



## Module syllabus: *Structural Biochemistry*

### 1. Overall information

Module coordinator	dr Daniel Wasilkowski
Contact	<a href="mailto:daniel.wasilkowski@us.edu.pl">daniel.wasilkowski@us.edu.pl</a> ; +48 32 2009576
ECTS	3
Method for the verification of learning outcomes	The final grade for the module is weighted on the average of the following student activities: - Active participation in laboratory classes (continuous evaluation of practical skills, tests and reports) (0.4) - Written final test (0.6) To be awarded, the student must have passed each activity of the module. Grades: below 51% – fail (F); 52-54% – poor (E); 55-59% – satisfactory (D); 60-74% – good (C); 75-84% – very good (B); 85-100% – excellent (A)

### 2. Description of student activity and work

Lecture/discussion sessions	
Responsible instructor	dr Daniel Wasilkowski
Content	<p><b>The main objective of this module</b> is to acquaint students with the structures of amino acids, proteins, nucleic acids, carbohydrates and lipids. This knowledge will help them to understand the role of these molecules in the organisation of pro- and eukaryotic cells as well as their functions.</p> <p><b>Lectures/discussion sessions</b> comprise the core subjects in biochemistry, including the knowledge of biology and organic chemistry.</p> <p><b>Lecture/discussion session content:</b> Structural biochemistry as an interdisciplinary subject. Structure and properties of amino acids as precursors of peptides and proteins. Peptides – structure and functions in living organisms. Classification and properties of proteins. Structure of carbohydrates (monosaccharides and oligosaccharides) and their derivatives. Polysaccharides – structure and functions. Nucleosides and nucleotides as precursors of nucleic acids. The structure of DNA and RNA. Organisation of the genetic material in pro- and eukaryotes. Ribosomes. Lipids – types and properties. Fatty acids and bioactive derivatives. Biological membranes – structure, dynamics and functions.</p>
Number of didactic hours (contact hours)	5
Literature	Biochemistry. Jeremy M. Berg, John L. Tymoczko, Lubert Stryer. W.H. Freeman & Co Ltd. Genomes. Terrence A. Brown. Oxford: Wiley-Liss.





Laboratory	
Responsible instructors	Staff of the Department of Biochemistry
Laboratory projects	Project 1. Amino acids. The structure, classification and properties of amino acids as precursors of peptides and proteins. Peptide bond. Natural peptides. Project 2. Characteristic reactions of proteins. Structure, classification and properties of proteins. Project 3. Specific reactions of carbohydrates. Structure of monosaccharides, oligosaccharides and their derivatives. Project 4. Structure and properties of nucleic acids. Structure of DNA and RNA. Organisation of genetic material in prokaryotes and eukaryotes. Ribosomes. Project 5. Qualitative analysis of lipids. Structure, types and properties of fatty acids and lipids. Biological membranes.
Methodology of laboratory classes	Experiments will be performed in small groups under the supervision of the instructors and will include: <ul style="list-style-type: none"><li>• Manual work practices of task in accordance with the protocols</li><li>• Calculating and elaborating the results</li><li>• Report</li></ul>
Number of didactic hours (contact hours)	15
Literature	Biochemistry. Jeremy M. Berg, John L. Tymoczko, Lubert Stryer. W.H.Freeman & Co Ltd. Genomes. Terrence A. Brown. Oxford: Wiley-Liss.

### 3. Forms of verification

Continuous evaluation of knowledge, activity and practical skills	
Grades	Grades are awarded on a scale of A-F, where A is the best and F is a fail. <u>An excellent performance (A)</u> – the student actively participates in the laboratory work, demonstrates an excellent understanding of the experimental procedures (its aims, sequence and outcomes), is engaged and creative in solving current problems and in assessing the experimental results. <u>Very good performance (B)</u> – the student actively participates in the laboratory work, demonstrates a very good understanding of the experimental procedures, is engaged in solving current problems and in assessing the experimental results with a little help from the instructor. <u>A good performance (C)</u> – the student demonstrates good judgment and knowledge, correctly performs an experiment, correctly exhibits a sense of the experimental procedure, properly assesses the experimental results. <u>A satisfactory performance (D)</u> – the student demonstrates satisfactory judgment and knowledge, needs additional help to solve the problems and finish the experiment, presents the final results of the experiment correctly. <u>A poor performance (E)</u> – the student meets the minimum academic criteria, demonstrates poor judgment and knowledge, is poorly engaged and needs a great deal of help to solve the problems and finish the experiment, presents the final





	results of the experiment with substantial errors. <u>A performance that does not meet the minimum academic criteria (F)</u> – the students is not engaged in the experiment, does not exhibit a sense of the experimental procedures, poorly and incorrectly interprets the experimental results.
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### Reports from realised laboratory projects

Evaluation	Evaluation comprises judgment and knowledge related to the sense and methods of the laboratory classes, engagement in experiment realisation, data analyses and the quality of the presentation of the obtained experimental results. Grades for reports are awarded on a scale of A-F, where A is the best and F is a fail. An excellent report (A) – without any essential errors Fail (F) – no report
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### Final exam

Grades	Grades are awarded on a scale of A-F, where A is the highest and F is a fail. Excellent (A) – the student presents fluent knowledge of the structure of amino acids, proteins, carbohydrates, nucleic acids and lipids and understands the role of these molecules in the functioning of living cells. Very good (B) – the student presents very good knowledge of the structure of acids, proteins, carbohydrates, nucleic acids and lipids and understands the role of these molecules in the functioning of living cells with very rare and subtle errors. Good (C) – the student presents a good knowledge of the structure of amino acids, proteins, carbohydrates, nucleic acids and lipids and understands the role of these molecules in the functioning of living cells, makes rare but subtle errors. Satisfactory (D) – the student presents a good knowledge of the structure of amino acids, proteins, carbohydrates, nucleic acids and lipids and understands the role of these molecules in the functioning of living cells, makes frequent but subtle errors. Poor (E) – the student presents a minimum of academic knowledge, poorly understands the structure of molecules and their roles in the functioning of living cells, makes frequent substantial errors. Fail (F) – the student does not present satisfactory knowledge connected with the structure of molecules and their roles in the living cells, makes many substantial errors, which disqualify their final exam.
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