

Module Handbook of Microbial Genetics

Module designation	The Microbial Genetics is a course intended to Agricultural Microbiology student at Faculty of Agriculture. This course discuss about the basic of microbial genetics, microbial genome, and their application on synthetic biology, genetic transformation, genetic of pathogenic microbes, genetic analysis methods, mutation, and DNA recombinant.
Semester(s) in which the module is taught	Third Semester
Person responsible for the module	Prof. Ir, Triwibowo Yuwono, Ph.D.
Language	Bahasa Indonesia/Indonesian Language
Relation to curriculum	<i>Compulsory Course</i>
Teaching methods	Lecture are conducted in the class with 30-40 students. In every meeting, there will be delivered interactive lecture and discussion. In some topics there will be quizzes, individual and/or group assignment. Details: 1. Lectures 2. Assignment (Individual and Group) 3. Discussion 4. Midterm 5. Final Exam 6. Laboratory Work
Workload (incl. contact hours, self-study hours)	<ul style="list-style-type: none"> - Lectures = 2 SKS x 50 minutes x 16 meetings = 1.600 minutes = 26,67 hours = 26,67 hours/30hours = 0,89 ECTS - Assignment = 2 SKS x 60 minutes x 16 meetings = 1.920 minutes = 32 hours = 32 hours/30hours = 1,07 ECTS - Self Study = 2 SKS x 60 minutes x 16 meetings = 1.920 minutes = 32 hours = 32 hours/30hours = 1,07 ECTS - Practicum = 1 SKS x 170 minutes x 16 meetings = 2.720 minutes = 45,33 hours = 45,33 hours/30hours = 1,51 ECTS <p>Total Workload = 4,54 ECTS</p>
Credit points	<i>2/1 Credit Points</i>
Required and recommended prerequisites for joining the module	<i>Biology of Microorganism</i>

<p>Module objectives/intended learning outcomes</p>	<p><i>Program Learning Outcomes (PLO):</i></p> <p><i>PLO1: Able to explain theoretical concepts of biology microorganism and develop microbial-based technology to increase plant production and environmental services.</i></p> <p><i>PLO2: Able to describe the latest methodology in the field of microbiology to create environmentally friendly and sustainable agricultural development.</i></p> <p><i>PLO3: Able to select, utilize and manage the potential of microbes and microbiomes to build industrial and agricultural systems.</i></p> <p><i>Course Learning Outcomes (CLO):</i></p> <p><i>CLO1: Able to explain genetics in general and genetics in microbes.</i></p> <p><i>CLO2: Able to explain various techniques and developments in microbial genetics and their benefits in various fields.</i></p> <p><i>CLO3: Able to carry out basic DNA recombination techniques and operate the tools used in these activities.</i></p>
<p>Content</p>	<ol style="list-style-type: none"> 1. <i>Introduction: Contracts, terminology of microbial genetics and the role of microbial genetics in the development of other sciences. (1 meeting)</i> 2. <i>The microbial genome and its organization. (1 meeting)</i> 3. <i>Microbial genetics and transformation. (1 meeting)</i> 4. <i>Yeast genetics. (1 meeting)</i> 5. <i>Development of microbial genetics and its application in synthetic biology. (1 meetings)</i> 6. <i>Transduction. (1 meeting)</i> 7. <i>Conjugation. (1 meeting)</i> 8. <i>Genetics of insect pathogenic bacteria. (1 meeting)</i> 9. <i>Fundamentals of microbial genome analysis. (1 meeting)</i> 10. <i>Mutation and mutagenesis. (1 meeting)</i> 11. <i>Non-chromosomal genetic materials. (1 meeting)</i> 12. <i>Genetics of N-fixing bacteria. (1 meeting)</i> 13. <i>Basic techniques of recombinant DNA. (1 meeting)</i> 14. <i>Materials Review. (1 meeting)</i>
<p>Examination forms</p>	<p><i>High Order Thinking Skills Examination</i></p>
<p>Study and examination requirements</p>	<p><i>To be able to take the final exams, the minimum of student attendance is 70% out of effective meetings. From 14 meetings, students must take a minimum of 10 meetings to take the exam.</i></p>

Reading list	<p><i>Main References:</i></p> <ol style="list-style-type: none">1. Benjamin A. Pierce. 2014. <i>Genetics. A Conceptual Approach. Fifth edition.</i> W.H. Freeman and Co2. Larry Snyder, Joseph E. Peters, Tina M. Henkin, Wendy Champness. 2013. <i>Molecular Genetics of Bacteria. 4th edition.</i> ASM Press, Washington.3. Michael T. Madigan, Kelly S. Bender, Daniel H. Buckley, W. Mathew Sattley, David A. Stahl. 2019. <i>Brock Biology of Microorganisms. 15th edition.</i> Pearson, New York.4. Sheela Srivastava. 2013. <i>Genetics of Bacteria.</i> Springer. <p><i>Additional References:</i></p> <ol style="list-style-type: none">1. <i>Related journals on the development of microbial genetics and synthetic biology</i>2. <i>Microbial Genetics laboratory guide book</i>
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