

MODULE HANDBOOK
MASTER IN BIOMEDICAL ENGINEERING



THE GRADUATE SCHOOL
UNIVERSITAS GADJAH MADA

2025

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Biomedical Engineering Principles

Module designation	An overview of multidisciplinary collaboration in solving biomedical and health problems, as well as an understanding of the branches of science and types of research in biomedical engineering.
Module level, if applicable	Master
Code	SPSTB212101
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Odd semester
Person responsible for the module	drg. Heribertus Dedy Kusuma Yulianto., M.Biotech., PhD.
Lecturers	drg. Heribertus Dedy Kusuma Yulianto., M.Biotech., PhD. drg. Aryan Morita, M.Sc., Ph.D. Prof. Ir. Alva Edy Tontowi, M.Sc., Ph.D., IPM., ASEAN Eng.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Classic tutorial, case-study learning, and discussion.
Workload	<p>The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 minutes of self-study per week, for a total of 16 weeks including mid-term and final examinations.</p> <p>Workload calculation for one semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours ÷ 26 hours/ ECTS = 5.4 ECTS/semester Total Workload = 5.4 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>
Credit points	3 SKS (5.4 ECTS)

Requirements according to the examination regulations	-
Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>CLO 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.</p> <p>CLO 2: Able to design research related to artificial organs and medical instrumentation.</p> <p>CLO 5: Able to convey the results of work in the field of biomedical engineering in writing orally or verbally</p>
Content	<ol style="list-style-type: none"> 1. Introduction to biomedical engineering, 2. Biomolecular principles: atoms, molecules, macromolecules, 3. General aspects of human anatomy and physiology, 4. Biomechanics, 5. Cardiovascular dynamics, 6. Biotechnology- Proteins design and engineering, 7. Fundamentals of signaling in biological systems and implications for biomedical engineering, 8. Engineering principles in biomedicine, 9. Systems biology and biomedical engineering / Biotechnologies for biomedical engineers, 10. Bioimaging, image processing and analysis, 11. Nanobiotechnology for biomedical engineering.
Study and examination requirements and forms of examination	<p>Classes are conducted with 80% classic tutorial and 20% case study/project based presentation per meeting.</p> <p>Exams are done by written exam and/or task-based exam.</p>
Media employed	PowerPoint, LMS (eLok, Google Classroom, etc.), and online meeting platform (Zoom, Gmeet, etc.)
Reading list	<ol style="list-style-type: none"> 1. Enderle, J.D., Blanchard S.M. & Bronzino J.D. (2005) Introduction to Biomedical Engineering (2a Ed.). San Diego, California, EE.UU.: Elsevier Academic Press 2. Saltzman, W.M., 2009, Biomedical Engineering: Bridging Medicine and Technology, Yale University (Cambridge Texts in Biomedical Engineering)
Last modified	November 2025.

Anatomy and Physiology for Biomedical Engineering

Module designation	Provides basic medical knowledge regarding human anatomy and physiology as a basis for subsequent courses in the field of Biomedical Engineering.
Module level, if applicable	Master
Code	SPSTB212103
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Odd semester
Person responsible for the module	dr. Rina Susilowati, Ph.D.
Lecturers	dr. Rina Susilowati, Ph.D. dr. Nur Arfian, Ph.D. dr. R. Jajar Setiawan, M.Sc., Ph.D
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Classic tutorial, case-study learning, and discussion.
Workload	<p>The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 minutes of self-study per week, for a total of 16 weeks including mid-term and final examinations.</p> <p>Workload calculation for one semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours ÷ 26 hours/ ECTS = 5.4 ECTS/semester Total Workload = 5.4 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>
Credit points	3 SKS (5.4 ECTS)

Requirements according to the examination regulations	-
Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>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.</p> <p>PLO 2: Able to design research related to artificial organs and medical instrumentation.</p> <p>PLO 4: Able to communicate and work effectively in a multi-disciplinary team.</p>
Content	<ol style="list-style-type: none"> 1. Introduction: medical terminology 2. The cellular level of organization. 3. Organ systems of the body: endocrine 4. Organ systems of the body: musculo skeletal 5. Organ systems of the body: nervous system 6. Organ systems of the body: special senses 7. Organ systems of the body: cardiovascular system 8. Organ systems of the body: respiratory system 9. Organ systems of the body: digestive system 10. Organ systems of the body: reproductive system
Study and examination requirements and forms of examination	<p>Classes are conducted with 80% classic tutorial and 20% case study/project based presentation per meeting.</p> <p>Exams are done by written exam and/or task-based exam.</p>
Media employed	PowerPoint, LMS (eLok, Google Classroom, etc.), and online meeting platform (Zoom, Gmeet, etc.)
Reading list	Tortora G, Derrickson B, (2014) Principles of Anatomy and Physiology 14th ed. Wiley. ISBN: 9781118808436
Last modified	November 2025.

