# Undergraduate Programme in Mathematics

**Module name**  
Introduction to Mathematical Models

**Module level, if applicable**  
Bachelor

**Code, if applicable**  
MMM-3303

**Subtitle, if applicable**

**Courses, if applicable**  
Introduction to Mathematical Models

**Semester(s) in which the module is taught**  
5th (fifth)

**Person responsible for the module**  
Chair of the Lab. of Applied Mathematics

**Lecturers**  
Dr. Fajar Adi Kusumo, M.Si. and Dr. Irwan Endrayanto A., M.Sc.

**Language**  
Bahasa Indonesia

**Relation to curriculum**  
Compulsory course in the third year (5th semester) Bachelor Degree

**Type of teaching, contact hours**  
150 minutes lectures and 180 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

**Requirements according to the examination regulations**  
Students have taken Introduction to Mathematical Models course (MMM-3303) and have an examination card where the course is stated on.

**Recommended prerequisites**  
Students have taken Introduction to Partial Differential Equations course (MMM-2310), Introduction to Probability Model course (MMM-2410), and have participated in the final examination of the course. Before taking this course, students must have a good understanding about the concepts of differential equations (ODE and PDE), and some basic concepts on Probability Model.

**Module objectives/intended learning outcomes**  
After completing this course, the students will have:

- CO 1. ability to formulate the mathematical model due to the problems.
- CO 2. ability to connect the simple real problem with the concepts on Mathematics.
- CO 3. ability to interpret the mathematical result on a model to the original problems.
- CO 4. ability to formulate some complex problems, e.g. physics problems, medical problems, biological problems, etc., which are to be modeled.
- CO 5. ability to interpret the results of the modeling analysis due to other disciplines.

**Content**  
Topics:

- a. Motivation of Mathematical Modeling
- b. Basic concept of Mathematical Modeling
- c. Some simple mathematical models and their analysis.
- d. Mathematical modeling based on the system of the differential equations
- e. Mathematical modeling based on the probability and optimization.

**Study and examination requirements and forms of examination**  
The final mark will be weighted as follows:

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<th>No</th>
<th>Assessment methods (components, activities)</th>
<th>Weight (percentage)</th>
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<tr>
<td>1</td>
<td>Final Examination</td>
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<td>2</td>
<td>Mid-Term Examination</td>
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<td>3</td>
<td>Presentation</td>
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<td>4</td>
<td>Class Activities: Quiz, Homework, etc.</td>
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The initial cut-off points for grades A, B, C, and D should not be less than 80%, 70%, 50%, and 40%, respectively.

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<th>Media employed</th>
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<td>Reading List</td>
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### PLO and CO Mapping

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