UNIWERSYTET PRZYRODNICZY WE WROCŁAWIU

Technology of concrete and mortars

Educational subject description sheet

Basic information

Field of study Civil engineering **Speciality** - **Organizational unit** The Faculty of Environmental Engineering and Geodesy **Study level** First-cycle (engineer) programme **Study form** Full-time **Education profile** Practical	**Education cycle** 2022/23 **Subject code** ID000000IBU(P)S.I4.2558.22 **Lecture languages** english **Mandatory** optional **Block** major subjects (conducted) in foreign languages **Disciplines** Civil engineering and transport **Subject related to scientific research** Yes **Subject shaping practical skills** Nie

Teacher responsible for the subject	Wojciech Kilian
Other teachers conducting classes	Wojciech Kilian

Period Semester 3	**Examination** graded credit **Activities and hours** lecture: 15 laboratory classes: 50	**Number of ECTS points** 4.0

Goals

C1	Transfer of basic knowledge in the field of technology of concrete and mortar required in the civil engineering.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	The student is aware of the importance of concrete as a construction material in the life of modern societies. Has knowledge of the formation and properties of cement, aggregates, mortar, concrete mix and concrete. Understands the phenomena and transformations occurring in these materials in technological processes. Knows the basic test methods and criteria for assessing the quality of components and products in concrete technology. The student understands the relationship between the properties of materials and their composition and environmental conditions during production, maturation and operation. Knows the ways and principles of concreting works. Knows how to test the quality of concrete in an existing structure. Knows the differences between monolithic technology and the prefabrication of concrete elements.	BU_P6S_WG02, BU_P6S_WG07	written credit
Skills – Student can:			
U1	The student knows how to examine the features and assess the quality of ingredients, mixtures and mortar and cement concrete. Is able to design the composition and formulate the laboratory and working recipe of mortar and concrete mix based on the assumed conditions of production, environment and operation. Can determine the class of concrete based on destructive and non-destructive strength tests. Is able to plan the order of activities and select the necessary equipment for concreting works in connection with the features of the mix, type of construction and environmental conditions.	BU_P6S_UO21, BU_P6S_UU22, BU_P6S_UW04	written credit, observation of student's work, active participation, performing tasks
Social competences – Student is ready to:			
K1	The student understands the type and scope of environmental burdens caused by the production of mineral binders and cement concrete.	BU_P6S_KO03	written credit

Balance of ECTS points

Activity form	Activity hours*
lecture	15
laboratory classes	50
consultations	2
lesson preparation	30
exam / credit preparation	10
presentation/report preparation	10

Student workload	**Hours** 117	**ECTS** 4.0
Workload involving teacher	**Hours** 67	**ECTS** 2.4
Practical workload	**Hours** 50	**ECTS** 2.0

* hour means 45 minutes

Study content

No.	Course content	Activities
1.	Binders, hydraulic additives, mineral fillers and special additives, admixtures of construction chemicals used in concrete and mortar technology. Cements: types, properties and scope of application. Cement slurry, binding process. Make-up water. Aggregates for concrete and mortar. Designing ordinary and special concretes. Technological features of fresh concrete mix. Cement mortars. Technology for the production of precast concrete. Technology of concrete works: production and quality control of ready-mixed concrete, transport, laying, compaction, care in various conditions. Assessment of concrete quality in existing structures. Basic methods of repairing concrete structures. Recycling of concrete structures.	lecture
2.	Tests on the characteristics of cement binders. Examination of aggregate features. Designing a mix of aggregates for concrete and mortar. Designing the composition of the concrete mix. Cement mortar testing. Testing fresh concrete mix. Study of physical and mechanical properties of mature concrete. Non-destructive methods for determining the strength of concrete. Report presentation. Passing exercises.	laboratory classes

Course advanced

Teaching methods:

problem-solving method, project-based learning (PBL), lecture, classes, Blended learning. Selected lestures and classes on-line.

Activities	Examination methods	Percentage in subject assessment
lecture	written credit	40%
laboratory classes	observation of student’s work, active participation, performing tasks	60%

Entry requirements

Building materials

Literature

Obligatory

1. Z. Jamroży, Beton i jego technologie. PWN, Warszawa-Kraków, 2000
2. Czarnecki L. Beton według normy PN-EN 206-1 – komentarz. Wydawnictwo „Polski Cement”, Kraków 2004
3. J. Małolepszy, J. Deja, W. Brylicki, M. Gawlicki, Technologia betonu. Metody badań. Wydanie II, Wydawnictwo AGH, Kraków, 2000
4. E. Szymański, J. Kołakowski, Materiały budowlane z technologią betonu. Wydawn. Polit. Białostockiej, Białystok, 1992

Optional

1. E. Gantner, Z. Wrońska, W. Wędrychowski, S. Nicewicz, Materiały budowlane z technologią betonu. Ćwiczenia laboratoryjne. Oficyna Wydawnicza Polit. Warszawskiej, Warszawa, 2000
2. A.M. Neville, Właściwości betonu. Wydawn. „Polski Cement”, Kraków, 2001
3. J. Kołakowski, E. Szymański, Pracownia technologiczna w prefabrykacji budowlanej. Wydawn. Szkolne i Pedagogiczne, Warszawa, 1977
4. Zestawy norm PN, EN
5. W. Kurdowski, Chemia cementu i betonu, PWN
6. Czasopismo Cement Wapno Beton
7. Czasopismo Materiały Budowlane

Kierunkowe efekty uczenia się

Kod	Treść
BU_P6S_KO03	Absolwent jest gotów do wypełniania zobowiązań społecznych oraz współorganizowania działalności na rzecz środowiska społecznego;
BU_P6S_UO21	Absolwent potrafi organizować, współdziałać i pracować w grupie, przyjmując w niej różne role; potrafi odpowiednio określić priorytety służące realizacji określonego przez siebie lub innych zadania;
BU_P6S_UU22	Absolwent potrafi samodzielnie uzupełniać i poszerzać wiedzę w zakresie nowoczesnych procesów i technologii w budownictwie, samodzielnie planować i realizować własne uczenie się przez całe życie;
BU_P6S_UW04	Absolwent potrafi dokonać właściwego wyboru materiałów i wyrobów budowlanych, poprawnie je zastosować oraz wykonać eksperymenty laboratoryjne prowadzące do oceny jakości stosowanych materiałów budowlanych;
BU_P6S_WG02	Absolwent zna i rozumie w zaawansowanym stopniu procesy chemiczne, występujące w produkcji oraz bezpiecznym stosowaniu materiałów i wyrobów budowlanych;
BU_P6S_WG07	Absolwent zna i rozumie zna powszechnie stosowane materiały budowlane, technologię ich wytwarzania oraz zasady produkcji przemysłowej;