



13. Course Specification of Engineering Drawing

I. Course Identification and General Information:						
1.	Course Title:	Engineering Drawing				
2.	Course Code & Number:	BR003				
3.	Credit hours:	C.H				Total
		Th.	Tu.	Pr.	Tr.	
		1	-	4	-	3
4.	Study level/ semester at which this course is offered:	1 st level/2 nd semester				
5.	Pre –requisite (if any):	None				
6.	Co –requisite (if any):	None				
7.	Program (s) in which the course is offered:	Electrical Engineering				
8.	Language of teaching the course:	English/Arabic				
9.	Location of teaching the course:	Faculty of Engineering				
10.	Prepared By:	Asst. Prof. Dr. Adel Ahmed Al-Shogairy				
11.	Date of Approval					

II. Course Description:
<p>This course covers two sections, manual drawing and computer-aided drafting (CAD), such as Solid Works. The general aim of this course is to provide students with theoretical and practical background in Engineering Drawing. This Course focuses on principles, terminologies, tools of Engineering Drawing to enhance the positive ability of students in being more precise in Drawing and measurements. Students are introduced to fundamental knowledge and skills such as line work, lettering, scale use, and sketching, multi-view drawings, sectional views, with the basics of manual drawing techniques and the use of computer aided drafting equipment.</p>

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III. Course Intended learning outcomes (CILOs) of the course		Referenced PILOs
a1	Define and understand the basic concepts of engineering drawing.	A1
a2	Know first angle, second angle, third angle and fourth angle projection	A2
a3	Recognize the importance of CAD's software as drafting and design tools.	A4
b1	Explain the principle of projection and sectioning.	B1
b2	Draw three-dimension objects on the paper and to draw the pectoral drawings as well as using CAD's software	B2
c1	Determine the proper scale for drawing	C1
c2	Justify projection and section views in the drawing using hand drawing and CAD	C3
d1	Search for information about the course materials related to CAD software.	D2
d2	Communicate effectively with engineers in drawing	D5

(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1 Define and understand the basic concepts of engineering drawing.	<ul style="list-style-type: none"> ▪ Lectures, ▪ Tutorials laboratory, ▪ Seminars 	<ul style="list-style-type: none"> ▪ Examinations, ▪ Laboratory reports, ▪ Homework presentations
a2 Know first angle, second angle, third angle and fourth angle projection	<ul style="list-style-type: none"> ▪ Lectures, ▪ Tutorials, ▪ Laboratory, ▪ Seminars, ▪ Projects 	<ul style="list-style-type: none"> ▪ Examinations, ▪ Laboratory reports, ▪ Homework presentations, ▪ Individual and group project reports.

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<p>a3 Recognize the importance of CAD's software as drafting and design tools.</p>	<ul style="list-style-type: none"> ▪ Lectures, ▪ Tutorials, ▪ Seminars, ▪ Projects. 	<ul style="list-style-type: none"> ▪ Examinations, ▪ Homework presentations, ▪ Individual and group project reports
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(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1- Explain the principle of projection and sectioning	<ul style="list-style-type: none"> ▪ Lectures, ▪ Tutorials, ▪ Laboratory, ▪ Seminars, ▪ Projects 	<ul style="list-style-type: none"> ▪ Examinations, ▪ Homework, ▪ Laboratory reports presentations, ▪ Individual and group project reports
b2- Draw three-dimension objects on the paper and to draw the pectoral drawings		

(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1- Determine the proper scale for drawing	<ul style="list-style-type: none"> ▪ Lectures, ▪ Laboratory, ▪ Seminars, ▪ Projects, ▪ Small group 	<ul style="list-style-type: none"> ▪ Examinations, ▪ Laboratory reports, ▪ Presentations, ▪ Individual and group project reports.
c2- Justify projection and section views in the drawing	<ul style="list-style-type: none"> ▪ Lectures, ▪ Laboratory, ▪ Seminars, ▪ Projects, ▪ Small group 	<ul style="list-style-type: none"> ▪ Examinations, ▪ Laboratory reports, ▪ Presentations, ▪ Individual and group project reports.

