



Course Module
Department of Animal Science
Faculty of Animal Science
Universitas Brawijaya

Module Name	Microbiology
Module Level	Undergraduate Study Program of Animal Science
Code	PET60001
Subtitle	-
Course	Microbiology
Semester(s)	2
Person responsible for the module	Dr. Abdul Manab, S.Pt, MP
Lecturer	<ol style="list-style-type: none"> 1. Dr. Abdul Manab, S.Pt, MP 2. Prof. Ir. Hendrawan Soetanto M.Rur.Sc., Ph.D. 3. Prof. Dr.Ir. Lilik Eka Radiati MS., IPU 4. Prof. Dr. Ir. Djalal Rosyidi, MS 5. Dr.Ir. Osfar Sofjan M.Sc. IPU, ASEAN Eng 6. Dr. Ir. Marjuki, M.Sc 7. Dr. drh. Rositawati, MS 8. Dr. Ir. Siti Nurul Kamaliyah, MP 9. Dr. Agus Susilo, S.Pt., MP 10. Dr. Khotibul Umam Al-Awwaly, S.Pt., M.Si 11. Dr. Herly Evanuarini, S.Pt., MP 12. Dr. Abdul Manab, S.Pt, MP 13. Dr. Dedes Amertaningtyas, S.Pt, MP 14. Dr. Premy Puspitawati Rahayu, S.Pt, MP 15. Ria Dewi Andriani, S.Pt, M.Sc 16. Mulia Winirsya Apriliyani, S.Pt, MP
Language	Indonesian language
Relation to curriculum	Study Program: Animal Science Specialization: Animal Production, Animal Nutrition and Food, and Animal Product Technology Type: Compulsory/elective
Type of teaching, contact hours	<ol style="list-style-type: none"> 1) Lecture: 100 minutes/meeting (14 meetings) 2) Practicum: 150 minutes/meeting (14 meetings) 3) Structured Assignments/quiz/group presentation: 4) Attendance: 80% of the total attendance
Workload	Estimated total and detailed study load The duration of the meetings (lectures, practicum, review session, etc.) and independent study, including exam preparation.
Credit points	3 credits (5,1 ECTS)
Requirements according to the examination	-

regulations	
Recommended prerequisites	-
Module objectives/intended learning outcomes	<ol style="list-style-type: none"> 1. ILO 6: Able to apply biological science, physiology, nutrition science, breeding science, animal raising management to comprehend the concept and implement it in the field of animal science. 2. ILO 7: Able to demonstrate independent, quality, and measurable performance (both quality and quantity) effectively, efficiently, and sustainably. 3. ILO 8 : Able to cooperate effectively and carry out a self-evaluation process towards the workgroup under their responsibility. 4. ILO 12 : Able to design and conduct experiments, analyze and interpret data to make correct decisions in solving problems in the field of animal science, meet ethics, and have environmental insight.
	<p>Knowledge:</p> <p>Knowledge of the various types, roles, and functions of microbes in life with case examples in animals, animal feed, and animal products that can affect the quality of life of the relevant animals and consumer society</p>
	<p>Skills:</p> <p>Cognitive To identifying, breeding and counting the number of microbes in a medium</p> <p>Phsycomotoric Introduction of equipment and materials needed for microbiological observation and SOP in the field of microbiological analysis</p>
	<p>Competences:</p> <p>Student can apply of microbiology in the field of animal science</p>
Content	<p>Courses:</p> <ol style="list-style-type: none"> 1. Introduction 2. Development of Microbiology 3. Types of Microbes (structure and function of microbial cells) 4. Microbial Reproduction 5. Basic Techniques of Microbiology 6. Applications of Microbiology in the field of Animal Science
Study and examination requirements and forms of examination	<ol style="list-style-type: none"> 1. Midterm Exam 2. Final Exam 3. Practicum 4. Structured Assignments 5. Quiz 6. Attendance <p>How to score: Minimum 80% attendance The final score of all the components of the PBM evaluation The final score component: 25% Midterm Exam 25% Final Exam 25% Practicum 15% Structured Assignments 5% Quiz 5% Attendance</p>