Bioethics and Safety

Module designation	Provides a deep understanding of ethics in medical and health services and research as well as an understanding of ethics related to laboratory animals in medical and health research.
Module level, if applicable	Master
Code	SPSTB212207
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Odd semester
Person responsible for the module	Dr. drh. Agustina Dwi Wijayanti, M.P.
Lecturers	Dr. drh. Agustina Dwi Wijayanti, M.P. Prof. Dr. drh. Pudji Astuti, M.P. Dyah Listyarifah, MD, MSc., D.Med.Sci
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Classic tutorial, case-study learning, and discussion.
Workload	<p>The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 minutes of self-study per week, for a total of 16 weeks including mid-term and final examinations.</p> <p>Workload calculation for one semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours ÷ 26 hours/ ECTS = 5.4 ECTS/semester Total Workload = 5.4 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>
Credit points	3 SKS (5.4 ECTS)

Requirements according to the examination regulations	-
Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>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.</p> <p>PLO 3: Able to test and analyze relevant design results in biomedical engineering field.</p> <p>PLO 6: Able to demonstrate professionalism and adhere to principles bioethics.</p>
Content	<ol style="list-style-type: none"> 1. Ethics in Health and Medical Treatment and Research 2. Professional Ethics in Biomedical Engineering 3. Beneficence, Nonmaleficence, and Technological Progress 4. Ethical Issues of Animal and Human Experimentation in the 5. Development of Medical Devices 6. Regulation of Medical Device Innovation 7. Nonhuman primate in biomedical research, ethical consideration. 8. The Role of Professional Societies in Biomedical Engineering 9. Issues related ethics in health and medical treatment 10. Issues related ethics in health and medical research 11. Issues related ethics in animal experimentation 12. Informed consent 13. Role of law in clinical ethics
Study and examination requirements and forms of examination	<p>Classes are conducted with 80% classic tutorial and 20% case study/project based presentation per meeting.</p> <p>Exams are done by written exam and/or task-based exam.</p>
Media employed	PowerPoint, LMS (eLok, Google Classroom, etc.), and online meeting platform (Zoom, Gmeet, etc.)
Reading list	<ol style="list-style-type: none"> 1. Sastrowijoto, S., Ismail D., Hakimi, M., Ngatidjan, Supartinah A., Kushadiwijaya H., Hadijah S., Widyarini S., 2008, Etika Penelitian dan Publikasi Kedokteran- Kesehatan dan Modul Pelatihan WHO, diedit oleh Indriati E., Yogyakarta: Fakultas kedokteran Universitas Gadjah Mada. 2. Abee CR., Mansfield K., Tardif S., Morris T., (editor), 2012. Nonhuman Primates in Biomedical Research, Vol. 1: Biology and Management, Elsevier, London.

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Applied Biostatistics

Module designation	Provides an understanding of the presentation of statistical data in research in the field of biomedical engineering as well as an understanding of statistical analysis of research data in the field of biomedical engineering.
Module level, if applicable	Master
Code	SPSTB212206
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Odd semester
Person responsible for the module	Dr. drg. Rosa Amalia, M.Kes.
Lecturers	Dr. drg. Rosa Amalia, M.Kes. drg. Aryan Morita, M.Sc., Ph.D. drg. Heribertus Dedy Kusuma Yulianto., M.Biotech., PhD. Dr. drg. Dibyo Pramono, S.U., MDSc
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Classic tutorial, case-study learning, and discussion.
Workload	<p>The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 minutes of self-study per week, for a total of 16 weeks including mid-term and final examinations.</p> <p>Workload calculation for one semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours ÷ 26 hours/ ECTS = 5.4 ECTS/semester Total Workload = 5.4 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>

Credit points	3 SKS (5.4 ECTS)
Requirements according to the examination regulations	-
Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>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.</p> <p>PLO 3: Able to test and analyze relevant design results in biomedical engineering field.</p> <p>PLO 4: Able to communicate and work effectively in a multi-disciplinary team.</p>
Content	<ol style="list-style-type: none"> 1. Summarizing and presenting data 2. Hypothesis Testing for Continuous Data 3. Hypothesis testing for Categorical data 4. Descriptive statistics 5. Non-Parametric Statistics 6. Sample Size Estimation 7. Correlation & Sample Linear regression 8. Multiple Regression 9. Logistic Regression 10. Diagnostic Test 11. Multivariations Analysis 12. Relation of Odds Ratio (OR) and Relative Risk (RR)
Study and examination requirements and forms of examination	<p>Classes are conducted with 80% classic tutorial and 20% case study/project based presentation per meeting.</p> <p>Exams are done by task-based exam.</p>
Media employed	PowerPoint, LMS (eLok, Google Classroom, etc.), and online meeting platform (Zoom, Gmeet, etc.)
Reading list	<ol style="list-style-type: none"> 1. Bland, M. 2000. An Introduction to Medical Statistics. Oxford University Press, Oxford. 2. Hosmer, D.W. & Lemeshow, S. 1989. Applied Logistic Regression. John Wiley & Sons, New York. 3. Lemeshow, S., Hosmer, D.W., Klar, J. and Lwanga, S.K. 1990. Adequacy of Sample Size in Health Studies. John Wiley & Sons, New York. 4. Rosner, B. 2006. Fundamentals of Biostatistics. Thomson Brooks/Cole, Singapore. 5. Sorlie, D.E. 1995. Medical Biostatistics and Epidemiology. Appleton & Lange. Norwalk, Connecticut

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Applied Biomedical System Design

Module designation	Provides understanding and explanation regarding the design of a system or medical device in the biomedical field as well as advanced knowledge about system concepts, system thinking and system analysis.
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. Rini Dharmastiti, M.Sc., Ph.D., IPM, ASEAN Eng.
Lecturers	Ir. Rini Dharmastiti, M.Sc., Ph.D., IPM, ASEAN Eng. Dr. Urip Agus Salim, S.T., M.Eng.Sc. Ir. I Gusti Bagus Budi Dharma, S.T., M.Eng., Ph.D., IPM., ASEAN. Eng. Ir. Dawi Karomati Baroroh, S.T., M.Sc., Ph.D.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Classic tutorial, case-study learning, and discussion.

