KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego

UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY

Course title	ECTS code
Structural analysis of marine natural products - lecture	13.4.0266

Name of unit administrating study

null

Studies

faculty	field of study		
Wydział Oceanografii i Geografii	Marine Biotechnology	type	wszystkie
		form	wszystkie
		specialty	wszystkie
		specialization	wszystkie

Teaching staff

dr Wioletta Żmudzińska

Forms of classes, the realization and number of hours

Forms of classes

Lecture

The realization of activities

classroom instruction

Number of hours

Lecture: 20 hours

ECTS credits

2
Lectures – 2
Classes – 20 h
Student's own work – 30h

The academic cycle

2024/2025 winter semester

Type of course

obligatory

Language of instruction

English

Teaching methods

multimedia-based lecture

Form and method of assessment and basic criteria for eveluation or examination requirements

Final evaluation

Examination

Assessment methods

written exam with open questions

The basic criteria for evaluation

Final grade is based on the writing exam with short open questions/single-choice test questions/task solving questions. A prerequisite for taking the exam is a positive (min 51%) passing of one colloquium at the end of the semester.

Method of verifying required learning outcomes

Lectures: (KW_04_Og/Bt) At the end of the course, the student takes a written exam (short open questions/single-choice test questions/task solving questions).

Required courses and introductory requirements

A. Formal requirements
B. Prerequisites
Basic knowledge on organic chemistry

Aims of education

The aim of the course is to:
gain knowledge of advanced research methods allowing for the structural analysis of natural marine products (UV, IR, MS and NMR spectroscopy), KW_04_Og / Bt

Course contents

Division of spectroscopic methods (emission and absorption methods); general principles of absorption spectroscopy, the nature and basic instrumentation in UV, IR, MS and NMR spectroscopy, the principle of signal formation, spectra analysis and structure determination of marine

natural compound from:
• UV spectroscopy
• IR spectroscopy
• MS spectroscopy
• NMR spectroscopy

Problems solving: spectroscopic analysis and identification of marine natural compounds.

Bibliography of literature

A.1. used during the lectures
• „Organic Structures from Spectra" L.D. Field, S. Sternhell, J. R. Kalman , WILEY
• R.M. Silverstein, F.X. Webster, D.J. Kiemle, Spektroskopowe metody identyfikacji związków organicznych, PWN
• Zieliński W., Rajca A., Metody spektroskopowe i ich zastosowanie do identyfikacji związków organicznych, WNT

A.2. studied independently by the student
Scientific papers published recently in specialized journals and other materials provided by the teacher during the classes

The learning outcomes (for the field of study and specialization)

KW_04_Og/Bt

Knowledge

KW_04_Og/Bt Possesses a broad knowledge and deeply understands advanced research methods used in structural analysis of marine natural products

Skills

Social competence

Contact

wioletta.zmudzinska@ug.edu.pl

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UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY

Course title	ECTS code
Structural analysis of marine natural products - laboratory	13.4.0267

Name of unit administrating study

null

Studies

faculty	field of study		
Wydział Oceanografii i Geografii	Marine Biotechnology	type	wszystkie
		form	wszystkie
		specialty	wszystkie
		specialization	wszystkie

Teaching staff

dr Wioletta Żmudzińska

Forms of classes, the realization and number of hours

Forms of classes

Laboratory classes

The realization of activities

classroom instruction

Number of hours

Laboratory classes: 15 hours

ECTS credits

1
Laboratory -1
Classes – 15 h
Student's own work – 15 h

The academic cycle

2024/2025 winter semester

Type of course

obligatory

Language of instruction

English

Teaching methods

Practical training in the computer laboratories

Form and method of assessment and basic criteria for eveluation or examination requirements

Final evaluation

Graded credit

Assessment methods

(mid-term / end-term) test

The basic criteria for evaluation

Final grade is based on the writing exam with short open questions/single-choice test questions/task solving questions. A prerequisite for taking the exam is a positive (min 51%) passing of one colloquium at the end of the semester.

