Summary
This course aims to provide a concise understanding of how materials and structures react to loads. It covers the basics of stress and strain in multi dimensions, deformation and failure criteria. The course is tailored to problems students from micro-engineering might encounter.

Content
• Review of equilibrium rigid body mechanics
• Stress and strain in one dimension
• Stress and strain in higher dimensions
• Stress concentrations
• Torsion
• Transformation of stress and strain
• Stress and strain in beams (shear and bending moments)
• Beam bending
• Indeterminate beams
• Beam buckling

Keywords
stress, strain, axial deformation, torsion, beam bending, buckling

Learning Prerequisites
Required courses
Statique et Dynamique - BA2 - MICRO-102

Learning Outcomes
By the end of the course, the student must be able to:
• Contextualise typical problems involving loads, pressures and torques
• Compute the stress and strain state of a structure in 3D
• Compute load limits and best geometries given a design problem
• Demonstrate a thorough understanding of the relationships between stresses and strains in 3D

Teaching methods
3 hours lecture and one hour exercises per week

Expected student activities
To work at solving the exercises given in the course

Assessment methods
Written exams: Midterm (30% of the grade) and Final (70% of the grade)

Supervision
Office hours  Yes
Assistants  Yes
Forum  No

Resources
Bibliography
Mechanics of Materials from James Gere and Barry Goodno

Ressources en bibliothèque
• Mechanics of Materials / Gere

Notes/Handbook
The course will follow different textbooks that will be provided through moodle to the class attendees.

Moodle Link
• http://moodle.epfl.ch/course/view.php?id=13763