

Cold chain

Faculty of	Mechanical and Power Engineering
Name in English	Cold chain
Name in Polish	Obiekty chłodnicze
Main field of study	Power Engineering
Specialization	-
Level of studies	II level
Form of studies	full-time
Kind of subject	optional-specialization
Subject code	W09ENG-SM2365
Group of courses	NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	15				
Number of hours of total student workload (CNPS)	25				
Form of crediting	Zaliczenie				
For group of courses mark final course with (X)					
Number of ECTS points	1				
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BU) classes	0,68				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1.	Fundamental knowledge of thermodynamics and fluid mechanics.
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SUBJECT OBJECTIVES

C1	Familiarize students with the basic knowledge about refrigeration technologies used in the cold chain.
C2	Familiarize students with the mathematical model for cooling and freezing processes.

SUBJECT LEARNING OUTCOMES

relating to knowledge:	
PEU_W01	Student is able to choose the right refrigeration technology depending on the individual requirements of the stored goods
PEU_W02	Student is able to calculate the needed cooling capacity depending of the individual requirements of the stored goods or processes.

PROGRAMME CONTENT

Form of classes - lecture	Number
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		of hours
Wy1	Scope of the lecture, credit conditions, literature. Basic thermal processes and their effect on organic materials.	1
Wy2	Cooling processes and characteristics of the most important accompanying processes	2
Wy3	Air cooling environment and the basics of cooling theory	2
Wy4	The theory of food freezing	2
Wy5	Food freezing by using the with air-blowing techniques	2
Wy6	Fluidized bed freezing – mathematical model	2
Wy7	Contact, immersion and crio freezing	2
Wy8	Final test	2
Suma godzin/ Total hours		15

TEACHING TOOLS USED	
N1	Traditional lecture with the use of multimedia presentation
N2	Self-study – reading of supplementary materials.
N3	Office hours.
N4	
N5	

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F– forming (during semester), C– concluding (at semester end))	Educational effect number	Way of evaluating educational effect achievement
P1	PEU_W01	Colloquium
P2	PEU_W02	Colloquium

PRIMARY AND SECONDARY LITERATURE

Primary literature	
1	Stoecker, W.F. and Jones, J.W. 1982. Refrigeration and Air Conditioning, NY, USA. McGraw Hill.
2	Mallett, C.P. 1993. Frozen Food Technology. Chapman and Hall, London, UK
Secondary literature	
1	

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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