

## COMPUTER-AIDED DESIGN

<b>Course code</b>	<i>MNG212</i>
<b>Compulsory in the programmes</b>	<i>Industrial Technology Management</i>
<b>Level of studies</b>	<i>Undergraduate</i>
<b>Number of credits</b>	<i>6 ECTS (48 in-class hours + 6 consultation hours + 2 exam hours, 104 individual work hours)</i>
<b>Course coordinator (title and name)</b>	<i>Dr. Darius Eidukynas</i>
<b>Prerequisites</b>	<i>FUN134 Technical Graphics</i>
<b>Language of instruction</b>	<i>English</i>

### THE AIM OF THE COURSE:

Assimilate the principles of modern 3D design and analysis for the creation of various geometric and industrial objects.

### MAPPING OF COURSE LEVEL LEARNING OUTCOMES (OBJECTIVES) WITH DEGREE LEVEL LEARNING OBJECTIVES (See Annex), ASSESMENT AND TEACHING METHODS

Course level learning outcomes (objectives)	Learning objectives for BSc in Business Management	Learning objectives for BSc in Social Science	Assessment methods	Teaching methods
CLO1. Is able to define the aims, object, importance, stages and systems of CAD and its main capabilities and features.	BLO3.2.		Presentation, Midterm Exam	Lectures, individual literature analysis
CLO2. Is able to use the design principles of the working surface of the various geometric forms and industrial parts	BLO3.2.		Presentation, Midterm Exam	Lectures, Practical works, individual literature analysis
CLO3. Is able to create assembly units consisting of designed parts and standard components	BLO3.2.		Presentation, Midterm Exam	Lectures, practical works, individual literature analysis
CLO4. Is able to create engineering documentation and drawings of various geometric forms, parts and assemblies	BLO 1.2		Presentation, Final Exam	Lectures, practical works, individual literature analysis
CLO5. Is able to create simple animations and renders of various geometric forms and structures	BLO4.2.		Presentation, Final Exam	Lectures, practical works
CLO6. Is able to perform simple numerical analysis of simple parts	BLO 1.2		Presentation, Final Exam	Lectures, practical

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## ACADEMIC HONESTY AND INTEGRITY

The ISM University of Management and Economics Code of Ethics, including cheating and plagiarism are fully applicable and will be strictly enforced in the course. Academic dishonesty, and cheating can and will lead to a report to the ISM Committee of Ethics. With regard to remote learning, ISM remind students that they are expected to adhere and maintain the same academic honesty and integrity that they would in a classroom setting.

## COURSE OUTLINE

Topic	In-class hours	Readings
1. The Basic concepts and terms of Computer-Aided Designed (CAD).	1	Bryden, D. (2014). CAD and Rapid Prototyping for Product Design. Laurence King Publishing.
2. Overview of Computer Aided Designed (CAD) systems and their development trends.	2	Bryden, D. (2014). CAD and Rapid Prototyping for Product Design. Laurence King Publishing.
3. CAD systems structure, main functions and capabilities.	1	Bryden, D. (2014). CAD and Rapid Prototyping for Product Design. Laurence King Publishing.
4. Solidworks Basics and the User Interface.	1	Matt Lombard. (2011). SolidWorks 2011 Parts Bible. Wiley. Matt Lombard. (2007). SolidWorks 2007 Bible. Wiley.
5. Introduction to sketching. Sketch preparation (2D sketches, sketch creation tools, creation rules, relationships between sketch elements, sketch management, dimensions, etc.	2	Matt Lombard. (2011). SolidWorks 2011 Parts Bible. Wiley. Matt Lombard. (2007). SolidWorks 2007 Bible. Wiley.
6. Part Modelling. Basic Modeling, terminology, symmetry and draft, patterning, sweep, loft, revolved features, shells, ribs.	6	Matt Lombard. (2011). SolidWorks 2011 Parts Bible. Wiley. Matt Lombard. (2007). SolidWorks 2007 Bible. Wiley.
7. Part modelling. Peculiarities of creating sheet metal parts.	4	Matt Lombard. (2011). SolidWorks 2011 Parts Bible. Wiley. Matt Lombard. (2007). SolidWorks 2007 Bible. Wiley.
8. Part modelling. Weldments, surface modelling.	4	Matt Lombard. (2011). SolidWorks 2011 Parts Bible. Wiley. Matt Lombard. (2007). SolidWorks 2007 Bible. Wiley.
9. Bottom-Up and bottom-down assembly modeling. Using assemblies, relationship management between parts, identification of overlaps, assembly configurations.	8	Matt Lombard. (2011). SolidWorks 2011 Parts Bible. Wiley. Matt Lombard. (2007). SolidWorks 2007 Bible. Wiley.
10. Preparation of documentation. Manual and automatic projections, sections, cuts, etc. generation.	6	Matt Lombard. (2011). SolidWorks 2011 Parts Bible. Wiley.

