UNIVERSITAS GADJAH MADA
Faculty of Mathematics and Natural Sciences
Department of Mathematics
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MODULE HANDBOOK

Module designation	Fundamental Algebra
Code, if applicable	MMM 7211
Subtitle, if applicable	-
Course, if applicable	Fundamental Algebra
Semester(s) in which the module is taught	1st or 2nd semester
Person responsible for the module	Chair of Algebra Laboratory
Language	Bahasa Indonesia
Relation to curriculum	Elective course
Teaching methods	Lecture, presentation, project
Workload (incl. contact hours, self-study hours)	Total workload is 232 hours per semester, which consists of 50 minutes lectures per week, 120 minutes structured activities per week, 120 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	Students master the concepts of logic and sets, algebraic structure theory and linear algebraic theory
Module objectives/intended learning outcomes	After taking this course, students will be able to: CO 1. clarify the concept, definitions of the topics in the lecture CO 2. prove properties related to the topic in the discussion. CO 3. formulate conjectures related to the material discussed. CO 4. generalize the concepts in the discussion into his research topics and validates them
Content	Advanced lattice theory, special properties and applications.
Examination forms	Oral presentation, essay, paper

Study and examination requirements	The final mark will be computed from a proportional weight of assignments, mid examination and final examination. The final mark will be weighted as follows: Weight (percentage) 1 Final Examination 20 - 30% 2 Mid-Term Examination 20 - 30% 3 Class Activities: Quiz, Project, etc. 50 - 60% Minimum final mark to pass : B
Media employed	Whiteboard, LCD screen, laptop
Reading list	1. Garret Birkhof, 1967, Lattice Theory, American Mathematical Society 2. George Gratzer, 2009, Lattice Theory, First Concepts and Distributive Lattices, Dover Publications, Inc, New York 3. George Gratzer and Freiderich Wehrung, 2016, Lattice Theory, Special Topics and Applications, Vol. 2, Birkhauser 4. Viijay K. Garg, 2016, Introduction to Lattice Theory with Computer Science Applications, John Wiley & Son Inc, New Jersey.

CO-PLO Mapping

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

Compilation Date **:** September 12th 2023

Modified Date **:** February 10th 2024

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MODULE HANDBOOK

Module designation	Fundamental Algebra
Code, if applicable	MMM 7211
Subtitle, if applicable	Lattice Theory
Semester(s) in which the module is taught	1st or 2nd semester
Person responsible for the module	Chair of Algebra Laboratory
Language	Bahasa Indonesia
Relation to curriculum	Elective course
Teaching methods	Lecture, presentation, project
Workload (incl. contact hours, self-study hours)	Total workload is 232 hours per semester, which consists of 50 minutes lectures per week, 120 minutes structured activities per week, 120 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	Students master the concepts of logic and sets, algebraic structure theory and linear algebraic theory
Module objectives/intended learning outcomes	After taking this course, students will be able to: CO 1. clarify the concept, definitions of the topics in the lecture CO 2. prove properties related to the topic in the discussion. CO 3. formulate conjectures related to the material discussed. CO 4. generalize the concepts in the discussion into his research topics and validates them
Content	Advanced lattice theory, special properties and applications.
Examination forms	Oral presentation, essay, paper

Study and examination requirements	The final mark will be computed from a proportional weight of assignments, mid examination and final examination. The final mark will be weighted as follows: Weight (percentage) 1 Final Examination 20 - 30% 2 Mid-Term Examination 20 - 30% 3 Class Activities: Quiz, Project, etc. 50 - 60% Minimum final mark to pass : B
Media employed	Whiteboard, LCD screen, laptop
Reading list	1. Garret Birkhof, 1967, Lattice Theory, American Mathematical Society 2. George Gratzer, 2009, Lattice Theory, First Concepts and Distributive Lattices, Dover Publications, Inc, New York 3. George Gratzer and Freiderich Wehrung, 2016, Lattice Theory, Special Topics and Applications, Vol. 2, Birkhauser 4. Viijay K. Garg, 2016, Introduction to Lattice Theory with Computer Science Applications, John Wiley & Son Inc, New Jersey.

