Applied Mathematics for Bioengineering

Module designation	Provides an explanation of basic mathematical theories and an understanding of mathematical applications in biomedical engineering.
Module level, if applicable	Master
Code	SPSTB212104
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Odd semester
Person responsible for the module	Ir. Muhammad Waziz Wildan, M.Sc., Ph.D., IPU.
Lecturers	Ir. Muhammad Waziz Wildan, M.Sc., Ph.D., IPU. Ir. Rini Dharmastiti, M.Sc., Ph.D., IPM, ASEAN Eng.
Language	Indonesian
Relation to curriculum	Compulsory course & English
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 - Practical Activities → math modelling in BME

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/Practical Activity = 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 1: Able to use knowledge in the fields of engineering, health, and biology to analyze problems in the field of biomedical engineering globally that are relevant to public needs. 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 to mathematics for bioengineering 2. Derivation and integral functions, 3. Basic of differential equation, first order of differential equation, 4. Laplace transformation, 5. Fourier function, 6. Physiological control system 7. Mathematical modeling on human physiological system. 8. Practical Activities → MathLab
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. Kreizyg, E. (2011). Advanced Engineering Mathemathics, 10th ed., John Willey and Sons, New York. 2. Zill, D.G. and Wright, W.S., 2009, Advanced Engineering Mathematics, 4th ed., Jones & Barlett Publishers. 3. James, G., Burley D., Clements, D., Dyke, P., Searl, J., Steele, N., Wright, J., 2011, Advanced Modern Engineering Mathematics, Pearson 4. Khoo, M.C.K., 2018, Physiological Control Systems, analysis, simulation and estimation, Wiley & Sons
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