Faculty of Architecture / ARCHITECTURA / NEW TECHNOLOGIES AND MATERIALS

Course:	NEW TECHNOLOGIES AND MATERIALS			
Course ID	**Course status**	**Semester**	**ECTS credits**	**Lessons** (Lessons+Exercises+Laboratory)
4378	Mandatory	6	3	2+1+0
Programs	ARCHITECTURA			
Prerequisites	No prerequisites required.			
Aims	The goal of the course is to explore the advantages and/or disadvantages of using modern (enhanced) technologies and/or materials. Students will be given the opportunity to reassess previously established solutions, with the possibility of their complete transformation and modification, including responses to ecological conditions, social changes, and challenges, referencing standards and the quality of design solutions, and properly adopting technical terminology. The aim is to develop an awareness of new materials with better mechanical, chemical, electrical, optical, and/or magnetic properties compared to traditional materials. The outcomes of the exercise consist of adding new knowledge related to contemporary construction materials and technologies, characterized by better performance, more modern appearance, resistance, durability, "eco-friendly" and "intelligent" design.			
Learning outcomes	It is expected that the student after passing the exam Contemporary technologies and materials: 1. Has adequate knowledge about structural systems, construction issues and modern technologies, relevant for architectural design; 2. Has adequate knowledge of the physical properties and characteristics of building materials, components and systems, as well as the influence of the same choices on the environment.			
Lecturer / Teaching assistant	Assistant Professor Sanja Paunović Žarić			
Methodology	Lectures, exercises, practical seminar project and consultations.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Classification and general overview of construction technologies (traditional, industrial, modular and cell systems). Traditional construction systems in comparison to modern construction systems.			
I week exercises	Facade design by using contemporary construction materials and technologies.			
II week lectures	Traditional construction systems in comparison to contemporary construction systems; Implementation of concrete in contemporary structures and materials.			
II week exercises	Façade design by using contemporary construction materials and technologies.			
III week lectures	Rationalized construction systems – prefabrication; Implementation of metal in the form of contemporary structures and materials.			
III week exercises	Facade design by using contemporary construction materials and technologies.			
IV week lectures	Implementation of glass in the form of contemporary structures and materials; Translucent materials; Intelligent glazing.			
IV week exercises	Facade design by using contemporary construction materials and technologies.			
V week lectures	Implementation of wood in the form of contemporary structures; Application of ceramic materials in the materialization of contemporary building envelopes.			
V week exercises	Facade design by using contemporary construction materials and technologies.			
VI week lectures	Implementation of plastic in the form of contemporary structures; Composite materials; Polycarbonate envelopes.			
VI week exercises	Facade design by using contemporary construction materials and technologies.			
VII week lectures	1st COLLOQUIUM			
VII week exercises	1st COLLOQUIUM			
VIII week lectures	Sustainable materials; Energy-efficient materials; Recyclable materials – principles, explanations, and presentation of environmentally friendly recycling methods.			
VIII week exercises	Façade design – first preliminary submission of the semester project.			
IX week lectures	High-performance materials; Smart facades; Shape-memory materials.			
IX week exercises	Façade design – Characteristic façade details with solution presentation, at the main project level, including all necessary details and dimensions, along with the display of any potential			

	transformations.
X week lectures	Systems of contemporary types of façade cladding; Application of unconventional materials in architectural design (textiles, paper, aerogel...).
X week exercises	Façade design – Characteristic façade details with solution presentation, at the main project level, including all necessary details and dimensions, along with the display of any potential transformations.
XI week lectures	Media facades / Interactive facades; Nanomaterials.
XI week exercises	Façade design – Characteristic façade details with solution presentation, at the main project level, including all necessary details and dimensions, along with the display of any potential transformations.
XII week lectures	Parametric design and algorithmic processes; Implementation of 3D printed materials in architecture.
XII week exercises	Façade design – Model of the selected façade segment (unified 3D printing in scale).
XIII week lectures	Vegetation materials in façade plane design; Binishells – pneumatically formed concrete structures, history, construction, design...
XIII week exercises	Façade design – Model of the selected façade segment (unified 3D printing in scale).
XIV week lectures	2nd COLLOQUIUM
XIV week exercises	2nd COLLOQUIUM
XV week lectures	Final exam
XV week exercises	Final exam
Student workload	Weekly 2 credits x 40/30 = 2 hours and 40 minutes During the semester 42 hours and 40 minutes (lectures) + 5 hours and 20 minutes.

