



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: matematika.fmipa.ugm.ac.id

Doctoral Program in Mathematics

Telp : +62 274 552243

Email : maths3@ugm.ac.id;

Website : <http://math.fmipa.ugm.ac.id/dpmath>

MODULE HANDBOOK
Doctoral in Mathematics

| Module name: | Semigroup Theory | | | | | | | | |
|---|---|--|---------------------|---------------------|----|-----------------------|----|------------------------------|----|
| Module level, if applicable: | Doctoral Program | | | | | | | | |
| Code, if applicable: | | | | | | | | | |
| Semester(s) in which the module is taught: | | | | | | | | | |
| Person responsible for the module: | Chair of Algebra Research Group | | | | | | | | |
| Lecturer(s): | 1. Dr. Budi Surodjo, M.S. 2. Dr.rer.nat. Yeni Susanti, M.Si | | | | | | | | |
| Language: | Indonesian | | | | | | | | |
| Relation to curriculum: | Doctoral Degree in Mathematics, Compulsory / Elective Course | | | | | | | | |
| Credit points: | 3 Semester Credit Unit | | | | | | | | |
| Type of teaching, contact hours: | 3x50 minutes lectures, 3x60 minutes structured activities. | | | | | | | | |
| Workload: | <ul style="list-style-type: none"> • 3x50 minutes lectures, • 3x60 minutes structured activities, • 3x60 minutes individual study, • In 16 weeks per semester (including assignments and examinations) | | | | | | | | |
| Recommended prerequisites: | Group theory | | | | | | | | |
| Module objectives/intended learning outcomes: | On successful completion of this course, students should be able to: CO.1. prove rigorously the fundamental properties of semigroup CO.2. identify and prove the properties of some special semigroups CO.3. ability to explain the application of semigrup on algebraic systems and other fields | | | | | | | | |
| Content: | Definition of semigroup, monoid, subsemigroup, ideals, natural order, partially ordered semigroup, congruence, Green's equivalence, Homomorphism of semigroups, regular element, idempotent element, inverse element, generalized invers semigrup, quotient semigroup, regular semigroup, Inverse semigroup, orthodox semigroup, semilattice, band, applications of semigroup. | | | | | | | | |
| Study and examination requirements and forms of examination: | <p>The final mark will be weighted as follows:</p> <table border="1"> <thead> <tr> <th>No Assessment methods (components, activities)</th> <th>Weight (percentage)</th> </tr> </thead> <tbody> <tr> <td>1 Final Examination</td> <td>35</td> </tr> <tr> <td>2 Midterm Examination</td> <td>35</td> </tr> <tr> <td>3 Quiz/Presentation/Homework</td> <td>30</td> </tr> </tbody> </table> <p>Final grade will be determined as follows: Grade Criteria The initial cut-off points for grades A, B, C, and D should not be less than 80%, 65%, 50%, and 40%, respectively.</p> | No Assessment methods (components, activities) | Weight (percentage) | 1 Final Examination | 35 | 2 Midterm Examination | 35 | 3 Quiz/Presentation/Homework | 30 |
| No Assessment methods (components, activities) | Weight (percentage) | | | | | | | | |
| 1 Final Examination | 35 | | | | | | | | |
| 2 Midterm Examination | 35 | | | | | | | | |
| 3 Quiz/Presentation/Homework | 30 | | | | | | | | |
| Media employed: | projector, board, laptop, e-learning http://elisa.ugm.ac.id | | | | | | | | |
| Reading List: | 1. Howie, J. M., 1974, An Introduction to Semigroup Theory, Academic Press. | | | | | | | | |

| | |
|--|--|
| | 2. Clifford, A.H. and Preston, G.B., 1961, The Algebraic Theory of Semigroups, American Math. Society, Rhode Island 3. Gilmer, R., 1984, Commutative Semigroup Rings, The University of Chicago Press, Chicago 4. Okniski, J, 1991, Semigroup Algebras, Marcel-Dekker, Inc |
|--|--|

| |
|------------------------------------|
| Mapping of The COs and PLOs |
|------------------------------------|

| | PLO - 1 S3 Mat | PLO - 2 S3 Mat | PLO - 3 S3 Mat | PLO - 4 S3 Mat | PLO - 5 S3 Mat | PLO -6 S3 Mat |
|-------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|
| CO 1 | | v | v | | | |
| CO 2 | | v | v | | | |
| CO 3 | | | | | v | v |

Programme Learning Outcomes (PLO) Doctoral Programme in Mathematics

| | | |
|--------------|---|---|
| PLO-1 | : | Attitude: Devote to God Almighty, uphold the humanity values, internalize academic values and ethics, responsible in working in the area of expertise independently. |
| PLO-2 | : | Knowledge: Mastering philosophy of mathematics and one of the fields in mathematics (algebra, analysis, applied mathematics, statistics, computational mathematics, computational statistics). |
| PLO-3 | : | Knowledge: Able to think logically, analytically, inductively, deductively, and structured; having the ability to manage, lead, and develop research programs independently, and able to communicate the thoughts as well as his work to the scientific community and the general public. |
| PLO-4 | : | Skill: Creating new concepts and / or new methods (original) in the field of mathematics that are recognized nationally and internationally. |
| PLO-5 | : | Skill: Able to apply mathematics according to their field of expertise to solve problems including those that require a multidisciplinary, cross-disciplinary, or trans-disciplinary approach. |
| PLO-6 | : | Life Long Learning: Having lifelong learning skills and adaptive to the development of science and technology, especially in fields related to Mathematics and its applications. |