



**THE MODULE HANDBOOK**  
**DOCTOR BIOLOGICAL SCIENCES STUDY PROGRAM**  
**FACULTY OF BIOLOGY**

**SELECTED TOPIC FOR DISSERTATIONS**

**Bioprocess and Bacterial Biomolecular**

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| <b>Course code</b>                                               | BIDB203167                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Course level</b>                                              | Doctoral Program                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Semester/ term</b>                                            | Odd/even                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Course coordinator</b>                                        | Prof. Dr. Endah Retnaningrum, S.Si., M.Eng.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Lecture(s)</b>                                                | Prof. Dr. Endah Retnaningrum, S.Si., M.Eng.<br>Prof. Dr. apt. Ratna Asmah Susidarti, M.S.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Language</b>                                                  | Indonesian/English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Classification within the Curriculum</b>                      | Compulsory Specialization Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Teaching format/ class hours per week during the semester</b> | This course is planned to have 14 teaching weeks and 2 weeks of examination.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Workload</b>                                                  | 1,125 hours/day<br>5 days/week<br>5,625 hours/week<br>16 Weeks/Semester<br><br>total workload : 90 hours/3,6 ECTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Credits</b>                                                   | 3.6 ECTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Requirements</b>                                              | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Program Learning Outcome</b>                                  | CPL 2.1. Upon completing this program, the graduates demonstrate an understanding of the scientific philosophy of biology which is related in depth to structure, function, diversity, reproduction, evolution and engineering of biological systems.<br>CPL 2.2. After attending this program, graduates demonstrate an understanding of substantial and leading theory in the field of biology/biological resources in order to support education for sustainable development<br>CPL 3.1. After completing this program, the graduates will be able to discover or develop new scientific theories/concepts/ideas in biology |
| <b>Course Learning Outcome</b>                                   | BIDB203167.1 By the end of this course, students gain knowledge and understanding of bacterial diversity from both macroenvironment and microenvironment, including exploration, screening, polyphasic                                                                                                                                                                                                                                                                                                                                                                                                                         |



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|                           | <p>identification, and their applications for human welfare.</p> <p>BIDB203167.2 By the end of this course, students will be able to analyze analyze the cellular, metabolic, and genetic characteristics of bacteria and apply this knowledge to assess bacterial communities, particularly in relation to their dissertation research</p> <p>BIDB203167.3 By the end of this course, students will be able to manage, lead, and develop research utilizing bacterial strains with superior traits for bioprocesses in the production of various products, including bacterial enzymes, bioactive compounds, and molecular transformation processes</p> <p>BIDB203167.4 By the end of this course, students will be able to solve human life challenges through bioprocess technology related to the design and development of equipment and processes for producing various products such as functional foods, pharmaceuticals, chemicals, agricultural products, and wastewater treatment.</p> |
| <b>Course Description</b> | <p>This course studies bacterial diversity from both macroenvironment and microenvironment, including exploration, screening, polyphasic identification, and their applications for human welfare. The study covers cellular, metabolic, and genetic characterization useful for assessing bacterial communities. Additionally, the course examines the utilization of bacterial strains with superior traits in the development of bioprocesses for producing various products, including bacterial enzymes, bioactive compounds, and molecular transformation processes. The course also reviews bioprocess technology related to the design and development of equipment and processes for manufacturing products such as functional foods, pharmaceuticals, chemicals, agricultural products, and wastewater treatment. Recent research related to bacterial diversity is incorporated into each topic, enabling students to analyze and solve relevant problems.</p>                         |
| <b>Assessments</b>        | <p>The assessment for Selected Topic for Dissertations (Bioprocess and Bacterial Biomolecular) is based on two main components, with the respective criteria and weights:</p> <p>A. Participatory Activity (20%)</p> <ul style="list-style-type: none"><li>• Final-Term Exam (30%)</li><li>• Participation (10%)</li></ul> <p>B. Project (80%)</p> <ul style="list-style-type: none"><li>• Mid-Term Exam (30%)</li><li>• Stuctured Assignment/Task (30%)</li><li>• Project Result/Case Study/Project Based Learning result (20%)</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |



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**Study Media  
and Literature**

**Main**

1. Madigan, M.T., Martinko, J.M. & Parker, J. 2000. Biology of Microorganisms, Prentice Hall International, Inc.

**Additional**

2. Sivasubramanian, V. 2018. Bioprocess Engineering for a Green Environment. Taylor & Francis Group.
3. Reddy, S. M., Singaracharya, M. A. & Girisham, S. 2021. Microbial Diversity: Exploration & Bioprospecting. Scientific Publishers
4. Kartan, P. 2017. Advances in Bioprocess Technology. Delve Publishing