

University of Macau
Department of Electromechanical Engineering
DRWG101 – Technical Drawing
Syllabus
1st Semester 2010/2011
Part A – Course Outline

Compulsory course in Electromechanical Engineering

Course description:

Equipment for instrument drawing. Geometric constructions. Lettering. Sketching and shape description. Multiview, axonometric, oblique and perspective projections. Sectional views. Dimensioning.

Prerequisite:

None

Textbook:

- Douglas Smith, Antonio Ramirez. *Technical Drawing 101 with AutoCAD*, Prentice Hall, 2009. ISBN: 0131751220

Reference:

- Cecil Jensen, *Engineering drawing & design*, McGraw-Hill, 2008.

Course objectives:

1. Learn graphical communication language that engineers practice. [g]
2. Recognize the need for life long learning by encouraging students to learn many aspects of CAD software and its user interface on their own since such engineering tools keep evolving. [i]
3. Learn free hand drawing skills, graphical techniques as well as use of modern CAD software. [j, k]

Topics covered:

1. **Technical Drawing** – Overview; Design Process; Graphics Language; Freehand Drawing; Instrument Drawing; Computer Drawing; Projection Method; Orthographic Projection; Axonometric Drawing; Multiview Drawing; Drawing Standard; Types of Lines; Drawing Tools; Lettering Standard; Word Composition; Freehand Sketching; Using Applied Geometry
2. **Orthographic Projection** – Multiview Projection; Glass Box Concept; Object Features; Projections of Points, Lines, Planes, and Objects; Conventional Practice of Lines.
3. **Pictorial Drawing** – Axonometric Projection; Oblique Projection; Isometric Projection; Isometric Sketching; Oblique Sketching
4. **Reading an Orthographic Drawing** – Analysis by Solids; Analysis by Surfaces; Missing View Problems
5. **Convention Practice in Orthographic Drawing** – Alternate Position of Side View; Incomplete View; Aligned View; Enlarged View; Non-Existing Intersection Line; Cylinder Intersection
6. **Introducing AutoCAD** – Workspace; Toolbars; Coordinate Systems; Setting Up 2D Drawing Environment; Drawing Tools in AutoCAD; Object Snap; Modify Tools in AutoCAD; Layers; Orthographic and Isometric in AutoCAD
7. **Sections** – Terminology; Cutting Plane; Section Lining; Kind of Sections; Convention Practice in Section View; Aligned Section
8. **Dimensioning** – Dimensioning Systems; Dimensioning Components; Dimensioning Features of Object; Placement of Dimensions

Class schedule and credits:

Timetabled work in hours per week			No of teaching	Total hours	Total credits	No / Duration of exam papers
Lecture	Tutorial	Practice				

			weeks			
2	0	4	14	84	3.5	1 / 3hrs

Topic Outline:

Week No.	No. of hours	Topics
1, 2	12	Technical Drawing Overview; Design Process; Graphics Language; Freehand Drawing; Instrument Drawing; Computer Drawing; Projection Method; Orthographic Projection; Axonometric Drawing; Multiview Drawing; Drawing Standards; Types of Lines; Traditional Drawing Tools; Lettering Standard; Word Composition; Freehand Sketching; Using Applied Geometry
3	6	Orthographic Projection Multiview Projection; Glass Box Concept; Object Features; Projections of Points, Lines, Planes, and Objects; Conventional Practice of Lines
4, 5	12	Pictorial Drawing Axonometric Projection; Oblique Projection; Isometric Projection; Isometric Sketching; Oblique Sketching
6	6	Reading an Orthographic Drawing Analysis by Solids; Analysis by Surfaces; Missing View Problems
7	6	Conventional Practice in Orthographic Drawing Alternate Position of Side View; Incomplete View; Aligned View; Enlarged View; Non-Existing Intersection Line; Cylinder Intersection
8, 9, 10	18	Introducing AutoCAD Workspace; Toolbars; Coordinate Systems; Setting Up 2D Drawing Environment; Drawing Tools in AutoCAD; Object Snap; Modify Tools in AutoCAD; Layers; Orthographic and Isometric in AutoCAD
11, 12	12	Sections Terminology; Cutting Plane; Section Lining; Kind of Sections; Convention Practice in Section View; Aligned Section
13, 14	12	Dimensioning Dimensioning Systems; Dimensioning Components; Dimensioning Features of Object; Placement of Dimensions

Contribution of course to meet the professional component:

This course prepares students to work professionally in the area of **engineering graphics**.

Relationship to EME program objectives and outcomes:

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

- (g) an ability to communicate effectively.
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

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

- (i) an ability to recognize the need for, and to engage in life-long learning.
- (j) a knowledge of contemporary issues.

Course content:

Maths	Engineering Science	Engineering Design and Synthesis	Complementary Studies	Computer Studies	Total 100%
10	20	40	0	30	100

Course modulator:

Dr. Zhixin Yang

Persons who prepared this description:

Mr. Seng Kin Lao, Dr. Zhixin Yang, Prof. Vai Kuong Sin

Part B – General Course Information and Policies

1st Semester 2010/2011

Instructor: Mr. Seng Kin Lao
Office Hour: By appointment
Email: skeltonl@umac.mo

Office: N327C/NLG104
Phone: (853) 8397-4379, 4289

Time/Venue:

Every Tuesday, 10:30 a.m. - 12:30 p.m., Room U102
Every Thursday, 1:30 p.m. - 5:30 p.m., Room T103

Assessment:

Final assessment will be determined on the basis of:

Homework: 70%

Final Exam (Comprehensive): 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

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 assignments prior to the lecture and should work all homework and practice assignments. You are encouraged to look at other sources (other texts, etc.) to complement the lectures and text.

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 course grade will be based on the average of the homework grades.

Note:

- Attendance is strongly recommended.
- Check UMMoodle (webcourse.umac.mo) for announcement, homework and lectures. Report any mistake on your grades within one week after posting.
- 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 Program Outcomes

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 (i)	5 (Excellent)	3 (Average)	1 (Poor)
Research/Gathering Information	Comprehensive collection of information on a subject, including state-of-the-art and background	Collects adequate information on a subject	Collects minimal information on a subject
Analysis/Evaluation	Detailed analysis accounting for all the information, conclusions are well supported	Some analysis done but somewhat shallow; some supporting evidence	Analysis simply involves restating gathered information; claims not supported by evidence

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.