

Engineering Design Principles Course Definition Document - BED

Engineering Design Principles Course

Technical Institute for Engineering Management and Digitization

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Number of sessions :12

Course summary:

The course aims to introduce the student to the principles of engineering drawing and design according to the standards followed in the labor market, so that he learns about the forms of engineering plans and how to draw building elements and their dimensional controls.

At the end of this course, the student is expected to be able to identify the shapes of engineering drawings and the elements within them, identify the basic details of building elements, draw their basic elements, know their coding and read them, in addition to identifying the basic controls in creating engineering drawings and the mechanism for starting drawings and the importance of accurate completion, in addition to the ability to read the basic details in engineering drawings.

The course includes twelve chapters whose contents vary from learning about the elements of engineering drawing, moving on to horizontal projection without and with cutting the element, then vertical projection without and with cutting the element, and discussing practical applications of projections. Then, in the course chapters, we address three-dimensional engineering drawing (perspective projection), then we learn about important terms in engineering design and learn about the most important software used in engineering design.

Course code: BED

Classes.....

❖ Classes chapters:

Chapter number	Chapter title	Brief explanation
1	Introduction to Engineering Design	- An introduction to engineering design, in which the basics of the course are identified and the chapter is considered an introduction to the field of engineering drawing.
2	Elements of engineering drawing	- Identify the elements of engineering drawing, including scale and projections.
3	Horizontal projection (projection without cutting the element)	- Identify horizontal projection and its use cases within specializations.
4	Horizontal projection (projection with element cut)	-What is meant by horizontal projection with the cutting of the element and the cases of its use within the specializations. -Expressing in drawing between the near, the far and the cut in the horizontal projection using the texture and line thicknesses.
5	Vertical projection without cutting the element (elevation)	-Identify vertical projection and its use cases within specializations.
6	Vertical Projection - Projection with Element Cut	-What is meant by vertical projection with the cutting of the element and the cases of its use within the specializations. -Expressing in drawing between the near, the far and the cut in the vertical

		projection using texture and line thicknesses.
7	Application on horizontal and vertical projection - stairs	-A practical application of horizontal and vertical projection (staircase), in which the student tests his understanding.
8	3D Drawing – Perspective Projection	-Learn the concept of perspective and the type of axonometric perspective and methods of drawing it.
9	3D Drawing - Perspective Projection (Perspective) - 2	-Learn about oblique perspective and how to draw it.
10	3D Drawing - Perspective Projection (Perspective) - 3	-Learn about vanishing point perspective and how to draw it.
11	Important terms in engineering design	-The student is provided with the necessary terms related to different engineering fields.
12	Software used in engineering design	- The student learns about the role of the computer in the engineering design process and the most important software used on it.

❖ Outcomes:

Learning Outcomes	Learning Outcomes	Exam	Synchronous sessions	Assignments
LO1	<ul style="list-style-type: none"> -Defining design or engineering drawing and its role in the lives of those working in the engineering field. - Knowing the difference between freehand drawing and drawing with tools and defining the tools that the student needs in the course and in his professional life later. -Identifying ways to represent shapes using engineering drawing and the difference between projection drawing and perspective drawing. -Identifying the types of engineering drawing lines by reading plans and drawings and expressing them. -Identifying how to write dimensions on drawings. -How to write on drawings and name them in an engineering way. -Showing some engineering applications in engineering drawing. 	√	√	√

<p>LO2</p>	<p>-Defining the scale and its importance in drawing and reflecting reality on paper, in addition to knowing the appropriate scales for each engineering specialty.</p> <p>-Identifying the basic elements of engineering drawing.</p> <p>-Learning the importance of two-dimensional drawing (projection) and identifying the types of projections and their method using tools.</p> <p>-Learning the difference between horizontal and vertical projection.</p>	<p>√</p>	<p>√</p>	<p>√</p>
<p>LO3</p>	<p>-Definition of horizontal projection.</p> <p>-What is meant by horizontal projection without cutting the element and its use cases within the specializations.</p> <p>-Expression in drawing between near and far in horizontal projection using Texture and line thicknesses.</p>	<p>√</p>	<p>√</p>	<p>√</p>
<p>LO4</p>	<p>-What is meant by horizontal projection with the cutting of the element and the cases of its use within the specializations.</p>	<p>√</p>	<p>√</p>	<p>√</p>

	-Expressing in drawing between the near, the far and the cut in the horizontal projection using the Texture and line thicknesses.			
LO5	<p>-Definition of vertical projection.</p> <p>-What is meant by vertical projection without cutting the element and its use cases within the specializations.</p> <p>-Identifying a concept specific to vertical projection, which is the reference line.</p> <p>-Expressing in drawing between near and far in vertical projection using Texture and line thicknesses.</p>	√	√	√
LO6	<p>-What is meant by vertical projection with the cutting of the element and the cases of its use within the specializations.</p> <p>-Expressing in drawing between the near, the far and the cut in the vertical projection using Texture and line thicknesses.</p>	√	√	√
LO7	-Learn to draw stairs because it is considered one of the most comprehensive practical applications, and if learned, the	√	√	√

