UNIVERSITÀ DI PAVIA

Anno Accademico 2021/2022

LEAN PRODUCTION

Enrollment year	2020/2021
Academic year	2021/2022
Regulations	DM270
Academic discipline	ING-IND/17 (INDUSTRIAL AND MECHANICAL PLANT)
Department	DEPARTMENT OF ELECTRICAL,COMPUTER AND BIOMEDICAL ENGINEERING
Course	INDUSTRIAL AUTOMATION ENGINEERING
Curriculum	Robotics and Mechatronics
Year of study	2°
Period	1st semester (27/09/2021 - 21/01/2022)
ECTS	6
Lesson hours	45 lesson hours
Language	English
Activity type	ORAL TEST
Teacher	DI BLASI DAVIDE (titolare) - 6 ECTS
Prerequisites	Basic knowledge of statistics
Learning outcomes	This course is an examination of systems redesign utilizing contemporary quality and systems engineering methodologies, specifically Six Sigma, Lean, Toyota Production System (TPS) and Constraint Management. Direct application of principles to a relevant industry field project will be shown. This course is recommended for those students interested in optimization and management of operational processes. The aim of the course is to provide competences and skills about lean and six sigma tools. At the end of the course, students will be able to apply the acquired competences and skills in order to improve industrial processes.
Course contents	Historycal introduction: lean thinking

	• Toyota case study: Toyota Production System • Japanese culture: an important starting point • Lean Manufacturing today: Europe vs USA vs Japan => main analogies and differences • Lean Manufacturing today: some significative examples (external Laboratories: visit to MONIER, CAMEROON, BLOOMBERG) • Continuous improvement and Lean Leadership • Visual and shoopfloor management • Safety and working environment; Heinrich Pyramid • MURI/MURA/MUDA: 3 tipology of wastes • SMED: change over and settings optimization • 5S and standardization • PDCA and problem solving approach • Fishbone analysis, 5W1H, 5 Why's tools • Quality Control and SPC • TPM: Total Preventive Maintenance • Autonomous and Preventive Manintenance • Machine classification: main criterias • Cost deployment and wastes indentification • Logistic application: JIT and Kanban • Value stream map and SIPOC approach
Teaching methods	Lectures (hours/year in lecture theatre): 45 Practical class (hours/year in lecture theatre), part of them (20%) will be spent in exercises 12 hours of practical/ Workshops (hours/year in lecture theatre): external visits (Monier, Cameron)
Reccomended or required readings	• 2017/18 suggestions: - The Toyota Way: continuous improvement (Liker/ Franz) - The Brith of Lean (Fujmoto edition) - Hoshi Kanri - Toyota Spirit (T.Ohno) 2016/17 suggestions: - James P. Womack and Daniel T. Jones . Lean Thinking: Banish Waste and Create Wealth in Your Corporation . 2003 Free Press, - Peter S. Pande, Robert P. Neuman and Roland R. Cavanagh. The Six Sigma Way: Team Fieldbook. 2002 McGraw?Hill, - Eliyahu M. Goldratt and Jeff Cox. The Goal: A Process of Ongoing Improvement . 1994 or 2004 The North River Press, - Michael L. George, David Rowlands, Mark Price and John Maxey. The Lean Six Sigma Pocket Toolbook. 2005 George Group
Assessment methods	Oral exam which requires the preparation of a presentation about a DMAIC Project that will be assigned to each team (3-4 students, depending on the number of total students). A Power Point presentation shall be submitted to my e-mail address (davide.diblasi@unipv.it) 3 days before the exam date at the latest, in order to be reviewed. During the exam, studentwillhave to: • present the lean six sigma tools used in the project • justify the choice made • answerquestions Time for the preparation of the project presentation will also be considered in the final

	mark, this to introduce the student into a working reality where it's very important to deliver a good product with a short lead time Threshold to pass is 18/30 and maximum mark is 30/30 cum laude. For laude: will be requested what book of the reference bobliography was read and what the main contents about it. 2 milestone (individual exercises) will be done during the training, as "refresh" of main contents. A preliminary evaluation will be given to each one.
Further information	3 external visits are planned in manufactuiring plants; a reports will be requested to each one.
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile