Hochschule Konstanz
University of Applied Sciences

Course number: MECH-312
Design of Mechanical Components/Machine Design
Study level: Bachelor / Undergraduate

Prof. Dr. Burkhard Lege

Language of instruction: English
ECTS Credits: 8

Objectives:

Objective 1: Design and draw machines containing several standard components

1.1 The students will be able to chose adequate components for a given task and design them according to stress and fatigue.
1.2 The students will be able to assemble the components into a machine and draw the machine as a technical drawing.
1.3 The students will be able to design the necessary part, that are not standard components e.g. castings, welded parts or shafts.
1.4 The student will be able to design the machine in a manner that allows it to be manufactured, assembled and maintained. Given two different designs, the students will be able to judge, which would be cheaper to produce.

Objective 2: Work with standards and books

The students will have some practice to work with standards and books and to derive the necessary information from them.

Contents:

The course applies theory and techniques learned in the mechanics courses to design mechanical components. The students learn to choose the right components for a machine according to the requirements function, load, stress (strength and fatigue design), lubrication, wear and costs. The students learn to calculate the mechanical properties of a chosen set of mechanical components in detail. This set includes rolling bearings, axles, pins, shafts, rivets, several types of connections between hub and shaft e.g. feather keys and force fits, couplings and clutches and welded connections between machine parts.
Other components like gear wheels; screws and springs will be used when designing machines or machine parts as homework, while the strength and fatigue design of these components will be learned in succeeding courses.
The homework consists of two or three larger take-home projects, like the design of a bottom hook block or a lifting gear for a crane or a simple adjustable friction gear. The projects start with a set of requirements and a blank piece of paper. The students usually have to work with the standards of some components in order to design them properly. The progress of the projects will get discussed regularly in small groups.

Assessment:

The students have to design several machines or machine parts as homework. The task will be discussed and the solutions have to be presented. Part of the homework can be solved in small teams. The progress of the homework will be controlled regularly.
At the end of the term, a written examination of 90 minutes will be given.
Grading:
Homework: 45%
Presentation: 5%
Examinations: 50%
Total: 100%