Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course offerings and teaching methods in academic year 2020-2021

A (semester 1) Dutch Gent
group work 0.0 h
lecture: plenary exercises 6.0 h
lecture 18.0 h

Offered in the following programmes in 2020-2021
Bachelor of Science in Engineering Technology (main subject Civil Engineering Technology)
Linking Course Master of Science in Civil Engineering Technology

Teaching languages
Dutch

Keywords
metal construction, welded joints, yield criterion, corrosion

Position of the course
Introduction to the use of steel and other metals as building materials;
Classification of steel according to chemical structure, to application possibilities, to sizes, dimensions and tolerances of the products;
Making the student familiar with:
- mechanical and thermal processing of steel components;
- problems as corrosion, and the means to prevent or to solve them;
- dimensioning of profiled beams and other structural components under current loads, with special attention to torsion;
- technology of the welded connections in steel structures;
- the important topic of the durability of steel structures, and the measures to be taken in the stage of design, manufacturing and erection.

Developing skills with respect to the calculation and dimensioning of welded joints.

Contents
Part 1:
Generalities; production of steel; characteristics; thermal, chemical and mechanical processing; properties;
Classification of steel according to chemical structure, to application possibilities, to shape, size, dimensions and tolerances of the building-products.

Part 2:
Steel for current use in steel construction; chemical structure; mechanical properties:
- strength, toughness, ductility, hardness; stress and strain;
- Trade products of rolled steel and appliance: hot and cold rolled profiles, plate products;
- Mechanical processing;
General and local corrosion; rust; removing, preventing and protection.
Part 3: Calculation of profile metals and other structural elements; allowed stresses and deformations; yield-criterion; load types and combinations: traction, compression, instability, shear, bending, torsion; calculation exercises;

Part 4: Technology of connections in steel structures; Welded joints: welding techniques, specifications, residual welding stresses, recommendations for design and manufacturing, calculation, design criteria in case of static and dynamic actions;

Initial competences
Final objectives of BOUWKUNDIGE REKENTECHNIEKEN I and II. Mechanics of materials.

Final competences
1. The student uses good insight in basic concepts of Probability and Statistics to determine representative values of material properties and relevant values and combinations of the actions on the steel structure.
2. The student analyses the mechanical behavior of welded joints (calculation of the load stresses) and applies the criteria for the design (in ultimate limit state) or assessment (in serviceability limit state).
3. The student completes the structural design of welded connections in steel structures in a correct way.
4. The student performs an observational analysis of a steel structure and reports in written, orally and graphically on the manufacturing and the building, the constructional details, the joints, the fire safety engineering,...
5. The student uses the technical terminology: alloying by precipitates, killed steels, quenching and self-tempering steel, Heat Affected Zone, residual welding stresses, ...
6. Knowing the different mechanisms of corrosion the elements and the joints of a steel structure have to deal with, the student takes measures in the stage of design, manufacturing and building in order to minimize or even prevent the problems due to this cause.
7. The student prevents and solves problems related to the stability or durability of steel structures on long terms, by taking measures in the stage of design, manufacturing or construction.
8. The student performs the structural design of a profiled beam or another structural component of a steel structure under current loads;
9. Appropriate and efficient use of the available standard profiles is guaranteed.

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
Group work, lecture, lecture: plenary exercises, online lecture.

Extra information on the teaching methods
Classroom and online lectures: 18h;
Classroom problem solving sessions: 6h;
Teamwork: observational analysis of structural steelwork.

Learning materials and price
*Teacher's course (Dutch): digitally available for free;
*Technical documentation: catalogue of steel profiles;
*Documentation and supplementary courseware on e-learning platform.

References
see references teacher's course and supplementary courseware.

Course content-related study coaching
1. Guidance and coaching by lecturer and assistants: Possibility to obtain individual explanation in case of any problem;
2. E-learning platform: Students can visit an electronic workspace for supplementary courseware and possible examination questions.

Evaluation methods
(Approved)
end-of-term evaluation and continuous assessment

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

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

Examination methods in case of permanent evaluation
  Assignment, report

Possibilities of retake in case of permanent evaluation
  examination during the second examination period is not possible

Extra information on the examination methods
  Theory: oral examination after written preparation;
  Teamwork: observational analysis of a recently built steel structure; conclusions and
  powerpoint presentation

Calculation of the examination mark
  Theory: 75%
  Teamwork: 25%
  The assessment and the final assignment of quotas of course components happens by
  means of the mathematical average according to the apportioned coefficients.
  When the student does not participate in the evaluation of one or more components or
  the student scores less than 8/20 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.

Facilities for Working Students
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