EASTERN MEDITERRANEAN UNIVERSITY
DEPARTMENT OF INDUSTRIAL ENGINEERING
IENG332/MANE332 PRODUCTION PLANNING I
COURSE OUTLINE

COURSE CODE	IENG332/MANE332	**COURSE LEVEL**	Third Year
COURSE TITLE	Production Planning I	**COURSE TYPE**	Area Core
CREDIT VALUE	(4, 0, 1) 4	**ECTS Credit Value**	8
PRE-REQUISITE(S)	IENG212/MANE212, MATH322	**CO-REQUISITE(S)**	NONE
PREPARED BY	Assoc. Prof. Dr. Orhan KORHAN	**SEMESTER / ACADEMIC YEAR**	SPRING 2018-19

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COURSE SCHEDULE	Lectures: Monday 14:30-16:20 (IE-D203); Wednesday 10:30-12:20 (IE-D201) Tutorial: Friday 08:30-09:20 (IE-D203) Office Hour: Friday 10:30-11:20			
COURSE WEB LINK	https://staff.emu.edu.tr/orhankorhan/en			

COURSE DESCRIPTION

Two sequel courses are designed together to provide the basics of production planning and control with the need of modern manufacturing organizations in mind. The topics covered in the first course are production and operations strategy, subjective and objective forecasting (i.e. Delphi method, trend-based methods, and methods for seasonal series), deterministic inventory planning and control (i.e. Economic Order Quantity model and its extensions to several environments), stochastic inventory planning and control, aggregate production planning, and master production scheduling.

COURSE OBJECTIVES

The main objectives of this course are:

1. Significance of production planning and control concepts (history, management theories, competitiveness, flow process, layout arrangements, organizational arrangements, supply chain management, product life cycle, decisions in production systems)
2. Market-driven systems (wheel of competitiveness, integrated production systems, CMS, FMS, CIM, world class manufacturing, lean production, agile manufacturing)
3. Problem solving (identification, understanding, developing, solving, interpretation, implementation)
4. Fundamental concepts of Forecasting (judgmental / qualitative, causal, time series)
5. Regression method for qualitative forecasting
6. Constant process (LDP, overall average, moving average, Simple Exponential Smoothing)
7. Trend process (Double Exponential Smoothing)
8. Seasonal process (Winter's method)
9. Forecast errors, tracking signals
10. Fundamental concepts of Inventory control (terminology, costs, periodic review, continuous review)
11. Lot sizing models (EOQ, EPQ)
12. Quantity discounts (all units, incremental)
13. Inventory control decisions (ABC analysis)
14. Working effectively in multidisciplinary teams, making an independent research for real life cases, and writing a technical report on the results

COURSE LEARNING OUTCOMES

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

1. Production management basics and its history
2. Key issues on market-driven systems and global competition
3. Classification of production systems, and their definitions
4. Classification of planning and control problems, and their definitions
5. Problem solving procedure
6. Demand forecasting and market analysis
7. Qualitative approaches to forecasting
8. A variety of quantitative forecasting techniques including the use of computer tools
9. Decomposition of data into its components
10. Classification of inventory models
11. The systems perspective to production planning problems and to integrate different production planning activities
12. Formulation of aggregate planning problems; their objectives, constraints and applicable solution techniques

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

13. Having competence over the analytical background of basic mathematical models
14. Surveying, gathering and analysis of data for planning purposes
15. Forecasting demand using qualitative techniques
16. Forecasting demand using regression

17. Forecasting demand using time-series methods
18. Evaluation of forecasts error for various forecasting methods
19. Solving basic production planning problems
20. Solving basic inventory management problems
21. Formulating aggregate production planning problems

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

22. Role of Industrial Engineering in Production Planning and Control
23. Acting in a team for the team's objectives
24. Importance of forecasting in production planning
25. Necessity for formulating viable alternatives to aggregate planning
26. Importance of accuracy in estimating market share, demand, relevant costs and all requirements and the sensitivity of results to these values

CONTRIBUTION OF THE COURSE TO MEETING THE REQUIREMENTS OF CRITERION 5

Mathematics and Basic Sciences	: 25 %
Engineering Science	: 50 %
Engineering Design	: 0 %
General Education	: 25 %

RELATIONSHIP OF COURSE TO STUDENT OUTCOMES

	Level of Contribution		
Student Outcomes	**Moderate**	**High**	**NO**
(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. 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 closed-book/closed-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.

Re-sit Exam: Re-sit examination is considered as Final Exam and will include Final Exam topics. Re-sit examination will be offered to the students who fall into the following categories: students who have gained letter grades **D-** or **F** (but not NG), and the students who received an academic warning or who are on unsatisfactory or probational status.

Term Project: Students should form groups of **3 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 the first course in a series of production planning and control courses. It will also prepare the students for facilities planning and design and the graduation project courses (IENG441/MANE441 Facilities Planning and Design & IENG492/MANE492 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 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 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.

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	20 % (3 Phases, (6% + 7% + 7%)
Quizzes	15 %
Mid-term Exam	25 %
Final Exam	35 %
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.

TEXTBOOK/S

Students must have the following textbook:

- Sipper, D., and Bulfin, R.D., "Production Planning, Control, and Integration", McGraw Hill, (1997). ISBN 0-07-115843-X.

Lecture Notes: Students are expected to make their own notes. Lecture notes and/or overheads used in class will not be made 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).

INDICATIVE BASIC READING LIST

- Nahmias, S., "Production and Operations Analysis", 5th edition, Irwin, (1997). ISBN 0-07-286538-5,

- Silver, E.A., Pyke, D., and Peterson, R., "Inventory Management and Production Planning and Control", 3rd Edition, John Wiley, (1998). ISBN 0-471-11947-4,
- Vollmann, T.E., Berry, W.L., and Whybark, D.C., "Manufacturing Planning and Control Systems", 4th Edition, McGraw Hill, (1997). ISBN 0-7863-1209-2.

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	Overview of Production Planning and Control Concepts
2	Problem Solving
3	Market Driven Systems
4	Forecasting System and Forecast Control
5	Qualitative Forecasting
6	Causal Forecasting with Regression
7	Time Series Models: Constant Process
8	**MIDTERM EXAM WEEK**
9	Time Series Models: Trend Process, Seasonal Process
10	Forecast Control
11	Inventory Control: Independent Demand Systems
12	Inventory Control: Quantity Decisions (EOQ, EOQ with backlog)
13	Inventory Control: Quantity Decisions (EPQ, EPQ with extensions)
14	Inventory Control: Quantity Discounts
15	Inventory Control: Control Decisions (ABC Analysis)
16	**FINAL EXAM WEEKS**

Class Schedule	Tutorial Schedule	Laboratory Schedule	Presentation
4 hours of lecture per week by the instructor	1 hour of tutorial per week by the course assistant	1 hour lab towards the mid of the semester for introducing Computer Integrated Manufacturing Lab	There will not be any presentation

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!!!