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

Course Code	IENG301	**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**	IENG263, IENG210
Prepared by	Assoc. Prof. Dr. ADHAM MACKIEH	**Semester and Year**	**Spring 2025- 2026**

Course Web Link : http://staff.emu.edu.tr/adhammackieh/en/teaching/ieng301-mane301-2

Course Schedule: Monday: 10:30-12:20 (IE-D101); Thursday: 10:30-12:20 (IE-D101);
Lab hours: Tuesday: 11:30-13:20 (IE-E001), Office Hours: Monday 12:30-13:20 and Wednesday 12:30-13:20

	Name (group)	e-mail	Office	Telephone
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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 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 : -
Engineering Topics : Contains significant design
General Education : -

RELATIONSHIP OF COURSE TO STUDENT OUTCOME

	Level of Contribution		
Student Outcomes	**Moderate**	**High**	**NO**
1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	☐	☑	☐
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	☐	☑	☐
3. an ability to communicate effectively with a range of audiences	☐	☑	☐
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	☐	☑	☐
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	☐	☑	☐
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	☐	☑	☐
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies	☑	☐	☐

TEXTBOOK/S

- Ralph M. BARNES. Motion and Time Study: Design and Measurement of Work. John Wiley & Sons, 7'Th edition, 1980.
- Fred E. Meyers, James R. Stewart. Motion and Time Study for Lean Manufacturing. Prentice Hall, 3'rd Edition, 2002.
- Benjamin NIEBEL and Andris FREIVALDS. Methods, Standards, and Work Design. McGraw Hill, 11'Th edition, 2003.

METHOD OF ASSESSMENT

All Examinations will be based on lectures, discussions, textbook and assigned work. To enter a formal examination, a student has to present her/his EMU student Identification card to the invigilator.

Quizzes: There will be **four** quizzes designed to test familiarity and basic understanding of various topics. There will be no quiz make-ups.

Midterm Exam: The midterm exam will be held in the week designated by the university administration. It will cover all of the material up to the date of examination.

Final Exam: The final exam will cover the whole course materials.

Make-up Exams: Make-up examinations will only be offered to students who provided adequate documentation for the reason of their absence within four working days at the latest after the examination date. University regulations apply for graduate make-ups.

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

Grading Policy:

Three Quizzes	15 % (5 % each)
Lab Performance	5 %
Midterm Exam	25 %
Term Project-Presentation	10 %
Term Project	15 %
Final Exam	30 %

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):

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 Sessions without a valid excuse.**
6. **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, Industrial accidents
14	Anthropometry, Fundamental of Industrial Product Design, Information Theory, Lean Manufacturing

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