Planning maintenance and repairs	**Name of the course/ Unit**
3 Units / 48 hours	**Number of units/Hours of the course**
Mohsen Alvandi, Assistant professor of the department of industrial management, Imam Khomeini International University	**Lecturer/ Faculty member name**
- Problem-based learning ☑ - Team-based learning ☑ - Project-based learning. ☑ - Game-based learning ✕ - Technology-based learning ☑ - Flipped learning ☑ - Web-based learning. ☑ - Experience-based learning ✕ - Technology Supported Collaborative Learning ☑	**Adapted strategy/ Approach/Innovation**
Undergraduate student	**Level of the course/ Units**
The purpose of this course is to increase students' familiarity with different Maintenance and repair methods, as well as the duties of active employees in this area.	**The purpose**

In this course, students will learn the following and acquire abilities related to the subject. They will develop: • Ability to design and deploy a complete TPM system for machine maintenance Tools and save money and time. • Control the maintenance and repairs system so that they proceed according to the plans. • To make effective decisions for the organization from a preventive aspect. • The steps and aspects of TPM in machines in detail • Maximizing the effectiveness and efficiency of the equipment. • Teaching various TPM softwares from basic to semi-advanced level using • These softwares are developed and developed by expert analysis. • The audience of this course will learn and be able to organize activities related to TPM • It was to determine and announce a specific time to carry out these activities. • To guide the organization in the direction of growth and excellence by dealing appropriately in different situations. • Learning how TPM interacts with the rest of the departments. • Ability to use different maintenance and repair systems • How to detect faults, use corrective methods to fix faults and improve things • • Learning how TPM interacts with other departments	
25 undergraduate students	**Number of learners/ students**
☑ Hybrid ☐ virtual ☐ presence	**Course/Lesson implementation method**

- During this course, the teachers will deploy all the dimensions of TPM well. - Instructors will be able to explain complex topics in a simple way that all students can understand, so that all the people present and the audience will understand the content and students will participate in the class process. - Instructors will be able to keep the class away from monotony by using different styles and contexts and make students eager to continue the discussions so that the discussions can be effectively transferred as a result. - Instructors create platforms for student evaluation and feedback in order to move forward with students' participation and up-to-date opinion, while at the same time putting the best method on their agenda at any time.	**Expected outcomes for teachers in terms of improved quality prior to the course/lesson implementation**
Before teaching[1]... 1. Sharing course materials with students before each session to achieve a higher engagement rate 2. Providing a copy of the taught materials to students, for the ease of learning the materials **During teaching**[2] 1. Presentation of course-related materials by students in PPT file format 2. Providing additional materials to familiarize students with the various dimensions in this field. 3. Engaging students in class discussion by using and proposing key and challenging questions	**Details of the implementation method of the strategy/approach/ innovation**

---

[1]. It refers to activities such as setting specific course objectives, sequencing the presented content, predicting learners' input behavior, grouping students into specific categories, and the class model and structure that will be determined by the instructor.

[2.] It refers to preparatory/initial evaluation activities and motivating learners, which will be designed and managed by the instructor.

4. Asking students for assignments related to the subject taught 5. Attending and contacting experts in the field of TPM to use their experiences and create a platform for questions and answers for students 6. Creating scientific incentive activities related to the topic, such as dedicating a part of the end of the class to play a video related to TPM by a volunteer student. 7. Using CMMS and Cogz software 8. Evaluation through oral questions 9. Students visiting the TPM department of a company in order to familiarize them as much as possible with the topics discussed in class. 10. Project a) During the TPM course, students will be required to present materials related to maintenance and repairs from a company they have chosen arbitrarily. By doing this, they can implement the learned material in the organization they are studying and evaluate themselves in this matter. b) Students are guided to do the project in the direction of basic learning of Access software. c) The project is carried out with the Access software by the relevant instructor, for whom the same general process is explained, and the students act according to this process and implement and execute the data related to their chosen company in this software and from it They prepare a report that helps the students to become more familiar with the maintenance and repair process in the factory environment.	

d) In the next step, students should prepare checklists related to the TPM in relation to their chosen company and complete them based on the conditions and status of the company. e) At the end, the students should be able to identify the losses and defects in their chosen company by using the materials they have collected and provide solutions based on the materials they have learned in order to fix the defects.	
• Oral questions from the taught material (8 marks) • Written assignments (4 marks) • Students' project (5 points) • End of semester exam (3 marks).	**Course/course evaluation method**
▪ Skype online meetings ▪ Adobe Connect ▪ Google Classroom for receiving assignments ▪ Telegram Channel	**Technologies used to enhance teaching and learning**
▪ **As an instructor:** 1. Instructors will achieve high levels of education in TPM topics and will be able to provide students with comprehensive and complete definitions by stating the effective dimensions and levers in this field. 2. Teachers achieve new styles and methods in the way of teaching maintenance and repairs, and by implementing these methods, they provide an attractive and engaging environment for students so that the maximum amount of learning takes place in them. 3. Teachers measure their skills in order to create a suitable platform for learning and improve their skills by evaluating the progress of students in class participation in relation to TPM materials.	**Skills and competencies expected to be developed after implementing the innovation**

4. Instructors can ensure that all students learn and become familiar with topics related to TPM and how to use it in the factory environment and receive useful information from these data.
5. Through the provision of software, teachers can strengthen their ability in these platforms and use more mastery in the direction of diverse training and increasing the amount of learning for students.
6. If the lecturers encounter new materials from the students during the course, they can use these materials by learning and improving their skills and provide higher quality education.

