COURSE SYLLABUS AND COURSE REQUIREMENTS
ACADEMIC YEAR ... SEMESTER ...

Course title	
Course Code	MSM628AN-EA-00
Hours/Week: le/pr/lab	2/0/2
Credits	4
Degree Programme	Biomedical Engineer (Msc)
Study Mode	*Full-time*
Requirements	colloquium
Teaching Period	2025/26-I.
Prerequisites	-
Department(s)	Department of Engineering and Smart Technologies
Course Director	Dr. Kovács Péter
Teaching Staff	*Fábián János Krisztián*

COURSE DESCRIPTION

A short description of the course (max. 10 sentences).
Neptun: Instruction/Subjects/Subject Details/Basic data/Subject description

Within the context of the Medical Devices course, students gain a comprehensive overview of the most frequently used devices in medicine. The course mainly focuses on the basics of medical imaging and life-supporting devices from an engineering perspective. During the laboratory practice, quality assurance–related tasks will be discussed in connection with the actual topics, since this is a typical biomedical engineering activity in hospitals.

SYLLABUS

Neptun: Instruction/Subjects/Subject Details/Syllabus

1. GOALS AND OBJECTIVES

Goals, student learning outcome.
Neptun: Instruction/Subjects/Subject Details/Syllabus/Goal of Instruction

The main goal of the course is to give a comprehensive picture of the discussed devices, from an engineering perspective.

2. COURSE CONTENT

Neptun: Instruction/Subjects/Subject Details/Syllabus/Subject content

	TOPICS
LECTURE	1. *The X-ray tube* 2. *CT scanner* 3. *MRI scanner* 4. *Devices in nuclear medicine* 5. *Life monitoring device (ECG, BPM, Anesthetic Monitoring)*
LABORATORY PRACTICE	1. *Excercises in relation with X-ray physics* 2. *Excercises with CT parameters* 3. *Discussion of CT scanner QA tasks* 4. *Discussion of MRI scanner QA tasks* 5. *Discussion of NM devices QA tasks* 6. *Discussion of safety tests of life monitoring devices*

DETAILED SYLLABUS AND COURSE SCHEDULE

ACADEMIC HOLIDAYS INCLUDED

LECTURE

week	**Topic**	**Compulsory reading; page number (from … to …)**	**Required tasks (assignments, tests, etc.)**	**Completion date, due date**
1.		…	…	…
2.	X-ray tube, structure, electronics			
3.	X-ray tube auxiliaries			
4.	Basics of CAT			
5.	CT scanner mechanics			
6.	CT scanner electronics			
7.	CT scanner auxiliaries			
8.				
9.	Challenges of CT scanner development			
10.	Basics of MRI physics			
11.	Structure of an MRI site			
12.	Structure of an MRI scanner			
13.	Basics of gamma-detectors			
14.	SPECT scanners			
15.	PET scanners			

PRACTICE, LABORATORY PRACTICE

week	**Topic**	**Compulsory reading; page number (from … to …)**	**Required tasks (assignments, tests, etc.)**	**Completion date, due date**
1.				
2.	Excercises in relation with X-ray physics			
3.	QA of CT			
4.	CT artefacts			
5.	MRI QA			
6.	MRI QA			
7.	QA of gamma-detectors			
8.				
9.	QA of SPECT scanners			
10.	QA of PET scanners			
11.	QA of monitoring devices			
12.	Consultation			
13.	Consultation			
14.	Consultation			
15.	Consultation			

3. ASSESSMENT AND EVALUATION

(Neptun: Instruction/Subjects/Subject Details/Syllabus/Examination and Evaluation System)

ATTENDANCE

In accordance with the Code of Studies and Examinations of the University of Pécs, Article 45 (2) and Annex 9. (Article 3) a student may be refused a grade or qualification in the given full-time course if the number of class absences exceeds 30% of the contact hours stipulated in the course description.

Method for monitoring attendance *(e.g.: attendance sheet / online test/ register, etc.)*

attendance sheet

ASSESSMENT

Cells of the appropriate type of requirement is to be filled out (course-units resulting in mid-term grade or examination). Cells of the other type can be deleted.

Course-unit with final examination

Mid-term assessments, performance evaluation and their weighting as a pre-requisite for taking the final exam

(The samples in the table to be deleted.)

Type	Assessment	*Weighting as a proportion of the pre-requisite for taking the exam*
1. *e.g..: Test 1*	*eg. max 20 points*	*eg. 20 %*
2. *e.g.: Test 2*	*eg. max 30 points*	*eg. 30 %*
3. *e.g.: home assignment (project documentation)*	*eg. max 30 points*	*eg. 30 %*
4. *…*	*eg. max 15 points*	*eg. 20 %*

Requirements for the end-of-semester signature

(Eg.: mid-term assessment of 40%)

Student presence at least on 70% of the lessons.

Re-takes for the end-of-semester signature (PTE TVSz 50§(2))

The specific regulations for grade betterment and re-take must be read and applied according to the general Code of Studies and Examinations. E.g.: all the tests and the records to be submitted can be repeated/improved each at least once every semester, and the tests and home assignments can be repeated/improved at least once in the first two weeks of the examination period.

…

Type of examination *(written, oral):* *Written*

The exam is successful if the result is minimum 40 %. *(The minimum cannot exceed 40%.)*

Calculation of the grade *(TVSz 47§ (3))*

The mid-term performance accounts for ***0*** %, the performance at the exam accounts for ***100*** % in the calculation of the final grade.

Calculation of the final grade based on aggregate performance in percentage.

Course grade	Performance in %
excellent (5)	85 % …
good (4)	70 % ... 85 %
satisfactory (3)	55 % ... 70 %
pass (2)	40 % ... 55 %
fail (1)	below 40 %

The lower limit given at each grade belongs to that grade.

4. SPECIFIED LITERATURE

In order of relevance. (In Neptun ES: Instruction/Subject/Subject details/Syllabus/Literature)

COMPULSORY READING AND AVAILABILITY

[1.] D.R. Dance, S. Christofides – Diagnostic Radiology Physics (2014)

[2.] Jobbágy Ákos, Varga Sándor – Biomedical Measurement Technology (2013)