University of Gdańsk

Subject card

Subject name and code	Thermodynamics of Sea Water - laboratory, PG_00206213		
Field of study	Oceanography		
Date of commencement of studies	October 2027	Academic year of realisation of subject	2027/2028
Education level	Master's studies	Subject group	Obligatory subject group in the field of study Optional subject group Subject group related to scientific research in the field of study
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	2.0
Learning profile	academic	Assessment form	credit
Conducting unit	Department of Geophysics -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Marcin Paszkuta	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	20.0	0.0	0.0	20

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	20	1.0	29.0	50

Subject objectives

Mastering the skills of calculation (description of phenomena) and understanding physical processes occurring in the marine environment; determining and calculating physical relationships; the importance of natural laws in seawater thermodynamics.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[OCEANMU2-U06] is able to use specialized computer software as well as advanced mathematical and statistical methods to analyze data and describe processes and phenomena occurring in the marine and coastal environment; evaluates their reliability and usefulness and performs critical analysis	Can use advanced mathematical methods in relation to seawater thermodynamics processes at an in-depth level.	[SU4] test/exam - oral or written [SU8] observation of student's independent or team work

Subject contents

B. Exercise topics:
B.1 Fundamentals of phenomenological thermodynamics,
B.2 Seawatera physical medium,
B.3 Thermodynamic potentials,
B.4 Thermodynamic susceptibilities,
B.5 Thermodynamic processes of seawater,
B.6 Phase transitionsequation of state,
B.7 Maxwell relations,
B.8 Molecular molar quantities,
B.9 Thermal expansion of seawater,
B10 Compressibility of seawater,
B.11 Potential temperature and potential density in the sea,
B.12 Change in seawater volume as a function of salinity,
B.13 Coupled processes thermodiffusion.

Prerequisites and co-requisites

Knowledge of the fundamentals of mathematics and physics at the university level

<table>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>final written examination</td><td>51.0%</td><td>90.0%</td></tr>
<tr><td>in-class activities</td><td>51.0%</td><td>10.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">1. Hołyst. R., 2003. Termodynamika dla chemików, fizyków i inżynierów. Instytut Chemii Fizycznej PAN i Szkoła Nauk Ści-słych, Warszawa</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">Leyendekkers. J.V., Hood W. D., 1976. Thermodynamics of Seawater. New York, ISBN 0-8247-6486-2;</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">1. Thermodynamic potentials,
2. Thermodynamic susceptibilities,
3. Thermodynamic processes of seawater,
4. Phase transitionsequation of state,
5. Maxwell relations</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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