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| antalya bilim Ã¼niversitesi ile ilgili gÃ¶rsel sonucu | **ECTS Course Description Form** |
| **PART I ( Senate Approval)** |
| **Offering School**  | **College of Engineering** |
| **Offering Department** | **Industrial Engineering Department**  |
| **Program(s) Offered to** | **Industrial Engineering Department** | **Area Elective** |
| **Engineering Faculty** | **Non-Area Elective** |
|  |  |
| **Course Code**  | **IE 473** |
| **Course Name** | **Lean Manufacturing** |
| **Language of Instruction** | **English** |
| **Type of Course** | **Departmental Area Elective** |
| **Level of Course** | **Undergraduate** |
| **Hours per Week** | **Lecture: 3** | **Laboratory:** | **Recitation: 1** | **Practical:**  | **Studio:**  | **Other:**  |
| **ECTS Credit** | **6** |
| **Grading Mode** | **Letter Grade** |
| **Pre-requisites** | **-** |
| **Co-requisites** | **-** |
| **Registration Restriction** | **-** |
| **Educational Objective** | **-** |
| **Course Description** | **This course will introduce undergraduate students and practicing engineers to lean production principles and practice. Industrial engineers and others responsible for continuously improving operational performance must develop systems that are fast, flexible, focused and friendly for their companies, customers and production associates. The course will provide the student with an introduction to lean production describing the background behind its development and how the evaluations and assessments of production systems are performed. Lean production tools and techniques will be described and in some cases demonstrated in simulation exercises. Issues relating to employee involvement, improvement teams, training and culture will be presented. Planning for lean process implementation and the necessity of sustain improvements will be discussed. Examples of application in manufacturing and business processes will be presented.** |
| **Learning Outcomes**  | **LO1** | **The students who succeeded in this course;**1. **You will learn a brief history of manufacturing approaches employed and the background and philosophy of lean production. You will also learn the concept of waste and that the quest for truly lean production is a journey and not a destination.**
2. **The need for strategy, alignment with other corporate or plant objectives, and preparation for lean production will be presented.**
3. **You will learn some evaluation techniques that one can use in preparation for and use in lean production activities**
4. **You will learn a set of approaches used in implementing lean production in production operations. While these tools are often useful, they are not an end in themselves and they are not necessarily the essence of lean production either.**
5. **Concepts as workplace organization, pull production, cellular arrangement and layout improvement, visual management, quick change, mistake reduction, employee involvement, need for employee creativity and motivation for lean implementation will be discussed and examples will be given.**
6. **Methods for promoting success in implementing lean transformations will be discussed.**
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| **LO2** |
| **LO3** |
| **LO4** |
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| **PART II ( Faculty Board Approval)** |
| **Basic Outcomes (University-wide)** | **No.** | **Program Outcomes** | **LO1** | **LO2** | **LO3** | **LO4** | **LO5** | **LO6** |
| **PO1** | **Ability to communicate effectively and write and present a report in Turkish and English.**  | 🗸 🗸 🗸 🗸 🗸 🗸🗸 🗸 🗸 🗸 🗸 🗸🗸 🗸 🗸 🗸 🗸 🗸🗸 🗸 🗸 🗸 🗸 🗸🗸 🗸 🗸 🗸 🗸 🗸🗸 🗸 🗸 🗸 🗸 🗸 |
| **PO2** | **Ability to work individually, and in intra-disciplinary and multi-disciplinary teams.** |
| **PO3** | **Recognition of the need for life-long learning and ability to access information , follow developments in science and technology, and continually reinvent oneself.** |
| **PO4** | **Knowledge of project management, risk management, innovation and change management, entrepreneurship, and sustainable development.** |
| **PO5** | **Awareness of sectors and ability to prepare a business plan.** |
| **PO6** | **Understanding of professional and ethical responsibility and demonstrating ethical behavior.** |
| **Faculty Specific Outcomes** | **PO7** |  |
| **PO8** |  |
| **PO9** |  |
| **PO10** |  |
| **PO11** |  |
| **PO12** |  |
| **Discipline Specific Outcomes (program)** | **PO13** |  |
| **PO14** |  |
| **PO15** |  |
| **PO16** |  |
| **PO17** |  |
| **PO18** |  |
| **Specialization Specific Outcomes** | **PO N….** |  |
| **PART III ( Department Board Approval)** |
| **Course Subjects, Contribution of Course Subjects to Learning Outcomes, and Methods for Assessing Learning of Course Subjects** | **Subjects** | **Week** |  | **LO1** | **LO2** | **LO3** | **LO4** | **LO5** | **LO6** |
| **S1** | **1** | **What is lean production? Introduction, background, and lean thinking.** | **A7** |  |  |  |  |  |
| **S2** | **2** | **Discussion of Toyota Production Systems** | **A7** | **A7** | **A5** |  |  |  |
| **S3** | **3-4** | **Lean production preparation – systems assessment, process and value-stream mapping** |  | **A2** |  | **A7** |  |  |
| **S4** | **5-6** | **Lean production processes, approaches and techniques.** | **A1** | **A5** | **A5** |  |  |  |
| **S5** | **7-10** | **5S-JIT-Stability-TPM-Poka/Yoke** |  | **A5** | **A7** |  |  |  |
| **S6** | **11-12** | **Employee involvement, teams, training** | **A2** | **A5** | **A2** |  |  |  |
| **S7** | **13-14** | **Sustaining improvement and change, auditing, follow-up actions** | **A1** | **A5** | **A5** |  |  |  |
| **Assessment Methods, Weight in Course Grade, Implementation and Make-Up Rules**  | **No.** | **Type** | **Weight** | **Implementation Rule** | **Make-Up Rule** |
| **A1** | **Exam** | **%65** | **1 midterm 1 final exam** | **If a student misses an exam and provides an acceptable legitimate document, a makeup exam should be provided.** |
| **A2** | **Quiz** | **%10** | **2 in class quizzes** |  |
| **A3** | **Homework** | **%15** | **5 homework assignments** | **There will be no make-up for homework. Late submissions are not accepted.** |
| **A4** | **Project** |  |  | **Course project are done in groups. Aim of the course project is to read and analyze a scheduling case on an industrial application. Related solver and data files are submitted to students. Students are expected to run and play with case files, do what if analysis and answer the questions at the end of the case.** |
| **A5** | **Report** |  | **-** | **-** |
| **A6** | **Presentation** | **%10** | **-** | **For each course project, students should give the problem definition, give information about the application, explain the mathematical model and proposed solution approach, suggest improvements (if any) and comment on the applicability of the study in Turkey.** |
| **A7** | **Attendance/ Interaction** |  | **-** | **-** |
| **A8** | **Class/Lab./****Field Work** |  | **-** | **-** |
| **A9** | **Other** |  |  |  |
| **TOTAL** | **100%** |
| **Evidence of Achievement of Learning Outcomes** | **Students will demonstrate learning outcomes through exams, homework assignments, and the term project report and presentation.****Every topic is tested with at least one exam question. In order to pass, a student needs to accumulate certain percentage of points and this percentage is determined by the class mean.** |
| **Method for Determining Letter Grade** | **The method on which the letter grade is based on will be announced at the beginning of the semester, and this method may be subjected to change depending on the performance of the students.****1 midterm exam, 1 final exam, 2 in-class quizzes, 5 homework assignments,1 term project presentation grade are used for grading. The table shows the maximum points to be collected from the exams and homework.**

