

Course Number: 28897**Course Name: Occupational Biomechanics**

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

Type & Max Unit: Constant 3
Corequisite: Nothing.
First Presentation: 1999-2
Last Edition: 2017-1.

Objectives:

The main goal of this course is to present the basic principles of biomechanics in assessing risk of injury during occupational activities. Several lifting analysis tools (both academic and commercial) are presented for evaluation of occupational risk of injury.

Topics:

Importance and objectives of occupational biomechanics
 Functional Anatomy of the Human Spine
 In vivo Methods to Estimate Spinal Loads
 Biomechanical Modeling Methods to Estimate Spinal Loads
 Application of Biomechanical Models in Occupational Ergonomics
 Popular Lifting Assessment Tools: NIOSH, Snook's Table, HCBCF8, 3DSSPP, Polynomials of McGill et al., 1996, and Predictive Equations of Arjmand et al., Potivn's model
 Application of Biomechanical Models in Design of ergonomics 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- Waters, T.R., Putz-Anderson, V., Garg, A., Fine, L.J. Revised NIOSH equation for the design and evaluation of manual lifting tasks. Ergonomics 1993; 36(7):749-776.
- 4- Snook, S.H., Ciriello, V.M. The design of manual handling tasks: revised tables of maximum acceptable weights and forces. Ergonomics 1991;34(9):1197-1213.
- 5- Merryweather, A.S., Loertscher, M.C., Bloswick, D.S. A revised back compressive force estimation model for ergonomic evaluation of lifting tasks. Work 2009; 34(3):263-272.
- 6- McGill, S.M., Norman, R.W., Cholewicki, J., 1996. A simple polynomial that predicts low-back compression during complex 3-D tasks. Ergonomics 39(9), 1107-1118.
- 7- Arjmand N, Plamondon A, Shirazi-Adl A, Larivière C, Parnianpour M. Predictive equations to estimate spinal loads in symmetric lifting tasks. J Biomech. 2011 Jan 4;44(1):84-91.