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(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1 Search for information about the course materials and related CAD software.	<ul style="list-style-type: none"> ▪ Seminars, ▪ Assignments, ▪ Projects. 	<ul style="list-style-type: none"> ▪ Presentations, ▪ Reports
d2 Communicate effectively with engineer in drawing	<ul style="list-style-type: none"> ▪ Seminars, ▪ Assignments, ▪ Projects. 	<ul style="list-style-type: none"> ▪ Presentations, ▪ Reports

IV. Course Content:					
A – Theoretical Aspect:					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact hours
1.	Introduction to Engineering Drawing	a1	<ul style="list-style-type: none"> ▪ Drawing tools and its uses ▪ Drawing sheets standards ▪ Alphabet of lines. ▪ Basic Dimensions and lettering 	1	1
2.	Geometrical Constructions	a1, a2	<ul style="list-style-type: none"> ▪ Lines ▪ Bisect a given line and angle ▪ Draw different fillet arcs ▪ Tangents to circles ▪ Reverse Curve ▪ Conic Sections 	2	2
3.	Theory of Projection	a2, b1	<ul style="list-style-type: none"> ▪ Conception of Projection ▪ Orthographic Projection ▪ Central Projection 	3	3

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			<ul style="list-style-type: none"> ▪ Oblique projection ▪ First and Third Angle Projection ▪ Projection of Point, Straight Line and Plane ▪ Projection of Three Dimensions Objects ▪ Standard dimensions of drawing. ▪ General data of drawing sheet. (Drawings distribution on the drawing sheet and tabling) 		
4.	Projection of Three Dimension Objects	b1,b2,c1,c2	<ul style="list-style-type: none"> ▪ Construction of isometric view. ▪ Construction of orthogonal isometric ▪ Construction of isometric from projections ▪ Construction of isometric from two projections 	2	2
5.	Drawing the missing view using two given views.	b1,c2,d1,d2	<ul style="list-style-type: none"> ▪ Exercises for drawing the third projection from two given projections 	3	3
6.	Sections	a2,c2	<ul style="list-style-type: none"> ▪ Types of sections. ▪ Full section ▪ Half section ▪ Interposed or revolved sections ▪ Partial section 	3	3

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			<ul style="list-style-type: none"> ▪ Aligned Section ▪ Hatching Lines ▪ Non-Sectioned Parts. 		
Number of Weeks /and Units Per Semester				14	14

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B - Practical Aspect:				
Order	Tasks/ Experiments	Number of Weeks	Contact hours	Learning Outcomes
1.	<ul style="list-style-type: none"> ▪ Train to using drawing tools. ▪ Train drawing types of lines. 	1	4	a1, a2
2.	<ul style="list-style-type: none"> ▪ Drawing geometrical constructions 	2	8	a2, b1
3.	<ul style="list-style-type: none"> ▪ Drawing projection of simple parts 	3	12	b1, b2, c1
4.	<ul style="list-style-type: none"> ▪ Drawing isometric simple parts ▪ Draw isometric from given views ▪ Draw isometric from semi complex parts 	3	12	b2, c2
5.	<ul style="list-style-type: none"> ▪ Drawing the missing view from two given views. 	3	12	c1, d1, d2
6.	<ul style="list-style-type: none"> ▪ Many exercises for drawing different types of sections. 	3	12	a1, d1, d2
Number of Weeks /and Units Per Semester		15	60	

V. Teaching strategies of the course:	
<ul style="list-style-type: none"> • Lectures that include white board, projector presentation, and media work learning. Objects are made by students, lab works (CAD) 	
<ul style="list-style-type: none"> • Tutorials that include: Exercise practice, CAD work, and homework assignment. Relisting machine components (made from wood) in sections 	

VI. Assignments:				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1.	Assignment in practice (1,2,3)	a1, a3	3	6
2.	Assignment in practice 4,5,6	a2, b1	6	6
3.	Quiz	a1, a2, a3, b2	7	4

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4.	Assignment in practice 7, and Homework	a2, b2,	8	4
5.	Midterm Exam	a1, a2, a3	9	20
6.	Assignment in practice 8,9,10	b1, b2, c1, c2	12	6
7.	Assignment in practice 11,12	a2, b1, d1	14	4
Total				50

