UNIVERSITAS GADJAH MADA
Faculty of Mathematics and Natural Sciences
Mathematics Department
Sekip Utara Bulaksumur Yogyakarta 55281 Telp: +62 274 552243 Fax: +62 274 555131 Email: math@ugm.ac.id Website: math.fmipa.ugm.ac.id

Undergraduate Programme in Mathematics
Telp : +62 274 552243
Email : maths1@ugm.ac.id; kaprodi-s1-matematika.mipa@ugm.ac.id
sekprodi-s1-matematika.mipa@ugm.ac.id
Website : http://s1math.fmipa.ugm.ac.id/

MODULE HANDBOOK

Module name	Introduction to Algebraic Structure I
Module level, if applicable	Bachelor
Code, if applicable	MMM-1203
Subtitle, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	2nd (second)
Person responsible for the module	Chair of the Lab. of Algebra
Lecturer(s)	Prof. Dr. Sri Wahyuni
Language	Bahasa Indonesia
Relation to curriculum	Bachelor Degree, Compulsory, 2nd semester
Type of teaching, contact hours	100 minutes lectures and 120 minutes structured activities (homework and task) per week.
Workload	Total workload is 136 hours per semester, which consists of 150 minutes lectures per week for 14 weeks, 180 minutes structured activities per week, 180 minutes individual study per week, in total is 16 weeks per semester, including mid exam and final exam.
Credit points	3 (three) credit semester
Requirements according to the examination regulations	Students have taken Introduction to Algebraic Structure I course (MMM-1203) and have an examination card where the course is stated on.
Recommended prerequisites	Students have taken Introduction to Mathematical Logic course (MMM-1208) and have participated in the final examination of the course.
Module objectives/intended learning outcomes	**Learning objectives:** Upon successful completion of this module, students will be able to: **CO1:** Recognize and analize the basic concept and the fundamental properties of groups as an algebraic structure consisting of one set and one operation, and manipulating skills in applying basic concepts, properties, techniques, and methods developed in group. The students should be able to prove simple consequences of the group axioms, such as the cancellation law; **CO2:** Demonstrate knowledge of basic concepts of a subgroup, generator, and their properties. The students should be familiar with group of permutations, general linear groups and symmetric groups, cyclic groups, and understand the difference between finding a proof from the axioms that works for all groups, and finding a counterexample. **CO3:** Demonstrate how to show that a subset of a group is a subgroup or a normal subgroup, and apply Lagrange's theorem. Derive and apply the concept of left and right coset, normal sugroup, and construction of group factor. **CO4:** Derive and apply the concept of group homomorphism, its kernel and image and the basic properties including the Fundamental Homomorphism Theorem and the uses. Derive and apply the Cayley's Theorem that every group is isomorphic to a group of permutations.

Content	**Syllabus:** • Binary operations, axioms group as an algebraic structure consisting of one set and one operation. Manipulating skills in applying basic concepts, properties, Cayley table, techniques, and methods developed in group. subgroup, generator, cyclic groups. general linear groups and special subgroups. Symmetric groups: cycles, general linear groups and special subgroups. Orders of elements; cyclic groups • Lagrange's Theorem and its application. Left and right coset, normal sugroup, and construction of group factor. Group homomorphism, its kernel and image and the basic properties including the fundamental homomorphism theorem and the uses. Group isomorphism, and cheking when are two groups `the same'. Cayley theorem, the proof and the uses.
Study and examination requirements and forms of examination	The final mark will be weighted as follows: No Assessment methods (components, activities) Weight (percentage) 1 Final Examination 40% 2 Mid-Term Examination 30% 3 Class Activities: Quiz, Homework, etc. 30% The initial cut-off points for grades A, B, C, and D should not be less than 80%, 70%, 50%, and 40%, respectively
Media employed	Board, LCD Projector, Laptop/Computer
Reading List	1. John B. Fraleigh, 1999; *A First Course in Abstract Algebra*; Fourth Edition; Addison-Wesley Publishing Company, Inc. 2. I. N. Herstein, 1975, *Topics in Algebra,* John Wiley and Sons Inc., New York 3. David S. Dummit, and Richard M. Foote, 1999, *Abstract Algebra*, 3rd Ed., John Wiley and Sons, Inc., New York 4. D.S. Malik, John M. Mordeson, and M.K. Sen, 1998, *Fundamental of Abstract*, Fourth Edition, Addison-Wesley Publishing Company, Inc.

PLO and CO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9
CO 1			V			V			V
CO 2			V			V			V
CO 3			V			V			V
CO 4			V			V			V
CO 5			V			V			V