



University of Puerto Rico
 Mayagüez Campus
 College of Engineering
 Department of Industrial Engineering
 Industrial Engineering Program



COURSE SYLLABUS

COURSE TITLE:	Methods and Work Measurement	
ALPHA-NUMERIC CODIFICATION:	ININ 4072	
NUMBER OF CREDITS-CONTACT HOURS:	3 credits, 2 hours of lecture, 2 hours of laboratory every other week, and 2 hours of discussion/workshop every other week	
PREREQUISITES, COREQUISITES AND OTHER REQUIREMENTS:	ININ 4071 - Ergonomics and Human Factors in Work Systems Design	
COURSE DESCRIPTION:		
<p>Spanish: Aplicación de estrategias y modelos utilizados en el diseño de sistemas de trabajo, incluyendo las estrategias de medición de trabajo para evaluar y mejorar la productividad y eficiencia de sistemas.</p>		
<p>English: Application of strategies and models used in work systems design in combination with work measurement strategies to evaluate and improve system productivity and efficiency.</p>		
COURSE OBJECTIVES:		
<p>After completing the course, the student should be able to:</p> <ul style="list-style-type: none"> • Design work systems based on efficiency considerations. • Apply the principles for work systems design. • Analyze, evaluate, improve, and standardize manual labor operations. • Develop labor time standards through direct observation time studies, predetermined time systems, or work sampling. • Apply learning curves to new processes. • Perform line balancing. • Gather, organize, analyze, and present relevant data related to a manufacturing or service process that is not readily available or not obvious. • Propose and evaluate engineering design alternatives and their implications. 		
TEXT BOOK: Groover, M.P., 2017, Work Systems: The Methods, Measurement & Management of Work, Pearson.		
Course time frame and thematic outline:		
Theme	TIME DISTRIBUTION	
	Face-to-Face	

Introduction to Work Methods (Methods Engineering and Lean Thinking, Principles of Motion Economy, Review of Guidelines for Work Design and Workstation Design)	3 hours
Operations and Methods Analysis (Assembly and Operation Process Chart, Flow Diagram, Value Stream Mapping, Cross Functional Map, Worker and Machine Process Chart, Operator Process Chart)	4 hours
Laboratory 1: Methods and Operations analysis	2 hours
Introduction to Time Studies	2 hours
Direct Time Study Procedure	4 hours
Laboratory 2: Division of Operations into Tasks or Work Elements	2 hours
Laboratory 3: Time Study with chronometer and computer software	2 hours
Performance Rating Methods and Applications	2 hours
Laboratory 4: Performance Rating	2 hours
Allowances and Standard Time	6 hours
Laboratory 5: Integrated Time Studies and Analysis	2 hours
Synthetic Basic Motion Time	10 hours
Laboratory 6: MOST	2 hours
Work Sampling (Worker and machine sampling and Pareto Analysis of sampling results)	5 hours
Laboratory 7: Work Sampling	2 hours
Line Balancing	4 hours
Learning curves	2 hours
Laboratory 8: Learning Curves	2 hours
Evaluations	2 hours
Total contact hours	60 hours

INSTRUCTIONAL STRATEGIES:

Face-to-Face

- ♦ Conferences
- ♦ Lectures
- ♦ Teamwork
- ♦ Hands-on laboratories and practice activities
- ♦ Individual tasks
- ♦ Assessment activities
- ♦ Oral presentations
- ♦ Project

MINIMUM OR REQUIRED RESOURCES AVAILABLE:

RESOURCE

Institutional learning management platform account (Moodle)
 Institutional email account
 Access to computer center or personal computer with internet access
 Programs or applications: word processor, spreadsheets, presentation editor

EVALUATION STRATEGIES:

Strategy	Quantity	Percentage
Exams	(3-4)	60 - 75%
Laboratory Reports	(6-10)	10 - 20%
Team Project	(0-1)	0 - 25%
Assignments	(0-10)	0 - 10%
Oral Presentations	(0-3)	0 - 10%
Peer Evaluations	(0-2)	0 - 5%

REASONABLE ACCOMMODATIONS:

The University of Puerto Rico at Mayagüez (RUM) recognizes that each student has an inherited right to request reasonable accommodation according to Law 51: Law for Integral Educational Services for People with Disabilities. Every student has the right to receive reasonable accommodation if he/she presents the necessary evidence to be evaluated by the Office of Services to Students with Disabilities (OSEI-RUM), and the related information can be found at the following link: <https://www.uprm.edu/cms/index.php/page/85>. If your case is approved by OSEI-RUM, you will receive reasonable accommodation in your courses and evaluation, and you must contact each professor for course registered. For additional information contact OSEI-RUM at Sánchez Hidalgo 410 or via telephone 787-832-4040 extension 3107.

ACADEMIC INTEGRITY:

The University of Puerto Rico promotes the highest standards of academic and scientific integrity. Article 6.2 of the UPR Student General Bylaws (Board of Trustees Certification 13, 2009-2010) states that academic dishonesty includes, but is not limited to: fraudulent actions; obtaining grades or academic degrees by false or fraudulent simulations; copying the whole or part of the academic work of another person; plagiarizing totally or partially the work of another person; copying all or part of another person's answers to the questions of an oral or written exam by taking or having someone else take the exam on his/her behalf; as well as enabling and facilitating another person to perform the aforementioned behavior. Any of these behaviors will be subject to disciplinary action in accordance with the disciplinary procedure established by the UPR Student General Bylaws.—

To ensure the integrity and security of user data, all hybrid, distance and online courses must be offered through the institutional learning management platform, which uses secure connection and authentication protocols. The system authenticates the identity of the user (student and professor) using the username and password assigned by the institution. The users are responsible for keeping their password safe, protected, and not to share it with other people.

POLICY AGAINST DISCRIMINATION BASED ON SEX, SEXUAL ORIENTATION, AND GENDER IDENTITY:

«The University of Puerto Rico prohibits discrimination based on sex, sexual orientation, and gender identity in any of its forms, including that of sexual harassment. According to the Institutional Policy Against Sexual Harassment at the University of Puerto Rico, Certification 130 (2014-2015) from the Board of Governors, any student subjected to acts constituting sexual harassment, may turn to the Office of the Student Ombudsperson, the Office of the Dean of Students, or the Coordinator of the Office of Compliance with Title IX for an orientation or formal complaint».

GRADING SYSTEM

Quantifiable (letters, A, B, C, D, F) Not Quantifiable

CONTINGENCY PLAN IN CASE OF AN EMERGENCY

In case of an emergency or class interruption, the professor can apply Bylaw 19-85 of the UPRM. This bylaw states that up to 25% of a class can be offered online.

BIBLIOGRAPHY

- Groover, M.P., 2017, Work Systems: The Methods, Measurement & Management of Work, Pearson.
- Frievalds, A., 2014, Niebel's Methods, Standards and Work Design, 13th Ed., McGraw-Hill.*
- Zandin, K.B., 2021, MOST Work Measurement Systems, 4th Ed., CRC Press.
- <https://www.osha.gov/ergonomics/control-hazards>

* This book is a classic with no up-to-date editions and remains as the top book in the subject.