VII. Schedule of Assessment Tasks for Students During the Semester:					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1.	Practice assignment H.W(1-13)	2-14	39	26%	a1-d1
2.	Quiz	2-14	6	4%	a1-d1
3.	Midterm Exam	7-8	30	20%	a1, a2, a2, b1, b2
4.	Final Exam	16	75	50%	a1-d1
Total			150	100%	

VIII. Learning Resources:	
<ul style="list-style-type: none"> • <i>Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).</i> 	
1- Required Textbook(s) (maximum two).	
	1. Thomas, E.F., “Fundamentals of Engineering Drawing”, McGraw-Hill, 2004 2. Thomas, E.F. and Vierck, C.J., “Engineering Drawing and Graphic Technology”, McGraw-Hill, 2001
2- Essential References.	
	1- Hart, K.R., “Engineering Drawing”, The English Universities Press Ltd, 2003 2- Bertoline–Wiebe “Engineering Graphics” McGraw–Hill Primis, 2006

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	3- ENGINEERING GRAPHICS FOR First Year Student Specialized Scientific Programs (SSP) Faculty of Engineering Alexandria University, Prepared by Assoc. Prof. / Raafat El sayed Shaker Ismail.
3- Electronic Materials and Web Sites etc.	
	1. http://www.ces.clemson.edu 2. http://www.prenhall.com/Giesecke 3. http://www.osu.okmulgee.edu

IX. Course Policies:	
1.	Class Attendance: A student should attend not less than 75 % of total hours of the subject; otherwise he will not be able to take the exam and will be considered as exam failure. If the student is absent due to illness, he/she should bring an approved statement from university Clinic
2.	Tardy: For late in attending the class, the student will be initially notified. If he repeated lateness in attending class he will be considered as absent.
3.	Exam Attendance/Punctuality: A student should attend the exam on time. He is Permitted to attend an exam half one hour from exam beginning, after that he/she will not be permitted to take the exam and he/she will be considered as absent in exam-
4.	Assignments & Projects: The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time-
5.	Cheating: For cheating in exam, a student will be considered as failure . In case the cheating is repeated three times during his/her study the student will be disengaged from the Faculty-
6.	Plagiarism: Plagiarism is the attending of a student the exam of a course instead of another student. If the examination committee proved a plagiarism of a student, he will be disengaged

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	from the Faculty. The final disengagement of the student from the Faculty should be confirmed from the Student Council Affair of the university.
7.	<p>Other policies:</p> <ul style="list-style-type: none"> - Mobile phones are not allowed to use during a class lecture. It must be closed, otherwise the student will be asked to leave the lecture room - Mobile phones are not allowed in class during the examination. <p>Lecture notes and assignments my given directly to students using soft or hard copy</p>

Reviewed By	<p><u>Vice Dean for Academic Affairs and Post Graduate Studies: Asst. Prof. Dr. Tarek A. Barakat</u></p> <p><u>President of Quality Assurance Unit: Assoc. Prof. Dr. Mohammed Algorafi</u></p> <p><u>Name of Reviewer from the Department: Assoc. Prof. Dr. Riyad A. Muharram.</u></p>
	<p><u>Deputy Rector for Academic Affairs Asst. Prof. Dr. Ibrahim AlMutaa</u></p> <p><u>Assoc. Prof. Dr. Ahmed Mujahed</u></p> <p><u>Asst. Prof. Dr. Munasar Alsubri</u></p>

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13. Course Plan of Engineering Drawing

Information about Faculty Member Responsible for the Course:								
Name of Faculty Member	Dr. Adel Ahmed Al-Shogairy		Office Hours					
Location & Telephone No.	Electrical Eng. Dep. 772771672		SAT	SUN	MON	TUE	WED	THU
E-mail	ashakiri62@gmail.com			8-12		8-12		