Method of verifying required learning outcomes

Laboratory: (KU_01_Og / Bt, KU_02, KK_01) During the laboratory classes students conduct a practical structural analysis of different marine natural products based on UV, IR, MS and NMR spectra. At the end of the semester student takes a colloquium. The colloquium questions are task solving questions and are assigned to particular learning outcomes, each outcome is assessed separately. The prerequisite for passing the colloquium is to obtain positive grades (min 51%) in all learning outcomes. The final grade in the colloquium is a weighted average of the grades obtained from individual learning outcomes, with the weights being respectively: KU_01_Og / Bt and KU_02 - 80% of the final grade, KK_01 - 20% of the final grade.

Required courses and introductory requirements

A. Formal requirements

B. Prerequisites

Basic knowledge on organic chemistry

Aims of education

The aim of the laboratory/practical training classes is to:
gain practical skills to plan and conduct the structural analysis of natural marine products using UV, IR, MS and NMR spectroscopy, document activities and research results, KU_01_Og / Bt
gain the ability to analyze data obtained from UV, IR, MS or NMR spectroscopy, formulate a conclusion based on the obtained / available spectra,

KU_02, KK_01

Course contents

Division of spectroscopic methods (emission and absorption methods); general principles of absorption spectroscopy, the nature and basic instrumentation in UV, IR, MS and NMR spectroscopy, the principle of signal formation, spectra analysis and structure determination of marine natural compound from:

- UV spectroscopy
- IR spectroscopy
- MS spectroscopy
- NMR spectroscopy

Problems solving: spectroscopic analysis and identification of marine natural compounds.

Bibliography of literature

A.1. used during the lectures

- „Organic Structures from Spectra" L.D. Field, S. Sternhell, J. R. Kalman , WILEY
- R.M. Silverstein, F.X. Webster, D.J. Kiemle, Spektroskopowe metody identyfikacji związków organicznych, PWN
- Zieliński W., Rajca A., Metody spektroskopowe i ich zastosowanie do identyfikacji związków organicznych, WNT

A.2. studied independently by the student

Scientific papers published recently in specialized journals and other materials provided by the teacher during the classes

The learning outcomes (for the field of study and specialization)

KU_01_Og/Bt
KU_02
KK_01

Knowledge

Skills

KU_01_Og/Bt Has the ability to plan and carry out the structural analysis research of basic marine natural products, document the experiments and their results; can draw conclusions based on the obtained results

KU_02 Has the ability to collect and interpret empirical data from different spectra (UV, IR, MS, NMR); uses IT tools in data analysis; formulates conclusions based on empirical data

Social competence

KK_01 Is ready to critically assess his knowledge and constantly improve it, update and raise his qualifications in the field of marine biotechnology

Contact

wioletta.zmudzinska@ug.edu.pl

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UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY

Course title	ECTS code
Bioinformatics and Molecular Modeling_Lecture	13.4.0269

Name of unit administrating study

null

Studies

faculty	field of study		
Wydział Oceanografii i Geografii	Marine Biotechnology	type	drugiego stopnia
		form	stacjonarne
		specialty	wszystkie
		specialization	wszystkie

Teaching staff

dr hab. Stanisław Ołdziej, profesor uczelni

Forms of classes, the realization and number of hours

Forms of classes

Lecture

The realization of activities

classroom instruction

Number of hours

Lecture: 10 hours

ECTS credits

1
Lecture (classes) - 10 h
Student's own work – 15 h

1 ECTS

The academic cycle

2024/2025 winter semester

Type of course

obligatory

Language of instruction

English

Teaching methods

multimedia-based lecture

Form and method of assessment and basic criteria for eveluation or examination requirements

Final evaluation

- Graded credit
- Examination

Assessment methods

- written exam with open questions
- written exam (test)

The basic criteria for evaluation

The student must obtain a grade of at least sufficient from each assessed learning effect.
The final (passing) grade is a percentage indicator included in the UG Studies Regulations.

Method of verifying required learning outcomes

Learning outcomes	Method of veryfying required learning outcome
KW_04	Test

Required courses and introductory requirements

A. Formal requirements
B. Prerequisites
Basic knowledge on organic chemistry

Aims of education

Acquisition by student knowledge on the methods and tools used in molecular modelling and bioinformatics, especially in the analysis of genes and their products as well as in prediction of chemical properties of molecules (KW_04).

