Study program : Mechanical Engineering

Type and level of studies: Academic studies – bachelor degree

Course unit: Introduction to Computer Aided Design (3D Product Modeling)

Teacher in charge : Goran Devedžić

Language of instruction (*English or other foreign language*): English

ECTS: 6

Prerequisites: Technical drawing and computer graphics

Semester: Spring Semester

Course unit objective

The objective of course is to provide students with knowledge and skills in the area of 3D product modeling to perform modeling of parts (prismatic, rotational, complex) and assemblies, and generate technical drawings using CATIA V5-6. Students will be also introduced to the principles of parameterization, as the basis for further advanced application of 3D modeling principles in the areas computer aided manufacturing and engineering.

Learning outcomes of Course unit

At the end of this course the student will be expected to be able to:

- know the importance and capabilities of product lifecycle management systems;
- understand and apply feature-based and parametric-based modeling principles and techniques;
- model prismatic, rotational and complex parts;
- create assemblies;
- generate technical documentation;
- know to manage (edit and modify) the model;
- understand the capabilities of computer aided engineering computer aided manufacturing technologies;
- know to use the standards for parts, forms, calculations and product operations.

Course unit contents

Theoretical classes

- Introduction. Advantages and basic characteristics of product lifecycle management systems.
- Principles of 3D product modeling. Sketching.
- Feature-based prismatic parts modeling.
- Feature-based rotational parts modeling.
- Feature-based complex parts modeling.
- Parametric modeling.
- Assemblies modeling.
- Documentation generation.
- Basics of computer aided engineering and computer aided manufacturing.
- Product data exchange. Standards for product data exchange. Management of models.

Practical classes

- Sketches: entities, constraints, operations.
- Prismatic parts modeling.
- Rotational parts modeling.
- Complex parts modeling.
- Parameters creation and application.
- Assemblies.
- Drawings.
- Basic application of computer aided engineering and computer aided manufacturing techniques.

Literature

1. Sham Tickoo: "CATIA V5-6R2014 for Designers"**,** CADCIM Technologies, 2015.
2. Tutorial Books: "CATIA V5-6R2015 Basics: Sketcher Workbench, Part Modeling, Assembly Design, Drafting, Sheet Metal Design, and Surface Design", CreateSpace Independent Publishing Platform, 2015.
3. Jaecheol Koh: "CATIA V5-6R2014 Design Fundamentals: A Step by Step Guide", CreateSpace Independent Publishing Platform, 2015.
4. Zeid I.: "CAD/CAM:Theory And Practice", McGraw Hill, New York, NY, USA, 2009.
5. Saša Ćuković, Goran Devedžić, Frieder Pankratz, Ionut Ghionea, Karupppasamy Subburaj: "PRACTICUM FOR CAD/CAM – AUGMENTED REALITY -", Faculty of Engineering, CIRPIS Center, Kragujevac, Serbia, 2015.

Number of active teaching hours				**Other classes**
Lectures: 20	Practice: 40	Other forms of classes: 15 - tutoring	Independent work: 15	

Teaching methods

Teaching approach is based on lessons, exercises, and independent work of students. Within theoretical classes students are introduced to the principles and essential techniques of 3D modeling.. During the exercises students acquire practical knowledge and skills to use specific 3D modeling tools in specific areas. Through supervised individual tasks students demonstrate integration of principles, knowledge and skills of 3D solid modeling needed for engineering problem solving.

Examination methods (maximum 100 points)			
Exam prerequisites	**No. of points:**	**Final exam**	**No. of points:**
Student's activity during lectures	**10**	oral examination	
practical classes/tests	**90**	written examination	
Seminars/homework		.....	
Project			
Other			

Grading system		
Grade	**No. of points**	**Description**
10	**91-100**	Excellent
9	**81-90**	Exceptionally good
8	**71-80**	Very good
7	**61-70**	Good
6	**51-60**	Passing
5	**<51**	Failing

(Table 5.2) Course unit description