SEMESTER LEARNING ACTIVITY PLANS (SLAP)

SEMESTER ODD 2022/2023

Physics Undergraduate Study Program

Physics Department

Medical Physics

MFF 3701/ 2 Credits

Lecturer Coordinator:

Dr. Bambang Murdaka Eka Jati, MS.

UNIVERSITAS GADJAH MADA
FACULTY OF MATHEMATICS AND NATURAL SCIENCE
2022

	Universitas Gadjah Mada Faculty of Mathematics and Natural Science Physics Department / Physics Undergraduate Study Program Semester ODD 2022/2023	**Document Number :** ……

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Code	Course Name	Credits (Credits)		Semester	Status	Prerequisite
MFF 3701	*Medical Physics*	*T: 2*	*P: …*	*ODD*	*Elective*	*Basic Physics I (MFF 1011), Basic Physics II (MFF 1012)*

Short Description	Medical Physics course (not Medical Physics) discusses Physics (based on Basic Physics I and Basic Physics II courses) which are applied to Health Sciences, Medical Devices, and Medical Instrumentation. That is, this course is more general than Medical Physics which only discusses related GEM radiation and nuclear radiation and their relation to diagnosis and treatment. From the participation of students in this course, it is hoped that they can provide creative ideas to be followed up for final projects or other scientific works oriented to Biophysics, Medical Instrumentation, and Medical Physics. The lecture material includes seven topics according to CPCourses1 (presented pre-UTS) and the following seven topics according to CPCourses2 (presented pre-UAS). Pre-UTS topics: (1) Metrology in Medical Physics, (2) Biomechanics, (3) Biofluids, (4) Vibration and Resonance, (5) Sound and the Sense of Hearing, (6) Ultrasonics in Medicine, and (7) Heat and the Sense of Taste. The pre-UAS topics are (8) Bioelectricity, (9) Biomagnetics, (10) GEM, (11) Biooptics and the Sense of Sight, (12) Atoms and Nuclear Radiation, (13) X-rays and Tomography, and (14) MRI. The 14 lecture topics are presented in 14 face-to-face sessions of 100 minutes, 2 Credits.

Program Learning Outcomes (PLO) Imposed on the Course	***PLO 2***	Knowledge. Able to explain theoretical concepts and principles of classical and modern physics and able to apply basic concepts of physics and related mathematical methods in finding solutions to physical problems.
	PLO 5	Long Life Learning. Able to analyze various alternative solutions to physical problems and conclude them for appropriate decision-making, both in familiar and new problems.
Course Outcomes (CO)	**After completing this course, students are expected to be able to:**	
	CO1	Understand the form of applying Basic Physics I to problems related to human health and medical devices
	CO2	Understand the form of applying Basic Physics II to problems related to human health and medical devices

		Learning Materials	Learning Methods	Time Allocation
The Correlation of CO to Learning Materials and Methods, and Time Allocation	***CO 1***	Metrology in Medical Physics	TCL-SCL mixed	***2X50 minutes***
	CO 1	biomechanics	TCL-SCL mixed	***2X50 minutes***
	CO 1	Biofluids	TCL-SCL mixed	***2X50 minutes***
	CO 1	Vibration and Resonance	TCL-SCL mixed	***2X50 minutes***
	CO 1	Sound and sense of hearing	TCL-SCL mixed	***2X50 minutes***
	CO 1	Ultrasound in medicine	TCL-SCL mixed	***2X50 minutes***
	CO 1	Heat and Sense of Taste	TCL-SCL mixed	***2X50 minutes***
	Midterm exam/Project Task Results/Case Analysis Results			
	CO 2	Bioelectric	TCL-SCL mixed	***2X50 minutes***

	CO 2	biomagnetic	TCL-SCL mixed	***2X50 minutes***
	CO 2	Electromagnetic wave	TCL-SCL mixed	***2X50 minutes***
	CO 2	Biooptics and the Sense of Sight	TCL-SCL mixed	***2X50 minutes***
	CO 2	Atoms and Nuclear Radiation	TCL-SCL mixed	***2X50 minutes***
	CO 2	X-rays and Tomography	TCL-SCL mixed	***2X50 minutes***
	CO 2	MRI	TCL-SCL mixed	***2X50 minutes***
	Final exams/ Project Task Results/Case Analysis Results			

Learning Methods	**SCL (Student Centered Learning): Project-based learning (Team-based Project)/Case-based learning/PBL/other SCL methods**
Student Learning Experience	**Face-to-face lectures, discussions, and self-study**
Access to Learning Media/ LMS and Offline and Online Percentage	Offline (LCD, PPT Slide, Whiteboard, Laptop) and Online (Zoom Meeting, Google Meet, Google Classroom)

Assessment Methods and Synchronization with CO

Assessment Methods	Assessment Percentage	Criteria/ Indicators	CO1	CO2
Participatory Activity*	**10**	**Attendance**	√	√
Project Results/ Case Study Results/ PBL Results*	**40**	**Proposal**	√	√
Cognitive				
Assignment	**5**		√	√
Quiz	**5**		√	√
Midterm Exam	**20**		√	√
Final Exam	**20**		√	√
Total	**100**			

*) can also be obtained from the Midterm or Final Exam as the result of participatory activities or project/ case study results. According to IKU 7, the percentage of project results/ case study/ PBL results is at least 50%.

References

Main References;

1. Jati, BME, 2021: Pengantar Fisika Kedokteran (Mekanika, Gelombang Kalor), edisi-1, UGM Press, Yogyakarta.
2. Jati, BME, 2022: Pengantar Fisika Kedokteran (Listrik, Magnit, Optika, Radiasi Nuklir, dan Teknologi Medis), edisi-2, UGM Press, Yogyakarta.
3. Maqbool, M., 2018: An Introduction to Medical Physics, Springer, 1st edition, Birmingham.
4. Gabriel, J.F., 1996: Fisika Kedokteran, edisi-7, Penerbit Buku Kedokteran EGC, Denpasar.

Additional References:

1. Fosbinder, R.A. & Kelsey, C.A., 2002: Essentials of Radiologic Science, 1st edition, Mc Graw Hill, Medical Publishing Edition, New York

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<tr><td></td><td colspan="4">2. Cember, H. & Johnson, T.E., 2009: Introduction to Health Physics, 4th edition, Graw Hill, Medical Publishing Edition, New York
3. Hendee, W.R. & Ritenour, E.R., 2002: Medical Imaging Physics, 4th edition, Wiley Liss Inc.</td></tr>
<tr><td>Lecturers (Team Teaching)</td><td colspan="4">1. Dr. Bambang Murdaka Eka Jati, MS.</td></tr>
<tr><td rowspan="2">Authorization</td><td>Date of Drafting</td><td>Lecturer Coordinator</td><td>Head of Curriculum Committee</td><td>Head of Study Program</td></tr>
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