

A COURSE SYLLABUS – DOCTORAL SCHOOL
REGARDING THE QUALIFICATION CYCLE FROM 2020 TO 2024

GENERAL INFORMATION ABOUT COURSE				
Course title	PhD seminar			
Name of the unit running the course	Doctoral School at University of Rzeszów			
Type of course (<i>obligatory, optional</i>)	obligatory			
Year and semester of studies	2021/2022; II year, s. III i IV 2022/2023; III year, s. V i VI 2024/2025; IV year, s. VII i VIII			
Discipline	Physical sciences			
Language of Course	English			
Name of Course coordinator	Prof. dr hab. Marian Cholewa			
Name of Course lecturer	Prof. dr hab. Marian Cholewa Prof. dr hab. n. med. Krzysztof Gutkowski			
Prerequisites	Knowledge of physics at the university level, in particular in the field of medical imaging using MRI.			
BRIEF DESCRIPTION OF COURSE (100-200 words)				
The doctoral seminar allows the candidate to have regular contacts with the supervisors of the doctoral dissertation. These classes will allow you to follow the course of the doctoral student's research work, progress in the preparation of scientific publications, conference presentations and the preparation of grants.				
COURSE LEARNING OUTCOMES AND METHODS OF EVALUATING LEARNING OUTCOMES				
Learning outcome	The description of the learning outcome defined for the course	Relation to the degree programme outcomes (symbol)	Learning Format (Lectures, classes,...)	Method of assessment of learning outcomes (e.g. test, oral exam, written exam, project,...)
Knowledge (no.)	(Knows and understands)			
K1	Understands the context of research in the field of medical imaging in relation to other issues of physics and is able to assess promising directions of their research.	P8S-WG/1, P8S-WG/2, P8S-KK/3	Seminar	Publication Preparation of the grant
K2	He/She knows the basic research tools, computer programs and laboratory methods to study medical imaging systems.	P8S-WG/3, P8S-WK/3	Seminar	Publication Preparation of the grant
Skills (no.)	(Able to)			
S1	Can use basic computational techniques and computer programs related to the methodology of medical imaging systems research	P8S-UW/1	Seminar	Publication Preparation of the grant
S2	Can critically analyze the obtained research results and evaluate their usefulness in planning further research activities	P8S-UW/2, P8S-KK/1	Seminar	Publication Preparation of the grant

S3	He can explain the purposefulness of conducted research and assess the chance of successful completion of the research	P8S-UK/3, P8S-UK/4, P8S-KK/2	Seminar	Publication Preparation of the grant		
S4	He can initiate cooperation with foreign scientists clearly defining his role in joint research	P8S-UO, P8S-UU/1	Seminar	Publication Preparation of the grant		
Social competence (no.)	(Ready to)					
SC1	Can write a scientific article on a selected field of research	P8S-WG/4, P8S-WK/3, P8S-UW/3	Seminar	Publication Preparation of the grant		
SC2	It is ready for a public conference or popular science presentation of the obtained research results	P8S-UW/3, P8S-UK/1, P8S-UK/2	Seminar	Publication Preparation of the grant		
SC3	Can respect the principles of public ownership of the results of scientific activity, taking into account the principles of intellectual property protection	P8S-KR	Seminar	Publication Preparation of the grant		
LEARNING FORMAT – NUMBER OF HOURS						
Semester (no.)	Lectures	Seminars	Lab classes	Internships	others	ECTS
III-IV	0	60	0	0	0	0
V-VI	0	60	0	0	0	0
VII-VIII	0	60	0	0	0	0
METHODS OF INSTRUCTION						
Discussion, presentations						
COURSE CONTENT						
<p>Seminars:</p> <ol style="list-style-type: none"> 1. Discussion of the methodology of scientific research in the discipline of physical sciences. 2. Location of the medical imaging systems research area selected by the doctoral student in the general area of physical sciences 3. Literature review and determination of the current state of knowledge in the field of medical imaging systems research 4. Review of available research tools, i.e. computational methods, computer programs and laboratory methods for examining medical imaging systems 5. Implementation of the selected issue in the studied subject 6. Writing a scientific article presenting the obtained results 						
COURSE ASSESSMENT CRITERIA						
Due to the individual nature of the classes (work with one student), the learning outcomes are checked and assessed on an ongoing basis.						
TOTAL PhD STUDENT WORKLOAD REQUIRED TO ACHIEVE THE INTENDED LEARNING OUTCOMES – NUMBER OF HOURS AND ECTS CREDITS						
Activity				Number of hours		

Scheduled course contact hours	180
Other contact hours involving the teacher (consultation hours, examinations)	30
Non-contact hours – student`s own work (preparation for classes or examinations, project, etc.)	210
Total number of hours	420
Total number of ECTS credits	0

INSTRUCTIONAL MATERIALS

Compulsory literature:	<ol style="list-style-type: none"> 1. „CT TEACHING MANUAL” – MATTHIAS HOFER & GEORG THIEME – 4TH ED., ISBN: 9783131243546, 2010. 2. „FUNDAMENTALS OF BODY CT” – W. RICHARD WEBB, WILIAM E. BRANT, NANCY M. MAJOR, 4TH ED., ISBN: 9780323221467, 2014 3. FEYNMANA WYKŁADY Z FIZYKI. T. „MECHANIKA KWANTOWA”/[TŁ. Z ANG. ANDRZEJ PINDOR I IN.]. - WYD. 4. - WARSZAWA : WYDAW. NAUKOWE PWN, 2004. 4. MAGNETISM IN THE SOLID STATE : AN INTRODUCTION / PETER MOHN. - BERLIN : SPRINGER, 2003. 5. QUANTUM THEORY OF MAGNETISM: MAGNETIC PROPERTIES OF MATERIALS / ROBERT M. WHITE. - 3 COMPL. REV. ED. - BERLIN : SPRINGER, COP. 2007. 6. MAGNETIC RESONANCE IMAGING, ROBERT W. BROWN, RAMESH VENKATESAN, MICHAEL R. THOMPSON, E. MARK HAACKE, Y.-C. NORMAN CHENG, WILEY, ISBN:9780471720850, 2014
Complementary literature:	<ol style="list-style-type: none"> 1. N.A. Spaldin, „Magnetic Materials. Fundamentals and Applications”, Cambridge University Press, Cambridge 2010. 2. Magnetic Resonance Imaging, William G Bradley, David D. Stark, Mosby Inc; ISBN: 0815185189, 1999