Course contents

Lecture: bases collecting biological data (amino acid sequences, nucleotides, biomolecule structures, metabolic pathways, medical data);

Bioinformatic methods used in analysis of genes and their products;
Methods applied in prediction of chemical properties of molecules.

Bibliography of literature

Bioinformatyka. Podręcznik do analizy genów i białek Andreas D. Baxevanis, B.F. Francis Ouellette (red.) PWN 2004
P.G. Higgs, T.K. Attwood. Bioinformatyka i ewolucja molekularna, PWN, 2008
Selected research and review articles suggested by lecturer
Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins. Andreas D. Baxevanis, B. F. Francis Ouellette. Wiley India Pvt. Limited, 2009
. Bioinformatics and molecular evolution . Higgs PG, Attwood TK.: Blackwell; 2005.

The learning outcomes (for the field of study and specialization)

KW_04_Og/Bt

Knowledge

KW_04 Knows and understands advanced bioinformatic methods applied in marine biotechnology and similar research areas.

Skills

Social competence

Contact

stanislaw.oldziej@ug.edu.pl

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UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY

Course title

Bioinformatics and Molecular Modeling - tutorials

ECTS code

13.4.0270

Name of unit administrating study

null

Studies

faculty	field of study		
Wydział Oceanografii i Geografii	Marine Biotechnology	type	drugiego stopnia
		form	stacjonarne
		specialty	wszystkie
		specialization	wszystkie

Teaching staff

dr hab. Stanisław Ołdziej, profesor uczelni

Forms of classes, the realization and number of hours

Forms of classes

Lecture

The realization of activities

classroom instruction

Number of hours

Lecture: 10 hours

ECTS credits

1
Auditorium classes - 10 h
Student's own work – 13 h
Consultations – 2 h

1 ECTS

The academic cycle

2024/2025 winter semester

Type of course

obligatory

Language of instruction

English

Teaching methods

- - Discussion of issues
- Consultations
- Student's own work
- discussion

Form and method of assessment and basic criteria for eveluation or examination requirements

Final evaluation

Graded credit

Assessment methods

- (mid-term / end-term) test
- assignment work – completing a specific practical assignment
- graded course credit based on individual grades obtained during the semester
- written/oral test

The basic criteria for evaluation

The student must obtain a grade of at least sufficient from each assessed learning effect.
The final (passing) grade is a percentage indicator included in the UG Studies Regulations.

Method of verifying required learning outcomes

Learning outcomes	Method of veryfication
KW_04	Test

Required courses and introductory requirements

A. Formal requirements
B. Prerequisites
basic knowledge on organic chemistry

Aims of education

Acquisition by student knowledge on the methods and tools used in molecular modelling and bioinformatics, especially in the analysis of genes and

their products as well as in prediction of chemical properties of molecules (KW_04).

Course contents

Auditorium classes: analysis of research articles on marine biotechnology in which molecular modelling and bioinformatic methods were applied.
Laboratory classes: data searching of specialized data bases (PDB, UniProt, NCBI Data Bases, ZINC, ChEMBL)

Bibliography of literature

Bioinformatyka. Podręcznik do analizy genów i białek Andreas D. Baxevanis, B.F. Francis Ouellette (red.) PWN 2004
P.G. Higgs, T.K. Attwood. Bioinformatyka i ewolucja molekularna, PWN, 2008
Selected research and review articles suggested by lecturer
Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins. Andreas D. Baxevanis, B. F. Francis Ouellette. Wiley India Pvt. Limited, 2009
. Bioinformatics and molecular evolution . Higgs PG, Attwood TK.: Blackwell; 2005.

The learning outcomes (for the field of study and specialization)

KW_04_Og/Bt

Knowledge

KW_04 Knows and understands advanced bioinformatic methods applied in marine biotechnology and similar research areas.

