

MIDDLE EAST TECHNICAL UNIVERSITY NORTHERN CYPRUS CAMPUS

Syllabus for MECH-113 (2-2)3 Computer Aided Engineering Drawing I
2023-2024 Academic Year Spring Semester

Instructor:

Assoc. Prof. Dr. Murat SÖNMEZ

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Course Schedule:

Assoc. Prof. Dr. Murat SÖNMEZ 2023-2024 Academic Year Spring Semester							
SCHEDULE							
Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
08:40 - 09:30				MECH 100 (S1) [I-104]			
09:40 - 10:30				MECH 100 (S1) [I-104]	MECH 533 (S1) [I-104]		
10:40 - 11:30	MECH 113 (S1) [I-104]	MECH 114 (S1) [I-104]		MECH 205 (S1) [I-104]	MECH 533 (S1) [I-104]		
11:40 - 12:30	MECH 113 (S1) [I-104]	MECH 114 (S1) [I-104]		MECH 205 (S1) [I-104]	MECH 533 (S1) [I-104]		
12:40 - 13:30							
13:40 - 14:30							
14:40 - 15:30							
15:40 - 16:30				MFAK - SÖNMEZ []			
16:40 - 17:30	MECH 205 (S1) [I-104]			MFAK - SÖNMEZ []			
17:40 - 18:30		ASE 492 (S1) [I-104]	MECH 114 (S1) [I-104]	MECH 113 (S1) [I-104]	ASE 492 (S1) [I-104]		
18:40 - 19:30		ASE 492 (S1) [I-104]	MECH 114 (S1) [I-104]	MECH 113 (S1) [I-104]	ASE 492 (S1) [I-104]		
19:40 - 20:30							

Reference Books and other Supplementary Materials:

- * “Technical Drawing with Engineering Graphics” by Giesecke et al., 15th Ed., 2016, Pearson
- * “Engineering Drawing and Design” by Jensen/ Helsel/ Short, 7th Edition, 2008, Mc Graw- Hill.
- * “Tools for Design Using AutoCAD 2020 and Autodesk Inventor 2020” by Randy Shih, 2019, SDC Publications.
- * “Engineering Graphics with AutoCAD 2014”, by Bethune, J., 2014, PEARSON
- * “Engineering Design and Graphics with Autodesk Inventor 2013”, by Bethune, J., 2014, Pearson Prentice Hall
- * “Technical Drawing- A Multidisciplinary Curriculum for the First Semester”, by Douglas Smith, Antonio Ramirez and Jana Schmidt, 2015, SDC Publications, USA.
- * “Autodesk Inventor 2010 Essentials Plus”, by Banach, D. at.al., Delmar Cengage Learning.
- * “Teknik Resim-Temel Bilgiler”, Şen, İ.Z., ve Özçilingir, N., 2003, Deha Yayıncılık.
- *Lecture Notes at the web page of MECH114
<http://users.metu.edu.tr/sonmez/MECH%20114/MECH%20114home.htm> and also in METU Class
<https://odtuclass.metu.edu.tr/>

Grading:

Mid-Term Exam : 40%
Quizzes& Pop Quizzes’, Class Works : 30%
Final : 30%

Important Note for Attendance: 80% attendance is mandatory. If your attendance is below 80%, you will not be allowed to take the midterm and the final exams.

(Attendance is optional for the ones who repeat the course for increasing the grade from BB if they accept that PQ grade will be substituted by the previous PQ grade)

Catalog Description

Introduction to engineering drawing; drafting as a language, drafting environment, board-drafting vs Computer Aided Drawing and Design. Standard drawing papers and paper format, paper templates, Types of Lines, Geometrical Constructions; two-dimensional sketching, sketching for creating solid models, drawing and editing tools in CAD environments (particularly in AutoCAD Mechanical). Orthographic projection; 1st and 3rd angle projection, Principal Views, Detail Drawing, Assembly drawing. Basic Dimensioning, size tolerances. Creating solid models of single parts; common solid model creation processes/tools (particularly in Autodesk Inventor Professional environment): Extrude, Revolve, Holes, Shell, Fillet, Chamfer, Split, Sculpt, Work Planes, Ribs, Loft, and Sweep. Creating orthographic views from a solid model, Auxiliary views. Pictorial Drawing, Sectioning and Sectional views.

