**Class: Construction Materials**

* Code: PM-RATNE097
* Semester: 1
* ECTS credits: 3
* Allotment of hours per week: 2L, 2P
* Prerequisites:
* Instructor: Orbán Zoltán PhD, associate professor, Tamás Balogh assistant lecturer

**Rövid leírás:**

This lecture and practical based subject intends to provide students with a useful knowledge concerning the fundamentals of construction materials and covers the following topics: chemical, physical and mechanical properties of construction materials; features and application of heat and sound insulation materials; waterproofing materials, bitumen, damp-proof layers, methods for later drying out of wet walls; production, testing and properties of construction ceramics, choice and application of ceramic masonry elements; types of mortar and their testing and properties, application of special mortars in the construction industry; construction with stone and their testing and application; types of timber, structure, physical and mechanical properties of wood, defects in wood and wood protection; metal and reinforced concrete, production, testing and mechanical properties of steel; architectural glass; properties of plastic materials and their application in the construction industry.

Through the examination of "changes in materials", chemical and physical processes can be examined, and by studying corrosion, degradation and compatibility of materials we can find the means to minimise damage or protect against degradation. Students also learn to classify the ever expanding range of construction materials, analyse the dangers originating from environmental changes and explain application directives and their boundary conditions.

This subject includes an architectural design project in the practical part (marked with a P) where students can practice and further develop the content of the lectures (marked with an L).

**Methods:**

1. visual methods for demonstrate the properties and changes (chemical and physical processes) in materials

2. practical and experimental methods

3. continuous communication

cal properties belong to the tests.

**Learning Objectives:**

Upon completion of this course the student should be able to:

1. interpret, appraise and put it into practice

a. the main and important properties of the basic building materials

b. the conditions of application of materials

2. choose the appropriate material for the design and structural problems and the built environment

**Process:**

In this course students will focus on the basic properties important for the building trade. On the lectures will focus on the manufacturing of materials and the different components of the materials.

The main purpose of the course is to obtain a useful knowledge about the material properties changing during the fabrication and during the using in construction.

There are lectures before the practical classes to get the theoretical basis and background of the properties and behavior of materials. The practical classes mainly focus on the material tests according to the European standards (EN) and the physical and chemical properties belong to the tests.

**Additional Reading will be equivalent to:**

1. Manfred Hegger, Volker Auch-Schwelk, Matthias Fuchs, Thorsten Rosenkranz, Construction Materials Manual, 2006.

2. Ken Ward-Harvey (2009). Fundamental Building Materials, Fourth Edition, Boca Raton, Florida, USA, Universal-Publishers, ISBN-10:1599429543, ISBN-13:9781599429540

3. Arthur Lyons (2010). Materials for Architects and Builders, Elsevier Science Ltd, ISBN-10: 1856175197, ISBN-13: 9781856175197

**Schedule:**

I. Materials for the concrete technology

A. Basic physical, chemical and mechanical properties

B. Binding materials – Lime, Cement, Gypsum

C. Aggregates

D. Concrete mix – properties and tests for determining the attributes

E. Concrete classification

F. Determining the concrete mixture

G. Basic principles of concrete mixture design

H. Concrete technology and chemical agents

I. Hardened concrete and concrete corrosion

J. Concretes for special purposes and applications

II. Construction materials – Insulations, wood, metal, ceramics

A. Thermal insulation and waterproofing

B. Building ceramics and masonry materials

C. Stones and mortars

D. Timber materials and protecting

E. Structural metals and rebars, metal corrosion

F. Glasses and composites

**Evaluation of Student Performance:**

1. Two test during the semester. The first test at the midterm and the second at the end of the semester. Grading will follow the course structure with the following weight: first test 40%, second test 40%, participation-activity 20%.

2. Class participation, class activity. Any unexcused absence will negatively affect your grade; 3 unexcused absences will result in failing the class. If you need to miss a class for any reason, please notify your professor by email prior to the start of that class.

Grading scale

Grade 5 4 3 2 1

Numeric Grade 100-86 85-76 75-66 65-56 55-0

1. Outstanding work

2. High quality work

3. Satisfactory work

4. Less than satisfactory work

5. Unsatisfactory work

**Students with special needs:**

Students with special physical needs and requesting classroom accommodation must first register with the Dean of Students Office, all application to provide an equal learning environment for all will be guaranteed.