Skills

Social competence

Contact

Stanislaw.oldziej@ug.edu.pl

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UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY

Course title	ECTS code
Bioinformatics and Molecular Modeling_laboratory	13.4.0271

Name of unit administrating study

null

Studies

faculty	field of study		
Wydział Oceanografii i Geografii	Marine Biotechnology	type	drugiego stopnia
		form	stacjonarne
		specialty	wszystkie
		specialization	wszystkie

Teaching staff

dr hab. Stanisław Ołdziej, profesor uczelni

Forms of classes, the realization and number of hours

Forms of classes

Lecture

The realization of activities

classroom instruction

Number of hours

Lecture: 10 hours

ECTS credits

1
Lecture (classes) - 10 h
Student's own work – 15 h

1 ECTS

The academic cycle

2024/2025 winter semester

Type of course

obligatory

Language of instruction

English

Teaching methods

- -Practical laboratories – data analysis, presentations, group discussion, problem solving
- group work
- problem solving

Form and method of assessment and basic criteria for eveluation or examination requirements

Final evaluation

- Graded credit
- Course credit

Assessment methods

- The final grade is based on partial grades received during the semester for activity during classes and written reports assignments
- (mid-term / end-term) test
- assignment work – completing a specific practical assignment
- graded course credit based on individual grades obtained during the semester

The basic criteria for evaluation

The student must obtain a grade of at least sufficient from each assessed learning effect.
The final (passing) grade is a percentage indicator included in the UG Studies Regulations.

Method of verifying required learning outcomes

Learning outcomes	
KU_02, KU_03	test/report/discussion

Required courses and introductory requirements

A. Formal requirements
B. Prerequisites

Basic knowledge on organic chemistry

Aims of education

Acquisition by students the ability to apply the bioinformatic methods (KU_02)
Familiarizing with the main databases and searching tools, data selection, verification and presentation (KU_03)

Course contents

Laboratory classes: data searching of specialized data bases (PDB, UniProt, NCBI Data Bases, ZINC, ChEMBL)

Bibliography of literature

Bioinformatyka. Podręcznik do analizy genów i białek Andreas D. Baxevanis, B.F. Francis Ouellette (red.) PWN 2004
P.G. Higgs, T.K. Attwood. Bioinformatyka i ewolucja molekularna, PWN, 2008
Selected research and review articles suggested by lecturer
Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins. Andreas D. Baxevanis, B. F. Francis Ouellette. Wiley India Pvt. Limited, 2009
. Bioinformatics and molecular evolution . Higgs PG, Attwood TK.: Blackwell; 2005.

The learning outcomes (for the field of study and specialization)

KU_02
KU_03

Knowledge

Skills

KU_02 Possess the ability to collect and interpret empirical data; in data analysis applies statistical and bioinformatic tools

KU_03 Poses the ability to use and critically assess the information deposited in data bases. Based on the information and own work is able to present in written and oral presentation on specific aspects on bioinformatics and molecular modelling

Social competence

Contact

stanislaw.oldziej@ug.edu.pl

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UNIA EUROPEJSKA
EUROPEJSKI FUNDUSZ SPOŁECZNY

Course title	ECTS code
Marine OMICS - laboratory	13.4.0258

Name of unit administrating study

null

Studies

faculty	field of study		
Wydział Oceanografii i Geografii	Marine Biotechnology	type	drugiego stopnia
		form	stacjonarne
		specialty	wszystkie
		specialization	wszystkie

Teaching staff

dr hab. Paulina Czaplewska, profesor uczelni; dr Katarzyna Macur; dr Bartłomiej Tomiczek; prof. dr hab. Hanna Mazur-Marzec; dr Łukasz Rąbalski

Forms of classes, the realization and number of hours

Forms of classes

Laboratory classes

The realization of activities

classroom instruction

Number of hours

Laboratory classes: 32 hours

ECTS credits

2
Classes (laboratories) – 32 h
Student's own work 20 h
TOTAL 52 h – 2 ECTS

The academic cycle

2024/2025 winter semester

Type of course

- an elective course
- obligatory

Language of instruction

English

Teaching methods

- Laboratory work, sample preparation with instruction, data analysis
- conducting experiments

