

IE 342 Product Design and innovation 2(2,1,2)

Catalog Data	Introduction to work analysis and design; methods engineering; study of the basic work measurement techniques; applications and limitations of the stop-watch time study, pre-determined motion time systems.			
Prerequisite	IE 352, STAT 324			
Co-requisites	IE 341			
Level	8			
Textbook	Motion and Time Study; Design and Measurement of Work; Ralph M. Barnes, 7th Ed., John Wiley & Sons; 1980.			
Reference	1. Methods, Standards and Work Design; Benjamin W. Niebel and Andris Freivalds; 11th ed; McGraw Hill; 2003. 2. Motion and Time Study for Lean Manufacturing; Fred E. Meyers and Jim R. Stewart; 3rd Ed.; Prentice Hall; 2002. 3. Work Systems: The Methods, Measurement & Management of Work; Mikell P. Groover; Prentice Hall; 2006.			
Learning Objectives	1. To provide the students the knowledge for methods engineering and study of the basic work measurement techniques. 2. Develop students' ability to investigate a specific operation with the goal of finding improvements to the operation and implementing these suggested improvements to the process or the layout.			
Topics (classes)		Topic	Week	Contact, hr
	1.	Introduction; Productivity; Definition and Scope of Motion and Time Study.	0.5	2.5
	2.	History of Motion and Time Study. The general problem solving process.	0.5	0.5
	3.	Work methods design; Process analysis	1.5	7.5
	4.	Activity charts; Man and machine charts; Analysis and charting techniques	2	10
	5.	Micromotion study; Motion study equipment; Film analysis.	0.5	2.5
	6.	Fundamental hand motions; The use of fundamental hand motions	1	5
	7.	Principles of motion economy	1	5
	8.	Motion study; Mechanization and automation; Standardization	1	5
	9.	Time study; Time study equipment; Making the time study; Rating factor; Allowances; Standard time	1.5	7.5
	10.	Work sampling	1	5
	11.	Determining time standards from standard data and formulas	1	5
	12.	Predetermined time systems and 'MOST'; Computer applications	2	10
	13.	Measuring work by physiological methods; Fatigue and human factors.	0.5	2.5
Laboratory Topics	Methods engineering (charting and operation redesign) and work measurement techniques (direct time study, work sampling, and MOST software)			
Project work	Independent group projects for work analysis and design following the principles of work measurement and covering the course topic			
Computer Usage	Computer use covers course topics			

Learning outcomes	1) Ability to understand the relationship between productivity and work analysis and design [a]. 2) Ability to approach a work design problem for the purpose of solving the problem [a,b]. 3) Ability to recognize the importance of studying the entire system or process of doing work before undertaking a thorough investigation of a specific operation in the process [a,b,f]. 4) Ability to investigate a specific operation with the goal of finding improvements to the operation and implementing these suggested improvements to the process or the layout [a,b,c]. 5) Ability to use various techniques, tools, equipment, and instruments needed to carry out motion and time study [a]. 6) Ability to use other methods for measuring work such as predetermined-time-systems, work sampling and physiological methods [a]. 7) Ability to design, conduct, analyze and interpret experiments in industrial systems [a,c,h].
Estimated Category Content	Engineering Design: 3 credit hour or 100%.
Prepared by	<i>Dr. Tamer Khalaf</i>
Preparation Date	May 2012