

**Subject card**

<b>Subject name and code</b>	Cosmeceuticals and nutraceuticals_laboratory, PG_00117380						
<b>Field of study</b>	Marine Biotechnology						
<b>Date of commencement of studies</b>	October 2024	<b>Academic year of realisation of subject</b>			2024/2025		
<b>Education level</b>	postgraduate studies	<b>Subject group</b>					
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	1	<b>Language of instruction</b>			English The language of instruction is English		
<b>Semester of study</b>	2	<b>ECTS credits</b>			1.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>					
<b>Conducting unit</b>	Dziedkanat MW Biotechnologii -> Intercollegiate Faculty of Biotechnology UG-MUG						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		prof. dr hab. Bogdan Banecki				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	0.0	0.0	15.0	0.0	0.0	15
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	15		2.0		10.0	27
<b>Subject objectives</b>	The aim of the classes is to familiarize students with the practical aspects of marine biotechnology and methods used in laboratories to develop dietary supplements and medicinal products. Students learn about biotechnological processes, analytical techniques, and acquire skills necessary for laboratory work. The classes include obtaining and using active substances from marine organisms in the pharmaceutical and cosmetics industries. The emphasis is on teamwork and individual planning of experiments and contact with modern equipment.						
<b>Learning outcomes</b>	<b>Course outcome</b>		<b>Subject outcome</b>		<b>Method of verification</b>		
	[MBMU2-KW02] Has advanced knowledge of the possibilities of biotechnological use of marine resources		Has advanced knowledge of the possibilities of biotechnological use of marine resources		[SW4] test/exam - oral or written [SW2] presentation/project/paper/report		
	[MBMU2-KU03] Can use and critically analyze available scientific information; can prepare and present - orally or in writing - a paper covering detailed problems in the field of marine biotechnology on the basis of the scientific information or their own work, with the use of scientific language, including specialized terminology and conceptual apparatus; has the ability to conduct discussions		Has advanced knowledge of the possibilities of biotechnological use of marine resources		[SU2] presentation/project/paper/report [SU4] test/exam - oral or written		