Form and method of assessment and basic criteria for eveluation or examination requirements

Final evaluation

Graded credit

Assessment methods

- (mid-term / end-term) test
- - (mid-term / end-term) test

The basic criteria for evaluation

Performance of laboratory work according to protocol-
• a written report

Method of verifying required learning outcomes

The assessment will be based on:
Laboratory class attendance is obligatory.
One absence is allowed that should be excused in the next class. Content should be supplemented in agreement with the teacher.
Laboratory exercises: As part of the exercises, students will mainly acquire skills. They will be verified on an ongoing basis by the practitioners. In during the exercises, the tutor will also check the student's knowledge related to it directly with the acquired skills (questions, discussion). The lecturer will be assessed the skills and knowledge of each student so that at the time of completion
each student will have a minimum of 4 grades for tutorials.
Final grade:
60% of the final grade is the exam grade.
40% of the final grade is the average grade from the exercises.

Required courses and introductory requirements

A. Formal requirements
B. Prerequisites

It is required to obtain knowledge, skills and competences implemented for specific courses: Biochemistry (lecture), Organic chemistry (lecture), Biodiversity and the basics of taxonomy, Bioinformatic sequence analysis, Molecular biology and genetics
After completing the compulsory subjects in the first three semesters, the student has the knowledge and skills qualifying him / her to participate and completion of the course

Aims of education

Getting to know and assimilation the basic concepts and terminology used in mass spectrometry; mastering the knowledge and skills necessary for self-preparation of the sample and for proteomic analysis of peptides and proteins.
familiarization with the methods used in identification of peptides and proteins based on ESI mass spectra
familiarization with the analysis of the fragmentation spectra of peptides
familiarization with the most important achievements in genomics.
Students will analyse and discuss the differences in organization and genetic content of prokaryotic and eukaryotic genomes, with particular emphasis on the human genome. As part of the course, student will acquire knowledge and skills allowing for independent assembly of genome based on the results of sequencing, annotation of genes in genomes and comparative analysis of genomes. Will be able to independently interpret the published results of genomic analyzes.
familiarization with metabolite profiling of microorganisms based on mass spectrometry.

Course contents

Laboratory exercises.
Isolation of genomic DNA - strategies and techniques. Genomic sequencing - strategies and techniques. Splicing of genes and identifying genes encoding proteins and RNA, including splicing sequences from Sanger sequencing. Identification of orthological genes in newly sequenced genome. Mapping short sequence reads to a reference genome. Annotation of gene functions in the genome. Genetic modifications in prokaryotic and eukaryotic genomes - techniques and methods. Identification of genes associated with genetic diseases.
Protein digestion, registration of MS/MS spectra, data analysis.
Effect of different factors on changes in metabolite profile.

Bibliography of literature

Scientific publications and studies prepared by the teacher and made available to students during the classes. • Genomes 3 T.A. Brown , 2007, Garland Science • Brown T.A. „Genomy”, wyd. II, przekład pod red. P. Węgleńskiego, Wydawnictwo Naukowe PWN, Warszawa 2009. • Molecular Biology of the Gene, wydanie 7, 2014, Pearson
Johnstone Robert A.W. I Malcolm E.Rose, Spektrometria mas, PWN 2001 De Hoffmann, Edmond, Charette, Jean Joseph, Stroobant, Vincent, Spektrometria mas, Wydawnictwa Naukowo-Techniczne 1998 Materials provided by the teacher

The learning outcomes (for the field of study and specialization)

KU_01
KK_03

Knowledge

Skills

KU_01: Has the skills indispensable for lab work; is able to plan conducting an experiment and carry it out, is able to document on his own operations and results; in lab work, under the supervision of the tutor, uses complex techniques and research tools, is able to use lab equipment.

