SYLLABUS

REGARDING THE CYCLE OF EDUCATION FROM 2018 TO 2024
ACADEMIC YEAR 2020/2021

1. BASIC COURSE/MODULE INFORMATION

Course/Module title	Picture diagnosis with the elements of nuclear medicine
Course/Module code *	DO/F
Faculty (name of the unit offering the field of study)	College of Medical Sciences, University of Rzeszow
Name of the unit running the course	Diagnostic Imaging and Nuclear Medicine Department
Field of study	Medical Direction
Qualification level	Unified master studies
Profile	General academic profile
Study mode	Stationary/ non-stationary
Year and semester of studies	Year III term/semester VI
Course type	obligatory
Language of instruction	English
Coordinator	Dr hab.n.med. Elżbieta Łuczyńska
Course instructor	Dr hab.n.med. Elżbieta Łuczyńska, dr Justyna Filipowska, dr Joanna Klęba , fiz.med. Kamil Kisielewicz

* - as agreed at the faculty

1.1.Learning format – number of hours and ECTS credits

Semester (no.)	Lectures	Classes	Colloquia	Lab classes	Seminars	Practical classes	Internships	others	**ECTS credits**
VI	20	20			10			Self-education, exam and colloquia attendance - 40	3

1.2. Course delivery methods

x conducted in a traditional way
x involving distance education methods and techniques

1.3. Course/Module assessment (exam, pass with a grade, pass without a grade)
VI term/semester – colloquia, pass with a grade, final exam

2. PREREQUISITES

Knowledge of anatomy and physiology.

3. OBJECTIVES, LEARNING OUTCOMES, COURSE CONTENT, AND INSTRUCTIONAL METHODS

3.1. Course/Module objectives

O1	Getting familiar with the physical and technical basics of standard radiography, ultrasound, computed tomography, magnetic resonance imaging and nuclear medicine
O2	Recognition of the contrast agents functioning, side effects and their management
O3	Acquiring the theoretical and practical knowledge in the field of: 1. Radiography: examination methodology, indications, contraindications, limitations, artefacts 2. Ultrasonography: examination methodology, indications, contraindications, limitations, equipment requirements 3. CT: examination methodology, indications, contraindications, limitations, contrast agents administration risk 4. MRI: examination methodology, indications, contraindications, limitations, contrast agents 5. Nuclear medicine: radiopharmaceuticals, equipment, examination methodology, indications, contraindications, limitations
O4	Recognition of the interventional radiology techniques used for diagnostic and therapeutic purposes; procedures, US or CT guided biopsies (DSA, embolization, stent grafting, vascular grafting, percutaneous procedures in the bile ducts, fine and core needle biopsy), indications, contraindications, procedure risk, examination methodology

3.2. COURSE/MODULE LEARNING OUTCOMES (TO BE COMPLETED BY THE COORDINATOR)

Learning Outcome	The description of the learning outcome defined for the course/module	Relation to the degree programme outcomes
LO_01	S conclude the relations between anatomical structures basing on diagnostic examinations results, mainly radiological (overview scans, contrast examinations, CT and nuclear MRI)	A.U4

LO_02	S have knowledge of contemporary imaging methods, particularly: a) radiologic symptomatology of basic diseases b) instrumental methods and imaging techniques used for therapeutic procedures performance c) indications, contraindications and patients preparation for particular imaging examinations and contraindications for contrast agents application	F.W10.
LO_03	S evaluate radiology examination outcome pertaining to the most common types of fractures, mainly long bones fractures	F.U7.
LO_04	S can assess ionizing, non-ionizing radiation dose harmfulness as well as other physical factors affecting the organism and follows the Radiological Protection Principles	B.U2
LO_05	S are aware of their own limitations and are constantly expanding their knowledge	K.O4.