• As a student:
1. Students will achieve a high level of familiarity with TPM equipment and dimensions and will be able to review and evaluate a company from this point of view.
2. Students gain the ability to design and implement a maintenance and repair system in the company
3. Students will be able to maximize the effectiveness of the equipment by preparing a regular and detailed schedule of maintenance and repairs.
4. Students will improve their skills in the field of TPM and will be able to take action and correct the defects and deficiencies in a company.
5. Students learn how to increase their skills in presenting materials related to this field and act to promote and understand more of this field in the outside environment.
6. Students will learn software related to this field and it will give them the opportunity to quantitatively and qualitatively examine the maintenance and repair aspects of a company.

|	
7. Students will get to know the existing and effective cases and interactions in the field of TPM and will be able to understand the relationship between these cases and use them to improve things and increase productivity. 8. Students will be able to apply the presented materials in their company through the courses held and create an image in their mind for better learning. 9. By doing a project related to TPM in the company of their choice, students learn the skills of using their learned materials in the company and test and evaluate the ability of their interactions to have an impressive performance in the future. 10. Students acquire a useful way of thinking for maintenance, repairs and increasing the productivity of equipment.	
Saeed Rezaei kallaj As Industry Expert (srezaeik63@gmail.com) Amir Mahdavi (Mahdavi.am@ut.ac.ir) as Teaching Assistant Abolfazl Pashangzade (Pashangzadeabolfazl@Gmail.com) as Administrative Assistant	**Consultant/designer/educational assistant**
▪ **Achieving course/lesson objectives using strategy/approach/innovation** Very good (5) Good(4) Average(3) Poor(2) Very poor (1)	**Course/lesson self-evaluation perspective**
In the maintenance and repair training course, the book "Maintenance and Repair Planning" authored by Dr. Ali Haj Shirmohammadi is one of the two sources of this course. This book is used as an initial introduction to the topics, and it mentions all aspects of maintenance and repairs, and it is very useful and effective for starting the way and framing the students' way of thinking about TPM. The contents are presented in a completely	**Other considerations**

captivating way in this book, and at the same time, it tries to make its audience eager to continue and curious about its contents.

Among other things mentioned in this book are the interactions and communications in the field of TPM, which have been investigated, and by knowing them, it will be easier to make corrections.
 By knowing the software mentioned in this book, students will gain the ability to work in the field of maintenance and repairs.
Students will be introduced to very important and practical topics such as Reliability-centered maintenance (RCM), Total Productive Manufacturing (TPM) and Computerized Manufacturing Management Systems (CMMS), which play an essential role in manufacturing.

The other source of this lesson is the book "Comprehensive Productive Maintenance and Repair" written by engineer Houshang Rostamian, which explains TPM topics in a more detailed and in-depth manner and presents the contents in a more detailed manner than the first source. In this book, we will see supplementary materials in the class process, which examines the dimensions and aspects in the best possible way and becomes complementary.
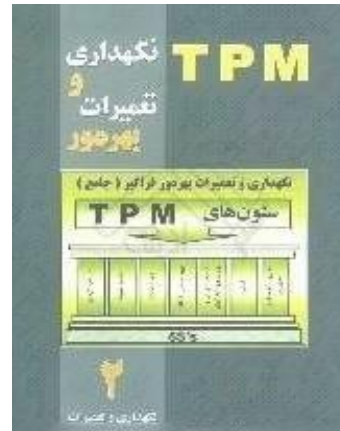
• By reading this book, students can fully understand the necessity of TPM in the factory and take action to acquire skills to make maximum use of this area in the factory.

• This book shows the evolution of the subject of repairs and maintenance from the initial establishment to the achievement of productivity and clearly shows its impact and effectiveness. • After reading the book, students will gain the ability to work practically with the tools available in the field of TPM, which will greatly help them to evaluate and discover defects in order to correct and improve things. • The checklists at the end of the book are a very useful map and guide for students in carrying out and implementing their project, to use them to observe the dimensions of TPM and to understand the maintenance and repairs specific to each department. Finally, by learning the skills, tools and software in this book, students can take action to reduce costs and gain the ability to design a completely effective and flawless system.	