

University of Macau  
Faculty of Science and Technology  
Department of Electrical and Electronics Engineering

Course Title:	Technical Drawing I		
Course Code:	DRWG100	Year of Study:	1
Course Title:	Technical Drawing I		
Compulsory/Elective:	Compulsory		
Course Prerequisites:	Nil		
Prerequisite Knowledge:	Nil		
Duration:	One semester	Credit Units:	3.5
Class/Laboratory Schedule:	2 hours of lecture and 4 hours of laboratory work per week.		
Laboratory/Software Usage:			
Course Description:	<p>This course aims at preparing undergraduate engineering students to be able to understand and create technical drawings as a basic technique in engineering and scientific communication. The course seeks to develop the student effective utilization of drawing instruments and hand drafting techniques for producing engineering drawings according to the international conventions and drawing standards. Topics will include lettering, geometric construction, technical sketching, orthogonal projection, pictorial drawings, sectional views, auxiliary views, dimensioning, standard drawing formats and detailing.</p>		
Course Objectives:	<ol style="list-style-type: none"> <li>1. To develop students visualization, imagination and ability to represent the shape, size and specifications of physical objects.</li> <li>2. To provide students with adequate knowledge and experience in preparing free hand sketching to effectively communicate engineering information graphically.</li> <li>3. To teach students to read, construct and understand basic engineering drawings.</li> <li>4. To help students acquire the skills pertinent to the production of properly detailed, formatted and dimensioned technical drawings according to the international standards.</li> </ol>		
Learning Outcomes (LO):	<p>Upon completion of this course, students should be able to:</p> <ol style="list-style-type: none"> <li>1. demonstrate an understanding of principles of sketching, geometric construction, orthographic projection, sectioning, pictorials, auxiliary views, dimensioning and detail drawings of typical engineered objects. [POs: a,g,i,j,k];</li> <li>2. develop the ability to visualize, understand, interpret and produce two-dimensional graphical representations of three-dimensional objects and engineering drawings and schematics. [POs: a,b,e,g,i,j,k]</li> <li>3. develop accurate, expedient manipulative and problem-solving skills in the use of drawing equipment to create properly detailed, formatted and dimensioned technical drawings that is consistent with professional engineering practice. [POs: a,b,e,f,k];</li> <li>4. develop an understanding of drawing standards and to relate them properly to drawings.[POs: a,g,h,k];</li> </ol>		

Texts & References: <i>(* recommended textbook(s))</i>	1. Frederick E. Giesecke (2009)*, Modern Graphics Communications, 4 <sup>th</sup> Edition, Prentice Hall.
Student Assessment:	<ul style="list-style-type: none"> <li>• Assignment: 40% ;</li> <li>• Midterm Exam: 30%</li> <li>• Final Examination: 30%</li> </ul>
Learning Outcome Assessment:	<ul style="list-style-type: none"> <li>• Class work &amp; Homework.</li> <li>• Midterm and final examination.</li> <li>• Course evaluation</li> </ul>
Pedagogical Methods:	<input checked="" type="checkbox"/> Lecture <span style="float: right;"><input type="checkbox"/> Service learning</span> <input type="checkbox"/> Guest speakers <span style="float: right;"><input type="checkbox"/> Internship</span> <input type="checkbox"/> Case study <span style="float: right;"><input type="checkbox"/> Field study</span> <input type="checkbox"/> Role playing <span style="float: right;"><input type="checkbox"/> Company visits</span> <input type="checkbox"/> Student presentation <span style="float: right;"><input type="checkbox"/> e-learning</span> <input type="checkbox"/> Project <span style="float: right;"><input checked="" type="checkbox"/> Independent study</span> <input type="checkbox"/> Simulation game <span style="float: right;"><input type="checkbox"/> Others: __</span> <input checked="" type="checkbox"/> Exercises and problems

