

Course Number: 28907
Course Name: Spine Biomechanics

Course Type: Theory
Prerequisite: Nothing
Level: Graduate
Group: Applied mechanics

Type & Max Unit: Constant 3
Corequisite: Nothing.
First Presentation: 2013-2
Last Edition: 2016-2.

Objectives:

The main goal of this course is to present the basic principles of spine biomechanics and its applications in ergonomics and rehabilitation. A number of *in vivo* and modeling approaches to determine spine loads during various recreational and occupational activities are presented.

Topics:

- Epidemiology and etiology of low back disorders
- Anatomy of the human spine and an introduction to spine biomechanics
- Evaluation of spinal loads using *in vivo* and *in vitro* approaches
- Biomechanical models of the spine: optimization-based, EMG-based, Finite element, and hybrid models
- Stability of the spine
- Application of the biomechanical models of the spine in design of prevention and rehabilitation programs

References:

- 1- Clinical and Radiological Anatomy of the Lumbar Spine, 5th Edition, by Nikolai Bogduk, 2012.
- 2- Reeves NP, Cholewicki J. Modeling the human lumbar spine for assessing spinal loads, stability, and risk of injury. Crit Rev Biomed Eng. 2003; 31(1-2):73-139.
- 3- Arjmand N, Bazrgari B., Shirazi-Adl A., 2008. Modeling and simulation of tissue load in the human spine. In: Hong Y., Bartlett R. (Eds), Routledge Handbook of Biomechanics and Human Movement Science. Taylor and Francis Ltd, London, pp. 35-49.
- 4- Low back disorders: evidence-based prevention and rehabilitation, 3rd Edition, by Stuart McGill, 2016.