Social competence

KK_03: Is aware of the significance of rules of safety at work, particularly in a laboratory; applies the rules of safety at work; is responsible for his/her own safety and the safety of others; can react adequately in hazardous situations

Contact

paulina.czaplewska@ug.edu.pl

KAPITAŁ LUDZKI
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Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego

UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY

Course title	ECTS code
Marine OMICS -lecture	13.4.0259

Name of unit administrating study

null

Studies

faculty	field of study		
Wydział Oceanografii i Geografii	Marine Biotechnology	type	drugiego stopnia
		form	stacjonarne
		specialty	wszystkie
		specialization	wszystkie

Teaching staff

dr hab. Paulina Czaplewska, profesor uczelni; prof. dr hab. Hanna Mazur-Marzec; dr Katarzyna Macur; dr Łukasz Rąbalski; dr Bartłomiej Tomiczek

Forms of classes, the realization and number of hours

Forms of classes

Lecture

The realization of activities

classroom instruction

Number of hours

Lecture: 28 hours

ECTS credits

2
Classes (lectures and laboratories) – 28 h
Student's own work 22 h
TOTAL 50 h – 2 ECTS

The academic cycle

2024/2025 winter semester

Type of course

- an elective course
- obligatory

Language of instruction

English

Teaching methods

- -Multimedia presentation prepared by student teams, consultations with course tutor. Students obtain a list of recently published scientific papers concerning a given issue. During subsequent seminar classes, under the supervision of the course tutor, students discuss selected scientific publications.
- discussion
- group work
- multimedia-based lecture
- project-based method (research, implementation, practical project)

Form and method of assessment and basic criteria for eveluation or examination requirements

Final evaluation

Examination

Assessment methods

- written exam with open questions
- written exam (test)
- - (mid-term / end-term) test

The basic criteria for evaluation

Performance of final work - project or presentation
- written exam with open questions (tasks)
- written test exam
• completion of the lecture: written test with open and test questions
• passing the exercises: written test with open and test ones questions, participation in the discussion
• a written report on the activities carried out as part of the exercises

Method of verifying required learning outcomes

Performance of final work - project or presentation
- written exam with open questions (tasks)
- written test exam
• completion of the lecture: written test with open and test questions
• passing the exercises: written test with open and test ones questions, participation in the discussion
• a written report on the activities carried out as part of the exercises

Required courses and introductory requirements

A. Formal requirements

B. Prerequisites

It is required to obtain knowledge, skills and competences implemented for specific courses: Biochemistry (lecture), Organic chemistry (lecture), Biodiversity and the basics of taxonomy, Bioinformatic sequence analysis, Molecular biology and genetics

After completing the compulsory subjects in the first three semesters, the student has the knowledge and skills qualifying him / her to participate and completion of the course

Aims of education

Getting to know and assimilation the basic concepts and terminology used in mass spectrometry; mastering the knowledge and skills necessary for self-preparation of the sample and for proteomic analysis of peptides and proteins.

familiarization with the methods used in identification of peptides and proteins based on ESI mass spectra

familiarization with the analysis of the fragmentation spectra of peptides

familiarization with the most important achievements in genomics.

Students will analyse and discuss the differences in organization and genetic content of prokaryotic and eukaryotic genomes, with particular emphasis on the human genome. As part of the course, student will acquire knowledge and skills allowing for independent assembly of genome based on the results of sequencing, annotation of genes in genomes and comparative analysis of genomes. Will be able to independently interpret the published results of genomic analyzes.

familiarization with metabolite profiling of microorganisms based on mass spectrometry.

Course contents

Lecture

Organization and genetic content of prokaryotic genomes (bacteria, archaea) and eukaryotic genomes (yeast, humans, plants).

Human genome project. The importance of mobile genetic elements for the organization and size of genomes. Mitochondrial genome and plastid genome.

Virus genomes. Comparative genomics. The influence of genomics on medicine and society. The use of ancient DNA in genomics. Evolution of genomes.

Introduction to mass spectrometry, physical basis for measuring MS spectra, apparatus and basis for MS spectra recording. • Qualitative and quantitative analysis in proteomics using mass spectrometry • Methods of sample preparation for MS analysis, recording and analysis of peptide and protein spectra (ESI, MALDI) • Analysis of post-translational modifications in MS • Protein depletion prior to MS analysis, digestion in solution and in-gel digestion • Analysis of MS data using MS spectra and protein databases.

