



EASTERN MEDITERRANEAN UNIVERSITY
Department of Industrial Engineering
IENG301 Fundamentals of Work Study and Ergonomics
COURSE OUTLINE



Course Code	IENG301/MANE301	Course Level	Third year
Course Title	Fundamentals of Work Study and Ergonomics	Course Type	Department Core
Credit Value	(4, 0, 1) 4	ECTS Value	8
Pre-requisites	-----	Co-requisites	-----
Prepared by	Assoc. Prof. Dr. Orhan Korhan	Semester and Year	Spring 2019- 2020

Course Web Link : https://staff.emu.edu.tr/orhankorhan/en/teaching/ieng301-mane301				
Course Schedule : Lectures: Tuesday: 14:30-16:20 (IE-D203); Friday: 08:30-10:20 (IE-D203); Lab: Wednesday: 12:30-14:20 (IE-E001), Office Hour: Thursday 10:30-11:20				
	Name (group)	e-mail	Office	Telephone
Instructor	Assoc. Prof. Dr. Orhan Korhan	orhan.korhan@emu.edu.tr	IE-B203	1052
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COURSE DESCRIPTION

This course is designed to teach the fundamentals of work-study and ergonomics, which are both, used in the examination of human and work in all their contexts. Work-study topics covered in the course are methods study, charting techniques, time study, workstation design principles, job evaluation, and compensation. The topics covered in ergonomics are human physiology and anthropometry, fatigue assessment, industrial hygiene, information retrieval and control in humans, and fundamentals of industrial product design. Industrial accidents, theories on causes of accidents, safety analysis and hazard prevention.

Course Objectives (CO)

1. Principles of Methods Study (Principles of work study and principles of ergonomics) [Contributing Student Outcomes 1, 4],
2. Designing new Work Methods (Putting a new product into production) [Contributing Student Outcomes 1, 2, 4, 5, 7],
3. Improving existing work methods (continuous improvement approach) [Contributing Student Outcomes 1, 2, 4, 5, 6, 7],
4. Analyzing work process [Contributing Student Outcomes 1, 4, 6],
5. Process Analysis tools (Process Chart, Assembly Process Chart, etc...) [Contributing Student Outcomes 1, 6],
6. Analyzing work operations [Contributing Student Outcomes 1, 2, 4, 6],
7. Operation Analysis tools (Operation Chart, Simo Chart, etc...) [Contributing Student Outcomes 1, 6],
8. Principles of motion economy [Contributing Student Outcomes 1, 2, 7],
9. Work Measurements Techniques (Stop Watch Time Study, MTM-1, Work Sampling) [Contributing Student Outcomes 1, 3, 4, 5, 6, 7],
10. Job Analysis and Job Evaluation [Contributing Student Outcomes 1, 2, 3, 4, 5, 6],
11. Wage incentive systems (Piece rate plan, standard hour plan, IMPROSHARE plan, etc...) [Contributing Student Outcomes 1, 2, 4],
12. Physical workload assessment by physiological measurements (Oxygen consumption, heart rate, etc...) [Contributing Student Outcomes 1, 2, 4, 6, 7],
13. Workplace design (Anthropometry) [Contributing Student Outcomes 1, 2, 4, 6],
14. Principles of Product Design [Contributing Student Outcomes 2, 4],
15. Preparing a Term Project (Working effectively in multidisciplinary teams, making an independent research, applying related techniques in real life environment, and writing and presenting a technical report on the results) [Contributing Student Outcomes 1, 2, 3, 4, 5, 6, 7].

COURSE LEARNING OUTCOMES

On successful completion of this course, students are expected to develop **knowledge** and **understanding** of:

1. Productivity,
2. Principles of Method study,
3. Charting techniques; process, operation, SIMO, Gantt, man-machine charts etc...,
4. Principles of motion economy,
5. Work measurement; stop-watch time study, standard data and formula, predetermined time system (MTM), work sampling,
6. Job analysis and evaluation, Job rotation, Job enrichment, and Job enlargement.
7. Wage incentives,
8. Fundamentals of ergonomics; measurement of maximal aerobic capacity,
9. Work design; Anthropometry, measurement of noise, illumination and so on,

On successful completion of this course, students are expected to develop **their skills in:**

10. Designing most effective methods and procedures,
11. Designing methods and procedures which require the least effort,
12. Designing suitable methods and procedures for the person who uses them,
13. Analyzing and evaluating jobs,
14. Designing and implementing wage incentive system,
15. Designing safe working environment,
16. Designing products for human use,
17. Identifying relevant data from irrelevant;

On successful completion of this course, students are expected to develop their **appreciation** of, and respect for **values and attitudes** to:

18. Impact of work study techniques in designing and developing working methods,
19. Importance of appropriate working methods and work conditions,
20. Considering limitations of the analyses by taking into account the realistic constraints such as environmental, social and ethical,
21. Understanding the impact of engineering solutions in global, environmental and societal context,
22. Importance of preparing and presenting technical reports,
23. Importance of teamwork.
24. Using related computer software effectively.

