University of Macau
Department of Electromechanical Engineering
MECH313 - Production Management
Syllabus
2nd Semester 2011/2012
Part A – Course Outline

Compulsory course in Electromechanical Engineering

Course description:

This course will be introduced to Basic Management Principles, Production and Operations Management, Production Planning, Production Control, Project Management, Quality Management and Control, Facility Planning, and Job Design. The course project is requested to focus on business angle for the product design and Total Quality Management concept.

Prerequisite:

None

Textbook:

- William J. Stevenson, Sum Chee Chuong, ***Operations Management – An Asian Perspective***, 9th Edition, McGraw-Hill/Irwin, 2010.

References:

- Chase, Aquilano, Jacobs, Production and Operations Management - Manufacturing and Services, 8th Edition, McGraw-Hill, 2001.
- George Ellwood Dieter, Engineering Design: A Materials and Processing Approach, 4th edition. McGraw-Hill Higher Educatio Press, 2008.
- Daniel Sipper; Robert L. Bulfin, JR., Production: Planning, Control and Integration, McGraw-Hill, 1998.
- Turner, Mize, Case, Nazemetz, Introduction to Industrial and System Engineering, 3rd Edition, Prentice Hall, 1993.
- James B. Dilworth, Production and Operations Management - Manufacturing and Services, 5th Edition, McGraw-Hill, 1993.

Course objectives:

1. Introduce to students to organize the creative product design project. [c, d, g, h, k]
2. Introduce to students mathematical modeling of project management, production control, and facility planning. [a, e, l]

Topics covered:

1. **Perspectives on Management** – Management and the Manager; The Evolution of management thought; Managerial Decision Making; Environmental Forces; Social Responsibility and Management Ethics.
2. **Quality Management and Control** – Total Quality Management; Concurrent Engineering.
3. **Project Management** – Scheduling and Controlling Projects.
4. **Production Planning** – MRP I/II; Economic Order Quantity.
5. **Production Control** – Bill of Materials; Just-in-Time Manufacturing or Manufacturing Excellence.
6. **Facility Planning and Job Design** – Facility Location; Layout of Facilities; Design and Manage for Technological Advantage.

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				
2	0	2	14	56	3.5	1 / 3 hours

Topic outline:

Week No.	No. of hours	Topics	Textbook
1	1	Introduction to course outline	Chapter 1
1	1	Introduction to course project	Notes
2	2	How to create a new product to fit market needs? Basic concept of Production Management – Critical Success Factors for Product – 4P – Mass Production Concurrent Engineering 1st Presentation Examples	Chapter 4
2	2	Quality Function Deployment (Presentation Practice)	Notes
3	2	ISO 9000 Project Management I	Chapter 9 Chapter 17
3	2	1st Presentation of course project (Basic Idea and Concept)	
4	2	Project Management II	Chapter 17
4	2	Project Management Tutorial	
5	2	Bill of Material (BOM) MRP I/II	Chapter 13 and 14
5	2	MS Project workshop	Notes
6	2	MRP I/II (Programming Design) – Case Study	Chapter 14 and Notes
6	2	Quiz I – Project Management	
7	2	Inventory System – Economic Order Quantity I	Chapter 12
7	2	EOQ II	Chapter 12 and Notes
8	2	Progress Presentation of Course Project	
8	2	Facility Layout Design – Rank Order Clustering;	Notes
9	2	Facility Layout Design – Direct Clustering	Notes
9	2	Facility Layout Design - Practice	
10	2	Systematic Layout Planning I	Notes
10	2	Systematic Layout Planning II	Notes
11	2	Systematic Layout Planning III - Practice	
11	2	Operation Research I	Chapter 8
12	2	Quiz II – MRP & EOQ	
12	2	Operation Research II	Chapter 8
13	2	Operation Research III - Practice	
13	2	Final Presentation of Course Project – First session	
14	2	Final Presentation of Course Project – Second session	

Contribution of course to meet the professional component:

This course prepares students to work professionally in the area of **engineering management and product design**.

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;

(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

(d) an ability to function on multidisciplinary teams;

(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice appropriate to the degree discipline.

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

(e) an ability to identify, formulate, and solve engineering problems;

(g) an ability to communicate effectively;

(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context, especially the importance of health, safety and environmental considerations to both workers and the general public;

(l) an ability to use the computer/IT tools relevant to the discipline along with an understanding of their processes and limitations.

