**Undergraduate Programme in Mathematics**

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**MODULE HANDBOOK**

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| Module name | Biological Mathematics |
| Module level, if applicable | Bachelor |
| Code, if applicable | MMM-2303 |
| Subtitle, if applicable | - |
| Courses, if applicable | Biological Mathematics |
| Semester(s) in which the module is taught | 4th (fourth) |
| Person responsible for the module | Chair of the Lab. of Applied Mathematics |
| Lecturer(s) | Dr. Fajar Adi Kusumo and Dr. Lina Aryati |
| Language | Bahasa Indonesia |
| Relation to curriculum | Elective course in the second year (4th semester ) Bachelor Degree |
| Type of teaching, contact hours | 150 minutes lectures and 180 minutes structured activities 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 Biological Mathematics course (MMM-2303) and have an examination card where the course is stated on. |
| Recommended prerequisites | Students have taken Elementary Differential Equations course (MMM-2301), Introduction to Probability Model course (MMM-2410), and have participated in the final examination of the course.<br>Before taking this course, students must have a good understanding about some concepts on Probability, Differential Equations, and Stability. |
| Module objectives/intended learning outcomes | Upon successful completion, students<br>CO 1: are able to solve simple problems on Genetic.<br>CO 2: are able to solve simple problems Pharmacology.<br>CO 3: are able to solve simple problems on Population Growth.<br>CO 4: are able to solve a simple problem on Epidemiology in order to handle more complicated problems. |
| Contents | 1. Genetics.<br>2. Pharmacology.<br>3. Discrete Population Growth.<br>4. Continuous Population Growth: Single and Two species.<br>5. Epidemiology: SIR and SIS |
| Study and examination requirements and forms of examination | 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:<br><br>No    Assessment methods (components, activities)    Weight (percentage)<br>1      Final Examination    30<br>2      Mid-Term Examination    30<br>3      Project and Presentation    25<br>4      Other Activities: Quiz, Homework, etc.    15 |

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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. | |
| Media employed | Boards, projectors, Laptop/Computer | |
| Reading List | 1. B. Barnes, and G.R. Fulford, 2002, *Mathematical Modelling with Case Studies,* Taylor & Francis, London.<br>2. Fred Brauer, and Carlos Castillo-Chavez, 2001, *Mathematical Models in Population Biology and Epidemiology,* Springer Verlag, New York.<br>3. Stanley I. Grossman, and James E. Turner, 1974, *Mathematical for Biological Sciences,* MacMillan Publishing Co., Inc., New York.<br>4. Jagat Narain Kapur, 1985, *Mathematical Models in Biology & Medicine,* Affiliated East-West Press Private Limited, New Delhi. | |

## PLO and CO Mapping

| | PLO 1 | PLO 2 | PLO 3 | PLO 4 | PLO 5 | PLO 6 | PLO 7 | PLO 8 | PLO 9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO 1** | | | | | | v | | | |
| **CO 2** | | v | | | v | v | | | v |
| **CO 3** | | v | | | v | v | | | v |
| **CO 4** | | v | | | v | v | v | | v |