Artificial Organs

Module designation	Providing an in-depth understanding of the principles, objectives, and developments of artificial organs in the field of health.
Module level, if applicable	Master
Code	SPSTB212236
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Odd/Even semester
Person responsible for the module	Ir. Rini Dharmastiti, M.Sc., Ph.D., IPM, ASEAN Eng.
Lecturers	Ir. Rini Dharmastiti, M.Sc., Ph.D., IPM, ASEAN Eng. Prof. Dr. dr. Budi Yuli Setianto, SpPD(K), SpJP(K) dr. Rahardyan Magetsari, SpOrtho., Ph.D.
Language	Indonesian & English
Relation to curriculum	Elective course
Type of teaching, contact hours	This course is planned to have 14 teaching weeks and 2 weeks of examination. several types of teaching conducted: - Classic tutorial, - Case-study learning, - Discussion - Laboratory Visit

Workload	This course is planned to have 13 teaching weeks, 1 week lab visit, and 2 weeks of examination. Lectures = 3 SKS x 50 minutes x 15 meetings = 2250 minutes = 37.5 hours = 37.5 hours/25 hours =1.5 ECTS Experiment/Laboratory visit= 3 SKS x 60 minutes x 1 meeting = 180 minutes = 3 hours = 3/25 hours = 0.12 ECTS Assigment = 3 SKS x 60 minutes x 16 meetings = 2880 minutes = 48 hours = 48 hours/ 25 hours =1.92 ECTS Self Study = 3 SKS x 60 minutes x 16 meetings = 2880 minutes = 48 hours = 48 hours/ 25 hours =1.92 ECTS Total workload = 5.46 ECTS
Credit points	3 SKS (5.46 ECTS)
Requirements according to the examination regulations	-
Recommended prerequisites	-
Module objectives/intended learning outcomes	PLO 2: Able to design research related to artificial organs and medical instrumentation. PLO 3: Able to test and analyze relevant design results in biomedical engineering field. PLO 4: Able to communicate and work effectively in a multi-disciplinary team.

Content	1. Introduction: principles, construction and control algorithms of artificial organs 2. Heart assist devices : principles, functionality, types of ventricular assist devices (VAD) and total artificial hearts (TAH) 3. Liver artificial support. 4. Hybrid organs 5. Bio-membranes – artificial kidneys 6. Biocompatibility and biomaterials of artificial organ, the immunological problems caused artificial organs application. 7. Prosthetic organ for medical rehabilitation 8. Design and testing of prosthetic organ for medical rehabilitation 9. Regenerative medicine – is it a future of artificial organ? 10. Ethical, economical, environmental and legal aspects in artificial organs domain 11. Discussion: Development and application of artificial organ in Indonesia 12. Independent Assignment I : Journal review 13. Independent Assignment II : Presentation 14. Laboratory visit → Centre for Innovation of Medical Equipment and Devices (*CIMEDs*)
Study and examination requirements and forms of examination	Classes are conducted with 80% classic tutorial and 20% case study/project based presentation. Exams are done by written exam and/or task-based exam..
Media employed	PowerPoint, LMS (eLok, Google Classroom, etc.), and online meeting platform (Zoom, Gmeet, etc.)
Reading list	1. Joseph D. Bronsino, Tissue Engineering and Artificial Organs, The Biomedical Engineering Handbook, 2006 2. Gerald Miller, Artificial Organs, 2006 3. Lary Hench, John Jones, Biomaterials, Artificial Organs and Tissue Engineering, 2005
Last modified	Desember 2025.