Course Syllabus

Code - Course Title	**BOP224 - Using 3D Printer**
Course Type	IV. SEMESTER
Laboratory + Practice	1+2
ECTS	**3.0**
Language of Instruction	Türkçe
Course Type	Area Elective Courses
Course Instructor(s)	ÖĞR. GÖR. PERİHAN ÖNDEŞ

Mode of Delivery	Face-to-face
Place of Delivery	On Campus
Used Educational Platforms	Face-to-face
Prerequisites	There are no prerequisites or corequisites for this course.
Courses Recomended	There are no prerequisite courses recommended for this course.
Recommended Resources	1. Visually supported course notes and application guidelines prepared by the instructor.2. Autodesk Tinkercad learning center (tinkercad.com/learn) – step-by-step modeling lessons.3. UltiMaker Cura user manual (support.ultimaker.com).
Work Placement	The course does not include an internship application.Two hours of weekly practical work are conducted in the computer laboratory, consisting of 3D modeling and 3D printing studies.
Aims of the Course	The aim of this course is to introduce students to the fundamental concepts of 3D printing technology and to provide them with the skills to model an object on a computer, prepare it for printing using slicing software, and safely produce outputs from a 3D printer. Throughout the course, students will create dimensioned and original models using Autodesk Tinkercad, configure print settings with Ultimaker Cura, execute the printing process, and analyze the causes of encountered printing errors.

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Weeks	Learning Outcomes	Topics	Teaching Methods
Week - 1	**LO-5**	Introduction to 3D printing technology: Definition, historical development, and its applications in the field of Computer Operation	Lecture, Question & Answer
Week - 2	**LO-6**	Additive manufacturing methods and types of 3D printers	Lecture
Week - 3	**LO-6** **LO-11**	Components of a 3D printer and basic concepts: Extruder, nozzle, build plate, layer height, filament types	Lecture, Demonstration and Practice
Week - 4	**LO-7**	3D modeling software and 3D file formats	Lecture, Demonstration and Practice
Week - 5	**LO-7**	Autodesk Tinkercad interface and modeling with basic geometric shapes	Lecture, Demonstration and Practice, Practice/Practical Work/Workshop

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Week - 6	LO-7	Grouping, creating holes, alignment, and dimensioning in Tinkercad	Demonstration and Practice, Practice/Practical Work/Workshop
Week - 7	LO-9	Slicing settings: Layer height, infill rate, support, and bed adhesion	Demonstration and Practice, Practice/Practical Work/Workshop
Week - 8	LO-10 LO-12	Pre-printing preparation and safe operation: Bed leveling, filament loading, occupational health and safety rules	Demonstration and Practice, Practice/Practical Work/Workshop
Week - 9	LO-7	Application: Modeling parts with given technical dimensions in Tinkercad	Demonstration and Practice, Practice/Practical Work/Workshop, Individual Work
Week - 10	LO-8	Application: Original 3D object design for a specific purpose of use	Proje Design/Management, Practice/Practical Work/Workshop
Week - 11	LO-9	Application: Exporting models as STL and slicing	Practice/Practical Work/Workshop
Week - 12	LO-10 LO-12	Application: 3D printing of the sliced model and monitoring of the printing process	Practice/Practical Work/Workshop
Week - 13	LO-11 LO-12	Printing errors and their resolution (warping, layer shift, stringing); support removal and reducing material waste	Question & Answer, Case Study, Practice/Practical Work/Workshop
Week - 14	LO-8 LO-12	Project: Printing, evaluation, and presentation of an original design	Proje Design/Management, Practice/Practical Work/Workshop

Learning Outcomes

#	Learning Outcome
1	The student can provide examples of the application areas of 3D printer technology within the field of Computer Operation.
2	Can compare additive manufacturing methods and types of 3D printers.
3	The student can use modeling tools to draw a part in accordance with the given dimensions.
4	The student can design an original 3D object for a specific purpose.
5	The student can slice a 3D model using print-appropriate settings.
6	The student can print a sliced model on a 3D printer without assistance.
7	The student will be able to analyze the causes of printing errors in terms of print settings and printer components.

Learning Outcomes

#	Learning Outcome
8	The student will be able to comply with occupational health and safety regulations while working with 3D printers.

Sustainable Development Goals

✓ Industry, Innovation and Infrastructure ✓ Responsible Production and Consumption

Course Theme

✓ Robotics, Automation and Mechatronics

AKTS Workload

Activity	Duration (Hour)	Count	Workload
Teorik Derse Katılım	1.00	14	14
Sınıf Dışı Çalışma (Ön Hazırlık & Pekiştirme Amaçlı)	1.00	14	14
Ödevler	2.00	4	8
Proje - Rapor - Sunum Hazırlama	5.00	1	5
Ara Sınav Hazırlığı (sınav süresi dahil)	2.00	1	2
Final Sınavı Hazırlığı (sınav süresi dahil)	4.00	1	4
Uygulama (Laboratuvar, Müzik/Enstrüman Uygulaması, Atölye/Saha Çalışması vb.)	2.00	14	28
Staj Uygulaması	0.00	0	0
		Calculated ECTS	**3.0**

Assessment Method and Passing Requirements

✓ Multiple Choice Test ✓ Project ✓ Homework