

Nazwa przedmiotu: Komputerowe wspomaganie projektowania Computer Aided Design		
field of study: Mechanical Engineering	type of study: full-time	course code: B1_3 (71E56)
course: Computer Modelling & Simulation	degree:	year: I semester: II
type of classes: lecture, laboratory	hours per week: 15L, 45Lab	No of ECTS credits: 6

MODULE DESCRIPTION

TARGETS

- T1.** Knowledge of the construction of geometric and structural models of any machine parts and mechanisms using CAD applications.
- T2.** Practical skills and preparation for geometric and structural modeling of machine elements and their assemblies in CAD programs.

PREREQUISITES & ADDITIONAL REQUIREMENTS

- R1.** Knowledge of technical drawing.
- R2.** Knowledge of machine design fundamentals.
- R3.** Ability to use of standard systems of machines.
- R4.** Ability to use of different sources of information.
- R5.** Ability to work independently and in a group.
- R6.** Ability to interpretation and presentation of obtained results.

LEARNING OUTCOMES

- LO1.** Identify and use of the capabilities of modeling elements, machine assemblies and mechanisms in 3D space, in CAD programs.
- LO2.** Create the parameterized geometrical and structural models in CAD programs.
- LO3.** Perform a 3D model of machine element, mechanism and complex assembly with standard elements in a CAD program.
- LO4.** Prepare a report on the progress of the exercise.

TEACHERS

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MODULE CONTENT

LECTURE	hours
L 1 – Characteristics of basic issues related to geometric and structural modeling.	1
L 2 – Introduction to one of the CAD program. Fundamentals of operation and infrastructure of the program.	1
L 3,4 – Creating and editing of 2D profiles.	2
L 5,6 – Definition of geometric and dimensional constraints and parameterization of profiles.	2
L 7 – Creating a wireframe.	1
L 8,9,10 – Basics of solid modeling. Tools, methods and functions used to create solid models.	3
L 11 – Basic operations used in surface modeling.	1
L 12 – Construction of hybrid models.	1
L 13,14 – Assembly of components and assembly analysis.	2
L 15 – Use of elements from the standard part database to build complex geometric models.	1
total	15

LABORATORY	hours
Lab 1 – Basic features, interface, model tree, and model space.	3
Lab 2 – Creating and editing of 2D profiles.	3
Lab 3 – A task illustrating creating profiles using drawing tools and editing tools.	3
Lab 4 – Application of geometric constraints, dimensional constraints and parameterization of profiles.	4
Lab 5 – A task illustrating the creation of parameterized profiles with geometric and dimensional constraints.	3
Lab 6 – Associate profiles with 3D geometry. Topology tree management and coordinate systems in 3D modeling.	3
Lab 7 – Creating a sample wireframe.	3
Lab 8 – Reference elements and basic solid modeling commands.	3
Lab 9 – Editing, modifying, and transforming of solids.	4
Lab 10 – Construction of parameterized solid model.	3
Lab 11 – Management of surface objects. Creating surface geometry. Surface operations.	3
Lab 12 – Hybrid commands. Creating an element using surface and hybrid modeling.	3
Lab 13,14 – Creating, positioning and transformation components. Analysis assemblies. Creation of a component.	4
Lab 15 – The use of elements from the database of standard parts for the construction of complex geometric model.	3
total	45

TEACHING TOOLS

1 - lecture with the use of multimedia presentations and computer equipped with the proper software.
2 - computers equipped with the proper software
3 - sample standard reports on the realised laboratory exercises (a manual available on the website)
4 - models of machine parts and assemblies

SOURCE LITERATURE

1. Akin J. E.: Finite Element Analysis Concepts via SolidWorks, Works Scientific, 2010.
2. Cekus D., Kania L.: Modelowanie elementów i zespołów maszyn w programach grafiki inżynierskiej. Częstochowa, 2009
3. Hamad M.M.: AutoCAD 2010 Essentials, Jones and Bartlett Publisher, Massachusetts, 2009.
4. Koh J.: CATIA V5 Design Fundamentals: A Step by Step Guide, Create Space Independent Publishing Platform, 2012.
5. Lombard M.: Solidworks 2011 Parts Bible, John Wiley & Sons, 2011
6. Lombard M.: Solidworks Assemblies Bible, John Wiley & Sons, 2011
7. Maguire D.: Engineering Drawing from First Principles. Using AutoCAD, Butterworth-Heinemann, 1998
8. Ticko S.: CATIA V5-6R2014 for Designers, Cadcim Technologies, 2015.
9. Ross E.: CATIA V5 Tips and Tricks, 2014
10. Skarka W., Mazurek A.: CATIA. Podstawy modelowania i zapisu konstrukcji, Helion, Gliwice, 2005.
11. Stasiak F.: Zbiór ćwiczeń Autodesk Inventor 11. Wydawnictwo ExpertBooks, Łódź 2007.
12. Wyleżoń M.: Modelowanie bryłowe w systemie CATIA. Przykłady i ćwiczenia, Helion, Gliwice, 2002.
13. Wyleżoń M.: CATIA. Podstawy modelowania powierzchniowego i hybrydowego, Helion, Gliwice, 2003.
14. Wełyczko A.: CATIA. Przykłady efektywnego zastosowania systemu w projektowaniu mechanicznym, Helion, Gliwice, 2005.
15. Waguespack C.: Mastering Autodesk Inventor 2012 and Autodesk Inventor LT 2012, Wiley Publishing Inc., Indianapolis, 2011
16. CATIA Version 5-6 Release 2015, English documentation in HTML format.