Workload	<p>The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 minutes of self-study per week, for a total of 16 weeks including mid-term and final examinations.</p> <p>Workload calculation for one semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours ÷ 26 hours/ ECTS = 5.4 ECTS/semester Total Workload = 5.4 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>
Credit points	3 SKS (5.4 ECTS)
Requirements according to the examination regulations	-
Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>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.</p> <p>PLO 2: Able to design research related to artificial organs and medical instrumentation.</p> <p>PLO 3: Able to test and analyze relevant design results in biomedical engineering field.</p>
Content	<ol style="list-style-type: none"> 1. Introduction to biomedical system design 2. Differences between engineering and physiological control system 3. System design analysis: fundamental concepts 4. Basic problem in biomedical system design 5. Basic modelling concept 6. System Characterization 7. Mathematical modeling 8. Generalized system properties 9. Medical instruments and devices 10. Modelling applications (360Fusion)

Study and examination requirements and forms of examination	Classes are conducted with 80% classic tutorial and 20% case study/project based presentation per meeting. 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	<p>King, P. H., Fries, R. C., Johnson, A. T., 2015, Design of Biomedical Devices and Systems 3rd Edition, Taylor & Francis, FL</p> <p>Ulrich, K.T. and Eppinger, S.D., 2012, Product Design and Development, 6th Ed, McGraw-Hill, Inc.</p> <p>Ashby, M., Shercliff, H. and Cebon, D., 2007 Material Engineering, Science, Processing and Design, Elsevier</p> <p>Weinger, M.B., Wiklund, M.E., Gardner-Bonneau, D.J, 2011, Handbook of Human Factors in Medical Device Design, CRC Press, Taylor & Francis Group</p>
Last Modified	November 2025.

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
Type of teaching, contact hours	Classic tutorial, case-study learning, and discussion.
Workload	<p>The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 minutes of self-study per week, for a total of 16 weeks including mid-term and final examinations.</p> <p>Workload calculation for one semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours ÷ 26 hours/ ECTS = 5.4 ECTS/semester Total Workload = 5.4 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>
Credit points	3 SKS (5.4 ECTS)
Requirements according to the examination regulations	-

Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>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.</p> <p>PLO 3: Able to test and analyze relevant design results in biomedical engineering field.</p> <p>PLO 4: Able to communicate and work effectively in a multi-disciplinary team.</p>
Content	<ol style="list-style-type: none"> 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.
Study and examination requirements and forms of examination	<p>Classes are conducted with 80% classic tutorial and 20% case study/project based presentation.</p> <p>Exams are done by written exam and/or task-based exam.</p>
Media employed	PowerPoint, LMS (eLok, Google Classroom, etc.), and online meeting platform (Zoom, Gmeet, etc.)
Reading list	<ol style="list-style-type: none"> 1. Kreizyg, E. (2011). Advanced Engineering Mathematics, 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.
Last modified	November 2025.

Research Methodology and Experimental Design

Module designation	Provides an understanding of research methodology biomedical field and research design.
Module level, if applicable	Master
Code	SPSTB212105
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Odd semester
Person responsible for the module	Prof. Dr. drg. Siti Sunarintyas, M.Kes.
Lecturers	Prof. Dr. drg. Siti Sunarintyas, M.Kes. Dr. Ir. Budi Arifvianto, S.T., M.Biotech. Adhyatmika, Apt., M.Biotech., Ph.D.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Classic tutorial, case-study learning, and discussion.
Workload	<p>The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 minutes of self-study per week, for a total of 16 weeks including mid-term and final examinations.</p> <p>Workload calculation for one semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours ÷ 26 hours/ ECTS = 5.4 ECTS/semester Total Workload = 5.4 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>
Credit points	3 SKS (5.4 ECTS)
Requirements according to the examination regulations	-

Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>PLO 4: Able to communicate and work effectively in a multi-disciplinary team.</p> <p>PLO 6: Able to demonstrate professionalism and adhere to principles Bioethics.</p> <p>PLO 7: Able to develop oneself sustainably and adapt to developments in science and technology biomedical technology.</p>
Content	<ol style="list-style-type: none"> 1. Introduction and Research Question 2. Bias in Research 3. Research population and sampling 4. Research concepting 5. Research Variable 6. Pengukuran, reliability, validity 7. Observational research design 8. Experimental research design 9. Randomized Clinical Trial (RCT) 10. Unrandomized Clinical Trial (Quasy Experimental) 11. Cohort Study 12. Case-Control Study 13. Cross-Sectional Study
Study and examination requirements and forms of examination	<p>Classes are conducted with 80% classic tutorial and 20% case study/project based presentation per meeting.</p> <p>Exams are done by written exam and/or task-based exam.</p>
Media employed	PowerPoint, LMS (eLok, Google Classroom, etc.), and online meeting platform (Zoom, Gmeet, etc.)
Reading list	<p>Bronzino, Joseph D. (2006). The Biomedical Engineering Handbook: Medical Device and systems (3rd edition).</p> <p>Sterman, J.D., 2000, Business Dynamics: System thinking and modeling for a complex world, McGraw-Hill Company.</p> <p>Khoo, Michael C.K. (1999) Physiological control systems: analysis, simulation and estimation. IEEE Press series on biomedical engineering.</p>
Last modified	November 2025.