Per week	**Per semester**
3 credits x 40/30=4 hours and 0 minuts 2 sat(a) theoretical classes 0 sat(a) practical classes 1 excercises **1 hour(s) i 0 minuts** of independent work, including consultations	Classes and final exam: **4 hour(s) i 0 minuts x 16 =64 hour(s) i 0 minuts** Necessary preparation before the beginning of the semester (administration, registration, certification): **4 hour(s) i 0 minuts x 2 =8 hour(s) i 0 minuts** Total workload for the subject: **3 x 30=90 hour(s)** Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) **18 hour(s) i 0 minuts** Workload structure: **64 hour(s) i 0 minuts (cources), 8 hour(s) i 0 minuts (preparation), 18 hour(s) i 0 minuts (additional work)**
Student obligations	Attendance in class: 5% First Colloquium: 22.5% (50% passing score) Second Colloquium: 22.5% (50% passing score) Semester Assignment: 50%
Consultations	
Literature	*** Knjige, članci, časopisi i publikacije sa fokusom na predstavljanja o savremenim materijala; Tehnički listovi proizvođača odabranog materijala. - Nataša Ćuković Ignjatović (2010). Fasada – adaptacije i transformacije. Zadužbina Andrejević - Amira Salihbegović (2018). Transparentne ovojnice i materijali u arhitekturi. Arhitektonski fakultet Univerziteta u Sarajevu - Vivienne Brophy, J. Owen Lewis (2011). A Green Vitruvius - Principles and Practice of Sustainable Architectural Design. Routledge - Christian Schittich, Gerald Staib, Dieter Balkow, Matthias Schuler, Werner Sobek (1999). Glass Construction Manual (Construction Manuals). DETAIL - Andrea Compagno (2002). Intelligent Glass Facades: Materials, Practice, Design. Birkhäuser - Eberhard Oesterle (2001). Double-Skin Facades: Integrated Planning. Prestel Pub - Dimitris Kottas (2012). Architecture & Construction in: Wood. Links - Links International (Editor) (2012). Architecture & Construction in: Concrete. Links - Dimitris Kottas (2012). Architecture & Construction in: Plastic. Links - Links International (Editor) (2012). Architecture & Construction in: Metal. Links - Dimitris Kottas (2012). Architecture & Construction in: Glass. Links - Daab Media (2006). Ag4 - Media Facades. Daab Pub; Multilingual edition - Florian Seidel (2008). Architecture Materials: Concrete. Taschen America Llc - Brownell, Blaine (2005). Transmaterial. Princeton Architectural Press - Brownell, Blaine (2008). Transmaterial 2. Princeton Architectural Press - Transmaterial 3: https://issuu.com/papress/docs/transmaterial-3 - Kelly Luckett (2009). Green Roof - Construction and Maintenance. McGraw Hill

Examination methods			Attendance 5% I Colloquium 22.5 % (50% point threshold) II Colloquium 22.5 % (50% point threshold) Practical task 50%			
Special remarks			Control by the University, the control of the teaching process by the faculty, the list of presence of students, analysis of the degree of transience (quality management system in accordance with ISO 9001).			
Comment			The tutorials are performed in groups of 2 students. If it is necessary, classes might be taught in English. Further information about the subject can be obtained from the course teacher / Vice Dean for Academic Affairs.			
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points