Fundamentals of Manufacturing Processes (ENG 005)

Preparatory Year, Faculty of Engineering, Fayoum University

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Course Aims

The aims of the course is to give *freshmen students* a comprehensive skills about the general engineering materials, *workshop* and *traditional machine tools* used in processing.

An overview of *manufacturing processes* such as carpentry, machining, forming, welding, and casting.

**Types of production.** The students learn how to *work safely* on the *workshop equipment* and machine.
Fundamentals of Manufacturing Processes

Theoretical
2 Hrs/week

Practical
2 Hrs/week
Theoretical Course Contents

• Introduction.
  • What is manufacturing?
  • Production process.
  • Manufacturing process.

• Engineering Materials.
  • Ferrous metals.
  • Non-ferrous metals.
  • Ceramics.
  • Polymers.
  • Composite.
  • Mechanical Properties.
  • Selection of materials.
  • Selecting manufacturing process.
Theoretical Course Contents (Cont.)

• Casting.
  • Melting practice and furnaces.
  • Cooling and solidification.
  • Metal casting processes.

• Metal Forming.
  • Hot work and cold work.
  • Forging.
  • Rolling.
  • Extrusion.
  • Tube drawing.
  • Wire drawing.
  • Deep drawing.
  • Spinning.
Theoretical Course Contents (Cont.)

• Metal Cutting.
  • Drilling machine.
  • Milling machine.
  • Turning machine.
  • Shaping machine

• Joining and Fastening Processes.
  • Welding processes (fusion, resistance, and friction).
  • Mechanical joining.
  • Adhesive bonding.
Theoretical Course Contents (Cont.)

• Measurements and Marking Out.
  • Used tools (measuring tools, devices and instruments, inspecting gauge).
  • Bench work (holding, cutting, striking and tightening tools).

• Sheet Metal Work.
  • Sheet metal tools.
  • Folded sheet metal joints.
  • Development of pattern layout.
  • Machines used in sheet metal hop.
Theoretical Course Contents (Cont.)

- Carpentry.
  - Hard and soft wood.
  - Some common timbers, their qualities and uses.
  - Felling, conversion and seasoning of wood
  - Defects in timber
  - Timber preservation
  - Characteristics of a good timbers
  - Plywood and applications
  - Miscellaneous material used in carpentry shop
  - Common tools used in carpentry shop
  - Common wood joints
  - Carpentry machines
  - Common safety in carpentry shop..
Practical Course Contents

7. Gas Welding Workshop (GW).
8. Forging workshop (FG).
10. Measurements Workshop (MS).
11. Metal Casting Workshop (MC).
Workshop
Teaching and Learning Methods

- Power Point Lectures.
- Course Handout.
- Assignments, Reports, .... etc.
- Quizzes.
Weighting of Assessment

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Communications

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Questions