Biomedical Signal Acquisition

Module designation	This course aims to provide students with an understanding and expertise regarding the characteristics of various types of sensors and technologies in using biomedical sensors for the purpose of collecting data and information from biomedical systems.
Module level, if applicable	Master
Code	SPSTB212228
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Odd semester
Person responsible for the module	Dr. Indah Soesanti, S.T., M.T.
Lecturers	Dr. Indah Soesanti, S.T., M.T. Ir. Noor Akhmad Setiawan, S.T., M.T., Ph.D, IPM.
Language	Indonesian
Relation to curriculum	Elective course
Type of teaching, contact hours	Classic tutorial, case-study learning, and discussion.
Workload	<p>The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 minutes of self-study per week, for a total of 16 weeks including mid-term and final examinations.</p> <p>Workload calculation for one semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours ÷ 26 hours/ ECTS = 5.4 ECTS/semester Total Workload = 5.4 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>
Credit points	3 SKS (5.4 ECTS)

Requirements according to the examination regulations	-
Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>PLO 2: Able to design research related to artificial organs and medical instrumentation.</p> <p>PLO 3: Able to test and analyze relevant design results in biomedical engineering field.</p> <p>PLO 4: Able to communicate and work effectively in a multi-disciplinary team.</p>
Content	<ol style="list-style-type: none"> 1. Introduction: Basics of Sensors and Measurement 2. Software-based Sensors 3. Pyshical Sensors 4. Chemical Sensors 5. Optical Sensors 6. Bio-inspierd and life-inspired Sensors 7. Image Sensors and Medical Imaging 8. Blood Pressure Measurement 9. Blood Flow Measurement 10. Blood Chemistry Measurement 11. Wireless Sensor Networks and Smart Sensors in Health
Study and examination requirements and forms of examination	<p>Classes are conducted with 70% classic tutorial and 30% case study/project based presentation.</p> <p>Exams are done by written exam and/or task-based exam.</p>
Media employed	PowerPoint, LMS (eLok, Google Classroom, etc.), and online meeting platform (Zoom, Gmeet, etc.)
Reading list	<p>Enderle, J. and Bronzino, J., 2012. Introduction to biomedical engineering. Academic press.</p> <p>Bronzino, J.D. and Peterson, D.R., 2018. Medical devices and human engineering. CRC Press.</p> <p>Webster, J.G., 2014 Measurement, Instrumentation and Sensors Handbook, CRC Press</p> <p>Wang, Ping, Liu and Qingjun, 2011. Biomedical Sensors and Measurement, Springer.</p>
Last modified	November 2025.

Applied Biomaterials

Module designation	Provides understanding and presentation of applied biomaterials and their applications in the field of biomedical engineering.
Module level, if applicable	Master
Code	SPSTB212221
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Odd semester
Person responsible for the module	Prof. Dr. drg. Siti Sunarintyas, M.Kes.
Lecturers	Prof. Dr. drg. Siti Sunarintyas, M.Kes. Ir. Muhammad Waziz Wildan, M.Sc., Ph.D., IPU. Dr. Ir. Budi Arifvianto, S.T., M.Biotech. Ir. Rini Dharmastiti, M.Sc., Ph.D., IPM, ASEAN Eng.
Language	Indonesian
Relation to curriculum	Elective course
Type of teaching, contact hours	Classic tutorial, case-study learning, and discussion.
Workload	<p>The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 minutes of self-study per week, for a total of 16 weeks including mid-term and final examinations.</p> <p>Workload calculation for one semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours ÷ 26 hours/ ECTS = 5.4 ECTS/semester Total Workload = 5.4 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>
Credit points	3 SKS (5.4 ECTS)

Requirements according to the examination regulations	-
Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>PLO 2: Able to design research related to artificial organs and medical instrumentation.</p> <p>PLO 3: Able to test and analyze relevant design results in biomedical engineering field.</p> <p>PLO 4: Able to communicate and work effectively in a multi-disciplinary team.</p>
Content	<ol style="list-style-type: none"> 1. Introduction to advanced biomaterial 2. Advanced metallic and polymeric biomaterial 3. Advanced ceramics biomaterial 4. Advanced composite biomaterial 5. Bioadhesive 6. Surface Engineering, biological surface modification 7. Biotribology 8. Biomaterials failure analysis and prevention. 9. Fractography 10. Biomaterial's fabrication.
Study and examination requirements and forms of examination	<p>Classes are conducted with 90% classic tutorial and 10% case study/project based presentation.</p> <p>Exams are done by written exam and/or task-based exam.</p>
Media employed	PowerPoint, LMS (eLok, Google Classroom, etc.), and online meeting platform (Zoom, Gmeet, etc.)
Reading list	<ol style="list-style-type: none"> 1. Callister Jr., WD., 2000, Material Science and Engineering, 6th ed. John Wiley and Sons, New York. 2. Black, J. 1992, " Biological Performance of Materials, 2nd Edition, Marcel & Dekker, New York 3. Park, J.B. dan Laker, R.S. 1992, " Biomaterials-An Introduction", 2nd Edition, Plenum Press, New York 4. Davis, J.R., 2003, ASM Vol. 23: Handbook of Materials for Medical Devices. ASM International
Last modified	November 2025.