Major Assessment Methods: For each Major Assessment Method below, please indicate the specific pedagogical methods involved (by putting a ✓ in the relevant box(es) on the right-hand side).	Case Study	Role Playing	Student Presentation	Individual project/paper	Group project/paper	Simulation Game	Exercises & problems	Service learning	Internship	Field Study	Company visits	Written examination	Oral examination	Others (please specify)
Class Participation/ Discussion (0%)														
Assignment(s) (40%)							✓							
Test(s) (30%)												✓		
Examination (30%)												✓		
Others (please specify) Reports,presentations														
Course Web: (if any)														

Course Content: (topic outline)	Week no.	Topics	Assignment no.	LO no.
	1	<b>Introduction to technical drawing</b> Syllabus review; course introduction; introduction to drawing instruments and their used;	--	2~3
	2	<b>Free hand and Instrumental lettering</b> Single stroke gothic lettering both free hand and with mechanical lettering devices.	1	2
	3,4	<b>Geometric Constructions and tangencies</b> Bisect a line, an arc and angle; line through a point parallel to a line; line parallel to a line at a given distance; dividing a line into proportional parts; line through a point and perpendicular to a line; construction of triangles and polygons; draw a circle through three points; find the center of a circle; constructing tangencies related to circles, arcs, lines and angles;	2,3	3
	5,6	<b>Sketching and Shape description</b> Types of sketches; scale and proportions; technique of sketching lines, circles and arcs; ellipses; isometric sketching; oblique sketching; 2D and 3D views of objects; line types;	4,5	1~3
	7,8,	<b>Multi-view Projection</b> Projection methods; folding lines; two-view instrumental drawing; three-view instrumental drawing; visualization; surfaces, edges, and corners; adjacent areas; similar shapes and surfaces; reading a drawing; normal and inclined surfaces; normal edges and inclined edges; oblique edges and surfaces; parallel edges; curved surfaces; cylindrical surfaces; first angle projection; third angle projection;	6,7	1,3
	9	<b>Midterm Exam</b>		
	10	<b>Isometric projection and oblique projection</b> Introduction to pictorial projection; Isometric projection of lines, angles, circles and curves; Oblique projection of lines, angles, circles and curves;	8	1,3
	11,12	<b>Sectional views</b> Types of sectional views; lines in sectioning; section lining; cutting plane; visualizing a section;	9,10	1,3
	13	<b>Auxiliary views</b> Auxiliary plane; folding-line method; references plane; reference-plane method; full auxiliary view; partial auxiliary views;	11	1,3
14	<b>Dimensioning, Formatting and Detailing</b> Dimension technique; placement of dimension and extension lines; arrowheads; leaders; fractional, decimal and metric dimensions; use of dimensioning symbols [ANSI Standards]; size and location dimensions of different features; local notes; title block and layout;	12	4	

Contribution to Program Outcomes:	Program Outcomes	Contribution to POs <sup>#</sup>				
		5 -----> 1				
		5 Significant	4	3	2	1 Least
	(a) apply knowledge of mathematics, science, and engineering	✓				
	(b) design and conduct experiments, and analyze data			✓		
	(c) design components, systems or processes in presence of constraints					
	(d) Function in a multi-disciplinary team					
	(e) Engineering problem solving			✓		
	(f) Understand professional and ethical responsibility					✓
	(g) Communicate effectively		✓			
	(h) Understand the impact of engineering solutions to the society					✓
	(i) Recognize the need and have the ability for lifelong learning			✓		
	(j) Have knowledge of contemporary issues			✓		
	(k) Apply the skills, techniques, modern engineering tools	✓				
	(l) Apply the computer/IT tools relevant to the discipline					
	# Note 5: Significant contribution; 4: Supporting contribution; 3: Moderate contribution; 2: Marginal support; 1: Least support					
Course Instructor(s):	Dr. I. T. Ng (In charge of the students in the department of CEE) Mr. I.M.Wan (In charge of the students in the department of EEE)					