**EASTERN MEDITERRANEAN UNIVERSITY**

**DEPARTMENT OF INDUSTRIAL ENGINEERING**

**IENG/MANE112 Introduction to Industrial/Management Engineering**

**COURSE OUTLINE**

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** |  IENG112 /MANE112 | **COURSE LEVEL** |  First Year |
| **COURSE TITLE** |  Introduction to IENG/MANE | **COURSE TYPE** |  **Area Core** |
| **CREDIT VALUE** |  (4, 2, 0) 4 | **ECTS Credit Value** |  8 |
| **PRE-REQUISITE(S)** |  No | **CO-REQUISITE(S)** |  No |
| **PREPARED BY** |  Prof. Dr. Béla Vizvári | **SEMESTER / ACADEMIC YEAR** |  Spring 2017-18 |
|  |
|  |  **Name(s)** |  **E-mail** |  **Office** |  **Telephone** |
| **LECTURER(S)** |  Prof. Dr. Béla Vizvári |  bela.vizvari@emu.edu.tr  |  IE-C105 |  +90 392 630 1103 |
| **ASSISTANT(S)** | tba |   |  |   |
| **COURSE SCHEDULE** |  Monday 16:30-18:20 (IE-D101); Tuesday 10:30-12:20 (IE-D101); Tutorial: Thursday 16:30-17:20 (IE-D101), Lab: Thursday 10:30-12:30 (room: tba) |
| **COURSE WEB LINK** |  http://ie.emu.edu.tr/lec/coursefull.php?course=ieng112  |
|  |
| **COURSE DESCRIPTION**This course is designed to introduce the fundamental concepts of Industrial Engineering and give answers to the first questions that are usually asked by the prospective Industrial Engineering students. The course surveys both the traditional and modern topics of Industrial Engineering, providing a historical as well as an academic perspective of the whole profession. Related software applications, together with fundamentals of modeling & optimization, and production system design and control (methods engineering, work measurement, ergonomics, facilities planning and design, production planning, inventory control and quality control) will also be covered in the course. |
| **COURSE OBJECTIVES**The main objectives of this course are:1. The history of Industrial Engineering (Contributing Student Outcomes h).
2. The notion of Technology (Contributing Student Outcomes e).
3. Mathematical formulation of the Transportation Problem (Contributing Student Outcomes a, c, e).
4. The use of the Transportation Problem for Facility Location decisions (Contributing Student Outcomes e).
5. Basic calculation of Loan Installments and Revenue of Investments (Contributing Student Outcomes a).
6. The notion of System (Contributing Student Outcomes e).
7. Forecast method (Exponential smoothing, moving average, and linear regression) (Contributing Student Outcomes b).
8. Traveling Salesman Problem and its applications (Contributing Student Outcomes a, c, e).
9. Scheduling on a single machine (Contributing Student Outcomes a, k).
10. Calculation of standard time (Contributing Student Outcomes b, k).
11. MPS (Master production scheduling) (Contributing Student Outcomes k).
12. MRP (Material requirement planning) (Contributing Student Outcomes k).
13. Basic Quality control (mean, variance, standard deviation, etc.) (Contributing Student Outcomes b).
14. Transportation modes (road, rail, air, water, river, tube, etc.) (Contributing Student Outcomes h).
15. Accounting actions (Contributing Student Outcomes k).
16. Using Excel to solve problems (Contributing Student Outcomes b).
 |
| **COURSE LEARNING OUTCOMES** On successful completion of this course, students are expected to develop **knowledge** and **understanding** of:1. Classification of location problems, and their definitions
2. Formulation of location problems; their objectives, constraints and applicable solution techniques
3. Alternative distance metrics and their use
4. Demand forecasting and market analysis
5. Facilities design in terms of product, process and schedule design
6. Facilities requirements planning in terms of man, machine and material requirements
7. Flow, space and activity relationship planning and departmentalization
8. Material handling systems design
9. Warehouse design
10. Personal requirements and plant support services
11. Alternative layout types
12. Available layout procedures and computerized solution techniques

 On successful completion of this course, students are expected to develop **their skills** in:1. Solving basic facilities location problems
2. Formulating advanced facilities location problems
3. Solving linear and mixed linear integer programming formulations using LINGO/LINDO
4. Using MS Excel in numerical problem solving
5. Surveying, gathering and analysis of data for planning purposes
6. Solving plant layout problems
7. Generating layout alternatives using computer software (i.e. BLOCKPLAN)
8. Evaluation of alternative facilities plans
9. Both written and oral presentation of the project study

On successful completion of this course, students are expected to develop their appreciation of and respect for **values and attitudes** regarding the issues of:1. Role of Industrial Engineering in Facilities Planning and Design
2. Acting in a team for the team’s objectives
3. Importance of location problem in real life
4. Necessity for formulating viable alternatives to facilities planning projects
5. Impact of human factors in generating design alternatives
6. Importance of accuracy in estimating market share, demand, relevant costs and all requirements and the sensitivity of results to these values
7. Impact of computer technology in solving Industrial Engineering problems
 |
| **CONTRIBUTION OF THE COURSE TO MEETING THE REQUIREMENTS OF CRITERION 5**Mathematics and Basic Sciences : 0Engineering Topics : 4General Education : 0 |
| **RELATIONSHIP OF COURSE TO STUDENT OUTCOMES**