Biomedical Signal Analysis

Module designation	This course aims to provide an in-depth analysis of how bioelectric signals are processed in biomedical systems.
Module level, if applicable	Master
Code	SPSTB212229
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Odd semester
Person responsible for the module	Dr. Indah Soesanti, S.T., M.T.
Lecturers	Dr. Indah Soesanti, S.T., M.T. Ir. Noor Akhmad Setiawan, S.T., M.T., Ph.D., IPM
Language	Indonesian
Relation to curriculum	Elective course
Type of teaching, contact hours	Classic tutorial, case-study learning, and discussion.
Workload	<p>The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 minutes of self-study per week, for a total of 16 weeks including mid-term and final examinations.</p> <p>Workload calculation for one semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours ÷ 26 hours/ ECTS = 5.4 ECTS/semester Total Workload = 5.4 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>
Credit points	3 SKS (5.4 ECTS)
Requirements according to the examination regulations	-

Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>PLO 2: Able to design research related to artificial organs and medical instrumentation.</p> <p>PLO 3: Able to test and analyze relevant design results in biomedical engineering field.</p> <p>PLO 4: Able to communicate and work effectively in a multi-disciplinary team.</p>
Content	<ol style="list-style-type: none"> 1. Introduction Physiological Origins of Biosignals 2. Characteristics of Biosignals 3. Signal Acquisition 4. Representation of Biological Signals 5. Linear Systems 6. Signal Averaging and Transforms 7. Signal Processing System Design for Biomedical Applications 8. Multivariate Spectral Analysis of Electroencephalogram 9. General Linear Modeling of Magnetoencephalography Data 10. Emergence of Groupwise Registration in MR Brain Study 11. Functional Optical Brain Imaging 12. Causality Analysis of Multivariate Neural Data
Study and examination requirements and forms of examination	<p>Classes are conducted with 80% classic tutorial and 20% case study/project based presentation.</p> <p>Exams are done by written exam and/or task-based exam.</p>
Media employed	PowerPoint, LMS (eLok, Google Classroom, etc.), and online meeting platform (Zoom, Gmeet, etc.)
Reading list	<ol style="list-style-type: none"> 1. Enderle, J. and Bronzino, J., 2012. Introduction to biomedical engineering. Academic press. 2. Bronzino, J. D. (2017). Biomedical signals, imaging, and informatic
Last modified	November 2025.

Maintenance Management in Healthcare Systems

Module designation	Provides an understanding of the principles and functions of maintenance management in healthcare systems.
Module level, if applicable	Master
Code	SPSTB212243
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Odd semester
Person responsible for the module	Ir. Andi Rahadiyan Wijaya, S.T., M.Sc., Ph.D., IPM., ASEAN Eng.
Lecturers	Ir. Andi Rahadiyan Wijaya, S.T., M.Sc., Ph.D., IPM., ASEAN Eng. Ir. Rini Dharmastiti, M.Sc., Ph.D., IPM, ASEAN Eng.
Language	Indonesian
Relation to curriculum	Elective course
Type of teaching, contact hours	Classic tutorial, case-study learning, and discussion.
Workload	<p>The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 minutes of self-study per week, for a total of 16 weeks including mid-term and final examinations.</p> <p>Workload calculation for one semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours ÷ 26 hours/ ECTS = 5.4 ECTS/semester Total Workload = 5.4 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>
Credit points	3 SKS (5.4 ECTS)
Requirements according to the examination regulations	-

Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>PLO 2: Able to design research related to artificial organs and medical instrumentation.</p> <p>PLO 3: Able to test and analyze relevant design results in biomedical engineering field.</p> <p>PLO 4: Able to communicate and work effectively in a multi-disciplinary team.</p>
Content	<ol style="list-style-type: none"> 1. Maintenance – basic concepts, purpose, functions and objectives of maintenance. 2. Maintainability, mean time to failure, mean time to repair. 3. Reliability – basic concepts – bathtub curve – failure rate – mean time before failure. 4. Availability – inherent, achieved and operational availability. 5. Reliability centered maintenance (RCM) – flow diagram, basic guidelines. 6. Reliability centered maintenance (RCM) – Failure modes and effects analysis (FMEA), Failure mode effect criticality analysis (FMECA) 7. Reliability centered maintenance (RCM) – methodology 8. Fault tree analysis (FTA), Event tree analysis (ETA), Root cause analysis (RCA) 9. Total productive maintenance (TPM) – basic concepts, purpose, functions and objectives. 10. Total productive maintenance (TPM) – methodology. 11. Maintenance costs – classification of maintenance costs, maintenance cost analysis, cost effectiveness analysis. 12. Maintenance effectiveness – overall equipment effectiveness, key performance indicators, maintenance performance measuring indices. 13. Human factor in maintenance – manpower planning for maintenance, objectives and stages of manpower planning, training for maintenance personnel. 14. Computer-aided maintenance management system (CMMS) – functions, applications and advantages of CMMS.
Study and examination requirements and forms of examination	<p>Classes are conducted with 80% classic tutorial and 20% case study/project based presentation.</p> <p>Exams are done by written exam and/or task-based exam.</p>
Media employed	PowerPoint, LMS (eLok, Google Classroom, etc.), and online meeting platform (Zoom, Gmeet, etc.)

