



**MODULE HANDBOOK DESCRIPTION**

Module designation	<i>Biomedical Instrumentation</i>	
Code	<i>FBB0005</i>	
Semester(s) in which the module is taught	<i>8/ Fourth year</i>	
Person responsible for the module	<i>Paniran, ST., MT.</i>	
Language	<i>Indonesian</i>	
Relation to curriculum	<i>Free Elective for Electronics Engineering.</i>	
Teaching methods	<i>lectures, small group discussion, case base method.</i>	
Workload (incl. contact hours, self-study hours)	Contact minutes every week, each week of the 16 weeks/semester: <ul style="list-style-type: none"> <li>• Lectures: 2 x 50 minutes</li> <li>• Exercises and Assignments: 2 x 60 minutes</li> <li>• Private study: 2 x 60 minutes.</li> </ul> total study hours = 5 hours 40 minutes/week	
Credit points	<i>2 SKS (~ 3.2 ECTS)</i>	
Required and recommended prerequisites for joining the module	Basic Electrical (FBS2123) Basic Electronics (FBS2125) Electric Circuits 1 (FBS1213)	
Module objectives/intended learning outcomes	1. Students are able to analyse the Introduction to Biomedical Instrumentation, Basic Transducer Principles, Source of Bioelectric Potentials, Electrodes, The Cardiovascular System, Vascular Measurement, Patient Care and Monitoring, Measurement in The Respiratory System, Noninvasive Diagnostic Instrumentation, The Nervous System, Instrumentation for Sensory Measurements and The Study of Behavior the Nervous System, BioTelemetry, Instrumentation for The Clinical Laboratory, X-Ray and Radio Isotope Instrumentation, The Computer in Biomedical Instrumentation, Electrical Safety of Medical Equipment.	<i>PLO3</i>

	<p>2. Students are able to design the Basic Transducer Principles, Source of Bioelectric Potentials, Electrodes, The Cardiovascular System, Vascular Measurement, Patient Care and Monitoring, Measurement in The Respiratory System, BioTelemetry, Instrumentation for The Clinical Laboratory, X-Ray and Radio Isotope Instrumentation.</p>	<i>PLO4</i>
	<p>3. Students are able to abstract the Basic Transducer Principles, Source of Bioelectric Potentials, Electrodes, The Cardiovascular System, Vascular Measurement, Patient Care and Monitoring, Measurement in The Respiratory System, Noninvasive Diagnostic Instrumentation, The Nervous System, Instrumentation for Sensory Measurements and The Study of Behavior the Nervous System, BioTelemetry, Instrumentation for The Clinical Laboratory, X-Ray and Radio Isotope Instrumentation.</p>	<i>PLO9</i>
Conten	<p>2. Introduction to Biomedical Instrumentation  3. Basic Transducer Principles  4. Source of Bioelectric Potentials  5. Electrodes  6. The Cardiovascular System  7. Vascular Measurement  8. Patient Care and Monitoring  9. Measurement in The Respiratory System  10. Noninvasive Diagnostic Instrumentation  11. The Nervous System  12. Instrumentation for Sensory Measurements and The Study of Behavior the Nervous System  13. BioTelemetry  14. Instrumentation for The Clinical Laboratory  15. X-Ray and Radio Isotope Instrumentation  16. The Computer in Biomedical Instrumentation  17. Electrical Safety of Medical Equipment</p>	
Examination forms	<ul style="list-style-type: none"> <li>- Written case study</li> <li>- Midterm and final test</li> </ul>	

Study and examination requirements	<p><i>The final grade in the module is composed of:</i></p> <ul style="list-style-type: none"> <li><i>a. Case I &amp; II assessment: 25%</i></li> <li><i>b. Case Project assessment: 30%</i></li> <li><i>c. Midterm assessment: 20%</i></li> <li><i>d. Final assessment: 25%</i></li> </ul> <p><i>Students must have a final grade of 65% or higher to pass</i></p>
Reading list	<ol style="list-style-type: none"> <li>1. Webster, J. G. (1978). <i>Medical Instrumentation, Application and Design</i>, Houghton Mifflin Co</li> <li>2. Aston, R.J. (1991), <i>Principles of Biomedical Instrumentation and measurement</i>. MacMillan, New York.</li> <li>3. Rizal, A. (2014), <i>Instrumentasi Biomedis</i>, Graha Ilmu, Yogyakarta</li> <li>4. Hadiyoso, S. dan Rizal, A. (2015), <i>Instrumentasi Biomedis Berbasis PC</i>, Penerbit Gava Media, Yogyakarta</li> </ol>