GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2018-2019

Materials Research (E715008)

Course size (nominal values; actual values may depend on programme)

Credits 3.0	Study time 85 h	Contact hrs	48.0 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 1)	Dutch	practicum	48.0 h

Lecturers in academic year 2018-2019

Wylaers, Marc	TW14	lecturer-in-charge
Boel, Veerle	TW14	co-lecturer
Vandenbruwane, Ignaas	TW14	co-lecturer

Offered in the following programmes in 2018-2019	crdts	offering
Master of Science in Civil Engineering Technology	3	A

Teaching languages

Dutch

Keywords

destructive testing, non-destructive testing, materials testing, concrete technology, reinforcement, formwork

Position of the course

Partim Production of a structural element:
Calculation and production of a structural element.

Partim Lab :
The purpose of the lab is to gain insight in the physical and mechanical properties of materials by conducting lab tests, analytical calculations and verifications using construction software. The students also learn to make use of european standards.

Contents

Partim Production of a structural element:
Calculation and production of a structural element (assembly of formwork and reinforcement cage, casting of concrete, and shuttering). In case the titular deems it necessary alternatively a specific research assignment can be given.

Partim Lab:
Lab examinations: analytical calculation of load tests (I-beam, inclined hollow section, warren truss) and the calculation of a concrete composition

Lab tests:

tests on aggregates
tests on cement
tests on mortar
concrete composition and casting
tests on hardened concrete
load test on an I-beam
load test on an inclined hollow section
tensile testing of steel or rebar
load test on a warren truss

Initial competences

Partim Production of a structural element:
Specific solution techniques from Stability, Reinforced Concrete calculation.

Partim Lab:
General mathematical calculation and solution techniques. Specific solution techniques from Strength of materials, Stability, Construction Technology I and II, Concrete calculation, Metal construction, applied mathematics and Concrete Technology'. Test methods of standardized tests.
The students are expected to come prepared to the lab, so during the tests there is no extra guidance on the theory and standards. There is obviously support for the correct use of the test equipment.

Final competences

1 To analyze the instruction.
2 To master research techniques and to be able to perform scientific research independently.
3 To read and create calculations, drawings and quantity surveys.
4 To understand the practical implementation (formwork and reinforcement cage making, concrete casting and shuttering).
5 Determine the concrete composition. To test the fresh properties of concrete and hardened concrete.
6 To be able to implement research methods and research techniques in an effective way also within an indefinite/unknown/uncertain context.
7 To be able to collect and to handle relevant scientific and technical information effectively.
8 To be able to communicate and to report information, ideas, problems and solutions – especially scientific and technical ones - to laymen as well as to specialists in an efficient way.
9 To be able to think and to reason permanently in a critical, creative and scientific way.
10 The above mentioned competences ensure that students can perform standardized tests adequately. The student has gained insight into the mechanical properties of materials and is capable to interpret the test results in a scientific way. This ensures that the student has acquired some research skills. Students can follow a predetermined schedule and knows to respect deadlines. The student is able to select an appropriate solution technique in function of a given structural problem.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Practicum

Extra information on the teaching methods

Self-study (book Concrete technology and textbook)
Labs

Learning materials and price

All technical subjects from the study curriculum
In case the titular deems it necessary alternatively a specific research assignment can be given.
PPE (Personal Protective Equipment): lab coat, safety shoes type S3
If additional PPE required to perform the test, they are made available: hearing protection, face protection, respiratory.

Estimated cost:
- Book concrete technology: 35 EUR (price for students)
- Safety shoes S3, helmet and fluorescent yellow vest: 55 EUR

References

Partim Production of a structural element:
Textbook Berekenen van gewapend beton in de grenstoestanden deel 1, ir. J; Ritzen - ir. R. Smet, ISBN 90 382 0192 3
Textbook Berekenen van gewapend beton in de grenstoestanden deel 2, ir. J; Ritzen - ir. R. Smet, ISBN 90 382 0336 5
Textbook Bouwtechniek I.

Partim Lab:
Standards and codes are available through the digital library and in the lab.
Textbook with description of the lab tests, lab rules, ... is available through the electronic platform Minerva.
Book: Concrete Technology – BBG - ISBN 2-9600637-1-6 (ISBN 978-2-9600637-1-4).
Different test setups in the lab.
Students are expected to consult their textbooks on stability, strength of materials, calculations of constructions I and II, and mechanics.

Course content-related study coaching

Until the day before a specific lab test the student can make an appointment with the teachers if there are some questions on the testing methods and theory. From the moment on the test started only questions on the testing machines and measuring equipment are allowed.

Evaluation methods

continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Examination methods in case of periodic evaluation during the second examination period

Examination methods in case of permanent evaluation

Assignment, skills test, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Extra information on the examination methods

The Materials Research course consists of 2 parts:
- Partim production constructive element: assignment and report.
- Partim Lab: lab examinations and reports of the lab tests.

Calculation of the examination mark

The distribution of points in the course Materials Research is as follows:
- 25% for the calculation and production v / e constructive element
- 20% for individual skill tests
- 55% for the reports of lab tests

When the student does not participate in the evaluation of one or more components or the student scores less than 10/20 for one of the components, he/she can no longer pass the entire course unit. If the total score is a mark of ten or more out of twenty, then this is reduced to the highest failing mark.
Unjustified absence in the project work gives rise to a total maximum score of 9/20.
Partim Production of a structural element
Calculation and production of a constructive element (team work): 25%
During the production of the constructive element students are evaluated based on their commitment and the quality of the finished product and the accuracy of the formwork and reinforcement cage, the drawings, the report, the tests on the fresh concrete and the specimens, cubes, cylinders and prisms.
Partim Lab
- Lab examinations (individual written examination): 20%

The assignment of quotas is based on the correctness of the responses of individual students. No points are given for a correct procedure only. Only a correct result with matching process results in a positive partial assignment of quotas.
- Reports of the lab tests (team work): 55%

The students are evaluated based on their knowledge regarding the lab test, the performance of the lab test, and the reporting on the lab test.

Unauthorized absences are charged by a fixed value (for each unauthorized absence) to be deducted from the final quotation.

Facilities for Working Students

There are no facilities for working students.