Course content:

Maths	Basic Sciences	Engineering Science	Engineering Design and Synthesis	Complementary Studies	Computer Studies	Total 100%
20	0	20	30	20	10	100

Persons who prepared this description:

Dr. Seng Fat Wong

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Part B – General Course Information and Policies

2nd Semester 2010/2011

Instructor: Dr. Seng Fat Wong
Office: N403
Office Hour: By appointment
Phone: (853) 8397-4453
Email: fstsfw@umac.mo

Time/Venue:
TBA

Assessment:
Final assessment will be determined on the basis of:

Attendance and in-class Performance:	5%
Homework:	10%
In-class Quizzes:	15%
Course Project:	30%
Final Exam (Comprehensive):	40%

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

Comment:
The objectives of the lectures are to explain and to supplement the text material. Students are responsible for the assigned material whether or not it is covered in the lecture. Students who wish to succeed in this course should read the textbook (chapter related) prior to the lecture, should work all homework and in-class quizzes and should made use of the material provided at UMMoodle such as examples and extra material. You are encouraged to look at other sources (such as other textbooks, websites, etc.) to complement the lectures and text.

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

- There will be approximately 7 homework assignments.
- 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.

Quizzes/Mid-terms Exams:
Approximately 4 quizzes and one final exam will be held during the semester.

Note:

- Check UMMoodle (ummoodle.umac.mo) for announcement, e-quizzes and lectures. Report any mistake on your grades within one week after posting.
- Attendance is strongly recommended.
- No make-up exam is give except for CLEAR medical proof.
- No exam is given if you are 30 minutes late in the final exam. Even 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 (c)	5 (Excellent)	3 (Average)	1 (Poor)
Design capability and design constraints	Student understands very clearly what needs to be designed and the realistic design constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	Student understands what needs to be designed and the design constraints, but may not fully understand the limitations of the design constraints	Student does not understand what needs to be designed and the design constraints.
Process to meet desired needs	Student understands very clearly the process of the design	Student understands what the needs of the process design, but may not fully understand the limitations of the design constraints	Student does not understand the process.

Rubric for (d)	5 (Excellent)	3 (Average)	1 (Poor)
Ability to work in teams	Performance on teams is excellent with clear evidence of equal distribution of tasks and effort as well as frequent meetings of the team members.	Performance on teams is acceptable with one or more members carrying a larger amount of the effort as well as infrequent meetings of the members or one or more members being absent from several meetings.	Performance on teams is poor to unacceptable with one or two members clearly carrying the majority of the effort as well as inadequate team meeting or one or more members missing the majority of the meetings.
Multi-disciplinary teams	Team consists of members from two or more different engineering/science/business fields (this could contain some members not actually enrolled in the course but interacting as part of a competition, collaboration, etc.)	Team consists of members from two or more concentrations within the Department of Electromechanical Engineering	Team consists of members from the same concentration within the Department of Electromechanical Engineering

Rubric for (e)	5 (Excellent)	3 (Average)	1 (Poor)
Identify applications in engineering systems	Students understand problem and can identify fundamental formulation	Students understand problem but cannot apply formulation, or cannot understand problem	Students cannot identify correct terms for engineering applications
Modeling, problem formulation and problem solving	Students choose and properly apply the correct techniques	Students model correctly but cannot select proper technique or model incorrectly but solve correctly accordingly	Students at loss as to how to solve a problem

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 (h)	5 (Excellent)	3 (Average)	1 (Poor)
Scope of Content	Students will demonstrate material, items, or topics characterized by a sophisticated array of information, insight, and understanding.	Students demonstrate significance reflecting an acceptable degree of perception and thoughts.	Students have limited abilities to relate, incorporate, or demonstrate knowledge of subject with a dynamic breadth.
Impact of Process	Students will employ techniques, designs, ideas, and knowledge demonstrating a profound ability to improve and possess broad applications with a keen a series of actions, changes, or functions	Techniques, designs, ideas, and knowledge present some understanding and ability to demonstrate progression, significance, and influence.	Techniques, designs, ideas, and knowledge present limited progression, significance, and influence

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.

Rubric for (l)	5 (Excellent)	3 (Average)	1 (Poor)
Use modern computer and software tools in engineering practice	Student uses the computer and software to correctly analyze engineering problems and/or create engineering designs, and understands the limitations of the software.	Student uses the computer and software to correctly analyze engineering problems and/or create engineering designs.	Student does not use the computer and software to correctly create engineering designs and/or does not correctly interpret the results.