University of Gdańsk

Subject card

Subject name and code	Cosmeceuticals and nutraceuticals_Tutorials, PG_00099404		
Field of study	Marine Biotechnology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
Education level	postgraduate studies	Subject group	
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	English The language of instruction is English
Semester of study	2	ECTS credits	1.0
Learning profile	academic	Assessment form	
Conducting unit	Instytut Biotechnologii UG -> Intercollegiate Faculty of Biotechnology UG-MUG		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Bogdan Banecki	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	15.0	0.0	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	2.0	10.0	27

Subject objectives

The aim of the course is to familiarize students with the practical aspects of marine biotechnology and the methods used in laboratories for developing dietary supplements and medicinal products. Students will learn about biotechnological processes, analytical techniques, and acquire essential laboratory skills. The course covers the extraction and application of active substances from marine organisms in the pharmaceutical and cosmetic industries. Emphasis is placed on teamwork, individual experiment planning, and working with modern equipment.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[MBMU2-KW02] Has advanced knowledge of the possibilities of biotechnological use of marine resources	He 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	Is able to fluently use and critically analyze the available scientific information; on their basis and on the basis of his own work, can prepare and present an oral presentation and / or a written study covering detailed issues in the field of marine biotechnology, using scientific language, including specialist terminology and conceptual apparatus; has the ability to conduct discussions	[SU2] presentation/project/paper/ report [SU6] demonstration of practical skills [SU8] observation of student's independent or team work

Subject contents	These exercises are designed 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 an active substance from material of marine origin release kinetics of marine active substance from solid drug form research on 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
Prerequisites and co-requisites	Knowledge of the basics of operation of biophysical apparatus: UV-VIS spectrometer, gas and liquid chromatograph, mass spectrometry. Knowledge of the basic processes of molecular biology, biotechnology, microbiology. Ability to use laboratory equipment.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
raport	51.0%	25.0%
practical implementation of the experiment	51.0%	50.0%
entry test	51.0%	25.0%

Recommended reading

Basic literature

1. *Importance of algae oil as a source of biodiesel;* A. Demirbas, M. F. Demirbas; Energy Conversion and Management, 2011, 52(1): 163-170, 10.1016/j.enconman.2010.06.055
2. *Lipid and morphological changes in developing rapeseed, brassica napus*; D. B. Fowler, R. K. Downey; Canadian journal of plant science, 1970, 50(3): 233-247, 10.4141/cjps70-047
3. *The effect of temperature on the oil content and fatty acid composition of the oils from several oil seed crops*; David T. Canvin; Canadian journal of botany, 1965, 43(1): 63-69, 10.1139/b65-008
4. *Novel Separation Techniques for Isolation and Purification of Fatty Acids and Oil By-Products*; Udaya N. Wanasundara1, P. K. J. P. D. Wanasundara, Fereidoon Shahidi; Published Online: 15 JUL 2005; DOI: 10.1002/047167849X.bio065
5. Colin Poole & Michael Cooke, 2000, Extraction, in Encyclopedia of Separation Science, 10 Vols., ISBN 9780122267703
6. *A Rapid Method for the Determination of Fucoxanthin in Diatom.* 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
7. *The Biochemical Composition and Antioxidant Properties of Fucus vesiculosus from the Arctic Region.* 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
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.
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.
10. Percutaneous Absorption: Drugs, Cosmetics, Mechanisms, Methods" by Robert L. Bronaugh and Howard I. Maibach
11. "Topical Drug Bioavailability, Bioequivalence, and Penetration" by Vinod P. Shah, Howard I. Maibach
12. "Pharmaceutical Skin Penetration Enhancement" edited by Kenneth A. Walters and Jonathan Hadgraft
13. "Skin Barrier: Chemistry of Skin Delivery Systems" by Johann Wiechers
14. "Methods for Skin Absorption" by William G. Reifenrath
15. Recent research articles from journals such as the Journal of Controlled Release, International Journal of Pharmaceutics, and European Journal of Pharmaceutics and Biopharmaceutics
16. "Fundamentals and Applications of Controlled Release Drug Delivery" by Juergen Siepmann, Ronald A. Siegel, Michael J. Rathbone

	Supplementary literature	1. *Importance of algae oil as a source of biodiesel;* A. Demirbas, M. F. Demirbas; Energy Conversion and Management, 2011, 52(1): 163-170, 10.1016/j.enconman.2010.06.055 2. *Lipid and morphological changes in developing rapeseed, brassica napus*; D. B. Fowler, R. K. Downey; Canadian journal of plant science, 1970, 50(3): 233-247, 10.4141/cjps70-047 3. *The effect of temperature on the oil content and fatty acid composition of the oils from several oil seed crops*; David T. Canvin; Canadian journal of botany, 1965, 43(1): 63-69, 10.1139/b65-008 4. *Novel Separation Techniques for Isolation and Purification of Fatty Acids and Oil By-Products*; Udaya N. Wanasundara1, P. K. J. P. D. Wanasundara, Fereidoon Shahidi; Published Online: 15 JUL 2005; DOI: 10.1002/047167849X.bio065 5. Colin Poole & Michael Cooke, 2000, Extraction, in Encyclopedia of Separation Science, 10 Vols., ISBN 9780122267703 6. *A Rapid Method for the Determination of Fucoxanthin in Diatom.* 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 7. *The Biochemical Composition and Antioxidant Properties of Fucus vesiculosus from the Arctic Region.* 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 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. 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. 10. Percutaneous Absorption: Drugs, Cosmetics, Mechanisms, Methods" by Robert L. Bronaugh and Howard I. Maibach 11. "Topical Drug Bioavailability, Bioequivalence, and Penetration" by Vinod P. Shah, Howard I. Maibach 12. "Pharmaceutical Skin Penetration Enhancement" edited by Kenneth A. Walters and Jonathan Hadgraft 13. "Skin Barrier: Chemistry of Skin Delivery Systems" by Johann Wiechers 14. "Methods for Skin Absorption" by William G. Reifenrath 15. Recent research articles from journals such as the Journal of Controlled Release, International Journal of Pharmaceutics, and European Journal of Pharmaceutics and Biopharmaceutics 16. "Fundamentals and Applications of Controlled Release Drug Delivery" by Juergen Siepmann, Ronald A. Siegel, Michael J. Rathbone
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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