A. Informacje ogólne (wypełnia koordynator przedmiotu z wyjątkiem pól *Kod przedmiotu*, *Przyporządkowanie do grupy przedmiotów*).

Nazwa pola		
Course title		Light scattering by polymer solutions
Faculty/Institute		Faculty of Chemistry, University of Warsaw
Programme for which the course is offered		
Course ID		
Erasmus code		**13300**
Course group		
Didactic cycle		Second level of studies, winter semester
Type/form of class		lecture
Brief course description		The aim of this lecture is presentation the Light Scattering as a method of polymer solution exploration. Theory and practical examples are presented.
Full course description		Light scattering by particles – history and theoretical background. Laser techniques. Theoretical background of laser light scattering measurements. Time averaged or Static Light scattering (SLS), and time dependent or Dynamic Light Scattering (DLS) methods. Fluctuation correlations. Autocorrelation function. Zimm plot. Light scattering from macromolecules solutions as a source of their dynamic and static properties (translational and rotational diffusion coefficients, size, shape, molecular weight, relaxation rates, polydispersity and entanglement of polymer chains).
Prerquisites	Formal prerquisites	Passed fundamental courses of physics and organic chemistry
	other prerquisites	Satisfactory knowledge of physics and organic chemistry
Learning outcomes		To the end with this lecture student: - knows the theoretical background of light scattering by particles - distinguishes light scattering effects by particles - explains light scattering effects by particles - describes laser techniques used in light scattering measurements - draws a comparison between SLS and DLS - defines autocorrelation function - explains fluctuation correlation - explains Zimm plot - explains polymer chains dynamic and static properties (translational and rotational diffusion coefficients, size, shape, molecular weight, relaxation rates, polydispersity and entanglement of polymer chains) using data obtained from SLS and DLS
ECTS credits		1ECTS
Assessment methods and criteria		Credit for a course with the mark
Type of examination		Written exam
Type of course		Optional course
Mode of delivery		lecture
Language of instruction		Polish
Bibliography		1. W.Przygocki „Metody fizyczne badań polimerów”, PWN, Warsaw 1990 2.B.J.Berne, R.Pecora „Dynamic light scattering with applications to chemistry, biology and physics” Dover Publications, Inc. 2000 3.Multi-author monograph “New frontiers in polymer research” Edited by Robert K. Bregg, new Publishers, Inc, New York, Chapter 8 by H.Wilczura-Wachnik and W. Alexander Van Hook
Work placement(s)		none
Course coordinator		**Hanna Wilczura-Wachnik**
Academic teachers		**Hanna Wilczura-Wachnik**
Remarks		none

B. Informacje szczegółowe (wypełnia prowadzący zajęcia, z wyjątkiem pól: *Limit miejsc w grupie, Terminy odbywania zajęć*, *Miejsce odbywania zajęć* – pola te prowadzący zajęcia wypełnia w porozumieniu z administracją).

Nazwa pola	
Name of the academic teacher	**Hanna Wilczura-Wachnik**
Academic degree	**Phd**
Form of the class	Lecture
Learning outcomes	To the end with this lecture student: - knows the theoretical background of light scattering by particles - distinguishes light scattering effects by particles - explains light scattering effects by particles - describes laser techniques used in light scattering measurements - draws a comparison between SLS and DLS - defines autocorrelation function - explains fluctuation correlation - explains Zimm plot - explains polymer chains dynamic and static properties (translational and rotational diffusion coefficients, size, shape, molecular weight, relaxation rates, polydispersity and entanglement of polymer chains) using data obtained from SLS and DLS
Assessment methods and criteria for this course	Credit for a course with the mark
Type of examination	Written exam
A list of topics	1. Light scattering by particles – introduction, historical sketch. 2. Rayleigh and non-Rayleigh scattering. 3. Fluctuations and time correlation function. Autocorrelation function. 4. Light scattering experiment and equipment. Digital autocorrelation techniques. 5.Time averaged (Static Light Scattering, SLS). 6. Time dependent (Dynamic Light Scattering, DLS). 7. Scattering from small molecules and very large molecules. 8. Zimm plot. 9. Corrections for finite concentrations and polydispersity. 10. Molecular weight, translational and rotational diffusion coefficients, size, shape, relaxation rates, polydispersity and entanglement of polymer chains determination. 11. Effects of polydispersity on the time correlation function and spectra.
Learning activities and teaching methods	Lecture, individual consultations
Bibliography	1. W.Przygocki „Metody fizyczne badań polimerów”, PWN, Warsaw 1990 2.B.J.Berne, R.Pecora „Dynamic light scattering with applications to chemistry, biology and physics” Dover Publications, Inc. 2000 3.Multi-author monograph “New frontiers in polymer research” Edited by Robert K. Bregg, new Publishers, Inc, New York, Chapter 8 by H.Wilczura-Wachnik and W. Alexander Van Hook
Limit of places available	
Time	
Place	