

FACULTY OF **ENGINEERING**

DEGREE COURSE: **COMPUTER AND CONTROL ENGINEERING**

MASTER DEGREE: **COMPUTER AND CONTROL ENGINEERING**

SUBJECT: ADVANCED CONTROL SYSTEMS

LECTURER: GUIDO ODDI

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OBJECTIVES

To introduce a set of advanced methodologies for the control of dynamic systems, with applications in the fields of automation and telecommunications.

CONTENTS

- Classical control theory. Space state representation. The state observer. State and output feedback.
- Fundamentals of industrial automation.
- Fundamentals of mathematical optimization.
- Optimal control of dynamic linear systems.
- The Markov Decision Processes (MDP), the dynamic programming and the Reinforcement learning.
- Applications in the fields of automation and telecommunications.

LEARNING OUTCOMES

Knowledge of the fundamentals of the classical control theory and the industrial automation, the space state representation and control, the control methodologies based on dynamic programming and Reinforcement Learning and the optimal control.

ASSESSMENT

Written exam: multiple-choice tests and open-ended questions

RECOMMENDED TEXTBOOKS

The provided material is sufficient for a complete comprehension of the course. However, the following readings are suggested:

1. Richard C. Dorf, Robert H. Bishop, "*Modern Control Systems (12th edition)*", Prentice Hall.
 2. Richard S. Sutton and Andrew G. Barto, "*Reinforcement Learning: An Introduction*", MIT Press, Cambridge, MA, 1998.
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