Table S2.6.4. Form for the preparation of the course information sheets

Name of the subject: ***Contemporary building materials***

Code of the subject	Status of the subject	Semester	Number of ECTS credits	Class load
	Optional	I	10	2+0+2

Study programme for which it is organised:
Doctoral studies in sustainable development, MARDS

Dependency by other subjects: None

Objectives of studying this subject: The goal of this course is that PhD students: understand contemporary building materials and particularities of their implementation; use gained knowledge in the scientific research and in engineering practice regarding design, construction and maintenance.

Contents of the subject (teaching units, forms of students' individual work, forms of testing) presented per working weeks in the academic calendar:

Preparatory week	Consultation with supervisor, courses selection.
I week	Introduction. Basic terms regarding contemporary materials from aspects of structure and phenomenology.
II week	Composite materials. Special types of concrete and their application – high strength concretes, lightweight concretes, heavy concretes, SC concretes.
III week	Composite materials. Special types of concrete and mortar and their application – micro reinforced concretes and mortars, polymer modified concretes and mortars, polymer concretes and mortars, epoxy resins.
IV week	Mortars for special applications – decorative mortars, hydro isolating mortars, soundproof mortars, radiationproof mortars, fireproof mortars.
V week	Corrosion and materials durability (steel, concrete, etc.), with general protection measures.
VI week	Severity of the environment and technical requirements for protection measures.
VII week	Contemporary plastics – history, characteristics and most common application in civil engineering.
VIII week	Carbon fibres based materials.
IX week	Contemporary structural materials – polymer based reinforcements and coupling with classic concretes.
X week	Ecology aspect of contemporary building materials – green construction.
XI week	Sustainable development principles and possibility of recycling, with special reference to classic building materials.
XII week	Project task. Experimental and laboratory work. (individual work)
XIII week	Project task. Experimental and laboratory work. (individual work)
XIV week	Project task. Experimental and laboratory work. (consultation and review)
XV week	Project task. Experimental and laboratory work. (discussion and defence)

Methods of education: teaching (lectures and exercises), in combination with supervised work; consultations; project based teaching/learning; experimental and laboratory work; obtained knowledge and skills presentation

Student's load

Weekly	**In semester**
10 credits x 40/30 = **13.33 hours** Structure: **2** hours of lectures **2** hours of exercises **9.33** hours of individual work	**Lectures and final exam**: (13.33 hours) x 16 = **213.33 hours** **Necessary preparation** before the start of the semester (administration, enrolment, verification): (13.33 hours) x 2 = **26.66 hours** **Total workload for the course**: **10 x 30 = 300 hours** **Additional work** for preparing correction of the final exam, including taking the exam: **0 - 60 hours** (remaining time from the first and the second item to the total workload for the course of 300 hours) **Structure of the workload**: 213.33 hours (lectures and final exam) + 26.66 hours

	(preparation) + 60 hours (additional work)

Students' obligations during the teaching:

- regular attending lectures and other classes or adequate activity in supervised work
- conscientious and individual elaboration of homework and project tasks, as well as realisation of experimental and laboratory work, with systematisation of material and adequately applied scientific research methodology
- individual elaboration of written exam, accompanied by oral discussion
- presenting obtained knowledge during the semester and at the final exam

Literature:

- Mihailo A. Muravljov, Dragica Lj. Jevtić: Građevinski materijali 2, Beograd, 2003
- Specijalni betoni i malteri, svojstva, tehnologija, primena – Monografija, Građevinski fakultet u Beogradu, editor Mihailo A. Muravljov, 1999
- Građevinska fizika i materijali – Monografija, JUDIMK i Građevinski fakultet u Beogradu, 2008
- Svojstva svežeg i očvrslog betona u funkciji termohigrometrijskih parametara sredine – Monografija, Građevinski fakultet u Beogradu, editor Dragica Lj. Jevtić; 2008
- current literature (scientific papers from international conferences and journals)

Learning outcomes (complied with the outcomes for the study programme):

Knowledge and understanding:

On completion of this course the student will be able to:

- make general classification of contemporary building materials and solve problems concerning durability and economy of civil engineering structures,
- determine by experiment design characteristics of new materials and, by means of results analysis, suggest development of new materials or composites with pre-defined characteristics,
- analyse influential parameters in different exploitation conditions and their interactions with the environment,
- analyse possibility of forming new materials based on industrial and other types of waste components,
- analyse possibility of forming new materials based on components of recycled material,
- develop and study new materials with strict requirements regarding energy efficiency and requirements regarding harmonisation with EU Directive for construction products.

Transferable / Key skills and other attributes:

- Communication skills: oral defence of lab work, manner of expression at written examination.
- Use of information technology: use of software tools in parametric and other analyses.
- Calculation skills: performing calculation operations in parametric analyses.
- Problem solving: analyses of possibilities for new materials forming.

Forms of tests and evaluation:

Knowledge assessment is continuous during the semester, through pre-exam checks, and in the final exam. In total, student may collect max 100 points.
The following is assessed:

- experimental and laboratory work 25%,
- other semester activities (homework etc.) 25%,
- final exam 50%.

The final exam consists of written and oral part. Written part may be realised through project task. Grades (A, B, C, D, E, F) are adjoined to collected number of points, in line with the Law of Higher Education and study rules at the University of Montenegro.

Name and surname of teacher and associate:

Prof.Dr Radomir Zejak

Particularities needed to be emphasized for the subject:

Note (if needed):