Subject contents	<p>These exercises are intended to familiarize students with the process of creating medicinal or cosmetic products using the potential of marine organisms, from the design stage, development of analytical methods, through formulation development, method validation, to quality control of finished products. extraction of a natural active compound of marine origin development and validation of an analytical method for determining the content of active substances from material of marine origin release kinetics of the active substance of marine origin from a solid drug form testing the diffusion of an active substance of marine origin from transdermal forms of pharmaceutical and cosmetic products extraction and testing of the properties of collagen obtained from marine organisms</p>														
Prerequisites and co-requisites	<p>Knowledge of the basics of operation of biophysical equipment: UV VIS spectrometer, gas and liquid chromatograph, mass spectrometry. Knowledge of basic processes of molecular biology, biotechnology, microbiology. Ability to operate laboratory equipment.</p>														
Assessment methods and criteria	<table border="1" data-bbox="448 562 1487 723"> <thead> <tr> <th data-bbox="448 562 794 595">Subject passing criteria</th> <th data-bbox="794 562 1141 595">Passing threshold</th> <th data-bbox="1141 562 1487 595">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 595 794 629">entry test</td> <td data-bbox="794 595 1141 629">51.0%</td> <td data-bbox="1141 595 1487 629">25.0%</td> </tr> <tr> <td data-bbox="448 629 794 685">practical implementation of the experiment</td> <td data-bbox="794 629 1141 685">51.0%</td> <td data-bbox="1141 629 1487 685">50.0%</td> </tr> <tr> <td data-bbox="448 685 794 723">raport</td> <td data-bbox="794 685 1141 723">51.0%</td> <td data-bbox="1141 685 1487 723">25.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	entry test	51.0%	25.0%	practical implementation of the experiment	51.0%	50.0%	raport	51.0%	25.0%
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Recommended reading	Basic literature	<ol data-bbox="794 730 1487 1845" style="list-style-type: none"> <li>1. <i>Importance of algae oil as a source of biodiesel</i>; A. Demirbas, M. F. Demirbas; Energy Conversion and Management, 2011, 52(1): 163-170, 10.1016/j.enconman.2010.06.055</li> <li>2. <i>Lipid and morphological changes in developing rapeseed, brassica napus</i>; D. B. Fowler, R. K. Downey; Canadian journal of plant science, 1970, 50(3): 233-247, 10.4141/cjps70-047</li> <li>3. <i>The effect of temperature on the oil content and fatty acid composition of the oils from several oil seed crops</i>; David T. Canvin; Canadian journal of botany, 1965, 43(1): 63-69, 10.1139/b65-008</li> <li>4. <i>Novel Separation Techniques for Isolation and Purification of Fatty Acids and Oil By-Products</i>; Udaya N. Wanasundara<sup>1</sup>, P. K. J. P. D. Wanasundara, Fereidoon Shahidi; Published Online: 15 JUL 2005; DOI: 10.1002/047167849X.bio065</li> <li>5. Colin Poole &amp; Michael Cooke, 2000, Extraction, in Encyclopedia of Separation Science, 10 Vols., ISBN 9780122267703</li> <li>6. <i>A Rapid Method for the Determination of Fucoxanthin in Diatom</i>. L. J. Wang,, Y. Fan, R. L. Parsons, G.R. Hu, P.Y. Zhang, F.L. Li; Mar Drugs, 2018, 22;16(1):33, 10.3390/md16010033</li> <li>7. <i>The Biochemical Composition and Antioxidant Properties of Fucus vesiculosus from the Arctic Region</i>. E. D. Obluchinskaya, O. N. Pozharitskaya, D.V. Zakharov, E.V. Flisyuk, I. I. Terninko, Y. E. Generalova, I. E. Smekhova, A. N. Shikov; Marine Drugs, 2022; 20(3):193, 10.3390/md20030193</li> <li>8. FDA Guidance for Industry: Documents such as "Dissolution Testing of Immediate Release Solid Oral Dosage Forms" provide regulatory perspectives and standardized methodologies, which can be very instructive for students.</li> <li>9. USP-NF and EP Monographs: The United States Pharmacopeia and European Pharmacopeia contains standardized methods and specifications for drug substances, including detailed procedures for dissolution testing and other analytical techniques.</li> <li>10. Percutaneous Absorption: Drugs, Cosmetics, Mechanisms, Methods" by Robert L. Bronaugh and Howard I. Maibach</li> <li>11. "Topical Drug Bioavailability, Bioequivalence, and Penetration" by Vinod P. Shah, Howard I. Maibach</li> <li>12. "Pharmaceutical Skin Penetration Enhancement" edited by Kenneth A. Walters and Jonathan Hadgraft</li> <li>13. "Skin Barrier: Chemistry of Skin Delivery Systems" by Johann Wiechers</li> <li>14. "Methods for Skin Absorption" by William G. Reifenrath</li> <li>15. Recent research articles from journals such as the Journal of Controlled Release, International Journal of Pharmaceutics, and European Journal of Pharmaceutics and Biopharmaceutics</li> <li>16. "Fundamentals and Applications of Controlled Release Drug Delivery" by Juergen Siepmann, Ronald A. Siegel, Michael J. Rathbone</li> </ol>													

	Supplementary literature	These exercises are intended to familiarize students with the process of creating medicinal or cosmetic products using the potential of marine organisms, from the design stage, development of analytical methods, through formulation development, method validation, to quality control of finished products. extraction of a natural active compound of marine origin development and validation of an analytical method for determining the content of active substances from material of marine origin release kinetics of the active substance of marine origin from a solid drug form testing the diffusion of an active substance of marine origin from transdermal forms of pharmaceutical and cosmetic product extraction and testing of the properties of collagen obtained from marine organisms
Example issues/ example questions/ tasks being completed	eResources addresses	Adresy na platformie eNauczenie:
Work placement	Not applicable	

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