**EASTERN MEDITERRANEAN UNIVERSITY**

**DEPARTMENT OF INDUSTRIAL ENGINEERING**

**IENG584 Advanced Quality Engineering**

**Course Outline**

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| **COURSE CODE** |  IENG584 | **SEMESTER / ACADEMIC YEAR** |  Spring 2018-19 |
| **COURSE TITLE** |  Advanced Quality Engineering |
| **CREDIT VALUE** |  (3, 0, 0) 3 |
| **LECTURER(S)** |  Asst. Prof. Dr. Sahand DANESHVAR |  sahand.daneshvar@emu.edu.tr  | IE-C109 |  +90 392 630 2773 |
| **COURSE TYPE** | Elective |
| **PRE-REQUISITE(S)** | Consent of the instructor |
| **DURATION OFCOURSE** | 14 Weeks |
| **COURSE SCHEDULE** | Thursday 08:30-11:20 IE-E201 |
| **COURSE WEB LINK** | http://staff.emu.edu.tr/sahanddaneshvar/en  |
| **COURSE DESCRIPTION**This course is designed to introduce a conceptual and practical notion of advanced quality control in engineering. It also provides students with methods and philosophy of statistical process control. The course contents include introduction to advanced quality control and improvement concepts in production processes, control charts for variable and attributes, cumulative sum control charts, economic design of control charts, fractional factorial experiments for process design, process optimization with designed experiments, advanced acceptance sampling techniques and lot-by-lot acceptance sampling for attributes. |
| **AIMS & OBJECTIVES**The basic purpose of presenting the materials of this course is to:* Improving the students’ knowledge about quality engineering topics.
* Introducing the new methods and processes which can improve the quality control on production or service of the manufacture or service systems
* Present to the students various control processes with applications to Industrial problems and other areas.

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| **GENERAL LEARNING OUTCOMES (COMPETENCES)**On successful completion of this course, students are expected to develop **knowledge** and **understanding** of:* The preliminaies and basic concepts of statistical quality engineering.
* Demonstrate the ability to design, use, and interpret control charts for variables.
* Demonstrate the ability to design, use, and interpret control charts for attributes.
* Design, use, and interpret cumulative sum and exponentially weighted moving average control charts.
* Perform and analysis of economic designe for control charts.
* Demonstrate the ability to use factorial and fractional factorial experiments for process design and improvetment.
* Demonstrate the ability to use Process optimization with designed experiments.
* Use and describe the acceptence sampling.
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| **GRADING CRITERIA****Exams:** All examinations and assignments will be based on the lectures and tutorials. Assignments will be to hone the problem skills of the students. Students will be encouraged to go through their answer scripts and clarify their omissions and mistakes, if any. Descriptions of the examinations are as follows:*Midterm Exam:* There will be one such examination covering all the teaching material up to the 9th week. This exam held on 18th April *2019 (08:30-10:20)* which is not flexible.*Final Exam:* The final examination will cover all the material studied throughout the semester, and has the same structure as the midterm examination. It will also be used to determine letter grades. Final exam held on 18th Jun *2019 (08:30-10:20)*. *Quizzes:* Three quizzes are held on 14th March *2019 (10:30-11:20)*, 28th March *2019 (10:30-11:20)* and 23th May *2018 (10:30-11:20)* respectively which are not flexible. *Assignments:* Six Homeworks in the form of assignments will be given to assess students’ problem solving ability. The assignments are to be submitted within the time frame stipulated. Late submissions will not be valued.Note: The voluntary paper presentation has (5%) bonus. Topics will be given by the instructor. |
| **LEARNING / TEACHING METHOD**Teaching will enable the students to understand the application of various statistical processes control 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 and solve the related homework questions after each lecture. The instructor will lecture in class by writing on the board and some lectures will be given as a MS power point presentation. Also the lectures will be supplemented by tutorial sessions. |
| **READING 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. Quizzes 5%+7%+10%=22% Homework 3%\*6=18 % Mid-term Exam 25 % Final Exam 35 % TOTAL 100 pointsNote 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. |
| **ATTENDANCE**1. Attendance is mandatory. Any student who has poor attendance and/or misses an examination without providing a valid excuse will be given **NG** grade.
2. Students missing just on Midterm Exam should provide a valid excuse within three days following the examination they missed. One make-up examination will be given at the end of the semester after the final examination period.
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| **TEXTBOOK/S**Students must refer the following textbooks:Text Book: John Oakland, *Statistical Process Control, 6th ed.*, Elsevier, 2008.Reference Books: Montgomery, D. C., *Introduction to Statistical Quality Control, 6th ed.*, Wiley, 2009. Richard E. Devor, Tsong-how Chang, John W. Sutherland, *Statistical Quality Design and Control,* Prentice-Hall, 1992.**CONTENT & SCHEDULE**Lectures will be held on *IE Building.* The lecture topics within the semester are as in the following schedule although minor changes are possible:

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| **Week** | **Topics** |
| 1 | Review and preliminary subjects |
| 2 | Control charts for , R |
| 3 | Control charts for , S |
| 4 | Control charts for fraction nonconforming |
| 5 | p, np, c and u charts |
| 6 | CUSUM charts and average run length |
| 7 | Economic design of Charts |
| 8 | **Midterm Exam** |
| 9 | Quality improvement and total quality control |
| 10 | Experimental and fractional factorial design |
| 11 | The Taguchi method, off-line and on-line quality control, Parameter design |
| 12 | Acceptance sampling, Producer’s and Consumer’s risks |
| 13 | AQL, LTPO and AOQL systems |
| 14 | Dodge-Romig System, Economic analysis of acceptance sampling |
| 15 | Demonstration of software (SPSS, Minitab) |
| 16 | **Final Exam** |

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| **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!!!**