	<p>rest of the applications become easier.</p> <p>-Learn about the components of the stairs and the method of drawing it geometrically (projections).</p>			
L 08	<p>-Moving from two-dimensional engineering drawing to three-dimensional engineering drawing (perspective), and learning about the importance of engineering perspective in all its forms.</p> <p>-Learning about the forms of engineering perspective.</p> <p>-Defining the axonometric perspective and its types.</p> <p>-Applying the isometric perspective and learning how to draw it.</p>	√	√	√
L 09	<p>-Defining oblique perspective as a type of engineering perspectives and identifying its types.</p> <p>-Identifying different methods of drawing oblique perspectives.</p> <p>-Practical applications on using oblique perspective in engineering drawing.</p>	√	√	√

<p>L 010</p>	<p>-Defining vanishing point perspective as a type of engineering perspective.</p> <p>-Identifying the types of vanishing point perspective.</p> <p>-Practical applications on the use of vanishing point perspective in engineering drawing.</p>	<p>√</p>	<p>√</p>	<p>√</p>
<p>L 011</p>	<p>-Identifying the most important terms that a student or graduate may need in the engineering field, which require understanding and memorization for constant repetition.</p> <p>-Identifying terms from different specializations to broaden horizons regardless of the student's specialization in the following year.</p>	<p>√</p>	<p>√</p>	<p>√</p>
<p>L 012</p>	<p>-Identify the most important software that benefits the student or graduate in the engineering field and which requires mastery.</p> <p>-Identify the software that works on two-dimensional drawing and that provides horizontal and vertical projections, and the software</p>	<p>√</p>	<p>√</p>	<p>√</p>

	that works on three-dimensional design to obtain the perspectives that we learned about previously but via the computer.			
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❖ Evaluation criteria:

Learning Outcomes	Evaluation Criteria
LO1	<p>To achieve the results, the student must demonstrate the capabilities in:</p> <ul style="list-style-type: none"> -The chapter presents exercises that test the student's ability to use engineering drawing tools (physical and intellectual ability). -The chapter presents applications that test the student's ability to imagine and understand the basics of geometry such as bisecting a line or drawing a circle surrounding the vertices of a triangle and other applications.
LO2	<ul style="list-style-type: none"> -The chapter tests the student's ability to understand the scale in its various states by presenting a set of practical applications in transferring drawings onto papers of different sizes. -The chapter tests the student's ability to differentiate between horizontal, vertical and others projection by presenting a set of practical applications and at an appropriate drawing scale.
LO3	<ul style="list-style-type: none"> -The chapter tests the student's ability to understand horizontal projection without cutting the element and the ability to transfer it to an appropriate scale on drawing paper, with the ability to express near and far, for a group of elements from various engineering specializations.

L04	-The chapter tests the student's ability to understand horizontal projection with cutting the element and the ability to transfer it to an appropriate scale on drawing paper with the ability to express near and far for a group of elements from various engineering specializations.
L05	-The chapter tests the student's ability to understand vertical projection without cutting the element and the ability to transfer it to an appropriate scale on drawing paper, with the ability to express near and far, for a group of elements from various engineering specializations.
L06	-The chapter tests the student's ability to understand vertical projection with cutting the element and the ability to transfer it to an appropriate scale on drawing paper with the ability to express near and far for a group of elements from various engineering specializations.
L07	-The chapter presents a practical application of the previous chapters, which is an exercise on the architectural staircase, testing the student's ability to understand horizontal and vertical projections through a case study.
L08	-The chapter presents applications of axonometric perspective and how to draw it, in different situations and various forms that test the student's ability to imagine and master the principles of spatial geometry.
L09	-The chapter presents applications of oblique perspective and how to draw it, in different situations and various forms that test the student's ability to imagine and master the principles of spatial geometry.
L010	-The chapter presents applications of vanishing point perspective (escape points) and how to draw it, in different cases and various forms that test the student's ability to imagine and master the principles of spatial geometry.

LO11	-The chapter presents the most important terms used in engineering fields and thus tests the student's ability to understand these terms in English, and tests their ability to search for other terms that develop their ability to search on the one hand and to improve their specialized English on the other hand.
LO12	-The research presents the most important engineering programs used in engineering drawing and design, tests the student's ability to understand the relationship between computer technology and manual engineering drawing, and asks questions about other software that works with the same technologies or supports engineering drawing and output processes.

❖ instructions:

Generating Evidence: The student individually prepares a brief report in which he demonstrates his ability to understand the previous outcomes, and this is before he takes the exam and deals with:

-One of the topics suggested by the course teacher about one of the concepts explained in the course.

References

First - Arabic books:

- Fawzi Yousef Al-War - Khaled Mohammed Saeed Dawood - Engineering drawing for all engineering specializations - Amman - August - 2008.

- Osama Mohamed El Mordi Soliman - Engineering Drawing for Engineers and Technicians - Part One - Faculty of Technical Engineering - Nile Valley University - February - 2016.

Rabi Muhammad Nazir Al-Harastani - Elements of Architectural Design and Construction Book - Nofert.

- Booklet of training courses qualifying for the entrance exam to the Faculty of Architecture - 2022.

- Mohammed Younes Younes - Computer Skills Course - Damascus University - Faculty of Architecture - 2022.

Second - foreign books:

- Indian Institute of Technology Guwahati Guwahati – SCALES AND Engineering Curves- Lecture 3 - 05-08-2011