, V. Radonjanin: Trajnost samougrađujućeg betona u funkciji primijenjene vrste agregata, Arhitektonsko-građevinsko-geodetski fakultet Univerziteta u Banjoj Luci, Banja Luka, ISBN 978-99976-978-0-6, 2021. (Original title) 5. D. Bjegović, N. Štirmer: Teorija i tehnologija betona, Građevinski fakultet Sveučilišta u Zagrebu, Zagreb, 2015. (Original title)					

Methods of knowledge assessment and grading		
Written examination conducted in one or two parts, as selected by the student.		
Activity	Pre-exam obligations	Exam
2+2+6	35	55
Note		
Modernization of course through the activities of the ERASMUS project SKILL2SUSTAIN.		
Name of lecturer that prepared syllabus		
prof. dr Gordana Broćeta		