Protein digestion, registration of MS/MS spectra, data analysis.

Effect of different factors on changes in metabolite profile.

Bibliography of literature

Scientific publications and studies prepared by the teacher and made available to students during the classes. • Genomes 3 T.A. Brown , 2007, Garland Science • Brown T.A. „Genomy”, wyd. II, przekład pod red. P. Węgleńskiego, Wydawnictwo Naukowe PWN, Warszawa 2009. • Molecular Biology of the Gene, wydanie 7, 2014, Pearson

Johnstone Robert A.W. I Malcolm E.Rose, Spektrometria mas, PWN 2001 De Hoffmann, Edmond, Charette, Jean Joseph, Stroobant, Vincent, Spektrometria mas, Wydawnictwa Naukowo-Techniczne 1998 Materials provided by the teacher

The learning outcomes (for the field of study and specialization)

KW_01

Knowledge

KW_01: Understands complex biological phenomena on the molecular level, knows their significance for biotechnology and their relationships with other areas and disciplines of science

KW_03_Og/Bt Knows and understands complex biological phenomena at the molecular level, understands their importance for the organism, marine environment and marine biotechnology

Skills

Social competence

Contact

paulina.czaplewska@ug.edu.pl

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UNIA EUROPEJSKA
EUROPEJSKI FUNDUSZ SPOŁECZNY

Course title	ECTS code
MSc Laboratory I	13.4.0252

Name of unit administrating study

null

Studies

faculty	field of study		
Wydział Oceanografii i Geografii	Marine Biotechnology	type	drugiego stopnia
		form	stacjonarne
		specialty	wszystkie
		specialization	wszystkie

Teaching staff

prof. dr hab. Hanna Mazur-Marzec; dr hab. Paulina Czaplewska, profesor uczelni; dr hab. Robert Czajkowski, profesor uczelni; dr hab. Mariusz Grinholc, profesor uczelni; prof. UG, dr hab. Konrad Ocalewicz

Forms of classes, the realization and number of hours

Forms of classes

Laboratory classes

The realization of activities

classroom instruction

Number of hours

Laboratory classes: 300 hours

ECTS credits

15
ECTS credits - 15 ECTS
MSc laboratory - 300 h
Consultations - 25 h
Student's own work - 50 h
TOTAL - 375 h

The academic cycle

2024/2025 winter semester

Type of course

obligatory

Language of instruction

English

Teaching methods

- conducting experiments
- designing experiments

Form and method of assessment and basic criteria for eveluation or examination requirements

Final evaluation

Graded credit

Assessment methods

assignment work – completing a specific practical assignment

The basic criteria for evaluation

Assessment of the quality and progress of the master thesis research work, independence in its realization, ability of the student to correctly interpret the results

Method of verifying required learning outcomes

Learning outcomes	Work plan	Experiments
	Knowledge	
KW_04	work plan, description and interpretation of results	
	Skills	
KU_01		student's performance during laboratory work
	Competences	
KK_03		student's performance during laboratory work

Required courses and introductory requirements

A. Formal requirements

B. Prerequisites

Aims of education

The main aim is the practical use of the knowledge and skills acquired during the education process, with particular emphasis on the following aspects:

- acquiring the extended knowledge and understanding the advanced methods used in marine biotechnology (KW_04)
- extending his/her laboratory work skills including independently planning and conducting experiments, consulting their results with the tutor. The student will deepen his/her ability to independently document the conducted experiments and their results and learns to independently operate the research devices (KU_01)
- improving the ability to collect and interpret the obtained experimental data, gaining the ability to independently formulate conclusions based on experimental and literature data (KU_01).
- applying the principles of health and safety rules in a research laboratory, knows and understands the risks associated with conducting laboratory experiments, and is able to solve problems arising in laboratory work and recognizes the risks (KK_03).

