Course code								
Type and description	Background Course							
ECTS credit	2							
Course name	Stochastic Processes							
Course name in Polish	Procesy stochastyczne							
Language of instruction	English							
Course level	8 PRK							
Course coordinator	Prof. dr hab. Lesław Gajek							
Course instructors	Prof. dr hab. Lesław Gajek							
Delivery methods and course duration		Lecture	Tutorials	Laboratory	Project	Seminar	Other	Total of teaching hours during semester
	Contact hours	15	0	0	0	0	0	15
	E-learning	No	No	No	No	No	No	
	Assessment criteria (weightage)	1,00				_	0,00	
Course objective	The aim of the cou	urse is:						
	 to enable the acquisition of knowledge and skills in stochastic processes to enable the acquisition of knowledge of elementary properties/theorems concerning stochastic processes to enable the acquisition of elementary knowledge of applications of stochastic processes in other sciences 							
Learning outcomes	After completing the course students can:							
	 formulate the definition/properties of the conditional expectation with respect to a sigma-field effects W1, W4, U3 							
	 give definitions/properties of basic stochastic processes, describe their types and give their probabilistic properties – effects W1, W4, U3 							
	3. apply t	he above l	knowledge to	o analyse matł	nematical m	nodels – effec	cts U3, K1,	K2
Assessment methods	Learning outcon	Learning outcomes 1—3 (effects W1, W4, U3, K1, K2): oral exam						
Prerequisites	The student has the	he knowle	dge and skill	s in the basics	of probabi	lity, measure	e and integr	al theory.
Course content with delivery methods	LECTURE 1. Definiti 2. Definiti	on and pro	operties of th	e conditional o	expectation nogorov Exi	with respect	to a sigma rem.	-field.

	 Basic characteristics of stochastic processes. Stationary processes. The Poisson process. The Wiener process. 		
	 Stopping times. Martingales, submartingales, supermartingales. Doob's optional stopping theorem. Wald's identities. Doob's decomposition theorem. 		
	5. Markov processes, Markov chains, ergodic theorem.		
Basic reference materials	 Kallenberg O. (2002) Foundations of Modern Probability, 2nd ed. Springer. Resnick S.I. (2013). Adventures in Stochastic Processes. Springer Williams D. (2019) Probability with Martingales, 2nd ed. Cambridge University Press 		
Other reference materials	4. Rolski T., Schmidli H., Schmidt V., Teugels J.L. (1999) Stochastic Processes for Insurance and Finance. John Wiley and Sons		
Average student workload outside classroom	35h		
Comments			
Last update			