Reading list	<ol style="list-style-type: none">1. Garg M. R., Industrial Maintenance, S. Chand & Co., 1986.2. Higgins L. R., Maintenance Engineering Hand book, McGraw Hill, 5th Edition, 1988.3. Mishra R. C. and Pathak K., Maintenance Engineering and Management, PHI Learning Pvt. Ltd., New Delhi, 2009
Last modified	November 2025.

Biomedical Instrumentation and Devices

Module designation	Conveys how to use electronic devices commonly used for biomedical signal processing and explains the signals commonly measured and their measurement methods.
Module level, if applicable	Master
Code	SPSTB212225
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Odd semester
Person responsible for the module	Ir. Prpto Nugroho, S.T., M.Eng., D.Eng., IPM.
Lecturers	Ir. Prpto Nugroho, S.T., M.Eng., D.Eng., IPM. Ridwan Wicaksono, S.T., M.Eng., Ph.D
Language	Indonesian
Relation to curriculum	Elective course
Type of teaching, contact hours	Classic tutorial, case-study learning, and discussion.
Workload	<p>The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 minutes of self-study per week, for a total of 16 weeks including mid-term and final examinations.</p> <p>Workload calculation for one semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours ÷ 26 hours/ ECTS = 5.4 ECTS/semester Total Workload = 5.4 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>
Credit points	3 SKS (5.4 ECTS)
Requirements according to the examination regulations	-

Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>PLO 2: Able to design research related to artificial organs and medical instrumentation.</p> <p>PLO 3: Able to test and analyze relevant design results in biomedical engineering field.</p> <p>PLO 4: Able to communicate and work effectively in a multi-disciplinary team.</p>
Content	<ol style="list-style-type: none"> 1. Sources and properties of biomedical signals. 2. Differential amplifiers. 3. Feedback, frequency response, and gain stability. 4. Operational amplifiers and comparators. 5. Instrumentation amplifiers and isolated amplifiers in biomedical instrumentation. 6. Noise in biomedical signal processing. 7. Digital interfaces. 8. Anti-aliasing filter design.
Study and examination requirements and forms of examination	<p>Classes are conducted with 90% classic tutorial and 10% case study/project based presentation.</p> <p>Exams are done by written exam and/or task-based exam.</p>
Media employed	PowerPoint, LMS (eLok, Google Classroom, etc.), and online meeting platform (Zoom, Gmeet, etc.)
Reading list	<ol style="list-style-type: none"> 1. Robert B. Northrop (2012), Michael R. Neuman, Series Editor: Analysis and Application of Analog Electronic Circuits to Biomedical Instrumentation, Second Edition, CRC Press. 2. Bonnie C. Baker, AN699: Anti-Aliasing, Analog Filters for Data Acquisition Systems (1999), Microchip Technology.
Last modified	November 2025.

Biomaterial Testing and Characterization

Module designation	Provides an understanding of biomaterials, their characterization, and applications in biomedical engineering and explains biomaterial testing.
Module level, if applicable	Master
Code	SPSTB212220
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Odd semester
Person responsible for the module	Ir. Muhammad Kusumawan Herliansyah, S.T., M.T., Ph.D., IPM, ASEAN Eng.
Lecturers	Ir. Muhammad Kusumawan Herliansyah, S.T., M.T., Ph.D., IPM, ASEAN Eng. Ir. Muhammad Waziz Wildan, M.Sc., Ph.D., IPU. dr. Rina Susilowati, Ph.D. Dyah Listyarifah, MD, MSc., D.Med.Sci
Language	Indonesian
Relation to curriculum	Elective course
Type of teaching, contact hours	Classic tutorial, case-study learning, and discussion.
Workload	<p>The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 minutes of self-study per week, for a total of 16 weeks including mid-term and final examinations.</p> <p>Workload calculation for one semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours ÷ 26 hours/ ECTS = 5.4 ECTS/semester Total Workload = 5.4 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>

Credit points	3 SKS (5.4 ECTS)
Requirements according to the examination regulations	-
Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>PLO 2: Able to design research related to artificial organs and medical instrumentation.</p> <p>PLO 3: Able to test and analyze relevant design results in biomedical engineering field.</p> <p>PLO 4: Able to communicate and work effectively in a multi-disciplinary team.</p>
Content	<ol style="list-style-type: none"> 1. Introduction to biomaterials and their characteristic 2. Biomaterial properties and characterization 3. Degradation of biomaterials in biological environments 4. Biomaterial Characterization 5. Metallic biomaterials 6. Polymeric biomaterials 7. Ceramic biomaterials 8. Composite biomaterials 9. Corrosion: fundamentals, testing, and protections 10. Destructive and non-destructive testing
Study and examination requirements and forms of examination	<p>Classes are conducted with 80% classic tutorial and 20% case study/project based presentation per meeting.</p> <p>Exams are done by written exam and/or task-based exam.</p>
Media employed	PowerPoint, LMS (eLok, Google Classroom, etc.), and online meeting platform (Zoom, Gmeet, etc.)
Reading list	<ol style="list-style-type: none"> 1. Callister Jr., WD., 2000, Material Science and Engineering, 6th ed. John Wiley and Sons, New York. 2. Black, J. 1992, " Biological Performance of Materials, 2nd Edition, Marcel & Dekker, New York 3. Park, J.B. dan Laker, R.S. 1992, " Biomaterials-An Introduction", 2nd Edition, Plenum Press, New York 4. Davis, J.R., 2003, ASM Vol. 23: Handbook of Materials for Medical Devices. ASM International 5. ASM Vol. 8: Mechanical Testing and Evaluation. 2000. ASM International.
Last modified	November 2025.