3.3. Course content (to be completed by the coordinator)

A. Lectures

Content outline
Physical basis of diagnostic imaging methods (X-ray, CT, US, MRI, PET-CT. Elements of radiobiology and radiological protection, dosimetry
Indications, contraindications and patients preparation for particular imaging examinations. Imaging methodology. Contrast agents role.
Disease symptomatology CNS part I (developmental disorders and injuries)
Disease symptomatology CNS part II (ischemic and haemorrhaging changes)
Disease symptomatology CNS part III (inflammatory and degenerative changes)
Disease symptomatology CNS part IV (intracranial tumors)
Disease symptomatology – vertebral column and vertebral canal
Disease symptomatology - chest
Disease symptomatology - breast
Disease symptomatology – abdominal cavity
Disease symptomatology – urinary system and pelvis
Disease symptomatology – musculo-skeletal system
Pediatric radiology
Interventional radiology
Nuclear medicine: indications and contraindications for isotope examination performance. Interpretation of the isotope examination results. Functioning of isotope therapy units.

B. Classes, tutorials/seminars, colloquia, laboratories, practical classes

Content outline
Work organisation in the Radiology and Diagnostic Imaging Unit. Information system of the Radiology Unit (RIS, PACS). Work organisation in the Nuclear Medicine Unit.
Ionizing and non-ionizing radiation. X-ray radiation characteristics. Radiographic diagnostic laboratory (indications, contraindications, examination methodology, contrast examinations)
CT laboratory (indications, contraindications, examination methodology)
MRI laboratory (indications, contraindications, examination methodology)
Brain diagnostics part 1 – chosen pathology examples
Brain diagnostics part 2 – chosen pathology examples
Vertebral column and vertebral canal diagnostics - chosen pathology examples
Head and neck diagnostics - chosen pathology examples
Chest diagnostics - chosen pathology examples
Abdominal cavity diagnostics - chosen pathology examples
Urinary system and pelvis diagnostics - chosen pathology examples
Osteo-articular system diagnostics - chosen pathology examples
Vascular system diagnostics - chosen pathology examples
Pediatric diagnostic imaging - chosen pathology examples
Diagnostic Imaging in the Hospital Emergency Unit

C. Seminars

Content outline
Physical basics of diagnostic imaging methods (X-ray, CT, US, MRI, PET-CT)
Indications, contraindications, patient preparation for imaging and radioisotope examinations. Methodology of imaging and functional examinations. Contrast agents and radiopharmaceuticals role.
Disease symptomatology – brain
Disease symptomatology – vertebral column and vertebral canal
Disease symptomatology – chest and breast
Disease symptomatology – abdominal cavity and pelvis
Disease symptomatology – musculo-skeletal system

3.4. Methods of Instruction

e.g.

Lecture: a problem-solving lecture/a lecture supported by a multimedia presentation/ distance learning
Classes: text analysis and discussion/project work (research project, implementation project, practical project)/ group work (problem solving, case study, discussion)/didactic games/ distance learning
Laboratory classes: designing and conducting experiments

4. Assessment techniques and criteria

4.1 Methods of evaluating learning outcomes

Learning outcome	Methods of assessment of learning outcomes (e.g. test, oral exam, written exam, project, report, observation during classes)	Learning format (lectures, classes,...)
LO-01	*COLLOQUIA, FINAL TEST – A SINGLE CHOICE TEST*	LECTURE, SEMINAR
LO-02	CREDIT: QUESTIONS AND OBSERVATION DURING CLASSES	CLASSES

4.2 Course assessment criteria

Detailed information about the class attendance rules are included in the General Regulations of Clinical Classes. All students are obliged to get familiar with above regulations prior to the beginning of the course.
Students are obliged to attend all classes.
Exam – the final test (a single choice test)
Knowledge assessment (LO_01, LO_02):
1. The exam consists of a single choice test containing 50 questions. Time of the test: 50 minutes.
2. In order to be eligible for taking the exam the students have to complete **ALL THE CLASSES**.
3. Before the exam the students are obliged to take their places, while the tutor presents the applicable rules, clarifies the doubts and answers all the questions. The students' representative confirms with his signature the possibility of asking and receiving answers to the questions and getting acquainted with the rules by all students eligible for the exam.
4. All personal belongings (bags) must be left in a designated point in the classroom. The students can be equipped only with pens. Mobile phones must be switched off.

