

Fall 2019

IE 665-101: Applied Industrial Ergonomics

Arijit Sengupta

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Applied Industrial Ergonomics (Fall 2019)
IE 665-101 Monday 6:00pm-9:05pm @ CKB 310

Instructor

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Office: GITC 2102

Office Hours: Tuesday 10 am to 12 noon, Thursday 3:15-5 pm, other time by appointment. [Click here to make an appointment.](#)

Catalog Description

Prerequisites: IE 355 (see undergraduate catalog for description) or IE 699. Introduces the fundamentals and applications of industrial ergonomics for improving equipment, tool, workplace, and job design. Engineers, as well as safety and health professionals, will benefit from the course by understanding the design principles for human operators and current issues in industrial ergonomics, and a variety of evaluating methodologies for the design

Textbook: Work Design: Occupational Ergonomics by Stephan A. Konz and Steven Johnson, latest edition

ISBN 13: 978-1-890871 **ISBN 10:** 1-890871-79-6.

Lecture notes and other relevant material posted on this page or handed out in class are required reading for the course.

Course Outline

Tentative weekly schedule of lecture topics (Any change will be notified beforehand in the class)

| Week | Topic |
|----------------------------|--|
| Sep 09 | Introduction of ergonomics , Term project outline , Homework#1 Lecture note |
| Sep 16 Sep 23 Sep 30 | Muscular contraction Lecture note Presentation#1 Video Handout#1 Presentation#2 Handout#2 Quiz Muscle types and joints Structure of muscle cells and mechanism of contraction Length tension relationship Type of contractions: isometric, concentric, eccentric Aerobic and anaerobic energy metabolism Central and peripheral nervous system, motor unit Regulation of force, local muscle fatigue EMG analysis (DHHS 91-100, read chapter 2 and 5) Biomechanics lecture backmodel |

| | |
|--------|--|
| | 2D model for lifting Segment mass and cg Lever systems, Static and dynamic muscle and joint forces Download 3DSSPP software EMG Lecture Electromyogram More on EMG |
| Oct 07 | Anatomy of cardiovascular system Handout Quiz Heart rate, stroke volume, blood pressure, oxygen consumption Metabolic rate and fatigue Handout |
| Oct 14 | Laboratory#1 Data-Laboratory#1 |
| Oct 21 | Temporal Ergonomics Handout Quiz Review |
| Oct 28 | Midterm Exam |
| Nov 04 | Engineering anthropometry, percentile calculations, use of data handout Normal distribution table Philippine anthropometric data Workstation Design handout quiz |
| Nov 11 | Workstation Design continued Supermarket Checkstand Design |
| Nov 18 | Musculoskeletal Disorders Handout Procedure for Managing Injury Risks Associated with Manual Tasks RULA analysis exercise MDS quiz RULA original paper Case study |
| Nov 25 | Manual Handling NIOSH lifting equation Homework Worksheet |
| Dec 02 | Hand tool design Lecture note |
| Dec 09 | Term Project Presentation |
| Dec 16 | Final Exam |

Grade Distribution

Quizzes, Lab, homework, attendance and class participation (15%)

Term project (25%) with a report and class presentation on an ergonomics topic.

Midterm and Final Exam (30% each)

NJIT Honor code constitution will be followed