

Subject card

| | | | | | | | |
|--|--|--|-----------------|-------------------------------------|--|------------|-----|
| Subject name and code | Waves and Dynamics of Coastal Waters - lecture, PG_00201934 | | | | | | |
| Field of study | Oceanography | | | | | | |
| Date of commencement of studies | October 2026 | 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 | 2 | Language of instruction | | | Polish | | |
| Semester of study | 3 | ECTS credits | | | 2.0 | | |
| Learning profile | academic | Assessment form | | | exam | | |
| Conducting unit | Laboratory of Physical Oceanography -> Department of Physical Oceanography and Climate Research -> Faculty of Oceanography and Geography -> Rector | | | | | | |
| 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 | 30.0 | 0.0 | 0.0 | 0.0 | 0.0 | 30 |
| | 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 | 30 | | 2.0 | | 18.0 | 50 |
| Subject objectives | Acquiring in-depth knowledge and understanding of selected aspects of dynamics of coastal seas, waters and coastal zone. | | | | | | |

| | | | |
|---|--|---|-----------------------------------|
| Learning outcomes | Course outcome | Subject outcome | Method of verification |
| | [OCEANMU2-W06] knows and identifies potential threats to the marine environment on a local and global scale resulting from strong anthropopressure, predicts their effects on various time and space scales | knows and identifies potential threats to the marine environment resulting from coastal engineering constructions | [SW4] test/exam - oral or written |
| | [OCEANMU2-K04] is ready to critically evaluate his/her knowledge and received content in the field of natural sciences in particular in the field of the studied specialty, a in problematic situations, supports oneself with knowledge experts | is ready to critically evaluate his/her knowledge and received content in the dynamics of coastal seas and waters and seeks expert support when necessary | [SK4] test/exam - oral or written |
| | [OCEANMU2-U01] is able to formulate and solve complex and unusual problems regarding the functioning of individual components of the marine environment using knowledge from various fields and scientific disciplines and propose solutions | is able to formulate and solve complex and unusual problems regarding the dynamics of coastal waters using relevant mathematical techniques and software | [SU4] test/exam - oral or written |
| | [OCEANMU2-W02] knows and understands complex processes and phenomena occurring in the marine environment, with particular emphasis on the coastal zone, as well as complex relationships between living and non-living elements of the aquatic environment | knows and understands, in-depth, complex dynamical processes and phenomena occurring in the coastal seas and waters as well as complex relationships between hydrodynamics and the marine life | [SW4] test/exam - oral or written |
| [OCEANMU2-W01] knows and understands in-depth specialized terminology used in oceanography and related sciences (in Polish and a selected foreign language) | knows and understands in-depth specialized terminology used in the dynamics of coastal waters (in Polish and English) | [SW4] test/exam - oral or written | |
| Subject contents | <ol style="list-style-type: none"> 1. Flows and boundary layers in coastal seas. 2. Long waves in coastal seas: Trapped waves; the influence of bathymetry and stratification. 3. Tides in coastal seas: Interaction with bathymetry; generation, mixing and tidal fronts; internal tides. 4. Fresh water outflows: Estuaries, fronts, buoyancy-driven currents, and wind-forced currents. 5. Wind waves: Linear theory of infinitesimal-amplitude waves over a flat seabed; Energy flux and energy balance; wave action. Wave transformation processes: diffraction, refraction, and refraction in the presence of currents. 6. Small- and finite-amplitude waves. 7. Wave breaking processes and the surf zone. 8. Sediment transport processes and seabed morphodynamics. 9. An outline of wave-induced loads and interactions with engineering structures. 10. Statistical description of wind waves: Wind-wave spectra and methods for wind-wave forecasting. | | |
| Prerequisites and co-requisites | Passing grade in "Mathematical methods in oceanography" and "Introduction to geophysical fluid mechanics" OR the ability to demonstrate working knowledge of incompressible fluid mechanics and associated mathematical techniques. | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | final written examination | 51.0% | 100.0% |
| Recommended reading | Basic literature | <ul style="list-style-type: none"> • Nielsen P., 2009. Coastal and Estuarine Processes, World Scientific Publishing, Singapore. (selected chapters) • Crapper G.D., 1984. Introduction to water waves, Ellis Horwood Ltd., Chichester. (selected chapters) • Lisicki, 1996. Pływy na morzach i oceanach, Gdańskie Wydawnictwo Naukowe, Gdańsk • Massel S.R. 2010. Procesy hydrodynamiczne w ekosystemach morskich. Wyd. Uniwersytetu Gdańskiego, Gdańsk. (topic 10, chapters: 11, 16) | |

| | | |
|--|--|---|
| | Supplementary literature | <ul style="list-style-type: none"> • Brink, K., 2009 Physical Oceanography of Continental Shelves, Princeton University Press (further reading into some advanced topics on shelf sea dynamics) • Dean R. G., Dalrymple R. A., 2019 (1991). Water wave mechanics for engineers and scientists, World Scientific Publishing, Singapore. • Holthuijsen, L. 2007. Waves in oceanic and coastal waters, Cambridge Univ. Press, Cambridge. • Pruszek, 1998. Dynamika brzegu i dna morskiego, IBW PAN, Gdańsk. • Bosboom J., Stive M.J.F, 2023. Coastal Dynamics, TU Delft Open, Delft, https://books.open.tudelft.nl/home/catalog/view/202/375/616 (introductory text, a possible alternative to Nielsen's book) • Simpson, J.H., Sharples, J., 2012. Introduction to Physical and Biological Oceanography of Shelf Seas, Cambridge Univ. Press (further reading into relations between marine hydrodynamics and marine life - topic 10) |
| | eResources addresses | |
| Example issues/ example questions/ tasks being completed | <p>Describe the processes leading to tidal front creation.</p> <p>Describe the wave action conservation.</p> | |
| Work placement | Not applicable | |

Document generated electronically. Does not require a seal or signature.