# Applied Biomedical System Design

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| 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.<br>Dr. Urip Agus Salim, S.T., M.Eng.Sc.<br>Ir. I Gusti Bagus Budi Dharma, S.T., M.Eng., Ph.D., IPM., ASEAN. Eng.<br>Ir. Dawi Karomati Baroroh, S.T., M.Sc., Ph.D. |
| Language | Indonesian & English |
| Relation to curriculum | Compulsory 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:<br>- Classic tutorial,<br>- Case-study learning,<br>- Discussion<br>- Practical Activities → Fusion software, HoQ method |

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| Workload | This course is planned to have 13 teaching weeks, 1 week lab visit, and 2 weeks of examination.<br>Lectures = 3 SKS x 50 minutes x 15 meetings<br>= 2250 minutes<br>= 37.5 hours<br>= 37.5 hours/25 hours<br>=1.5 ECTS<br>Experiment/Practical activities = 3 SKS x 60 minutes x 1 meeting<br>= 180 minutes<br>= 3 hours<br>= 3/25 hours<br>= 0.12 ECTS<br>Assigment = 3 SKS x 60 minutes x 16 meetings<br>= 2880 minutes<br>= 48 hours<br>= 48 hours/ 25 hours<br>=1.92 ECTS<br>Self Study = 3 SKS x 60 minutes x 16 meetings<br>= 2880 minutes<br>= 48 hours<br>= 48 hours/ 25 hours<br>=1.92 ECTS<br>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.<br>PLO 2: Able to design research related to artificial organs and medical instrumentation.<br>PLO 3: Able to test and analyze relevant design results in biomedical engineering field. |

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| Content | 1. Introduction to biomedical system design<br>2. Differences between engineering and physiological control system<br>3. System design analysis: fundamental concepts<br>4. Basic problem in biomedical system design<br>5. Basic modelling concept<br>6. System Characterization<br>7. Mathematical modeling<br>8. Generalized system properties<br>9. Medical instruments and devices<br>10. Modelling applications (360Fusion)<br>11. Practical Activities: 3D design using Fusion |
| Study and examination requirements and forms of examination | Classes are conducted with 80% classic tutorial and 20% case study/project based presentation per meeting.<br>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 | King, P. H., Fries, R. C., Johnson, A. T., 2015, Design of Biomedical Devices and Systems 3rd Edition, Taylor & Francis, FL<br>Ulrich, K.T. and Eppinger, S.D., 2012, Product Design and Development, 6th Ed, McGraw-Hill, Inc.<br>Ashby, M., Shercliff, H. and Cebon, D., 2007 Material Engineering, Science, Processing and Design, Elsevier<br>Weinger, M.B., Wiklund, M.E., Gardner-Bonneau, D.J, 2011, Handbook of Human Factors in Medical Device Design, CRC Press, Taylor & Francis Group<br>Produk Inovatif Desain Konsep, Prototype dan HKI (Desain Industri-Paten), Prof. Ir. Alva Edy Tontowi, M.Sc., Ph.D, Mei 2013 |
| Last Modified | November 2025. |