HEAT PUMP APPLICATIONS

1	Course Title:	HEAT PUMP APPLICATIONS
2	Course Code:	İSOS224
3	Type of Course:	Optional
4	Level of Course:	Short Cycle
5	Year of Study:	2
6	Semester:	4
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:	Absent
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Prof. Dr. SALİH COŞKUN
15	Course Lecturers:	Meslek Yüksekokulları Yönetim Kurullarının görevlendirdiği öğretim elemanları.
16	Contact information of the Course Coordinator:	Prof. Dr. Salih COŞKUN
17	Website:	
18	Objective of the Course:	Learn working principles of heat pump systems. Classify heat pump systems. Explain functions of accessory components. Explain faults in heat pumps sytems
19	Contribution of the Course to Professional Development:	raising qualified personnel for the air conditioning sector
20	Learning Outcomes:	
	1	Classify all heat pump systems
	2	Understand heating and cooling cycle of heat pump
	3	Identify functions of all components of heat pumps
	4	Learn control system of the heat pump
	5	Learn how describes performance coefficient of heat pump
	6	Learn installation stages of air and geothermal heat pumps
	7	Know faults encountered the heat pump systems
	8	
	9	
	10	

21	Course Content:	
	Course Content:	
Week	Theoretical	Practice
1	Reverse- cycle refrigeration, heat sources for winter, the four-way reversing valve	
2	The Air-to Air heat pump, refrigerant lines identification, metering devices	
3	Thermostatic expansion valves, the capillary tube, electronic expansion valves, orifice metering devices, liquid line accessories	

4	Application of Air-to-air heat pump, Auxilary heat, balance point, coefficient of performance	
5	Split system Air-to-Air heat pump, The indoor unit, air temperature of conditioned air, the outdoor unit installations	
6	Package Air-to-Air heat pump, controls for air-to-air heat pump	
7	defrost cycle, indoor fan motor control, auxilary heat	
8	Servicing the Air-to-Air heat pump, troubleshooting the electrical system, the mechanic problems, the four-way valve, the compressor, checking the charge	
9	Special application for heat pumps, Heat pumps using scroll compressors, heat pump systems with variable speed controls	
10	Geothermal heat pumps: reverse- cycle refrigeration, geothermal heat pump classifications	
11	Open-loop systems, water quality, closed-loop systems	
12	Ground loop configirations and flows, system materials and heat exchange fluids	
13	Geothermal wells and water sources for open loop systems, water-to-water heat pumps	
14	Troubleshooting, direct geothermal heat	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	2.00	28.00
Practicals/Labs	0	0.00	0.00
Laboratory Application	14	4.00	56.00
Homeworks	0	0.00	0.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	1.00	1.00
Final Exam	1	60.00	
Others	0	0.00	0.00
Final Exams	1	1.00	1.00
Total Work Load			87.00
Total work load/ 30 hr			2.87
ECTS Credit of the Course			3.00

SEMESTER ACTIVITIES	NUMBER	WEIGHT
Midterm Exam	1	40.00
Quiz	0	0.00
Home work project	0	0.00
Midterm exams	1	40.00
Final Exam	1	60.00
Total	2	100.00
Contribution of Term (Year) Learning Activities to		40.00
Contribution of Final Exam to Success Grade		60.00
Total		100.00

Measurement and Evaluation Techniques Used in the Course	Measurement and evaluation is carried out according to the priciples of Bursa uludag University Associate and Undergraduate Education Regulation.

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	5	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
ÖK2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ÖK3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK4	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
ÖK5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK6	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
ÖK7	3	0	0	0	0	0	5	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**