I. Course Identification and General Information:						
1.	Course Title:	Engineering Drawing /CAD				
2.	Course Number & Code:	BR003				
3.	Credit hours:	C.H				Total
		Th.	Tu.	Pr.	Tr.	
		1	-	4	-	
4.	Study level/year at which this course is offered:	1 st level/2 nd semester				
5.	Pre –requisite (if any):	None				
6.	Co –requisite (if any):	None				
7.	Program (s) in which the course is offered	Electrical Engineering				
8.	Language of teaching the course:	English/Arabic				
9.	System of Study:	Semester				
10.	Mode of delivery:	Lecture and CAD software				
11.	Location of teaching the course:	Faculty of Engineering				

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I. Course Description:

This course covers two sections, manual drawing and computer-aided drafting (CAD), such as Solid Works. The general aim of this course is to provide students with theoretical and practical background in Engineering Drawing. This Course focuses on principles, terminologies, tools of Engineering Drawing to enhance the positive ability of students in being more precise in Drawing and measurements. Students are introduced to fundamental knowledge and skills such as line work, lettering, scale use, and sketching, multi-view drawings, sectional views, with the basics of manual drawing techniques and the use of computer aided drafting equipment.

V. Intended learning outcomes (ILOs) of the course:

- Brief summary of the knowledge or skill the course is intended to develop:
 1. Define and understand the basic concepts of engineering drawing.
 2. **Know** first angle, second angle, third angle and fourth angle projection
 3. Recognize the importance of CAD's software as drafting and design tools.
 4. Explain the principle of projection and sectioning.
 5. Draw three-dimension objects on the paper and to draw the pectoral drawings as well as using CAD's software
 6. Determine the proper scale for drawing
 7. Justify projection and section views in the drawing using hand drawing and CAD
 8. Search for information about the course materials related to CAD software.
 9. Communicate effectively with engineers in drawing

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. Course Content:				
• Distribution of Semester Weekly Plan Of course Topics/Items and Activities.				
A – Theoretical Aspect:				
Order	Topics List	Sub Topics	Week Due	Contact Hours
1.	Introduction to Engineering Drawing	<ul style="list-style-type: none"> ▪ Drawing tools and its uses ▪ Drawing sheets standards ▪ Alphabet of lines. ▪ Basic Dimensions and lettering 	1 st	1
2.	Geometrical Constructions	<ul style="list-style-type: none"> ▪ Lines ▪ Bisect a given line and angle ▪ Draw different fillet arcs ▪ Tangents to circles ▪ Reverse Curve ▪ Conic Sections 	2 nd & 3 rd	2
3.	Theory of Projection	<ul style="list-style-type: none"> ▪ Conception of Projection ▪ Orthographic Projection ▪ Central Projection ▪ Oblique projection ▪ First and Third Angle Projection ▪ Projection of Point, Straight Line and Plane ▪ Projection of Three Dimensions Objects ▪ Standard dimensions of drawing. 	4 th -6 th	3

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		<ul style="list-style-type: none"> General data of drawing sheet. (Drawings distribution on the drawing sheet and tabling) 		
4.	Projection of Three Dimension Objects	<ul style="list-style-type: none"> Construction of isometric view. Construction of orthogonal isometric Construction of isometric from projections Construction of isometric from two projections 	7 th &8 th	2
5.	Midterm Exam		9 th	3
6.	Drawing the missing view using two given views.	<ul style="list-style-type: none"> Exercises for drawing the third projection from two given projections 	10 th &12 th	3
7.	Sections	<ul style="list-style-type: none"> Types of sections. Full section Half section Interposed or revolved sections Partial section Aligned Section Hatching Lines Non-Sectioned Parts. 	13 th &15 th	3
8.	Final Test		16 th	3
Number of Weeks /and Units Per Semester			16	20

B – Practical Aspect:

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Order	Topics List	Week Due	Contact Hours
1.	<ul style="list-style-type: none"> ▪ Train to using drawing tools. ▪ Train drawing types of lines. 	1	4
2.	<ul style="list-style-type: none"> ▪ Drawing geometrical constructions 	2	8
3.	<ul style="list-style-type: none"> ▪ Drawing projection of simple parts 	3	12
4.	<ul style="list-style-type: none"> ▪ Drawing isometric simple parts ▪ Draw isometric from given views ▪ Draw isometric from semi complex parts 	3	12
5.	<ul style="list-style-type: none"> ▪ Drawing the missing view from two given views. 	3	12
6.	<ul style="list-style-type: none"> ▪ Many exercises for drawing different types of sections. 	3	12
Number of Weeks /and Units Per Semester		15	60