CONTRIBUTION OF COURSE TO MEETING THE REQUIREMENTS OF CRITERION 5

Mathematics and Basic Sciences	:	0	credit hours
Engineering Topics	:	4	credit hours
General Education	:	0	credit hours

GRADING CRITERIA

Exams: All examinations will be based on lectures, tutorials, labs, assigned readings, project study or other work. To pass these exams students will need to have studied the material well in advance in order to understand the concepts, procedures and techniques. To discourage last minute cramming, the instructor and the assistants will not answer any questions from students on the day of an examination. Exam results will be announced on the notice boards as soon as the exam papers have been evaluated. Descriptions of these examinations are as follows:

Quizzes: There will be three quizzes that will be announced in advance. They will be of closed-book/closed-notes type but all required material will be supplied.

Midterm Exam: There will be one open-book/open-notes midterm examination that covers all the material up to the date of the examination. The midterm exam may consist of two sections: discussion questions and problems. It will be scheduled for a day in the designated mid-term exams week.

Final Exam: The final examination will be an open-book exam which will cover all the material studied throughout the semester and has the same structure as in the midterm examination. It will also be used to determine letter grades. Like the midterm exam, the final exam will be scheduled for a day in the designated final exams week.

Make-up Exam: **No make-up examination will be given to students who miss quizzes, and whose attendance is below 70%.** Make-up examination will only be offered (at the end of the semester) to students who missed the final or midterm exam and provided adequate documentations for the reason for their absence within three working days at the latest after the examination date. A student's illness will only be accepted as a valid excuse if it is supported by a written report of a physician from the Health Center of the EMU.

Term Project: Students should form groups of 3/4 students (exactly, otherwise you should submit a valid excuse in written form) who may be in different class groups, should submit a single project report. The topic for the project will be selected by the project group among the list of topics provided by the instructor. Unfortunately, a penalty for late submissions will be applied if the project report is not submitted on the due date.

Note: The students need a calculator so they should bring their calculators to all lecture/tutorial/lab/exam hours.

RELATIONSHIP WITH OTHER COURSES

It is a synthesis course of all the previously taken departmental courses and also a preparation for the graduation project course (IENG441 Facilities Planning and Design).

LEARNING / TEACHING METHOD

Teaching will be based on enabling the students to understand the concepts and procedures in each topic section and to be able to apply them. To do this the course will be organized into two modules: Lectures and Tutorials/Laboratory sessions. Sometimes four hours of class in a week will be used for lectures according to the perceived need. On the other hand, sometimes 2 hours of class in a week will be organized for lectures, 1 or 2 hours for Tutorials and/or Laboratory sessions.

Lectures: In lectures the instructor will attempt to summarize and explain only selected important concepts and points as clearly as possible. To be familiar with the material presented in lectures and participate in class discussions, students are expected to read the material covered in the previous lectures prior to the class meeting. Students will then find the lectures more interesting, and will benefit from the discussion if they come well prepared.

Tutorials: In addition to the regular lectures, there will be tutorial sessions conducted in the classroom by the assistants, according to the perceived need. In these hours the assistants will do extra example problems. Obviously, the best tutorials are those that meet the learning needs of students. The people who best understand your learning needs are you. Please contact the assistants regarding what you would like to see in the tutorials. Tutorial content will then be determined, and the tutorial date will be announced accordingly.

Laboratory Work: Throughout the semester, there will be weekly regular laboratory sessions, which will be conducted by the assistants, to do various exercises and experiments that require application of Time Study, Work Study and Ergonomics knowledge in the laboratory. Laboratory sessions will always be held in the Work Study and Ergonomics Labs. If you have any problem in these sessions please try to resolve your problem with the assistants first.

Office Hours: The students' timetables will be a base for determining appropriate time slots with zero clash (or minimum number of clashes) as much as possible. If students have difficulty in understanding any material after they have tried their best, they should consult their assistants and instructor during their office hours only. However, if you wish to meet the instructor outside of their office hours, please call him by phone or send an e-mail first to make an appointment.

ASSIGNMENTS

Besides the textbook material, there will be some reading assignments, which will support the lectures. For any type of examination, students are also responsible from studying all assigned readings, even if they might not be discussed in class.

METHOD OF ASSESSMENT

Although the student's overall grade will be based on the general assessment of the instructor, the following percentages may give an idea about the relative importance of various assessment tools.