Completion of working drawings: indication of shape and position deviations, roughness in the drawings, etc. Preparation of product specifications.		Matt Lombard. (2007). SolidWorks 2007 Bible. Wiley. Giesecke, E. Frederick. Technical drawing with engineering graphics / Giesecke.14th. ed.Harlow : Pearson education limited, 2014.iv, 840 p. ISBN 9781292026183;.
11. Realistic model presentation and animation. Model preparation for realistic image creation: material assignment, scene creation, lighting, etc. Model preparation for animation and its creation	8	Matt Lombard. (2011). SolidWorks 2011 Parts Bible. Wiley. Matt Lombard. (2007). SolidWorks 2007 Bible. Wiley.
12. Introduction to engineering analysis. Static, thermal and dynamic analysis approach in various conditions and environments.	5	Matt Lombard. (2011). SolidWorks 2011 Parts Bible. Wiley. Matt Lombard. (2007). SolidWorks 2007 Bible. Wiley.
	<b>Total: 48 hours</b>	
CONSULTATIONS	6	
FINAL EXAM	2	

#### FINAL GRADE COMPOSITION

Type of assignment	%
<i>Group Components 40%</i>	
Assignments and Presentation	40
<i>Individual Components 60%</i>	
Midterm Examination	30
Final Examination	30
<b>Total:</b>	<b>100</b>

#### DESCRIPTION AND GRADING CRITERIA OF EACH ASSIGNMENT

*(Provide short descriptions and grading criteria of each assignment)*

**Assignments and Presentation comprise 40% of the final grade and cannot be retaken.** Presentation is assignment form during which students present their results of practical works (up to ten tasks during whole course), show their ability to use CAD software and defend their knowledge during practical task, carried out with computer using Solidworks software. During assignment students individually perform tasks and reveals their ability to work with CAD system. Results of practical works should be obtained personally using provided tasks. Copies from other sources are not allowed.

**Midterm Examination comprises 30% of the final grade.** Midterm examination is assignment form during which students show their ability to use CAD software by creating sketches, 3D models of parts and assemblies. During assignments students perform multiple choice test and up to 3 tasks with computer and Solidworks software. Tasks are individual and copies from other sources are not allowed.

**Final Examination comprises 30% of the final grade.** Final examination is assignment form during which students show their ability to use CAD software by creating drawings, technical documentation, renders, animation and simple engineering



analysis during practical tasks (up to 3 tasks), carried out with computer using Solidworks software. Tasks are individual and copies from other sources are not allowed.

#### RETAKE POLICY

*(Provide short description and percentage of the final grade)*

Students who receive a failing grade shall have the right to **re-take exam, which will comprise 60%** of the final grade and cover all topics of the course. Midterm exam and final exam results will be annulled. Retake examination is assignment form during which students shows their ability to use CAD software, create render, animation and simple engineering analysis during practical tasks (up to 6 tasks), carried out with computer using Solidworks software. Tasks are individual and copies from other sources are not allowed.

#### ADDITIONAL REMARKS

"Solidworks" software must be used during this courses.

#### REQUIRED READINGS

1. Matt Lombard. (2011). SolidWorks 2011 Parts Bible. Wiley.
2. Matt Lombard. (2007). SolidWorks 2007 Bible. Wiley.
3. Giesecke, E. Frederick. Technical drawing with engineering graphics / Giesecke.14th. ed.Harlow : Pearson education limited, 2014.iv, 840 p. ISBN 9781292026183;.
4. Bryden, D. (2014). CAD and Rapid Prototyping for Product Design. Laurence King Publishing.

#### ADDITIONAL READINGS

1. Henry, K. (2012). Drawing for Product Designers. Laurence King Publishing.
2. Yu, C., & Jia, S. (2012). Computer Aided Design: Technology, Types, and Practical Applications. Nova Science Publishers, Inc.
3. Bert Bielefeld, & Isabella Skiba. (2013). Basics Technical Drawing. Birkhäuser.
4. He, X. (2011). Computer-Aided Design, Manufacturing, Modeling and Simulation. Trans Tech Publications Ltd.
5. G. Farin, J. Hoschek, & M.-S. Kim. (2002). Handbook of Computer Aided Geometric Design. North Holland.

## DEGREE LEVEL LEARNING OBJECTIVES

### Learning objectives for the Bachelor of Business Management

Programmes:

*International Business and Communication,  
Business Management and Marketing, Finance,  
Industrial Technology Management*

Learning Goals	Learning Objectives
Students will be critical thinkers	BLO1.1. Students will be able to understand core concepts and methods in the business disciplines
	BLO1.2. Students will be able to conduct a contextual analysis to identify a problem associated with their discipline, to generate managerial options and propose viable solutions
Students will be socially responsible in their related discipline	BLO2.1. Students will be knowledgeable about ethics and social responsibility
Students will be technology agile	BLO3.1. Students will demonstrate proficiency in common business software packages
	BLO3.2. Students will be able to make decisions using appropriate IT tools
Students will be effective communicators	BLO4.1. Students will be able to communicate reasonably in different settings according to target audience tasks and situations
	BLO4.2. Students will be able to convey their ideas effectively through an oral presentation
	BLO4.3. Students will be able to convey their ideas effectively in a written paper

### Learning objectives for the Bachelor of Social Science

Programmes:

*Economics and Data Analytics,  
Economics and Politics*

Learning Goals	Learning Objectives
Students will be critical thinkers	ELO1.1. Students will be able to understand core concepts and methods in the key economics disciplines
	ELO1.2. Students will be able to identify underlying assumptions and logical consistency of causal statements
Students will have skills to employ economic thought for the common good	ELO2.1. Students will have a keen sense of ethical criteria for practical problem-solving
Students will be technology agile	ELO3.1. Students will demonstrate proficiency in common business software packages
	ELO3.2. Students will be able to make decisions using appropriate IT tools
Students will be effective communicators	ELO4.1. Students will be able to communicate reasonably in different settings according to target audience tasks and situations
	ELO4.2. Students will be able to convey their ideas effectively through an oral presentation
	ELO4.3. Students will be able to convey their ideas effectively in a written paper