Course title in English	**Protein structure and energetics**
Course title in Polish	Struktura i energetyka białek
Course code	
Type of course	Lecture
Level of course	PhD
Year of study	1-4
Semester/trimester	1/3/5/7
Number of hours/credits allocated	30/2
Name of lecturer	Józef Adam Liwo
Objective of the course (expected learning outcomes and competences to be acquired)	*Knowledge*: Acquisition of the knowledge specified in the "Course contents" section. *Skills*: Fluency in distinguishing various types of secondary, supersecondary, and tertiary structure and fold types, as well as protein architecture, ability to determine how does amino-acid sequence determine secondary and supersecondary structure, abiliy to connect protein-folding thermodynamics to protein stability, plasticity, misfolding, and aggregation, awareness of advantages and disaddvatages of various types of experimental methods of protein-structure determination, ability to select appropriate theoretical method for a given molecular-modeling task involving proteins. *Social competence*: Work in a team, ability to take active part in constructive discussions.
Prerequisites	Organic chemistry, physical chemistry
Course contents	1. Levels structural organization of proteins. 2. Quantitative description of protein geometry. 3. Secondary and supersecondary structure.

	4. Tertiary and quaternary structure; schemes of protein-structure classification. The CATH classification system 5. Interactions in proteins and their interplay. 6. Folding transition as a phase transition. 7. Foldability and the necessary conditions for foldability. 8. Misfolding and aggregation; formation of amyloids. 9. Experimental methods for the investigation of protein folding. 10. Atomistic-detailed and coarse-grained models and force fields for protein simulations.
Recommended reading	Proteins Structure and Function, D. Whitford, Wiley, 2005.
Teaching methods	Lecture with multimedia presentation.
Assessment methods	Exam
Language of instruction	Polish