University of Gdańsk

Subject card

Subject name and code	MATLAB/Octave Laboratory, PG_00188603		
Field of study	Oceanography		
Date of commencement of studies	October 2027	Academic year of realisation of subject	2029/2030
Education level	Bachelor's studies	Subject group	Obligatory subject group in the field of study Optional subject group
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	6	ECTS credits	1.0
Learning profile	academic	Assessment form	credit
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr Jordan Badur	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	15.0	0.0	0.0	15

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	15	1.0	9.0	25

Subject objectives

The course is intended to introduce students to MATLAB (or Octave) programming while highlighting the connection between algebra and oceanography. Students are expected to develop the ability to write short to medium programs and supplement analytical methods with short numerical and symbolic calculations as well as visualisations.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[OCEANL3-K01] is willing to plan and implement, individually or as a team, the subsequent stages of the entrusted task, is willing to take responsibility for the results of these works, effectively cooperates in the team and performs various roles in it	Student teams solve a problem requiring writing a short code and choosing the right computational technique	[SK4] test/exam - oral or written
[OCEANL3-U05] is able to use general-purpose and specialized software, as well as mathematical and statistical methods, in data analysis and the presentation of results	Student is able to write a short code solving a problem using numerical or symbolic cal-culations.	[SU4] test/exam - oral or written
[OCEANL3-W05] has an advanced knowledge of techniques, research methods, and tools (mathematical, statistical, and computational) used by oceanographers to describe and interpret processes and phenomena occurring in the marine environment	Student has the knowledge of selected oceanographical problems solved with demonstrated computational techniques.	[SW4] test/exam - oral or written [SW5] implementation of a problem task

<table>
<tr><td>Subject contents</td><td>1. Workspaces, variables and their scopes.
2. Vector algebra, logical indexing. Time series visualisation with simple 1D graphics
3. Functions and scripts, flow control. Run-time debugging.
4. Matrix algebra, Transpose and inverse matrices. Matrix determinant and linear equations. Eigenvalue problem in oceanography and biology.
5. Structures and cell_array, 2D graphics and interpolation.
6. Symbolic variables and calculus. Symbolic and numerical differentiation. Numerical integration.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>A first-year course in Mathematics covering basics of linear algebra and single-variable calculus</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Test</td><td>51.0%</td><td>70.0%</td></tr>
<tr><td>Implementation of a problem task</td><td>51.0%</td><td>30.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>1. Thompson R., Emery W.J., Data analysis methods in physical oceanography, Elsevier, London, 2024.
2. Harder, D.W., A practical introduction to linear algebra for undergraduate engineering using MATLAB. Univ. of Waterloo Publishing, Waterloo, 2019
3. Sradomski W., MATLAB. Praktyczny poradnik modelowania, Helion, Wrocław, 2019.
4. Berwick, D., Computational Physics using MATLAB. Dublin University, Dublin 2012</td></tr>
<tr><td>Supplementary literature</td><td>Jankowski R., Lubowiecka I., Witkowski W. Podstawy programowania w języku MATLAB, Wydawnictwo PG, Gdańsk, 2002</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>Fill missing data in a time series using a relevant interpolation method.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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