SYLLABUS

Basic data of the subject	
University	**University of Applied Sciences in Ferizaj**
Academic unit	**Faculty of Engineering and Informatics**
Program	**Industrial Engineering with Informatics**
Title of the subject	**Reverse Engineering and 3D Modelling**
Level	**Bachelor**
Course Status	**Obligatory**
Year of studies	**III, Semester V**
Number of hours per week	**3**
Value of Credits - ECTS	**4**
Time / location	
Course lecturer	
Contact details	
Course Description	*This course will equip students with the knowledge and skills of recycling engineering and 3D Modeling in order to intervene in the design of existing products which work will end with the generation of its prototype. Scanning 3D objects through the most advanced technologies, intervention (changing the shape according to their requirements).*
Objectives of the course	*The objective of this course is to address the basics of methods and techniques to support engineering design processes, by focusing on the opportunities offered by Reverse Engineering and Rapid Printing. The subject will clarify the design stages and the circumstances in which Reverse Engineering and Rapid Printing are most useful. Students will have the opportunity to experiment directly using the available tools in a laboratory environment. The student will use computer programs to get acquainted with the principles of 3-dimensional design. Projects include modeling objects, features, aesthetic concepts, and proportions in space using various programs (3dsMax, AutoCAD, Rhino, Invertor, Blender, Creo).*
Expected learning outcomes	After *successful completion of this module, student will be able to:* • *gain knowledge about the opportunities offered by reverse engineering and rapid printing,* • *understand the main differences, pros and cons of alternative technologies to design products that can be created by 3D printing devices.* • *identify the advantages and limitations of Reverse engineering and additive manufacturing processes in the overall design, manufacturing and industrial engineering context.* • *understand the additive production processes used for*

	fabricating prototypes and components of products. • *model 3D objects by way of reverse engineering using computer programs.* • *Professionally use 3D scanners,*
Prerequisites	*The students must have knowledges on Engineering Graphics and CAD course.*

Contribution to the student load (which must correspond with learning outcomes)			
Activity	**Hour**	**Day/Week**	**In total**
Lectures with numerical exercises	3	15	45
Internship			
Contacts with teacher / consultations	1	3	3
Field exercises			
Midterm, seminars and projects.	15		15
Homework			
Self-learning time student (at the library or at home)	3	12	36
Final preparation for the exam			
Time spent on evaluation (tests, quiz and final exam)	2		2
Projects and presentations.	1		1
Total			**102**

Teaching methodology	*Lectures through presentations, as well as using software directly, exercises tasks and examples, seminars, discussions and lab activities.*
Assessment methods	*The student is assessed as following:* *1. Project 50%: individual/group assessment* *2. Final Exam 50%: individual assessment* ***Additional clarification:*** *If the student in each activity above reaches the maximum points, then he will be evaluated with 100 points.* *Project Task (50%): it is an activity in which students apply the acquired knowledge in a concrete project. It is carried out by one student (it also can be a group of 2 or 3 students) who is obliged to carry out the activity, document it, and present it to the subject professor.* *Evaluation by Final Exam (50%), the student will undergo the exam which is held after the end of the lectures of the course, and is organized in the exam deadlines, determined by the University senate.* *The final exam contains:* • *Tasks/Exercises directly with laboratory equipment and software*

	• *Theoretical questions from the course materials* ***Rating:*** *91-100 points – graded 10 (ten)* *81-90 points – graded 9 (nine)* *71-80 points – grade 8 (eight)* *61-70 points – grade 7 (seven)* *51-60 points – grade 6 (six)* *0-50 points – The student repeats the exam.*
The ratio of theory and practice	50% theory with exercises and 50% laboratory work.
Literature	
Basic Literature	1. *Materials provided by course lecturer*
Additional Literature	2. *Christopher Barnatt, 3D PRINTING* 3. *Samuel N. Bernier, Bertier Luyt, and Tatiana ReinhardDESIGN FOR 3D PRINTING* 4. *Raja, Vinesh, Fernandes, Kiran J. (Eds.), "Reverse Engineering: an Industrial Perspective", Spinger* 5. *3D Photorealistic Rendering: Interiors & Exteriors with V-Ray and 3ds Max, Jamie Cardoso* 6. *Rafiq I. Noorani, "Rapid Prototyping: Principles and Applications", Wiley* 7. *HAMAD M.; AutoCAD 2019 3D Modeling,*
Designed learning plan	
Week:	**Lectures and exercises to be held**
Week one	*Introduction to New Product Development*
Week two	*Duties of detailed design and Design tools*
Week three	*Reverse Engineering and Existing Technologies*
Week four	*Introduction to Basic Principles of Additive Production*
Week five	*Rapid Prototype Generating Technologies*
Week six	*Stereolithography (SLA) and Modeling (FDM) Polymers of Metals and Other Materials*
Week seven	*Revision*
Week eight	*Application of Reverse Engineering*
Week nine	*3D scanning*
Week ten	*3D modeling theory*
Week eleven	*Modeling of objects*
Week twelve	*Laboratory exercises*
Week thirteen	*Modeling complex objects with 3D software and VR*
Week fourteen	*Presentation of course work*
Week fifteen	*Summary*
Academic policies and rules of conduct	
Regular attendance of lectures and exercises is necessary, as well as active participation with discussion and solution of tasks. Not impeding the progress required for learning using mobile phones turned off or in silent mode.	