



## Mathematics and Its Application

### Abstract Algebra

Module designation	<i>Abstract Algebra</i>
Semester(s) in which the module is taught	6
Person responsible for the module	<i>Please indicate a specific person.</i> <i>Dr. Makmuri, M.Si.</i>
Language	<i>Bahasa</i>
Relation to curriculum	<i>Compulsory / elective / specialisation</i> <i>Names of other study programmes with which the module is shared</i> <i>Bachelor of Mathematic Education</i>
Teaching methods	<i>lecture, lesson.</i>
Workload (incl. contact hours, self-study hours)	<i>For this course, students required to meet a minimum of 231,99 hours in one semester, which consist of</i> <i>39,99 hours for lecture</i> <i>96 hours for structured assignments</i> <i>96 hours for private study</i>
Credit points	<i>3 cp = 4,5 ECTS</i>
Required and recommended prerequisites for joining the module	<i>Introduction of Basic Mathematics</i> <i>Linear Algebra</i> <i>Number Theory</i>
Module objectives/intended learning outcomes	Students are able to give examples and non-examples, construct valid proofs or provide counter-examples of the relationship between existing knowledge/concepts.  Knowledge : Theory of set, mapping, binary operations, group, and ring. Competence: Remember, understand, apply, analyze and construct proof of the relationship between concepts, the properties of a concept, and the necessary and sufficient conditions of a proposition.



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Content	<p><i>The description of the contents:</i></p> <ol style="list-style-type: none"> <li>1. <i>Set Theory, Mappings, The Integers, Complex Numbers.</i></li> <li>2. <i>Definitions and Examples of Groups, Subgroups, Factor Groups, Homomorphisms and Normal Subgroups.</i></li> <li>3. <i>The Symmetric Group, Cycle Decomposition, Odd and Even Permutations.</i></li> <li>4. <i>Ring Theory, Ideals, Homomorphisms, and Quotient Rings, Maximal Ideals.</i></li> </ol>
Examination forms	<i>Individual Assignment, oral presentation, essay test</i>
Study and examination requirements	<p><b>Study and examination requirements:</b></p> <ul style="list-style-type: none"> <li>- Students must attend 15 minutes before the class starts.</li> <li>- Students must switch off all electronic devices during examination.</li> <li>- Students must inform the lecturer if they cannot attend the class due to sickness, etc.</li> <li>- Students must submit all class assignments before the deadline.</li> <li>- Students must attend the exam to get final grade.</li> </ul>
Reading list	<p><i>Names of textbooks, articles, etc.</i></p> <ol style="list-style-type: none"> <li>1. <b><i>Abstract Algebra</i></b>, Third Edition, I. N. Herstein, 1996.</li> <li>2. <b><i>Modern Algebra An Introduction</i></b>, Sixth Edition, John R. Durbin, 2009.</li> <li>3. <b><i>Introduction to Modern Algebra</i></b>, Version 1.2.7, David Joyce, 2017.</li> <li>4. <b><i>Subgroups Close to Normal Subgroups</i></b>, George M. Bergman and Hendrik W. Lenstra, jr., <b><i>Journal of Algebra</i></b>, 127, 80 - 97 (1989).</li> <li>5. <b><i>Graphs associated to co-maximal ideals of commutative rings</i></b>, Hsin-Ju Wang, <b><i>Journal of Algebra</i></b> 320 (2008) 2917–2933</li> </ol>