Artificial Intelligence in Biomedical Engineering

Module designation	This course aims to provide students with expertise in artificial intelligence theory applied to provide solutions to complex biomedical problems.
Module level, if applicable	Master
Code	SPSTB212227
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Odd semester
Person responsible for the module	Dr. Eng. Igi Ardiyanto, S.T., M.Eng.
Lecturers	Dr. Eng. Igi Ardiyanto, S.T., M.Eng. Dr. Eng. Ir. Sunu Wibirama, S.T., M.Eng., IPM
Language	Indonesian
Relation to curriculum	Elective course
Type of teaching, contact hours	Classic tutorial, case-study learning, and discussion.
Workload	<p>The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 minutes of self-study per week, for a total of 16 weeks including mid-term and final examinations.</p> <p>Workload calculation for one semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours ÷ 26 hours/ ECTS = 5.4 ECTS/semester Total Workload = 5.4 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>
Credit points	3 SKS (5.4 ECTS)
Requirements according to the examination regulations	-

Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>PLO 2: Able to design research related to artificial organs and medical instrumentation.</p> <p>PLO 3: Able to test and analyze relevant design results in biomedical engineering field.</p> <p>PLO 4: Able to communicate and work effectively in a multi-disciplinary team.</p>
Content	<ol style="list-style-type: none"> 1. Introduction to Applications of Artificial Intelligence in Biomedicine 2. Overview of Artificial Intelligence 3. Artificial Intelligence and Machine Learning 4. Regression 5. Naive Bayes Classification 6. Instance Based Learning 7. k-Means Clustering 8. Principal Component Analysis 9. Decision Tree Decision Rule Decision Table Random Forest 10. Support Vector Machine 11. Artificial Neural Networks 12. Clustering 13. Ensemble Learning 14. Fuzzy Logic and Genetic Algorithms 15. Deep Learning 16. Artificial Intelligence System Design for Biomedical Applications 17. A System for Melanoma Diagnosis Based on Data Mining 18. Fuzzy Naïve Bayesian Approach for Medical Decision Support
Study and examination requirements and forms of examination	<p>Classes are conducted with 80% classic tutorial and 20% case study/project based presentation.</p> <p>Exams are done by written exam and/or task-based exam.</p>
Media employed	PowerPoint, LMS (eLok, Google Classroom, etc.), and online meeting platform (Zoom, Gmeet, etc.)
Reading list	<ol style="list-style-type: none"> 1. Agah, A. (2014). Medical applications of artificial intelligence. Boca Raton, Taylor & Francis. 2. Lisboa, P. J. G. (2000). Artificial neural networks in biomedicine. London, Springer. 3. Smolinski, T. G., Milanova, M. G., & Hassanien, A. E. (2010). Computational intelligence in biomedicine and bioinformatics: current trends and applications. Berlin, Springer.

Last modified	November 2025.
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Biomedical Imaging and Image Processing

Module designation	Describes the types of medical imaging equipment, their principles and how they work, and explains medical image processing techniques to obtain better image results and support the image analysis process.
Module level, if applicable	Master
Code	SPSTB212226
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Odd semester
Person responsible for the module	Dr. Indah Soesanti, S.T., M.T.
Lecturers	Dr. Indah Soesanti, S.T., M.T. Dr. Eng. Igi Ardiyanto, S.T., M.Eng.
Language	Indonesian
Relation to curriculum	Elective course
Type of teaching, contact hours	Classic tutorial, case-study learning, and discussion.
Workload	<p>The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 minutes of self-study per week, for a total of 16 weeks including mid-term and final examinations.</p> <p>Workload calculation for one semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours ÷ 26 hours/ ECTS = 5.4 ECTS/semester Total Workload = 5.4 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>
Credit points	3 SKS (5.4 ECTS)

Requirements according to the examination regulations	-
Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>PLO 2: Able to design research related to artificial organs and medical instrumentation.</p> <p>PLO 3: Able to test and analyze relevant design results in biomedical engineering field.</p> <p>PLO 4: Able to communicate and work effectively in a multi-disciplinary team.</p>
Content	<ol style="list-style-type: none"> 1. Introduction to biomedical imaging 2. Image formation and acquisition principles 3. Radiography: X-rays projection, fluoroscopy and computed tomography (CT) 4. Ultrasound imaging (US) 5. Magnetic resonance imaging (MRI) 6. Nuclear medicine: SPECT and PET 7. Fundus camera 8. Introduction to digital image processing 9. Image Enhancement I: Contrast enhancement and normalisation 10. Image Enhancement II: Filtering, denoising and edge detection 11. Image Registration: Features, similarity measures, transformations 12. Image Segmentation I: Histogram-based technique, colour image- based 13. Image Segmentation II: Region growing, clustering-based 14. Medical Image Reconstruction: MRI CT
Study and examination requirements and forms of examination	<p>Classes are conducted with 80% classic tutorial and 20% case study/project based presentation.</p> <p>Exams are done by written exam and/or task-based exam.</p>
Media employed	PowerPoint, LMS (eLok, Google Classroom, etc.), and online meeting platform (Zoom, Gmeet, etc.)
Reading list	<ol style="list-style-type: none"> 1. Chris Guy and Dominic, "An Introduction to the Principles of Medical Imaging" World Scientific (2005) 2. Gonzalez, R. C. and Woods, R. E., "Digital Image Processing" Prentice Hall 3rd Ed. (2009) 3. Geoff Dougherty, "Digital Image Processing for Medical Applications" Cambridge University Press. (2009)