CO-PLO Mapping

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

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MODULE HANDBOOK

Module designation	Fundamental Algebra
Code, if applicable	MMM 7211
Subtitle, if applicable	Category Theory and Functors
Semester(s) in which the module is taught	1st or 2nd semester
Person responsible for the module	Head of Algebra Laboratory
Language	Bahasa Indonesia
Relation to curriculum	Elective course
Teaching methods	Lecture, presentation, project
Workload (incl. contact hours, self-study hours)	Total workload is 232 hours per semester, which consists of 50 minutes lectures per week, 120 minutes structured activities per week, 120 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	Students master the concepts of logic and sets, algebraic structure theory and linear algebraic theory.
Module objectives/intended learning outcomes	After taking this course, students will be able to: CO 1. clarify the concept, definitions of the topics in the lecture CO 2. prove properties related to the topic in the discussion. CO 3. formulate conjectures related to the material discussed. CO 4. generalize the concepts in the discussion into his research topics and validates them
Content	By categorical point of view, some materials from various algebraic and/or mathematical topics will be discussed.
Examination forms	Oral presentation, essay, paper.

Study and examination requirements	The final mark will be computed from a proportional weight of assignments, mid examination and final examination. The final mark will be weighted as follows: Weight (percentage) 1 Final Examination 20 - 30% 2 Mid-Term Examination 20 - 30% 3 Class Activities: Quiz, Project, etc. 50 - 60% Minimum final mark to pass : B
Media employed	Whiteboard, LCD screen, laptop
Reading list	1. Anderson, F.W., Fuller, K.R., 1992, Rings and Categories of Modules, Springer Verlag, New York. 2. Awodey, S., 2006, Category Theory, Clarendon Press, Oxford. 3. Schubert, H., 1972, Categories, Springer Verlag, Berlin. *4.* Wisbauer, R., 1991, Foundation of Module and Ring Theory, Gordon and Breach, Philadelphia.

CO-PLO Mapping

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO 6**
CO 1		**v**	**v**			
CO 2		**v**	**v**			
CO 3	**v**	**v**	**v**	**v**		**v**
CO 4				**v**		

Compilation Date **:** September 12th 2023

Modified Date **:** February 10th 2024

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MODULE HANDBOOK

Module designation	Fundamental Algebra
Code, if applicable	MMM 7211
Subtitle, if applicable	Fuzzy Logic
Semester(s) in which the module is taught	1st or 2nd semester
Person responsible for the module	Head of Algebra Laboratory
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the 1st or 2nd semester of doctor's degree
Teaching methods	Lecture, presentation, project
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	Students master the concepts of logic and sets, algebraic structure theory and linear algebraic theory
Module objectives/intended learning outcomes	After taking this course, students will be able to: CO 1. clarify the concept, definitions of fuzzy set and fuzzy logics CO 2. prove properties related to the fuzzy logics CO 3. formulate conjectures related to fuzzy logics and the research topics CO 4. generalize the concepts in the discussion into his research topics and validates them
Content	Materials from various topics about fuzzy set, fuzzy algebra, fuzzy logics, intuitionistic fuzzy logics, fuzzy number theory, fuzzy system, applications of fuzzy logic

Examination forms	Oral presentation, essay, paper
Study and examination requirements	The final mark will be computed from a proportional weight of assignments, mid examination and final examination. The final mark will be weighted as follows: No Assessment methods (components, activities) Weight (percentage) 1 Final Examination 20 - 30% 2 Mid-Term Examination 20 - 30% 3 Class Activities: Quiz, Project, etc. 50 - 60% To pass the course, the minimum grade is : B
Media employed	Whiteboard, LCD screen, laptop, zoom
Reading list	1. Chen, G. and Tat Pham, T. , 2001, Introduction to Fuzzy Sets, Fuzzy Logic, and Fuzzy Control Systems, CRC Press LLC, http://sc.uaemex.mx/xose/html/clases/logica/articles/libro_fuzzy_logic.pdf 2. James J. Buckley, J.J. and Eslami, E., 2002, An Introduction to Fuzzy Logic and Fuzzy Sets, Springer https://link.springer.com/book/10.1007%2F978-3-7908-1799-7 3. Krasimir T. Atanassov, 2013, Intuitionistic Fuzzy Sets, Theory and Applications, Springer-Verlag Berlin Heilderberg GmbH 4. Krasimir T. Atanassov, 2016, Intuitionistic Fuzzy Logics, Springer 5. Klir, G.J., and Bo Yuan, 1995, Fuzzy Sets, Fuzzy Logic, and Fuzzy Systems, Selected paper by Lotfi A. Zadeh, World Scientific 6. W.B. Vasantha Kandasamy, 2003, Smarandache Fuzzy Algebra, American Research Press 7. Setiadji, 2009, Himpunan dan Logika Samar dan Aplikasinya, Graha Ilmu *8*. Barnabas Bede, 2012, Mathematics of Fuzzy set and Fuzzy Logic, Springer

CO-PLO Mapping

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

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