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| --- | --- | --- | --- | --- | --- | --- |
| **Assessment** | **Assignments Average** | **Quizzes Average** | **Project Presentation** | **Midterm** | **Final** | **TOTAL** |
| **Points** | **15** | **10** | **10** | **30** | **35** | **100** |

**Letter grade is determined using the table below:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Total points** | **100-95** | **94-90** | **89-85** | **84-80** | **79-75** | **74-70** | **69-65** | **64-60** | **59-55** | **54-50** |
| **Letter Grade** | **A** | **A-** | **B+** | **B** | **B-** | **C+** | **C** | **C-** | **D+** | **D** |

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| **Teaching Methods, Student Work Load** | **No** | **Method** | **Explanation** | **Hours** |
| **Time applied by instructor** |
| **1** | **Lecture** | **Lecturing and utilizing chalkboard/whiteboard. Sample questions and answers to strengthen learning. In class exams.** | **2hrs weekly** |
| **2** | **Interactive Lecture** | **The instructor stops and asks students questions and encourages them to answer.** | **1hr weekly** |
| **3** | **Recitation** | **Problems and solutions are demonstrated on chalkboard/whiteboard.** | **2hrs weekly** |
| **4** | **Laboratory** |  |  |
| **5** | **Practical** |  |  |
| **6** | **Field Work** |  |  |
| **Time expected to be allocated by student** |
| **7** | **Project** | **The problem subject of the project is researched and presented.** | **2hrs weekly** |
| **8** | **Homework** | **Application of LEKIN software and AMPL software** |  |
| **9** | **Pre-class Learning of Course Material**  | **New subjects are learned by reading course notes before class.** | **0.5hrs weekly** |
| **10** | **Review of Course Material** | **Review of the subjects before exams in order to prepare.** | **1hr weekly** |
| **11** | **Studio** | **-** | **-** |
| **12** | **Office Hour** | **Asking questions to instructor or to the teaching assistant out of class hour.** | **2hrs weekly** |
| **TOTAL** |  |
| **IV. PART** |
| **Instructor** | **Name** | **Asstr. Prof. Dr. Kamer Özgün** |
| **E-mail** | **kamer.ozgun@antalya.edu.tr** |
| **Phone Number** | **+90(242)2450346** |
| **Office Number** | **+90(242)2450346** |
| **Office Hours** |  |
| **Course Materials** | **Mandatory** | **Michael L. Pinedo, Planning and Scheduling in Manufacturing and Services, Springer Series, (2005).** |
| **Recommended** | **Michael L. Pinedo, Scheduling: Theory, Algorithms, and Systems, Fifth Edition, Springer Series** |
| **Other** | **Scholastic Honesty** | **Violations of scholastic honesty include, but are not limited to cheating, plagiarizing, fabricating information or citations, facilitating acts of dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. Any for of scholastic dishonesty is a serious academic violation and will result in a disciplinary action.** |
| **Students with Disabilities** | **Reasonable accommodations are made for students with verifiable disabilities.** |
| **Safety Issues**  | **Safety of the classroom, the students and the instructor are maintained by the university policies and regulations.** |
| **Flexibility** | **Circumstances may arise during the course that prevents the instructor from fulfilling each and every component of this syllabus; therefore, the syllabus is subject to change.  Students will be notified prior to any changes.** |