|  |  |
| --- | --- |
|  | **Level of Contribution** |
| **Student Outcomes** | **No**  | **Moderate** | **High** |
| (a) an ability to apply knowledge of mathematics, science and engineering | 🞏 | 🗹 | 🞏 |
| (b) an ability to design and conduct experiments, as well as to analyze and interpret data | 🞏 | 🞏 | 🗹 |
| (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability | 🞏 | 🗹 | 🞏 |
| (d) an ability to function on multi-disciplinary teams | 🗹 | 🞏 | 🞏 |
| (e) an ability to identify, formulate, and solve engineering problems | 🞏 | 🞏 | 🗹 |
| (f) an understanding of professional and ethical responsibility | 🗹 | 🞏 | 🞏 |
| (g) an ability to communicate effectively | 🗹 | 🞏 | 🞏 |
| (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context | 🞏 | 🞏 | 🗹 |
| (i) a recognition of the need for, and an ability to engage in life-long learning | 🗹 | 🞏 | 🞏 |
| (j) a knowledge of contemporary issues | 🗹 | 🞏 | 🞏 |
| (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice | 🞏 | 🗹 | 🞏 |

 |
| **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. Quizzes, midterm and final consist of both essay questions and problems. Resit exams consists of essay questions. 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 five quizzes that will be announced in advance. They will be of closed-book/closed-notes type but all required material will be supplied. *Lab Quizzes:* There will be two lab quizzes. *Midterm Exam:* There will be one closed-book/closed-notes midterm examination that covers all the material up to the date of the examination. *Final Exam:* The exam will cover all the material studied throughout the semester.*Make-up Exam:* There will be one general make-up after the final period. This make-up covers every discussed topic and all problems and questions must be answered regardless what a student missed during the semester. Special make-up exams are possible but not negotiable. Their existence depend on the decision of the instructor.**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 (IENG492 Manufacturing and Service Systems 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 instructor and assistants. In these hours, extra example problems will be solved. The students are expected to work on the problems. The instructor and the assistants are giving the necessary help but don’t provide complete solution.**Laboratory Work:** Throughout the semester, there will be several laboratory sessions, which will be conducted by the assistants, to do various computer exercises that require the use of Word, Excel, together with general IE/OR Software available in the laboratory. Laboratory sessions will always be held in the Department’s PC Labs and their dates announced in advance. 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. Notes will be available on the homepage of the course with the exception of Note 3. The notes are not discussed in the order of their numbering. |
| **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/Participation 0 %Lab Quizzes 20 %  Quizzes 25 % March 8, and 22, April 5, May 3, and 17, starting time 17:30 Mid-term Exam 25 % Final Exam 30 % TOTAL 100 %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.**EXAM POLICY:** Every exam has both essay questions and calculation/modeling problems.**There are two necessary conditions to get a passing grade: (1) the total result must be at least 50.00% (49.99% is not enough!), (2) the total lab quiz result musy be at least 10.00% (9.99% is not enough!).****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 attending any one of the **Lab Exams without a valid excuse**.
4. **Having an attendance to lectures/tutorials/labs less than 50%.**

**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. |
| **TEXTBOOK/S**Wayne C. Turner, Joe H. Mize, Kenneth E. Case, John W. Nazemetz, Introduction to Industrial and Systems Engineering, Third editition, Prentice Hall, ISBN 0-13-481789-3.**Lecture Notes:** Students are expected to make their own notes. Lecture notes and/or overheads used in class will be available for copying. Material presented in class taken from other than the textbook will be made available on the web page of the course (refer to <http://www.ie.emu.edu.tr> ).**EXTENDED READING LIST**Note that aside from these books, EMU Library has quite a good collection of books on the intermediate and advanced levels in the related fields of industrial engineering discipline. |
| **TOPICS COVERED and COURSE SCHEDULE**

|  |  |
| --- | --- |
| **WEEK** | **TOPICS** |
| 1 | Technology |
| 2 | Systems |
| 3 | Scheduling |
| 4 | Facility Location and Layout |
| 5 | Out-Door Transportation and Traveling Salesman Problem |
| 6 | Work Design and Organizational Performance Measurement |
| 7 | Forecast |
| 8 | Production Planning |
| 9 | **MIDTERM EXAM WEEK** |
| 10 | Engineering Economy |
| 11 | Quality Control |
| 12 | Accounting |
| 13 | Contemporary Issues in Industrial and Management Engineering  |
| 14 | The History of IE |
| 15 | **FINAL EXAM WEEKS** |

 |
| **ACADEMIC HONESTY, PLAGIARISM & CHEATING**This is intentionally failing to give credit to sources used in writing regardless of whether they are published or unpublished. Plagiarism (which also includes any kind of cheating in exams) is a disciplinary offence and will be dealt with accordingly. According to university by laws cheating and plagiarism are serious offences punishable with disciplinary action ranging from simple failure from the exam or project/report, to more serious action (suspension from the university for up to one semester). Disciplinary action is written in student records and may appear in student transcripts. Any act not suitable for a university student will not be tolerated and may lead to formal disciplinary action. Example of this are: getting someone else to take the examinations for you, misrepresentation of your own answer sheet as another’s work, cheating, knowingly assisting other students to cheat, abusing the tolerance or breaking the discipline of the class. |

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

**I read and understood the rules of the course.**

**Name, surname:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |

**Student ID.**

**Signature:**