The basics of chemical synthesis of oligonucleotides
SYLLABUS

Lecture title	**The basics of chemical synthesis of oligonucleotides**
Venue	Institute of Bioorganic Chemistry PAS, Poznan
Language	Polish
Learning objectives	Ph.D. Student shall: 1. gain advanced subject and methodological knowledge regarding chemistry of components of nucleic acids, 2. master chemistry, methods and analytical techniques used in the synthesis of oligonucleotides and their analogues, be able to: (i) elaborate on the concept and strategy for synthesis of a target oligonucleotide. (ii) choose a proper method for oligonucleotide synthesis, (iii) to a considerable extent, determine cognitive and applicative goals for synthetic oligonucleotides. (iv) evaluate the economic aspects of a chosen synthetic approach, (v) critically evaluate papers of other researchers on chemistry and properties of synthetic oligonucleotides.
Course type	**Facultative**
Term/Year	winter term 2021/2022
Lecturer's name	**Prof. Adam Kraszewski, PhD, DSc**
Examiner's name	**Prof. Adam Kraszewski, PhD, DSc**
Teaching methods	Lectures/Seminars with audiovisual techniques
Attendance requirements knowledge of English language and organic chemistry at an academic level.	
Number of ECTS points	**2**
Number of lectures	12 h
Didactic methods	Lectures and discussions.
Methods of verification and assessment of learning outcomes	Written exam and individual discussion on the examination work.
Conditions of a positive evaluation	A passing grade from the exam.
Course content	1. Structure of DNA vs RNA – requirements for approaches in chemical synthesis 2. Concepts and protection systems for nucleoside and nucleotides used in oligonucleotide synthesis.

	3. Methods for oligonucleotide synthesis with PV chemistry. 4. Methods for oligonucleotide synthesis with PIII chemistry. 5. Selected mechanisms of introduction and removal of phosphoester protective groups. 6. Selected oligonucleotide phosphorous analogues– synthesis, properties. 7. Goals for synthetic oligonucleotides.
Literature constituting the course materials	• Series of papers: *Studies on polynucleotides* - H. G. Khorana et al., published within 1960 – 1976. • Reese C. B. An approach to oligonucleotide synthesis by the phosphotriester method. *Phosphorus and Sulfur*, 1976, 245 • Reese C. B. The chemical synthesis of oligo- and poly-nucleotides: a personal commentary. *Tetrahedron* 2002, 58, 8893 • *Oligonucleotide synthesis: a practical approach*. M. Gait (red.). Oxford: Oxford University Press, 1984. • *Oligonucleotides and Analogues. A Practical Approach*. F. Eckstein (red.). Oxford: Oxford University Press, 1991. • *Protocols for Oligonucleotides and Analogs. Synthesis and Properties*. S. Agrawal (red.). Totowa: Humana Press, 1993. • *Protocols for Oligonucleotide Conjugates. Synthesis and Analytical Techniques*. S. Agrawal (red.). Totowa: Humana Press, 1994.