Course contents

The course content varies and depends on the topic of master thesis

Bibliography of literature

Books and articles published in scientific journals related to the topic of master thesis
Students will select appropriate literature (scientific publications) according to the MSc project

The learning outcomes (for the field of study and specialization)

KW_04
KU_01
KK_03

Knowledge

KW_04 Possesses knowledge on the advanced methods used in marine biotechnology, especially those applied during MSc laboratory

Skills

KU_01 Possess the ability to plan and perform the laboratory experiments and document the results; is able to use research tools applied during MSc laboratory

Social competence

KK_03 - Has an ability to work in accordance with safety regulations, is responsible and can predict the potential hazard.

Contact

hanna.mazur-marzec@ug.edu.pl

KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego

UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY

Course title	ECTS code
MSc Seminar I	13.4.0251

Name of unit administrating study

null

Studies

faculty	field of study		
Wydział Oceanografii i Geografii	Marine Biotechnology	type	drugiego stopnia
		form	stacjonarne
		specialty	wszystkie
		specialization	wszystkie

Teaching staff

prof. UG, dr hab. Konrad Ocalewicz

Forms of classes, the realization and number of hours

Forms of classes

Seminar

The realization of activities

classroom instruction

Number of hours

Seminar: 30 hours

ECTS credits

10
ECTS credits- 10 ECTS

Seminar - 30 godz.
Consultations 50 godz.
Student's own work 170 godz.

TOTAL: 250

The academic cycle

2024/2025 winter semester

Type of course

obligatory

Language of instruction

English

Teaching methods

text analysis and discussion

Form and method of assessment and basic criteria for eveluation or examination requirements

Final evaluation

Graded credit

Assessment methods

assignment work – project or presentation

The basic criteria for evaluation

Preparation and presentation of materials related to the master thesis

Ability to contribute to group discussion. Final grade will be based on partial grades obtained during semester. Students must obtain at least a satisfactory grade for every assessed learning outcome.

Method of verifying required learning outcomes

Learning outcomes	Text analysis	Presentation made by student	
	Knowledge		
KW_04	discussion	presentation of MSc thesis'assumptions	
	Skills		
KU-03		presentation of MSc thesis'assumptions	
	Competences		
KK_01	discussion	presentation of MSc thesis'assumptions	

Required courses and introductory requirements

A. Formal requirements
none

B. Prerequisites
none

Aims of education

Acquisition by students of knowledge and understanding of advanced methods used in marine biotechnology (KW_04)
Acquisition the ability to present, interpret and discuss the results of research work (KU_03)
Acquisition of the ability to critically assess own knowledge and constantly improve it (KK_01)

Course contents

The course covers issues concerning early stages of preparation of the Msc thesis including presentation of the current state of knowledge related to topics of MSc thesis, presentation of aims and scientific hypothesis, experimental design, description of material and methods used. Moreover, principles of preparation, writing and editing master thesis and research papers are covered by the course.

Scientific writing and presentations of the research results

Introduction to the research related to Msc thesis:
- providing new data /knowledge and sollutions of the scientific problems,
- current state of art - presentation of of what is known and what is unknown in the fields of interests,
-the aim of the research and scientific hypothesis,
-experimental design and technical capabilities and lab facilities.
- material and methods used to provide new scientific information

Bibliography of literature

Books and articles published in scientific journals related to the topic of master thesis Students will select appropriate literature (scientific publications) according to the MSc project

The internet resources, e.g.:
How to Write a Masters Thesis: The Ultimate Guide to Writing a Master's Thesis | With Format, Guidelines, and Samples - Acknowledgement World
https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/bes2.1258
https://www.oxbridgeediting.co.uk/blog/a-complete-guide-to-writing-a-masters-thesis/

The learning outcomes (for the field of study and specialization)

P6/7U_W, P6/7U_WG KW_04
P6/7U_U, P6/7U_UW KU_03
P6/7U_K, P6/7U_KK KK_01

Knowledge

KW_04 - Student Possesses knowledge on the advanced methods used in marine biotechnology, especially those applied during MSc laboratory

	Skills KU_03 Student possess the ability to present and interpret the results obtained during MSc laboratories, has the ability to participate in a group discussion
	Social competence KK_01 - Student has an ability to critically assess his own knowledge on marine biotechnology and is willing to constantly improve and update it.

Contact

konrad.ocalewicz@ug.edu.pl