UNIVERSITAS NEGERI YOGYAKARTA

FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF SCIENCE EDUCATION
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Bachelor of Education in Science **MODULE HANDBOOK**

Module name:	**Biotechnology**
Module level,ifapplicable:	Undergraduate
Code:	IPA-6243 / BIM6223
Sub-heading,ifapplicable:	-
Classes,ifapplicable:	-
Semester:	6td
Module coordinator:	Ir. Ekosari Roektiningroem, MP.
Lecturer(s):	Ir. Ekosari Roektiningroem, MP.
Language:	Bahasa Indonesia
Classification within the curriculum:	Compulsory Course
Teaching format / class hoursperweekduring the semester:	100 minutes lectures and 120 minutes structured activities per week.
Workload:	Total workload is 90,67 hours per semester which consists of 100 minutes lectures, 120 minutes structured activities, and 120 minutes individual study per week for 16 weeks.
Credit points:	2
Prerequisites course(s):	General Biology 2nd (IPA6206),
Targeted learning outcomes:	After taking this course 1. students are expected to be able to understand & have insight into the description of the development of biotechnology, which includes: a. Tissue Culture b. Cloning & Genetic Engineering c. GMO Plants & Livestock in Agricultural Biotechnology, d. Biotechnology in Pharmacy & Medical (production of drugs, Recombinant Vaccine & Insulin, gene therapy, diagnosis & instruments: Biosensor - Biochip).

<table>
<tr><td></td><td>e. Biotechnology for Bioenergy production
f. Biotechnology in Industry (among others in the production of enzymes/catalase, MSG, Citric Acid, Vitamin C, & Renin/Chimosin)
g. Biotechnology in Environmental (remediatition)
2. students are able to make food by fermentation processes (such as tempe, tape, cheese, yogurt etc.), and are able to design, and carry out experimental experiments on making fermented foods, and analyze, discuss, conclude and communicate with the exhibition model.</td></tr>
<tr><td>Content:</td><td>This course discusses and develops competencies regarding the description of technological developments in the application of basic biological concepts, which include: Tissue Culture, Cloning, Genetic Engineering, Agricultural & Food Biotechnology, Pharmaceuticals & Medicine, Energy & Industry, and the Environment..</td></tr>
<tr><td>Study/examachievements:</td><td>Attitude assessment is carried out at each meeting by observation and / or self-assessment techniques using the assumption that basically every student has a good attitude. The student is given a value of very good or not good attitudeif they show it significantlycompared to other students in general. The result of attitude assessment is not a component of the final grades, but as one of therequirements to pass the course. Students will pass from this course if at least have a good attitude.

The final mark for each LO will be weight as follow:

<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1
CO2,</td><td>a. Individual Assignment
b. Group Assignment
c. Mid
d. Final Exam</td><td>Presentation / written test</td><td>15%

15%
15%
25%
30%</td></tr>
<tr><td colspan="4">Total</td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Formsof media:</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Literature:</td><td>A. Compulsory
1. Prentis, S. 1985. Bioteknologi. Terjemahan. Jakarta: Erlangga,.
2. Yuwono, T. 2005. Biologi molekular. Jakarta: Erlangga,
3. ---------- 2008. Bioteknologi Pertanian. Jakarta: Erlangga,
4. Sudjadi. 2008. Bioteknologi kesehatan. Yogyakarta: Kanisius.
5. Wetter, LR. & F Constabel. 1982. Metoda kultur jaringan tanaman. Terjemahan. Bandung: Penerbit ITB.

Recommendations
1. Smith, John E. 2004. Biotechnology. 4th-ed. 266p.
2. Bergeron, B. & Paul Chan. 2004. Biotecnology Industry. A</td></tr>
</table>

	global, economic & financing over view. John Wiley & Sons Inc. New Jersey. 3. Campbell, Neil A., Jane B. Reece, & Lawrence G. Mitchell. 2002. Biologi. Erlangga, Jakarta. 3 jilid; 210 x 280 cm. 4. Muhammad, S.A. 1991. Pengantar Kloning Gen. Yayasan Esentia Medica Yogyakarta 5. Watson, James D., Tooze, John, Kurtz, David T. 1988. DNA Rekombinan. Penerbit Erlangga Jakarta **Internet source.** 1. Helmut Kae (2003). The New Macdonald Pharm. http://www.scq.ubc.ca/the-new-macdonald-pharm/ 2. Prosedur Sapi ternak transgenik dari 3. http://www.fao.org/docrep/004/T0094E/T0094E03.htm 4. Kloning: https://www.ncbi.nlm.nih.gov/pmc/ articles/ PMC521203/ & pdf dari https://pdfs.semanticscholar.org/ fb26/ 0e5b6f3a06c9ee3771fa0442c813d1031225.pdf

PLO and CO mapping

	PLO											
	Attitude			Knowledge				Spesific SKill				
	PLO1	PLO2	PLO3	PLO1	PLO2	PLO3	PLO4	PLO1	PLO2	PLO3	PLO4	PLO5
CO1					✓							
CO2					✓	✓	✓		✓	✓	✓	✓