Course Learning Outcomes

Having successfully completed this course, the student will be able to:

- (1) Draw views, two-dimensional sketches, in CAD environment (particularly in AutoCAD and Autodesk Inventor)
- (2) Import 2D AutoCAD file into Inventor environment and create the solid model of the object.
- (3) Create solid models of objects; objects in basic shapes, composite bodies, custom-built machine parts, building modules etc., particularly in AutoCAD and Autodesk Inventor environments. Import/export the files from/to other common solid model environments (Such as CATIA, Solid Works, SAT, Pro Engineer, Parasolid, etc.)
- (4) Draw the orthographic views of an object in CAD environment (particularly in Autodesk AutoCAD environment).
- (5) Create principle orthographic views of an object from the solid model (particularly in Autodesk Inventor and 3D AutoCAD environments).
- (6) Dimension the views, show some annotations, provide the size tolerance of functional features, and general tolerances for non-functional features
- (7) Explain and interpret the dimensions and the associated tolerances, and some annotations
- (8) Create auxiliary views,
- (9) Create sectional views.
- (10) Read orthographic views; i.e. visualize the 3-Dimensional model of the object shown to its orthographic views and create the solid model.

In short, having successfully completed this course, the student will be able to write and read the language of the industry, "Engineering Drawing" and to create the solid-model of a single part and its engineering drawings

Teaching Format

Four 50-minutes, for lectures and CAD applications in class-room, and 10 hours video watching/Week

Weekly Class and Tutorial Schedule

Week 1	Introduction; Engineering Graphics as a language, Board Drawing vs. Computer- Aided Drawing, Introduction to AutoCAD Mechanical and Inventor Environments.
Week 2-3	Drawing Tools and Instruments, Corresponding CAD facilities , Structures of AutoCAD Mechanical, Solid Model Creation in AutoCAD, Structure of Autodesk Inventor Professional, Drawing Paper/Drawing Template Scaling, Types of Lines, Precedence of Lines, Lettering,
Week 3	Layer creation in AutoCAD, Geometrical Constructions, View drawing in AutoCAD and sketching in Inventor, Drawing/Sketching and Editing Commands, , Solid Model creation; Importing an AutoCAD file into Inventor environment, 2-Dimensional Sketching in Inventor, Creation of right prisms, extrusion process, Rounds and fillets
Week 4	Orthographic Projection; Principle Picture Planes, Principal views, 1st.Quadrant, 3rd.Quadrant projections, Object Orientation, Selection of Views,
Week 4	Projections of a point, Views of lines, flat planes and objects, Order of Drawing, Creating views in Autodesk Inventor Professional Environment
Week 5	Revolve process; creating revolved parts and features, Decal, Importing Excel files into Inventor, Loft, 3D Sketching, Sweep, Rib, Split and Shell Process',
Week 5	Exercises on Solid Model creation, Inspection tools of AutoCAD and Inventor Environments
Week 6	Dimensioning format/ Rules, Non-functional and Functional Dimensions, Size Tolerances, IT-Grading System, General Tolerances, Dimensioning tools of AutoCAD Mechanical and Inventor Professional Environments, Dimensioning exercises
Week 6	Auxiliary Views, Sectional Views, Schematic Drawing in AutoCAD
Week 6	Method of View Reading, Reading Details, Exercises

Relationship to Program Performance Indicators

This course contributes to fulfillment of the following performance indicators:

c4. Construct a functional prototype based on design documentation

g1. Communicate using visual tools such as engineering drawings, graphics, diagrams, charts, plots, schematics, sketches, free body diagrams

k1. Use tools for 3D CAD modeling and fabrication/manufacturing

k2. Use tools to prepare technical report, presentations, and graphics

Important Note: It is recommended to have a personal computer for studying CAD applications at home. The properties of an eligible computer can be seen from the document which can be accessed from the web address:

<http://users.metu.edu.tr/sonmez/MECH%20113/MECH%20113home.htm>

NOTE: Without taking the permission of the instructor, course materials; lecture notes, video records, work-sheets, exam questions, and their solutions are not allowed to share