

University of Macau
Department of Electromechanical Engineering
MECH206 - Manufacturing Process II
Syllabus
2nd Semester 2011/2012
Part A – Course Outline

Compulsory course in Electromechanical Engineering

Course description:

This course has two parts. In the theory part, students will learn various kinds of manufacturing processes for metals and plastics. In practice parts, students will learn to manufacture products by themselves using the machines in the workshop.

Prerequisites:

MECH300 - Manufacturing Process I

Textbook(s)

- Philip F. Ostwald, Jairo Muñoz, *Manufacturing Processes and Systems*, 9th edition. John Wiley & Sons, Inc. 1997.

References:

- Mikell P. Groover, *Fundamentals of Modern Manufacturing: Material, Processes, and Systems*, 3rd edition. John Wiley & Sons, Inc. 2007.

Course objectives:

1. Introduce the concept of modern manufacturing to students. [a, j]
2. Provide students hands-on experience on manufacturing. [b, k]
3. Enable students to work effectively in a team environment. [g]

Topics covered:

1. **Grinding and Abrasive Processes** – Grinding and abrasive practices, processes, abrasive materials.
2. **Welding and Joining Processes** – Introduction on arc welding, resistance welding, solid-state welding, and other joining process.
3. **Hot Working of Metal** – Plastic deformation, rolling, forging, extrusion, pipe and tube making, drawing.
4. **Cold Working of Metal** – Cold working process, high energy rate forming, other methods.
5. **Press working and Operations** – Presses, driving mechanisms, feed mechanisms, and operations.
6. **Plastic Materials and Processes** – Thermosetting compounds, thermoplastic compounds, processing, design fundamentals.
7. **Nontraditional Processes and Powder Metallurgy** – Special machining processes, temperature machining, chemical energy, electroforming, metal spraying.
8. **Thread and Gear Working** – Screw threads, thread making, gears and gear making.

Class schedule and credits:

Timetabled work in hours per week			No of teaching weeks	Total hours	Total credits	No / Duration of exam papers
Lecture	Tutorial	Practice				
3	0	2	14	70	3	1 / 2 hours

Contribution of course to meet the professional component:

This course prepares students to work professionally in the area of **manufacturing process**.

Relationship to EME programme objectives and outcomes:

This course primarily contributes to Electromechanical Engineering Programme outcomes that develop student abilities to:

- (a) An ability to apply knowledge of mathematics, science, and engineering;
- (j) A knowledge of contemporary issues;
- (g) An ability to communicate effectively.

The course secondarily contributes to Electromechanical Engineering programme outcomes that develop student abilities to:

- (b) An ability to design and conduct experiments, as well as to analyze and interpret data;
- (k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice appropriate to the degree discipline.

Course content:

Maths	Basic Sciences	Engineering Science	Engineering Design and Synthesis	Complementary Studies	Computer Studies	Total 100%
15	0	70	15	0	0	100

Persons who prepared this description:

Dr. Zhengchao Xie

Part B – General Course Information and Policies

2nd Semester 2011/2012

Instructor: Dr. Zhengchao Xie
Office Hour: By appointment
Email: zxie@umac.mo

Office: B1-B810
Phone: (853) 8397-8471

Time/Venue:

TBA

Assessment:

Final assessment will be determined on the basis of:

Homework: 15%
Mid-term I: 20%
Final Exam (Comprehensive): 35%
Practice: 30%

Grading System:

The credit is earned by the achievement of a grade from 'A' to 'D'; 'F' carries zero credit.

Grades are awarded according to the following system:

Letter Grades	Grade Points	Percentage
A	4.0 (Excellent)	93-100
A-	3.7 (Very good)	88-92
B+	3.3	83-87
B	3.0 (Good)	78-82
B-	2.7	73-77
C+	2.3	68-72
C	2.0 (Average)	63-67
C-	1.7	58-62
D+	1.3	53-57
D	1.0 (Pass)	50-52
F	0 (Fail)	Below 50

Homework Policy:

The completion and correction of homework is a powerful learning experience; therefore:

- Homework is due one week after assignment unless otherwise noted, no late homework is accepted.
- Possible revision of homework grades may be discussed with the grader within one week from the return of the marked homework
- The homework grade will be based on the average of the assignment grades.