Attendance and Participation	5 %
Project Study	25 %
Quizzes	15 %
Mid-term Exam	25 %
Final Exam	30 %
TOTAL	100 points

Note that the instructor reserves the right to modify these percentages in case he finds it necessary. Letter grade equivalents of numerical performances will be announced by the Registrar's Office after the last day for the submission of letter grades.

NG (Nil-grade): Conditions that lead to NG (Nil-grade):

1. Not attending the **Final Exam** or its **Make-up Exam** without a valid excuse.
2. Not attending the **Mid-term Exam** without a valid excuse.
3. Not submitting the **Term Project**.
4. Not attending the **Project Presentation**.
5. Not attending any one of the **Lab Exams** without a valid excuse.
6. **Having an attendance to lectures/tutorials/labs less than 70%.**

Objections: Any form of document concerning work that is to be used by the instructor as the basis of grading will be shown to the student upon request, **within a week following the announcement of the grade**. The objection to any grade must be made to the assistants within that period. If, after an exam has been graded, you think an error was made in grading or you have questions about the grading of the material, please examine the exam solutions first, and then write your questions or comments on a separate sheet of paper and turn this paper to the assistants.

ATTENDANCE AND NG GRADE

Attendance will be taken every Lecture/Tutorial/Lab session. Note that EMU regulations allow instructors to give a grade of **NG** (Nil Grade) to a student whose absenteeism is more than 30% of the Lecture/Tutorial/Lab hours and/or who do not complete sufficient work that are included in the assessment of the course.

Any objection to the grade or mark should be made not later than one week following its announcement.

Grading Policy:

Quizzes	15 % (5 % each)
Midterm Exam	25 %
Term Project-Presentation	10 %
Term Project	15 %
Final Exam	35 %

Note that the instructor reserves the right to modify these percentages in case it is found necessary. Moreover, the student's overall Letter grade will be based on the general assessment of the instructor.

NG (Nil-grade): Conditions that lead to NG (Nil-grade):

7. Not attending the **Final Exam** or its **Make-up Exam** without a valid excuse.
8. Not attending the **Mid-term Exam** without a valid excuse.
9. Not submitting the **Term Project**.
10. Not attending the **Project Presentation**.
11. Not attending any one of the **Lab Sessions** without a valid excuse.
12. **Having an attendance to lectures/tutorials/labs less than 70%.**

Note: The Midterm and Final Exam will be scheduled by the Exam Coordinators in the Faculty of Engineering.

COURSE CONTENT (WEEKLY TEACHING PLAN)

Week	Topics
1	Productivity, Methods and Standard Scope, Methods Engineering
2	Work Design, Objective of Methods, Standards, and Work Design, Historical Development
3	The Problem Solving Tools, Recording and Analyzing Tools, Process Analysis
4	Activity Charts, Operation Analysis
5	Micro motion Study, Motion Study and Basic Motions, Principles of Motion Economy
6	Time Study
7	Determining time standards from standard data and formulas
8 – 9	MIDTERM Exams
10	Work Sampling
11	Predetermined time systems, Wage payment and wage incentives
12	Job analysis and job evaluation, Job rotation, Job enrichment, Job enlargement.
13	Human Factors, Workplace, Equipment, and Tool Design
14	Anthropometry, Fundamental of Industrial Product Design

LEARNING TEACHING METHODS

The function of teaching is to enable students to learn. Therefore, students are required to read the chapters of the textbook before coming to class. The instructor will lecture in class by writing on the board and using overhead projectors or data-show equipment.

ASSIGNMENTS

Students will be given a term project; the project should be prepared according to the project guidelines (which can be found under the following web site <http://ie.emu.edu.tr/reportw/?sub=CO> . Each report must contain at least Title Page, Abstract, Acknowledgments, Table of Contents, List of Tables, List of Figures, List of Symbols/Abbreviations, and Main Body of the Text, Bibliography/References, and Appendices. The term project must be handed in latest on the date specified by the course instructor. Late submissions will be penalized by 50 percent per day.

ATTENDANCE

Attendance will be taken every lecture hour. Note that university regulations allow the instructor to give a grade of NG to a student whose absenteeism is more than 30% of the total lecture hours or who do not complete sufficient work.

ACADEMIC HONESTY - PLAGIARISM

Cheating is copying from others or providing information, written or oral, to others. Plagiarism is copying without acknowledgement from other people's work. According to university by laws, cheating and plagiarism are serious offences punishable with disciplinary action ranging from simple failure from the exam or project, to more serious action (letter of official warning suspension from the University for up to One Semester). The disciplinary action will be written in student records and may appear in student transcripts.

PLEASE KEEP THIS COURSE OUTLINE FOR FUTURE REFERENCE AS IT CONTAINS IMPORTANT INFORMATION