Course Unit Descriptor

Study Programme: Civil Engineering

Course Unit Title: Contemporary composites based on agriculture, industry and construction waste

Course Unit Code: GG412

Name of Lecturer(s): Bulatović Vesna, Malešev Mirjana, Lukić Ivan, Šupić Slobodan

Type and Level of Studies: bachelor

Course Status (compulsory/elective): elective

Semester (winter/ summer): winter

Language of instruction: english

Mode of course unit delivery (face-to-face/distance learning): face-to-face

Number of ECTS Allocated: 3

Prerequisites: none

Course Aims:.

Understanding the importance of usage of waste materials in construction industry in the scope of sustainable development and environmental protection. Getting to know about the availability of waste materials in the world and in Serbia which could be used as a substitution for aggregate or binder in concrete composites. Mastering knowledge on the properties and possibilities of application of concrete composites based on selected waste materials.

Learning Outcomes:

The acquired knowledge is used in engineering practice. Students are aware of the importance of protecting the environment, understand the principles of sustainable construction and green architecture and they are competent in the selection, preparation and use of various types of construction, industrial and agricultural waste materials, depending on the purpose of the concrete composite. They are also trained for mix design and the quality control of concrete composites.

Syllabus.

Principles of sustainable development, circular economy and environmental protection. Availability of waste materials from agriculture, industry and construction in the world and in Serbia. Production, preparation and testing of basic properties of selected waste materials which are used as aggregate in concrete (crushed bricks, crushed old concrete, chopped rubber, expanded glass and alkali activated fly ash) and for substitution of part of cement (flying ash, silica fume and biomass-ashes such as rice husk ash, wheat straw ash, soya straw ash and cob corn ash). Production, basic and special properties and possibilities for application of concrete and other composites on the basis of the listed waste materials.

Required Reading:

Relevant literature in English, tbd

Weekly Contact Hours:2	**Lectures: 2**	**Practical work: 2**

Teaching Methods:

Lectures, auditory and laboratory practice and consultations. During lectures, presentations with photographs, tables, diagrams, formulas and appropriate text – definitions are used to explain the students the course content predicted by the curriculum. In laboratory practice, students design and batch and mix concrete mixtures and test basic properties of fresh and hardened concrete based on waste materials. A part of the practice is used for computing, where students through different tasks connect the presented course content with the construction practice. Students are evaluated during lectures and exercises as well as their graphic work. The exam is taken orally in examination terms.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Attendance			
Computer exercises			
Tests (4x)			