<table>
<tr><td colspan="3">Programme of "Impianti Industriali" - "Fundamentals of Production Systems"</td></tr>
<tr><td colspan="3">• Code: I0219
• Type of course unit: compulsory for the management engineering specialization
• Level of course unit: first cycle
• Year of study: third, semester: second</td></tr>
<tr><td colspan="3">Number of ECTS credits: 9 (workload of 90 hours of teaching + work at home; 1 credit = 25 hours of total activities)</td></tr>
<tr><td colspan="3">Teacher: Prof. Mario Palumbo</td></tr>
<tr><td>1</td><td>Course objectives</td><td>The aim of the course is to give the fundamentals of manufacturing and plants in which it is carried out. On successful completion of this module, the students should receive the basic instruments for designing, planning, managing and maintaining production systems and their ancillary plants.</td></tr>
<tr><td>2</td><td>Course content and Learning outcomes (Dublin descriptors)</td><td>Topics of the module include:
Introduction to Industrial Manufacturing: structure of manufacturing systems and classification criteria for industrial enterprises; the manufacturing system in the industrial enterprise. Feasibility Study: market analysis; production capacity sizing; plant location; technical - economic - financial assessments; profitability indexes (PBP, NPV, DCFRR); investment risk analysis. Manufacturing system design: plant layout; queuing theory; continuous and batch production; Economic Production Quantity; sizing of the means of production. Project planning: program evaluation techniques and their use in the design, construction and operation of industrial plants (PERT and CPM). Work measurement and organization: Taylor and the principles of scientific management; Methods and Time Measurement; stopwatch time study; predetermined times methods (Work Factor, MTM); work sampling; manpower sizing. Raw materials and finished goods storage; Economic Order Quantity; quantity discounts; techniques of inventory management; safety stock. Reliability: fundamentals; components and systems reliability; Fault Tree Analysis. Ancillary plants: industrial water supply and distribution; fire-fighting systems; production and distribution of compressed air; electrical system; thermal system; Combined Heat and Power systems.

On successful completion of this module, the student will:
- have profound knowledge of basics of economics engineering and feasibility studies;
- have knowledge and understanding of the procedures to:
o design industrial layouts;
o size manufacturing plants;
o carry out work/time studies;
o maintain correct levels of inventory.
- understand and explain the meaning of complex statements concerning reliability of components and systems;
- demonstrate skill in the use of project management tools as PERT and CPM;
- demonstrate ability to carry out the sizing of main plant ancillary systems (water, electrical, thermal…);
- demonstrate capacity for reading and understand other texts on related topics.</td></tr>
<tr><td>3</td><td>Prerequisites and learning activities</td><td>Prerequisites: mathematics; physics; basics of manufacturing processes.</td></tr>
<tr><td>4</td><td>Teaching methods and language</td><td>Lectures and exercises. Language: Italian

Ref. Text books:

• James Mendon Moore - Plant layout and design – Macmillan
• Ruddell Reed - Plant location, layout, and maintenance
• Phillip F. Ostwald, Jairo Muñoz - Manufacturing Processes And Systems - John Wiley & Sons
• David J. Smith - Reliability, Maintainability and Risk – Newnes
• C.R.Wynne Roberts, George Kanawaty - Introduction to Work Study - International Labour Office
• John F. Magee, David M. Boodman - Production planning and inventory control - McGraw-Hill

Some didactic materials and scientific papers published by the teacher</td></tr>
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