MATERIAL FOR ADDITIVE MANUFACTURING

1	Course Title:	MATERIAL FOR ADDITIVE MANUFACTURING	
2	Course Code:	MAK5274	
3	Type of Course:	Optional	
4	Level of Course:	Third Cycle	
5	Year of Study:	1	
6	Semester:	2	
7	ECTS Credits Allocated:	6.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	none	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Doç. Dr. MUSTAFA SAFA YILMAZ	
15	Course Lecturers:	-	
16	Contact information of the Course Coordinator:	msafayilmaz@uludag.edu.tr 0224 2942637 U.U. Müh. Fak. Makine Müh. Böl. BURSA	
17	Website:		
18	Objective of the Course:	Types of materials required for additive manufacturing processes; production, quality control, optimization, validation etc. Gain knowledge of processes.	
19	Contribution of the Course to Professional Development:	Production and quality control processes of materials used in additive manufacturing systems will be learned.	
20	Learning Outcomes:		
		1	To have knowledge about materials used in additive manufacturing technologies
		2	Gaining the ability to choose the appropriate material production process for the purpose
		3	To learn quality control processes in additive manufacturing materials
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21	Course Content:		

Course Content:

Week	Theoretical	Practice
1	Introduction to Additive Manufacturing: Transformation from rapid prototyping to advanced manufacturing	
2	Materials for Additive Manufacturing: Polymers: Personal printers	

3	Materials for Additive Manufacturing: Polymers: Industrial polymer printers	
4	Materials for Additive Manufacturing: Metals and ceramics: Indirect processes	
5	Materials for Additive Manufacturing: Metals and ceramics: Direct processes	
6	Powder specification standards for Metal Additive manufacturing (ASTM)	
7	Additive Manufacturing of Composite Materials	
8	Bioprinters	
9	Powder and part characterization in Additive Manufacturing	
10	Powder and part characterization in Additive Manufacturing-2	
11	New powder and Alloy development	
12	Process maps and process control	
13	Microstructure and porosity control	
14	Standardization in powder and applications	

22	Textbooks, References and/or Other Materials:	1. Toz Metalurjisi ve Parçacıklı malzeme İşlemleri, Türk Toz Metalurjisi Derneği, 2007. 2. Leander F. Pease III and William G. West, (2002), Fundamentals of Powder Metallurgy, MPIF, New Jersey (NJ), USA

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	9.00	126.00
Homeworks	1	3.00	3.00
Projects	0	0.00	0.00
Home work-project	1	40.00	
Field Studies	0	0.00	0.00
Midterm exams	0	0.00	0.00
Total	2	100.00	
Others	0	0.00	0.00
Final Exams	1	3.00	3.00
Total Work Load			174.00
Total work load/ 30 hr			5.80
Total		100.00	
ECTS Credit of the Course			6.00

Measurement and Evaluation Techniques Used in the Course	One homework assignment is given per semester. There is 1 final exam.

24	**ECTS / WORK LOAD TABLE**

25	**CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS**															
	PQ1	**PQ2**	**PQ3**	**PQ4**	**PQ5**	**PQ6**	**PQ7**	**PQ8**	**PQ9**	**PQ10**	**PQ11**	**PQ12**	**PQ13**	**PQ14**	**PQ15**	**PQ16**
ÖK1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LO: Learning Objectives PQ: Program Qualifications					
Contribution Level:	**1 very low**	**2 low**	**3 Medium**	**4 High**	**5 Very High**