I. Teaching strategies of the course:	
	<ul style="list-style-type: none"> • Lectures that include white board, projector presentation, and media work learning. Objects are made by students.
	<ul style="list-style-type: none"> • Tutorials that include: Exercise practice, and homework assignment. Relisting machine components (made from wood) in sections

II. Assignments:				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1.	Assignment in practice (1,2,3)	a1, a3	3	6
2.	Assignment in practice 4,5,6	a2, b1	6	6

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3.	Quiz	a1, a2, a3, b2	7	4
4.	Assignment in practice 7, and Homework	a2, b2,	8	4
5.	Midterm Exam	a1, a2, a3	9	20
6.	Assignment in practice 8,9,10	b1, b2, c1, c2	12	6
7.	Assignment in practice 11,12	a2, b1, d1, d2	14	4
Total			16	50

VIII. Schedule of Assessment Tasks for Students During the Semester:

Assessment	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1.	Practice assignment H.W(1-13)	2-14	26	26%
2.	Quiz	2-14	4	4%
3.	Midterm Exam	7-8	20	20%
4.	Final Exam	16	50	50%
Total			150	100%

X. Learning Resources:

• Written in the following order: (Author – Year of publication – Title – Edition – Place of publication – Publisher).

1- Required Textbook(s) (maximum two).

1. Thomas, E.F., “Fundamentals of Engineering Drawing”, McGraw-Hill, 2004
2. Thomas, E.F. and Vierck, C.J., “Engineering Drawing and Graphic Technology”, McGraw-Hill, 2001

2- Essential References.

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=	<ol style="list-style-type: none"> 1. Hart, K.R., “Engineering Drawing”, The English Universities Press Ltd, 2003 2. Bertoline–Wiebe “Engineering Graphics” McGraw–Hill Primis, 2006 3. ENGINEERING GRAPHICS FOR First Year Student Specialized Scientific Programs (SSP) Faculty of Engineering Alexandria University, Prepared By Assoc. Prof. / Raafat El sayed Shaker Ismail.
3- Electronic Materials and Web Sites <i>etc.</i>	
	<ol style="list-style-type: none"> 1. http://www.ces.clemson.edu 2. http://www.prenhall.com/Giesecke 3. http://www.osu.okmulgee.edu

. Course Policies:	
1.	<p>Class Attendance: A student should attend not less than 75 % of total hours of the subject; otherwise he will not be able to take the exam and will be considered as exam failure. If the student is absent due to illness, he/she should bring an approved statement from university Clinic</p>
2.	<p>Tardy: For late in attending the class, the student will be initially notified. If he repeated lateness in attending class he will be considered as absent.</p>
3.	<p>Exam Attendance/Punctuality: A student should attend the exam on time. He is Permitted to attend an exam half one hour from exam beginning, after that he/she will not be permitted to take the exam and he/she will be considered as absent in exam-</p>
4.	<p>Assignments & Projects: The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time-</p>
5.	<p>Cheating: For cheating in exam, a student will be considered as failure. In case the cheating is repeated three times during his/her study the student will be disengaged from the Faculty-</p>
6.	<p>Plagiarism:</p>

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	<p>Plagiarism is the attending of a student the exam of a course instead of another student. If the examination committee proved a plagiarism of a student, he will be disengaged from the Faculty. The final disengagement of the student from the Faculty should be confirmed from the Student Council Affair of the university.</p>
7.	<p>Other policies:</p> <ul style="list-style-type: none"> - Mobile phones are not allowed to use during a class lecture. It must be closed, otherwise the student will be asked to leave the lecture room - Mobile phones are not allowed in class during the examination. <p>Lecture notes and assignments my given directly to students using soft or hard copy</p>

Prepared by	Head of Department Asst. Prof. Dr. Adel Ahmed Al-Shakiri	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Algorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
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Rector of Sana'a University
 Prof. Dr. Al-Qassim Mohammed Abbas