



COURSE: Integrated Production Systems

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website:

<https://sites.google.com/site/paoloreнна/home/didattica/sistemi-integrati-di-produzione>

Language italian

ECTS: 9

n. of hours: 81

Academic year: 2014/2015

Campus: Potenza

Semester: I°

TOPICS

Components of automated manufacturing systems: Numerical control machine, automated guided vehicle, local network, numerical control programming, computer aided process planning, CAD-CAM software, BobCAD applications. Design and performance analysis of integrated manufacturing systems: Static allocation, LINGO software applications, Queuing network and decision models, Jackson Network, Mean value Analysis, Event discrete simulation, Rockwell ARENA package.

TEACHING METHODS (please tick one or more options)

- Theoretical lessons**
- Tutorials in classroom**
- Tutorials in laboratory**
- Project works
- Technical visits

Other activities (please specify) _____

TEXTBOOKS

F. Giusti e M. Santochi, Tecnologia Meccanica e Studi di Fabbricazione, Casa Editrice Ambrosiana, Milano;

F. Grimaldi, "CNC Macchine utensili a controllo numerico", HOEPLI;

N. Viswanadham, Y. Narahari, "Performance Modeling of Automated Manufacturing Systems", Prentice Hall;

F. S. Hillier, G. J. Liebermann, "Introduction to Operations Research", McGraw Hill;

Kelton, Sadowski, Sadowski, 1998, "Simulating with ARENA" McGrawHill;

A. Li Calzi, 1999, Ingegneria Gestionale, EPOS.

On line lectures materials on: <https://sites.google.com/site/paoloreнна/home/didattica/sistemi-integrati-di-produzione>

ON-LINE EDUCATIONAL MATERIAL

web address: <https://sites.google.com/site/paoloreнна/home/didattica/sistemi-integrati-di-produzione>

LEARNING OUTCOMES

Understand the management of numerical control machine in advanced production systems. Understand the design and performance analysis approaches for the advanced manufacturing systems in order to optimize the performance measures and integrate of its components. Understand the discrete event simulation approach; understand the design and analysis of simulation models.

REQUIREMENTS

EVALUATION METHODS (please tick one or more options)

- Intermediate verifications
- Written examination
- Discussion of a project work**
- Practical test
- Oral examination**

Other methods (please specify) _____



DETAILED CONTENT

SECTION I: Automated manufacturing systems

- I.1. Overview: automation in modern industrial applications
- I.2. Numerical Control
 - I.2.a. Components of numerical control machines
 - I.2.b. Movements and motors of a numerical control machine
 - I.2.c. Tools management
 - I.2.d. Dimensional measurement and other services
 - I.2.e. Closed loop control and sensors
 - I.2.f. Numerical control management
 - I.2.g. Numerical control programming
- I.3. Material Handling: Automated Guided Vehicle (AGV)
 - I.3.a. Overview of AGVs
 - I.3.b. Characteristics and structure of AGVs
 - I.3.c. Control and management of AGVs
 - I.3.d. Industrial Conveyor
- I.4. Integration tools in advanced manufacturing systems
 - I.4.a. FMS, FAL e RMS
 - I.4.b. Cellular manufacturing systems
 - I.4.c. Design and control of integrated manufacturing systems
 - I.4.d. Local Network of manufacturing systems

SECTION II: Integration tools

- II.1. II CAD-CAM software programming for numerical control machines; BOBCAM software;
- II.1. II Computer Aided Process Planning: variant and generative CAPP;
- II.3. Group technology e cellular production systems
 - II.3.a. Code and classification of parts
 - II.3.b. Production Flow Analysis: the cluster Identification
 - II.3.c. cellular manufacturing systems applications
 - II.3.d. Design of cellular manufacturing systems

SECTION III: Manufacturing systems

- III.1 Overview and classification of manufacturing systems
- III.2 Single station manufacturing system
- III.3 Cellular manufacturing systems
- III.4 Flexible manufacturing systems
- III.5. Assembly lines
 - III.5.a Transfer lines and similar automated manufacturing systems
 - III.5.b. Applications of automated production lines
 - III.5.c. Analysis of transfer lines with no internal storage
 - III.5.d. Analysis of transfer lines with storage buffer
- III.6. Manual Assembly lines
 - III.6.a. Overview of assembly lines
 - III.6.b. Assembly lines for single product
 - III.6.c. Design methodologies for assembly lines
 - III.6.d. Flexible assembly lines
 - III.6.e. Design methodologies for flexible assembly lines

SECTION IV: Design and analysis methodologies for automated manufacturing systems

- IV.1. Performance measures in automated manufacturing systems
 - IV.2. Overview of static allocation in manufacturing systems
 - IV.2.a. Static allocation to design manufacturing systems
 - IV.2.b. Static allocation to analyze manufacturing systems
 - IV.3. Mathematical descriptive methods
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IV.3.a. Stochastic processes
IV.3.b. Overview of Markov queuing systems
IV.3.c. Queuing network
IV.3.d. Jackson Network and Mean Value Analysis
IV.4. Design and analysis by discrete event simulation
IV.4.a. Overview of discrete event simulation
IV.4.b. Simulations: languages and software
IV.4.c. Simulation models with Rockwell ARENA

SEMINARS BY EXTERNAL EXPERTS **YES** **NO**

EXAMINATION SESSIONS (FORECAST)

26/02/2016 18/03/2016 22/04/2016 27/05/2016 24/06/2016 29/07/2016 23/09/2016 18/11/2016 16/12/2016

FURTHER INFORMATION
