Course Title	Manufacturing Process Automation				
Course Code	**MMK 541**				
Course Type	COMPULSORY				
Level	MASTER/PHD				
Year / Semester	WINTER SEMESTER				
Teacher's Name	An academic position vacancy has been announced to meet the teaching needs of this field				
ECTS	8	Lectures / week	2 X 1,5 AN HOUR	Laboratories / week	1
Course Purpose and Objectives	The purpose of this course is to 1) extend and broaden a range of engineering skills, containing a careful blend of mechanical engineering, manufacturing, process engineering and automation, and 2) gain the advanced knowledge necessary to devise innovative solutions and systems in the broad field of manufacturing process automation.				
Learning Outcomes	The students will develop a thorough understanding of the principles of modern manufacturing techniques, automation and production processes. They will be able to identify and review appropriate manufacturing systems for different production requirements and analyse their performance. They will also be able to understand appropriate technology, quality tools and manufacturing methodology to design, re-design and continuously improve manufacturing operations.				
Prerequisites	NO	Required	NO		
Course Content	The course involves an in-depth study of the physical dynamics in the wider spectrum of manufacturing processes, assessing their potential for automation. The course reviews the classical background in thermodynamics, fluids and mechanics together with dynamic systems and controls, in the context of analysis and design for automation of individual manufacturing processes. It also involves modelling and control issues examined in comparative studies of metal cutting, forming, bulk deformation, joining, welding, casting, and sintering in processing of ceramic, semiconductor and composite material processing. Emphasis is given on new technologies such as rapid prototyping, microelectronics fabrication and nano-manufacturing, as well as on advanced, nonlinear, adaptive and multivariable control algorithms. Simulation tools (Matlab/Simulink) are taught to allow students assess and optimize the performance of processing systems. Research directions are explored through taxonomy of manufacturing processes, suggesting redesign for automation. Students integrate and demonstrate control of a process experiment in the laboratory, such as part inspection station, automated bottle labelling robotic cell, thermal control of welding with infrared feedback, or automated assembly with machine vision. They also undertake the complete, real-world design of an automated plant such as a bakery.				

Teaching Methodology	Lectures 3 hours per week / Tutorials or laboratory exercises 1 hour per week Class and laboratory lectures; powder point presentations There is continuous communication with the instructor and active participation of the students in the class. During the first week of the semester the instructor hands in the Syllabus of the course to the students, which includes all information about the materials covered by the course, the learning outcomes, the evaluation and the office hours.
Bibliography	Lecture notes; selected articles Mikell P. Groover. Automation, Production Systems, and Computer-integrated Manufacturing. ISBN: 0134605462, 9780134605463
Assessment	Midterm exam (35%), final exam (35%), homework, lab reports/presentation (30%)
Language	GREEK OR ENGLISH