Course description

1 General information

Course name	Refrigeration and AC plants
Course code	M5-RAC
Level of study (B.Sc, M.Sc., Ph.D.)	B.Sc.
ECTS	6
Course manager	Dr hab. inż. Beata Niezgoda-Żelasko, prof. PK M5
Course length	One (1) semester
Coordinator for international programs	erasmus@mech.pk.edu.pl

2 Prerequisites

- None

2 Program

Type	Lectures	Classes	Labs	Computer labs	Project	Seminar
Hours	30	30				

3 Contents

Lectures		
No.		Hours
1	Refrigeration systems and applications	1
2	Compression and sorbent refrigeration system	3
3.	Overview of refrigerants and their environmental impact	2
4.	Heat pumps –types and application	2
5.	Air-conditioning systems	2
6.	Heat comfort, indoor air quality parameters	1
7.	Humid air properties, Mollier diagram	2
8.	Heat balance for building	1
9.	Elements of refrigeration and air-conditioning devices	1

Classes		
No.		Hours
1	Determination of the thermodynamic parameters of refrigerant using log(p)-i diagram	4
2	Designing single-stage vapor compression refrigeration system	6
3.	Adjusting devices and fittings for refrigeration system	3
4.	Designing two-stage vapor compression refrigeration system	2
5.	Humid air parameters calculation	6
6.	Heating, cooling, dehumidifying and humidifying processes calculation and illustrating on a Mollier diagram	9

3 Learning Outcomes (skills and knowledge):

- The student is able to illustrate vapor compression refrigeration cycle on log(p)-i diagram.
- The student knows the requirements for refrigerants.
- The student knows the difference between refrigerator, heat pump and air conditioning.
- The student is able to calculate the coefficient of performance of heat pump, refrigerator and air conditioning systems.
- The student is able to define the basic humid air parameters.

- The student is able to illustrate heating, cooling, dehumidifying and humidifying processes on a Mollier diagram.

4 Assessment policy (examination):

- Written exam (theoretical) and written colloquium (solving examples)

5 Literature

1. Althouse A.D. et al., *Modern Refrigeration and Air Conditioning*, Goodheart-Willcox 2016
2. *Ashrae Handbook: HVAC Applications*, Amer Society of Heating 2015
3. *Ashrae Handbook: HVAC Systems and Equipment*, Amer Society of Heating 2016
4. *Ashrae Handbook: Refrigeration*, Amer Society of Heating 2018
5. Jones W.P., *Air Conditioning Engineering*, Butterworth-Heinemann 2001
6. Wang S.K., *Handbook of Air Conditioning and Refrigeration*, McGraw-Hill Education 2000