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Doctor in Mathematics **MODULE HANDBOOK**

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Module Designation	Advanced Graph and Combinatorics
Code, if applicable	MMM 7206
Subtitle, if applicable	-
Course, if applicable	Advanced Graph and Combinatorics
Semester(s) in which the module is taught	1st Semester
Person responsible for the module	Chair of Algebra Research Group
Language	Indonesia
Relation to curriculum	Elective courses
Teaching methods	Lecture, presentation, flipped classroom – project-based learning
Workload (incl. contact hours, self-study hours)	Total workload is 232 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 in Credit Units	3
Required and recommended prerequisites for joining the module	Before taking this course, students must master the introduction to graph theory and discrete mathematics and probably some other basic theory related to dissertation topic such as group theory, ring theory, linear algebra theory and number theory

Module objectives/intended learning outcomes	Upon successful completion of this course, students are able to: ● CO 1: clarify various concepts, philosophies, definitions and important properties of advanced theory in graph theory and combinatorics ● CO 2: prove the concepts of some theory in graph theory and combinatorics that is related to the topic of dissertation ● CO 3: make a conjecture on the continuation of the problem on the concept of graph theory and combinatorics ● CO 4: develop special knowledge related to graph theory and combinatorics concepts that is related to the topics of courses supporting dissertation
Content	● This course provides material to students about some topics in graph theory and combinatorics, including definition of graphs, basic properties of graphs, graph isomorphism, group of graph automorphisms, connectivity of graph, graph and matrices, graph operations. ● Additional further topics and syllabus will be adjusted to the dissertation topic. It can be, for instance, labeling and algebraic graph.
Examination forms	Midterm Examination, Project, Homework/Assignments
Study and examination requirements	The final mark will be weighted as follows: No Assessment methods (components, activities) Weight (percentage) 1 Midterm Examination 25 % 2 Homework/Assignment 25 % 3 Project 50 % To pass the course, the minimum grade is B (70%).

Reading list	References may take from the following list: 1. Ravindra B. Bapat, 2010, Graphs and Matrices, Springer 2. Chris Godsil and Gordon Royle, 2001, Algebraic Graph Theory, Springer 3. Norman Biggs, 1996, Algebraic Graph Theory, Cambridge University Press 4. Ulrich Knauer, 2011, Algebraic Graph Theory, De Gruyter 5. Lowell W. Beineke, Jay S. Bagga, 2021, Line Graphs and Line Digraphs, Springer 6. Dougherty, S.T., 2020, Combinatorics and Finite Geometry, Springer International Publishing 7. Reinhard Diestel, 2005, Graph Theory, Springer Verlag Heidelberg New York 8. Rosen, K.H., 2011, Discrete Mathematics and Its Applications, Seventh Edition, Mc-Graw Hill Education 9. Robin J. Wilson, 1998, Introduction to Graph Theory, Fourth Edition, Addison Wesley Longman 10. Van Lint, J.H., Wilson, R.M., 1992, A Course in Combinatorics, Cambridge university Press 11. Bose, R.C., Manvel, B., 1983, Introduction to Combinatorial Theory, Colorado State University, John Wiley and Sons 12. Gallian J.A. , A Dynamic Survey of Graph Labelling: The Electronic Journal of Combinatorics

CO-PLO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
CO-1	V	V	V	V	V	V
CO-2	V	V	V	V	V	V
CO-3	V	V	V	V	V	V
CO-4	V	V	V	V	V	V

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