5. Every attempt to communicate between students or cheat will be punished with taking back the test which means receiving unsatisfactory mark.
6. Every attempt to use any electronic devices including mobile phones will be punished as above.
7. Students remain seated (even if they complete the test earlier) till the end of designated

exam time.
8. Any comments concerning the test, including correctness of the questions, must be submitted only during the test by raising hand and presenting the problem to the tutor. Substantial comments concerning questions content are submitted in writing during the test on a specially provided form. Submitted comments are viewed by the subject coordinator and didactic tutors. The students are informed about the results of the analysed problems via Wirtualna Uczelnia portal or personally by the subject coordinator. If the substantial mistake of a question is confirmed, the question will be annulled and the percentage thresholds are recounted according to the new number of questions.
9. Unjustified absence on the final exam results in receiving the unsatisfactory mark.
10. The only accepted absence justifications are absent notes issued by university Rector or Dean or sick notes presented within three days since the date of the exam to the Dean's office and to the subject coordinator. Not presenting any absent notes results in receiving the unsatisfactory mark.
11. Grading scale
5.0 – S shows familiarity with the course content on the level of 93%-100%

4.5 – S shows familiarity with the course content on the level of 85%-92%

4.0 – S shows familiarity with the course content on the level of 77%-84%

3.5 – S shows familiarity with the course content on the level of 69%-76%

3.0 – S shows familiarity with the course content on the level of 60%-68%

2.0 – S shows familiarity with the course content on the level of 60%

Seminars

Competence assessment

1. Presence at the seminars is compulsory.
2. In case of unjustified absence, the seminar must be completed with another group of students.
3. In case of justified absence and lack of possibility to complete the seminar with another group, the student is obliged to pass the test covering relevant content in maximum two attempts.
4. In case of two unjustified absences, the student is not eligible for taking the exam session.
5. During the first classes the students confirm being familiar with applicable rules and receiving answers to their questions pertaining to above rules.
6. The seminars are considered completed on the basis of student's presence, involvement and positive colloquia results.
7. Colloquium is a single choice test including 20 questions and lasting 20 minutes.
8. The rules of colloquium are the same as the final test rules.

Classes

Competence assessment

1. Presence at the seminars is compulsory.
2. In case of unjustified absence, the seminar must be completed with another group of students.
3. In case of justified absence and lack of possibility to complete the seminar with another group, the student is obliged to pass the test covering relevant content in maximum two attempts.

4. In case of two unjustified absences, the student is not eligible for taking the exam session.
5. A subject tutor may refuse to accept students from other groups if the group is excessively numerous.
6. During the first classes the students confirm being familiar with applicable rules and receiving answers to their questions pertaining to above rules.
7. The classes are considered completed on the basis of student's presence, involvement and positive colloquia results.

Assessment – pass with a grade

5.0 – student is active and involved in the classes, well prepared, knows the subject matter very well
4.5 - student is active and involved in the classes, knows the subject matter well
4.0 - student is active and involved in the classes, requires correcting, knows the subject matter
3.5 – student participates in the classes, their preparation does not allow for comprehensive issue presentation, presents satisfactory knowledge
3.0 - student participates in the classes, presents satisfactory knowledge, requires frequent corrections
2.0 – student is passive, presents substantially incorrect opinions, knowledge is unsatisfactory

5. Total student workload needed to achieve the intended learning outcomes – number of hours and ECTS credits

Activity	Number of hours
Scheduled course contact hours	50
Other contact hours involving the teacher (consultation hours, examinations)	10
Non-contact hours - student's own work (preparation for classes or examinations, projects, etc.)	30
Total number of hours	90
Total number of ECTS credits	3

* One ECTS point corresponds to 25-30 hours of total student workload

6. Internships related to the course/module

Number of hours	*Doesn't apply*
Internship regulations and procedures	*Doesn't apply*

7. Instructional materials

Compulsory literature: 1.WIliam Herring " Learning Radiology" Elsevier Books 2019
Complementary literature: 1. W.E. BRANT, C.A. HELMS "Fundamentals of Diagnostic Radiology" Lippincott Williams & Wilkins 2020 2. Materials from seminars and classes provided by the subject tutors

Approved by the Head of the Department or an authorised person