

Module Handbook

Modul Name	Fundamental of Biotechnology
Modul Level	Bachelor
Abbreviation, if applicable:	BIT300
Sub---heading, if applicable:	-
Courses included in the module, if applicable:	-
Semester	Even (6 th Semester)
Module Coordinator	Dr. Sri Puji Astuti W., M.Si.
Lectures	Prof. Win Darmanto, M.Si.,Ph.D.
Language	Bahasa Indonesia
Classification within the curriculum:	Compulsory Course / Elective Studies
Teaching format/ class hours per week during semester	300 minutes/ week
Workload per semester	100 min lecture + 100 min structural assignment + 100 min self-assignment x 13 weeks; total 3900 min = 65 hours 65/25 = 2.6 ECTS
Credit point	2
Requirements	General Biology, Molecular Genetics, General Microbiology
Learning goals/competencies	<p>General Competence (knowledge)</p> <p>Students are able to explain the definition and history of biotechnology, differentiate several types of conventional and modern biotechnology, explain the modern biotechnology principles including genetic structure and materials, explain the genetic changes in living organism including mutation, recombination, transposition, DNA technology, and comparing several types of biotechnology branches.</p> <p>Specific Competence</p> <ol style="list-style-type: none"> 1. Students are able to explain the definition and history of biotechnology development, supporting technology for modern biotechnology, strength and weakness of conventional and modern biotechnology 2. Students are able to explain the cell doctrine, the grouping of cellular bodies, prokaryotic cell, eukaryotic cell, virus, cell component, protein, and biocatalyst 3. Students are able to explain DNA as a genetic material, nucleic acid, RNA structure, DNA in prokaryotic and eukaryotic cell, genomic virus organism 4. Students are able to explain mutation, spontaneous mutation, reverse mutation, metagenesis, recombination, transposition 5. Students are able to explain DNA cloning technique, DNA cloning application, practical application of DNA technology 6. Students are able to explain the basic principles of microbe's cultivation, the use of microbes in biotechnology industry, improving microbe's physiology ability 7. Students are to explain nitrogen fixation by microbes, symbiosis between Rhizobium-Legume, mechanism of nitrogen fixation in the roots, basic techniques to make organic Fertilizer, Rhizobium cultivation and multiplication techniques, the use of VAM fungi as organic fertilizer.

	<p>8. Students are able to explain the basic technique of in vitro culture of plant, the media for in vitro culture, in vitro regeneration techniques, the application of in vitro culture technique.</p> <p>9. Students are able to compare process industrial wastewater treatment.</p> <p>10. Students are to explain the use of microbes as pesticide, developing transgenic pest resistant plant, biological control of plant pathogen, genetic engineering application for biological control</p> <p>11. Students are able to present the result of research and study of international journals in the field of microbial biotechnology</p> <p>12. Students are able to present the result of research and study of international journals in the field of plant biotechnology</p> <p>13. Students are able to present the result of research and study of international journals in the field of animal/human biotechnology</p>
Content	<p>Introduce the concepts of biotechnology, its cope and application. Explain the principles of genetic engineering. Explain the structure of DNA and RNA and its characteristics. Drawing the schematic concept of genetic engineering processing (isolation, restriction, insertion, detection DNA in transforming). Demonstration for DNA fragment analytical technique in transforming. Explain the function of vectors.</p>
Soft skill Attribute	Discipline and Argumentation
Study/ exam achievements	<p>Students are considered to be competent and pass if at least get 40% of maximum. Final score (NA) is calculated as follow: Paper project (30%), mid exam (30%), final exam (30%), soft skill (10%)</p> <p>Final index is defined as follow:</p> <p>A : 75 - 100</p> <p>AB : 70 - 74.99</p> <p>B : 65 - 69.99</p> <p>BC : 60 - 64.99</p> <p>C : 55 - 59.99</p> <p>D : 40 - 54.99</p> <p>E : 0 - 39.99</p>
Form of media	LCD, computer
Learning Method	Class and discussion
Literature	<p>a. Suharto. 1995. <i>Bioteknologi dalam dunia industri</i>, Andi Offset, Yogyakarta</p> <p>Nasir, M. 2002. <i>Bioteknologi Molekuler, Teknik rekayasa genetika tanaman</i>. PT Citra Bakti, Bandung</p> <p>b. Albert, B, Bray, D., Lewis, J., Raff, M.,Robert, K., and Watson, J.D. 1989. <i>Molecular biology of the cell</i>. Garland Publishing, Inc, New York.</p> <p>c. Glick, B. R., and Paternak, J.J. 1994. <i>Molecular biotechnology: Principles and applications of recombinant DNA</i>. American Society for Microbiology, Washington, DC</p> <p>d. Watson, J. D., Gilman, M., Witkowski, J. dan Zoller, M. 1992. <i>Recombinant DNA</i>. Scientific American Books, New York, 2nd edition.</p>
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