	<p>A : 80 < Final Score ≤ 100 B+ : 75 < Final Score ≤ 80 B : 69 < Final Score ≤ 75 C+ : 60 < Final Score ≤ 69 C : 55 < Final Score ≤ 60 D : 50 < Final Score ≤ 55 D+ : 44 < Final Score ≤ 50 E : 0 < Final Score ≤ 44</p>
Media employed	Class, Online learning system (Zoom and Google Classroom)
Reading list	<p>Handbooks: Radiati, L E., Andriani RD., Apriliyani MW., and Rahayu PP. 2020. Mikrobiologi Dasar Hasil Ternak. UB Press, Malang. Soetanto, H. 2019. Pengantar Ilmu Nutrisi Ruminansia. UB Press, Malang. Sjofjan, O., M.H. Natsir., Irfan HD., 2019. Ilmu Nutrisi Ternak Non Ruminansia. UB Press, Malang.</p> <p>Textbooks: Buckle, K.A, R.A Edward, G.H Fleet, and M. Wooton. 1987. Ilmu Pangan. Terjemahan Hari Purnomo. Jakarta: Universitas Indonesia Press. Capuccino, J. G. and Natalie S. 2000. Microbiology A Laboratory Manual. Benjamin/Cummings Publishing Company Inc., Menis Park, California. Dehority, B.A, 2003. Rumen microbiology. Nottingham University Press; 1 edition. Fuller, Sheryl L. 2007. General Microbiology Laboratory –BIO 308L-. www.mhhe.com Hobson, P.N., 19 The Microflora of the Rumen. http://www.microbiologytext.com/index.php?module=Book&func=displayarticlesinchapter&chap_id=32 John G. Holt. 1994. Bergey's Manual of Determinative Bacteriology. Lippincott Williams & Wilkins. Michael T. Madigan, John M. Martinko, David A. Stahl, and David P. Clark. 2010. Brock Biology of Microorganism (13th Edition). Benjamin Cummings. Ogimoto, and Imai,,1981. An Atlas of Rumen Microbiology. Powar and Daginawala. 2010. General Microbiology. Himalaya Publishing House. Radiati, LE. 2009. Mekanisme Antimikroba. Lab. Faal FK. UB Reynolds, Jackie. 2005. Lab Procedures Manual Biol. 2421 Lab Manual. ww.rlc.dcccd.edu.</p> <p>Journals: Food Control. https://www.sciencedirect.com/journal/food-control FEMS Microbiology Reviews. https://www.sciencedirect.com/journal/fems-microbiology-reviews/issues Applied and Environmental Microbiology. https://aem.asm.org/</p>

Headings, if available	-
Course Coordinator	
Linkages with the Curriculum	Study Program: Animal Science Specialization: Animal Production, Animal Nutrition and Food, and Animal Product Technology Sifat: Wajib/ Pilihan
Learning Methods and Duration	1) Lecture: 100 minutes/meeting (14 meetings) 2) Practicum: 150 minutes/meeting (14 meetings) 3) Structured Assignments/quiz/group presentation: 4) Attendance: 80% of the total attendance
Student Study Load	Estimated total and detailed study load The duration of the meetings (lectures, practicum, review session, etc.) and independent study, including exam preparation.
Credit Weight	
Requirements for Passing the Course	Minimum 80% attendance The final score of all the components of the PBM evaluation The final score component: 25% Midterm Exam 25% Final Exam 25% Practicum 15% Structured Assignments 5% Quiz 5% Attendance
Prerequisite Course	Biology
Learning Outcomes	

Learning Content	<p>Course Learning Outcomes:</p> <ol style="list-style-type: none"> 1. Able to explain the development of microbiology science 2. Able to recognize the variety of microbes and the role of microbial reproduction 3. Able to apply basic microbiology techniques 4. Able to apply microbiology in the animal industry with the added value of feed ingredients and animal products <p>Topics:</p> <ol style="list-style-type: none"> 1. Development of Microbiology 2. Variety of microbes (structure and function of microbial cells) 3. Microbial Reproduction 4. Basic Microbiology Techniques 5. Applications of Microbiology in the Animal Science Industry
Test Terms and Forms	<p>Minimum 80% attendance to attend Final Exam Multiple Choices/Essay/Group Presentation/etc.</p>
Learning Media	<p>Projector and screen, VLM, SPADA, Google Classroom</p>
References	<p>Handbooks: Radiati, L E., Andriani RD., Apriliyani MW., and Rahayu PP. 2020. Mikrobiologi Dasar Hasil Ternak. UB Press, Malang. Soetanto, H. 2019. Pengantar Ilmu Nutrisi Ruminansia. UB Press, Malang.</p>

Sjofjan, O., M.H. Natsir., Irfan HD., 2019. Ilmu Nutrisi Ternak Non Ruminansia. UB Press, Malang.

Textbooks:

Buckle, K.A, R.A Edward, G.H Fleet, and M. Wooton. 1987. Ilmu Pangan. Terjemahan Hari Purnomo. Jakarta: Universitas Indonesia Press.

Capuccino, J. G. and Natalie S. 2000. Microbiology A Laboratory Manual. Benjamin/Cummings Publishing Company Inc., Menis Park, California.

Dehority, B.A, 2003. Rumen microbiology. Nottingham University Press; 1 edition.

Fuller, Sheryl L. 2007. General Microbiology Laboratory –BIO 308L-. www.mhhe.com

Hobson, P.N., 19 The Microflora of the Rumen.

http://www.microbiologytext.com/index.php?module=Book&func=displayarticlesinchapter&chap_id=32

John G. Holt. 1994. Bergey's Manual of Determinative Bacteriology. Lippincott Williams & Wilkins.

Michael T. Madigan, John M. Martinko, David A. Stahl, and David P. Clark. 2010. Brock Biology of Microorganism (13th Edition).

Benjamin Cummings. Ogimoto, and Imai, 1981. An Atlas of Rumen Microbiology.

Powar and Daginawala. 2010. General Microbiology. Himalaya Publishing House.

Radiati, LE. 2009. Mekanisme Antimikroba. Lab. Faal FK. UB

Reynolds, Jackie. 2005. Lab Procedures Manual Biol. 2421 Lab Manual. www.rlc.dcccd.edu.

Journals:

Food Control. <https://www.sciencedirect.com/journal/food-control>

FEMS Microbiology Reviews.

<https://www.sciencedirect.com/journal/fems-microbiology-reviews/issues>

Applied and Environmental Microbiology. <https://aem.asm.org/>

