

COOLING MACHINERY

1	Course Title:	COOLING MACHINERY
2	Course Code:	BSM4820-S
3	Type of Course:	Optional
4	Level of Course:	First Cycle
5	Year of Study:	4
6	Semester:	8
7	ECTS Credits Allocated:	3.00
8	Theoretical (hour/week):	2.00
9	Practice (hour/week):	0.00
10	Laboratory (hour/week):	0
11	Prerequisites:	No prerequisites
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Doç. Dr. İLKNUR ALİBAŞ
15	Course Lecturers:	Yok
16	Contact information of the Course Coordinator:	e-posta : ialibas@uludag.edu.tr Telefon: 0 224 2941608 Adres: Bursa Uludağ Üniversitesi, Ziraat Fakültesi, Biyosistem Mühendisliği Bölümü, Görükle Kampüsü, 16059, Nilüfer/BURSA
17	Website:	
18	Objective of the Course:	To understand the cooling phenomenon, to know the cooling systems, to make cooling calculations, to be able to choose the appropriate cooling machine,
19	Contribution of the Course to Professional Development:	To be able to make thermodynamic calculations of cooling systems, to choose the appropriate cooling machine,
20	Learning Outcomes:	
	1	Short history of cooling, basic concepts Cooling systems,
	2	Steam compressed mechanical cooling system, the use of pressure- enthalpy diagram(Molier diagram), cooling conversion calculations,
	3	Heat pump conversion calculations, example problems, real cooling conversion, cooling circuit heat exchanger system.(over-heating/ over-cooling process), cooling Systems working at different temperatures with one compressor and 2 or more than 2 steamers and conversion calculations, compressors, condensators, evaporators,
	4	Contraction valves and supporting equipment, cooling system with absorption,
	5	Thermodynamic analysis of cooling system with absorption, giving each student air storage project for different quantity and type of product, problem solving about cooling system with absorption,
	6	Pumpless cooling system with absorption, cooling Fluids and characteristics, cool storerooms,
	7	Projecting cool storerooms, suggestions for cooling and cool storing, example projecting,

		8	Running cooling facilities, mounting, service, maintenance, fixing, problems and solutions occurring at the facility, problems seen at the enterprise and fixing, example problems and solutions.		
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21	Course Content:				
	Course Content:				
Week	Theoretical		Practice		
1	Introduction of the course and content, history of cooling, basic concepts; Cooling systems; Cooling systems				
2	Steam compressed mechanical cooling system; The use of pressure- enthalpy diagram (Molier diagram); Cooling conversion calculations				
3	Heat pump conversion calculations; Example problems, real cooling conversion; Cooling circuit heat exchanger system.(over-heating/ over-cooling process)				
4	Cooling Systems working at different temperatures with one compressor and 2 or more than 2 steamers and conversion calculations; 2 phase cooling systems and conversion calculations; Systems using two or more cooling fluid and conversion				
Activites			Number	Duration (hour)	Total Work Load (hour)
Theoretical	Cooling system with absorption; Thermodynamic analysis of cooling system		14	2.00	28.00
Practicals/Labs			0	0.00	0.00
Self study	Laboratory study; Laboratory study; Laboratory study; Giving each student six		4	5.00	20.00
Homeworks			3	4.00	12.00
Projects	of product		0	0.00	0.00
Field Studies			0	0.00	0.00
Midterm exams	absorption; Problem solving of cooling system with absorption; Problem solving of cooling		1	10.00	10.00
Others			0	0.00	0.00
Final Exams	Problem solving of cooling system with absorption; Problem solving of cooling system		1	15.00	15.00
Total Work Load					95.00
Total work load/ 30 hr					2.83
ECTS Credit of the Course					3.00
	system with absorption; Cooling Fluids and characteristics				
11	Cool storages; Projecting cool storages; Projecting cool storages				
12	Suggestions for cooling and cool storing; Example projecting; Example projecting				
13	Running cooling facilities, mounting, service, maintenance, fixing, problems and solutions occuring at the facility; Problems seen at the enterprise and fixing; Problems seen at the enterprise and fixing				
14	Example problems and solutions; Example problems and solutions; Example problems and solutions				

22	Textbooks, References and/or Other Materials:	- Yamankaradeniz, R., Horuz, I. ve Coşkun, S., Uygulamalı Soğutma Tekniği, Uludağ Üniversitesi, Vipaş, Bursa, 2002. - N. Aybers (1992), Soğutma Makinaları, Umran Yayınevi - A. K. Dağsöz (1990), Soğutma Tekniği, Isı Pompaları, Isı Boruları, Alp Teknik Yayınları. - N. Özkol (1985), Uygulamalı Soğutma Tekniği, Makine Mühendisleri Odası yayın no:115, Ankara. - S. Savaş (1987), Soğuk Depoculuk ve Soğutma Sistemlerine Giriş, Cilt 1, Uludağ Üniversitesi Basımevi. - O. F. Genceli (2001), Soğutma Tesisatı, Makine Mühendisleri Odası yayın no: MMO/2001/295, Ankara.1998 14. - O. F. Genceli (1999), Isı Değiştiricileri, Birsen Yayınevi, İstanbul.
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23	Assesment
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TERM LEARNING ACTIVITIES	NUMBER	WEIGHT
Midterm Exam	1	40.00
Quiz	0	0.00
Home work-project	0	0.00
Final Exam	1	60.00
Total	2	100.00
Contribution of Term (Year) Learning Activities to Success Grade		40.00
Contribution of Final Exam to Success Grade		60.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course	The effect of the midterm exam on the course-passing grade is 40%, the effect of the final exam on the course-passing grade is 60%.	

24	ECTS / WORK LOAD TABLE
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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	3	2	2	2	4	1	1	5	2	2	2	0	0	0	0	0
ÖK2	3	2	2	2	4	1	1	5	2	2	2	0	0	0	0	0
ÖK3	3	2	2	3	4	1	1	5	2	2	2	0	0	0	0	0
ÖK4	4	2	2	2	4	1	1	5	2	2	2	0	0	0	0	0
ÖK5	4	2	2	2	4	1	1	5	2	2	2	0	0	0	0	0
ÖK6	4	4	3	3	4	1	1	5	3	3	2	0	0	0	0	0
ÖK7	4	4	3	3	4	1	1	5	3	3	2	0	0	0	0	0
ÖK8	4	4	3	3	4	1	1	5	3	3	2	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			