Last modified	November 2025.
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Drug Delivery System

Module designation	Provides an understanding of pharmacokinetics and drug formulation design, understanding of modern analytical techniques in the pharmaceutical field, as well as providing an understanding of drug delivery systems and their applications in the field of Biomedical engineering.
Module level, if applicable	Master
Code	SPSTB212223
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Odd semester
Person responsible for the module	Adhyatmika, Apt., M.Biotech., Ph.D.
Lecturers	Adhyatmika, Apt., M.Biotech., Ph.D. Dr. rer. nat. Ronny Martien, M.Si Dr. apt. Sekar Ayu Pawestri Dr. apt. Nindya Kusumorini
Language	Indonesian
Relation to curriculum	Elective course
Type of teaching, contact hours	Classic tutorial, case-study learning, and discussion.

Workload	<p>The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 minutes of self-study per week, for a total of 16 weeks including mid-term and final examinations.</p> <p>Workload calculation for one semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours ÷ 26 hours/ ECTS = 5.4 ECTS/semester Total Workload = 5.4 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>
Credit points	3 SKS (5.4 ECTS)
Requirements according to the examination regulations	-
Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>PLO 2: Able to design research related to artificial organs and medical instrumentation.</p> <p>PLO 3: Able to test and analyze relevant design results in biomedical engineering field.</p> <p>PLO 4: Able to communicate and work effectively in a multi-disciplinary team.</p>
Content	<ol style="list-style-type: none"> 1. Introduction on Drug Delivery System 2. Biopharmaceutic and pharmacokinetic principal of drug 3. Evaluation of drug delivery system 4. Biotechnological products and drug delivery system 5. Modified of drug delivery system 6. Modern analytical techniques 7. Pharmacokinetics and formulation design 8. Advances in pharmaceutical technology (pharmaceutics) 9. Design & development of novel delivery systems
Study and examination requirements and forms of examination	<p>Classes are conducted with 100% classic tutorial.</p> <p>Exams are done by written exam and/or task-based exam.</p>

Media employed	PowerPoint, LMS (eLok, Google Classroom, etc.), and online meeting platform (Zoom, Gmeet, etc.)
Reading list	<ol style="list-style-type: none">1. Instrumental Methods of Analysis - Scoog and West2. Methods of Drug Analysis — Gearien, Graboski.3. Yie W. Chien, Novel Drug Delivery Systems, Drugs and Pharm. Sci. Series, Vol.14, Marcel Dekker Inc.N.Y.4. Bert N. LaDu, "Fundamentals of Drug Metabolism & Disposition", Waverley. Press Inc., Baltimore, 1972
Last modified	November 2025.

Thesis

Module designation	Research in accordance with the research plan that has been tested at the proposal seminar. This course meeting is conducted in a regular meeting in offline/online form, as a form of thesis guidance from the supervising lecturer at UGM and field supervisors (at the workplace).
Module level, if applicable	Master
Code	SPSTB212499 (Regular Programme) SPSTB232499 (By-Research Programme)
Subtitles, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Even and Odd semester
Person responsible for the module	Respective Thesis Supervisors.
Lecturers	Thesis Supervisors.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Discussion.
Workload	<p>The total workload is approximately 640 hours per semester, consisting of 2400 minutes of self-study per week for a total of 16 weeks including examination.</p> <p>Workload calculation for one semester = 40 hours/week × 16 weeks/semester = 640 hours/semester = 640 hours ÷ 26 hours/ ECTS = 24.6 ECTS/semester Total Workload = 24.6 ECTS/semester</p> <p>Notes: 1 ECTS is equivalent to 25 – 30 hours of work, with 26 hours set as the minimum standard.</p>
Credit points	8 SKS (24.6 ECTS)
Requirements according to the examination regulations	-

Recommended prerequisites	-
Module objectives/intended learning outcomes	<p>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.</p> <p>PLO 2: Able to design research related to artificial organs and medical instrumentation.</p> <p>PLO 3: Able to test and analyze relevant design results in biomedical engineering field.</p> <p>PLO 4: Able to communicate and work effectively in a multi-disciplinary team.</p> <p>PLO 5: Able to convey the results of work in the field of biomedical engineering in writing orally or verbally</p> <p>PLO 6: Able to demonstrate professionalism and adhere to principles bioethics.</p> <p>PLO 7: Able to develop oneself sustainably and adapt to developments in science and technology biomedical technology</p>
Content	Thesis consultation to respective thesis supervisors.
Study and examination requirements and forms of examination	<p>Course is conducted with 100% thesis discussion per meeting.</p> <p>Exams are done by oral/presentation examination.</p>
Media employed	Online meeting platform (Zoom, Gmeet, etc.)
Reading list	-
Last modified	November 2025.