**Civil Engineering Draw**

**Code:** MK3MAG1S6SX17EN

**ECTS Credit Points:** 4 credits

**Evaluation:** mid-semester grade

**Year, Semester:** 1st year, 1st semester

**Its prerequisite(s):** -

**Further courses are built on it:** Yes

**Number of teaching hours/week**

Lecture: 2

Practice: 2

**Topics**:

The series of lectures are based on the relevant standards.

It reviews the fundamental rules and formal requirements of technical drawing, drawing of projections, views and sections, auxiliary and sectional views. Representations of threaded parts, and threaded fasteners, gears, splines and keys. Drawing standardized machine elements and the concept of manufacturing tolerance and fitting, dimensional specification, geometrical and positioning tolerancing, surface roughness and the rules of elaboration of the workshop drawing and detailed drawings of simple machine elements.

In seminar there are six tasks to elaborate: workshop drawing of different machine elements and components.

**Literature:**

*Compulsory:*

TIBA ZS.: Machine Drawing, ISBN 978-963-318-066-2, Debrecen University Press 2010.

*Recommended:*

**Schedule**

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| **1st week Registration week** | |
| **2nd week:**  **Lecture:** Drawing standards, formal requirements of machine drawings. Drawing sheet dimensions, title block, defining the line types and thickness groups. Standardized letter and figure shape and sizes, scales, full size, reduction scales, enlarged scales.  **Practice:** issuing task 1: Lettering | **3rd week:**  **Lecture:** Defining the surfaces of a part. Presentation method in machine drawing, views, auxiliary view, local view, breaking, sectional views and sections.  **Practice:** issuing task 2: Drawing Machine Parts. Practicing the presentation methods. |
| **4th week:**  **Lecture:** Complex sectional views, removed element, removed sections, specific sectional views and sections, conventional practice in machine drawing.  **Practice:** submitting the task 1: Lettering, elaborating the task 2. Practicing the presentation methods. | **5th week:**  **Lecture:** General prescriptions for dimensioning, choosing basis surfaces. Conventional dimensioning methods.  **Practice:** submitting the task 2, issuing the task 3: Shaft drawing. Practicing the presentation methods. |
| **6th week:**  **Lecture:** Specific dimensioning, defining and giving conical taper and flat taper  **Practice:** Applying the dimensioning methods to dimensioning parts. | **7th week:**  **Lecture:** ISO Tolerance system. Basic size, actual size, limits, deviations, fundamental deviation. Defining the tolerance IT grades, hole-base system, shaft base system. Free dimensional tolerance.  **Practice:** submitting the task 3, issuing the task 4: Designing Fitting Pieces. Applying the cutting plane and the cutting sphere method to construct the intersection lines of interpenetrating surfaces. Applying the triangulation and parallel line methods to  develop fitting pieces. Representing tolerances and calculating its dimensions. |
| **8th week: 1st drawing week** |  |
| **9th week:**  **Mid-term test**  **Lecture:** ISO Tolerance system. Defining fits: clearance, transition and interference fit. Form and position tolerances.  **Practice:** Designing Fitting Pieces. Applying the triangulation and parallel line methods to  develop fitting pieces. Representing fits and calculating its dimensions. Elaborating the shop drawing of pattern development of fitting pieces  . | **10th week:**  **Lecture:** Defining the surface roughness. Feasible roughness with different processing methods. Correlation between the surface roughness and the IT grade of dimension.  **Practice**: issuing the task 5: Screw Fastening and Joints. Presentation of tolerances and fits in drawing. Presentation of surface roughness in drawing. |
| **11th week:**  **Lecture:** Standardized Thread forms and its main features. Threads and thread symbols in drawing. Threaded joints: bolted joint, studded joint, screw fastening.  **Practice:** elaborating the task 5, Drawing threaded joints in section and on view. | **12th week:**  **Lecture:** springs: standardized representation of helical spring, Belleville spring, buffer spring, annular spring, multi-leaf spring. Keyed joints with saddle keys, sunk keys, parallel keys and woodruff keys. Splined shaft joint.  **Practice:** submitting the task 5, issuing the task 6: Gearing. Drawing keyed joints and splined shaft joint in section and on view. |
| **13th week:**  **Lecture:** Gears and toothed parts. Spur and helical gears, bevel gears, worms, rack and pinion gears, sprockets.  **Practice:** elaborating the gear task 5. Drawing meshing gears in section and on view. | **14th week:**  **End-term test**  **Lecture:** rolling bearings: ball and roller bearings. Riveted joints. Welding symbols and welded joints: butt joint, lap joint, tee joint, corner joint.  **Practice:** submitting the task 6. Drawing bearings, riveted and welded joints in section and on view. |
| **15th week: 2nd drawing week** | |

**Requirements**

**A,** **for a signature:**

Attendance at lectures is recommended, but not compulsory.

Participation at practice is compulsory. Students must attend the practical classes and may not miss more than three practical classes during the semester. In case a student misses more than three, the subject will not be signed and the student must repeat the course. Students can’t make up a practice with another group. The attendance at practice will be recorded by the practice leader. Being late is counted as an absence. In case of further absences, a medical certificate needs to be presented. Missed practice classes should be made up for at a later date, to be discussed with the tutor. Students are required to bring the drawing tasks and drawing instruments for the course with them to each practice. Active participation is evaluated by the teacher in every class. If a student’s behaviour or conduct doesn’t meet the requirements of active participation, the teacher may evaluate his/her participation as an absence due to the lack of active participation in class.

Students have to submit all the six drawing tasks as scheduled minimum on a sufficient level.

During the semester there are two tests: the mid-term test is in the 9th week and the end-term test in the 14th week. Students have to sit for the tests.

**B, for a grade:**

The course ends in a mid-semester grade. Based on the average of the marks of the drawings and the average of the test results, the mid-semester grade is calculated as an average of them:

* average grade of the six drawing tasks
* average grade of the two tests

The minimum requirement for the mid-term and end-term tests is 60%. Based on the score of the tests separately, the grade for the tests is given according to the following table:

Score Grade

0-59 fail (1)

60-69 pass (2)

70-79 satisfactory (3)

80-89 good (4)

90-100 excellent (5)

If the score of any test is below 60, the student once can take a retake test covering the whole semester material.