Mid-terms Exams:

One mid-term exam will be held in the middle of the semester.

Note:

- Attendance is strongly recommended.
- Check UMMoodle (webcourse.umac.mo) for announcement, homework and lectures.
- No make-up exam is give except for CLEAR medical proof.
- If you are late in the exam, you must turn in at the due time.
- Cheating is absolutely prohibited by the university.

Appendix - Rubric for Programme Outcomes

Rubric for (a)	5 (Excellent)	3 (Average)	1 (Poor)
Understand the theoretic background	Students understand theoretic background and the limitations of the respective applications.	Students have some confusion on some background or do not understand theoretic background completely	Students do not understand the background or do not study at all
Use a correct model and formulation correctly	Students choose a model correctly and properly apply correct techniques	Students choose a wrong model sometime, use a wrong formula, or a different technique	Students use a wrong model and wrong formula, or do not know how to model
Compute the problem correctly	Students use correct techniques, analyze the problems, and compute them correctly	Students sometime solve problem mistakenly using wrong techniques	Students do not know how to solve problems or use wrong techniques completely

Rubric for (b)	5 (Excellent)	3 (Average)	1 (Poor)
Conduct experiments	Student successfully completes the experiment, records the data, analyzes the experiment's main topics, and explains the experiment concisely and well.	Student successfully completes the experiment, records the data, and analyzes the experiment's main topics.	Student either does not complete the experiment successfully, or completes it successfully but does not record the correct data.
Design experiments	Student understands what needs to be tested and designs an appropriate experiment that takes into account the limitations of the equipment and measurement accuracy.	Student understands what needs to be tested and designs an appropriate experiment, but may not fully understand the limitations of the measurements.	Student does not understand what needs to be tested and/or does not design an appropriate experiment.

Rubric for (g)	5 (Excellent)	3 (Average)	1 (Poor)
Professional Impact	Student's/Team's/Group's document(s)/presentation(s) is/are considered to be of professional quality	Student's/Team's/Group's document(s)/presentation(s) is/are considered acceptable for college level work	Student's/Team's/Group's document(s)/presentation(s) is/are considered unacceptable for college level work
Written Component	Document is nearly error free with sophisticated use of vocabulary, formatted properly, with well developed concise sentences and paragraphs	Document contains some errors with a somewhat colloquial vocabulary, minor formatting issues, with some organizational issues that do not interfere with communication	Document contains many errors, very colloquial vocabulary, with severe organizational issues that interfere with communication. Document would be considered unacceptable.
Oral Component	Presentation is consistent, uniform, clear, direct, complete and captivating with very clear fonts and graphics with an excellent layout that clearly presents the technical content	Presentation is somewhat inconsistent between speakers, occasionally difficult to hear, with an acceptable layout containing acceptable fonts and graphics that adequately presents the technical content	Presentation is very inconsistent between speakers, difficult to hear with a poor layout containing illegible fonts and graphics that poorly presents the technical content. Would be considered unacceptable

Rubric for (j)	5 (Excellent)	3 (Average)	1 (Poor)
Relevance to the Present Time	Student displays an understanding of the theoretical or practical impact and an ability to correlate a subject, perception, communication, association and reasoning from a global and societal perspective.	Student is able to display an understanding of current topics and issues with some knowledge regarding their impact in a bigger global and societal sense.	Student has difficulty demonstrating an awareness or familiarity with current topics and issues relevant to most current global and societal affairs.

Rubric for (k)	5 (Excellent)	3 (Average)	1 (Poor)
Use modern hardware tools in engineering practice	Student uses the hardware to measure and/or build engineering systems/designs correctly, and understands the limitations of the hardware.	Student uses the hardware to measure and/or build engineering systems/designs correctly.	Student does not use the hardware correctly.