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**Master Program in Mathematics**

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**MODULE HANDBOOK**

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| Module Name | Descriptive set theory |
| Module level, if applicable | Master |
| Code, if applicable | MMM-6105 |
| Subtitle, if applicable | |
| Courses, if applicable | Descriptive set theory |
| Semester(s) in which the module is taught | 3rd (third) |
| Person responsible for the module | Chair of Analysis Research Group |
| Lecturer(s) | Atok Zulijanto, S.Si.,M.Si.,Ph.D. |
| Language | Bahasa Indonesia |
| Relation to curriculum | Elective course in the second year (3rd semester) master's degree |
| Teaching methods | Lecture, classroom discussion, and presentation. |
| Workload (incl. contact hours, self-study hours) | The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam. |
| Credit points | 3 |
| Required and recommended prerequisites for joining the module | Students have taken the module of Analysis I (MMM-5101) and have participated in the final exam of the module.<br>Before taking this course, students must have a good understanding about metric spaces and topology. |

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| Module objectives/intended learning outcomes | After completing this course, the students should have:<br>CO 1. Ability to analyze and prove properties of metrizable spaces and Polish spaces.<br>CO 2. Ability to analyze and prove properties related to functions on metrizable spaces.<br>CO 3. Ability to analyze and prove properties of Borel sets in a topological space.<br>CO 4. Ability to analyze and prove properties related to analytic sets. |
| Content | Ordinal and cardinal numbers : well-ordered sets, ordinal numbers, cardinal numbers.<br>Metrizable spaces and Polish spaces : metrizable spaces, trees, Polish spaces, extensions of continuous functions and homeomorphism on metrizable spaces, Polish subspaces of Polish spaces, Hilbert cube, Vietoris topology, Cantor-Bendixson derivatives, zero-dimensional spaces.<br>Borel sets : The Borel Hierarchy, standart Borel spaces.<br>Analytic sets : Representations of analytic sets, separations theorems. |
| Examination forms | Essay |
| Study and examination requirements | The final mark will be weighted as follows:<br>No — Assessment methods (components, activities) — Weight (percentage)<br>1 — Final Examination — 35 - 45%<br>2 — Mid-Term Examination — 30 - 40%<br>3 — Class Activities: Quiz, Homework, Presentation, etc. — 25 - 30% |
| Media employed | Board, LCD Projector, Laptop/Computer |
| Reading list | 1. Kechris A.S., 1994, *Classical Descriptive Set Theory*, Springer-Verlag, Berlin.<br>2. Srivastava S.M., 1998, *A course on Borel Sets*, Springer-Verlag, New York.<br>3. Dugundji J., 1966, *Topology*, Allyn and Bacon. Inc, Boston. |

**CO-PLO Mapping**

| | PLO – 1<br>S2 Mat | PLO – 2<br>S2 Mat | PLO – 3<br>S2 Mat | PLO – 4<br>S2 Mat | PLO – 5<br>S2 Mat | PLO –6<br>S2 Mat |
|---|---|---|---|---|---|---|
| **CO 1** | V | | V | | V | |
| **CO 2** | V | | V | | V | |
| **CO 3** | V | | V | | | |
| **CO 4** | V | | V | | | |

**Compilation Date :**

**Modified Date : August 7th, 2022**