



INOVASI MODEL PEMBELAJARAN

COURSE MODULE AGRICULTURAL MICROBIOLOGY EVEN GASAL 2021/2022

course coordinator :
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Teaching team:
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Prodi Agroteknologi Fakultas Pertanian
Universitas Pembangunan Nasional "Veteran" Jawa Timur
Jalan Raya Rungkut Madya-Gunung Anyar, Surabaya
2021

1. ELO Prodi

- CPL-S1 Berkarakter bela negara, yaitu cinta tanah air, kesadaran berbangsa dan bernegara, meyakini Pancasila sebagai ideologi negara, rela berkorban untuk bangsa dan negara, serta memiliki kemampuan awal bela negara
- ELO-A1 Be defending country character, namely the love of the motherland, national and state awareness, believes in Pancasila as the ideology of the state, willing to sacrifice for the nation and the state, and has the initial ability to defend the country.*
- CPL-S2 Bertanggungjawab atas pekerjaan di bidang keahliannya secara mandiri
- ELO-A2 Responsible for work in the field of expertise independently*
- CPL-S3 Mampu memelihara dan mengembangkan jejaring kerja secara kolaboratif di dalam maupun di luar lembaganya;
- ELO-A3 Be able to maintain and develop collaborative networking within and outside the institution;*
- CP-4 Mampu menerapkan pengetahuan Ilmu Tanaman dan konsep dasar Produksi Tanaman, Tanah dan konsep dasar Sumber daya lahan, serta konsep perlindungan tanaman terhadap hama Penyakit secara terpadu
- ELO-4 Be able to apply knowledge of Plant Sciences and basic concepts of Plant Production, Soil and basic concepts of land resources, as well as the concept of crop protection against pests and diseases in an integrated manner*
- CP-5 Mampu menguasai prinsip-prinsip penerapan teknologi pertanian untuk menyelesaikan permasalahan di bidang pertanian
- ELO-5 Be able to master the principles of the application of agricultural technology to solve problems in agriculture*
- CP-6 Mampu menganalisis, merencanakan dan menerapkan sistem pertanian dataran rendah mengacu pada prinsip pertanian berkelanjutan, baik yang bersifat modern maupun yang mengangkat kearifan lokal, secara efektif dan produktif
- ELO-6 Be able to analyze, plan and implement lowland farming systems refers to the principles of sustainable agriculture, modern , raise local wisdom, effectively and productively*
- CP-7 mampu mengkaji implementasi penerapan sistem pertanian berkelanjutan yang memperhatikan dan menerapkan kaidah, tata cara dan etika ilmiah dalam rangka menghasilkan solusi, gagasan, dan desain berdasarkan hasil analisis informasi dan data
- ELO-7 Be able to study the implementation of sustainable agriculture systems Base on scientific rules aplication, procedures and ethics in order to produce solutions, ideas, and designs based on the results of information and data analysis*

- CP-8 Kemampuan menguasai teknologi perbanyakan tanaman , dan pengelolaan tanaman sesuai dengan zona agroklimat
- ELO-8 The ability to master plant propagation technology, and crop management in accordance with the agro-climate zone*
- CP - 9 Kemampuan mengidentifikasi, merumuskan, menganalisis dan menyelesaikan permasalahan bidang sumberdaya lahan
- ELO - 9 The ability to identify, formulate, analyze and solve problems in the field of land resources*
- CP - 10 Kemampuan mendiagnosa, menganalisis dan menyelesaikan permasalahan hama penyakit tanaman
- ELO - 10 The ability to diagnose, analyze and solve plant pest problems*
- CP - 11 Kemampuan menguasai prinsip dan issue terkini tentang pertanian dataran rendah dan permasalahan lingkungannya
- ELO - 11 The ability to handle the current principles and issues of lowland agriculture and its environmental problems*
- CP - 12 Penguasaan teknologi dan mampu mengkomunikasikan dengan masyarakat dalam menyelesaikan permasalahan pertanian baik lisan maupun tulisan
- ELO - 12 Mastery of technology and be able to communicate with the community in solving agricultural problems both oral and written*


2. COURSE IDENTITY

Mata Kuliah	Agricultural Microbiology
Kode Mata Kuliah	PG 141102
Semester	3 (Tiga)
Team Teaching	Dr. Ir. Arika Purnawati, MP. Dr. Ir. Yenny Wuryandari, MP. Dr. Ir. Tri Mujoko, MP., Dr. Ir. Sri Wiyatiningsih, MP. Noni Rahmadini, SP., MSc. Dra. Endang Triwahyu Prasetyawati, MP.
Language	English
Relation to curriculum	Subject of 3rd semester
Type of teaching	Learning methods: lectures, discussions, assignments, problem based learning, practice 2 x 50 menit lecture = 100 menit 2 x 50 menit strutured tasks = 100 menit 2 x 50 menit self tasks = 100 menit 1 x 100 menit practice = 100 menit Total teaching format = 400menit /6,7 jam
Beban kerja	Total beban kerja : 6,7 jam x 14 pertemuan = 93,8 jam
sks	3
Syarat ujian	Students must be present is 80%
Mata kuliah syarat	Biology
Indikator kinerja	
CPL 2 , CPL 3, CPL 5	<ol style="list-style-type: none"> 1. Being able to explain the important of microbiology and differntiate of microorganism 2. Being able to do methods and base technique of microbiology, molecular technique in microorganism 3. Being able explain and relationship effect of biotic and abiotic envionmetal to miroorganism 4. To implementation of microbiology role of microbiology for complete problem in agriculture, biotechnoogy, food, and environmental in pertanian, bioteknologi, pangan, dan lingkungan
Subject	<ol style="list-style-type: none"> 1. Definition of microbiology and microorganisms which include types of microorganisms, nutrition and metabolism, reproduction and growth 2. Basic methods and techniques in microbiology, molecular techniques on microorganisms 3. The biotic and abiotic environment of microorganisms 4. The role of microorganisms in agriculture, biotechnology, food, and the environment
Study and examination requirements and forms of examination	Penugasan (makalah, presentas, problem based learning, laporan praktikum) UTS dan UAS
Media employed	LCD, laptop, e-learning, WA, you tube

Reference	<ol style="list-style-type: none"> 1. Black, J.G. 2008. Microbiology, Principles and Explorations, 7th ed. John Wiley & Sons, Inc. 2. Hajoeningtjas, OD. 2012. Mikrobiologi Pertanian. Graha Ilmu. Yogyakarta. 3. Hastuti, US. 2012. Petunjuk Praktikum Mikrobiologi. UMM Press. Malang. 4. Machmud, M. 2011. Teknik penyimpanan dan pemeliharaan mikroba. Bulletin Agrobio 4 (1) : 24-32 5. Madigan,MT., Martinko,JM, Dunlap, PV.,Clark,D.P. 2009. Biology of Microorganisms.12th ed. Pearson Benjamin Cummings, San Francisco, USA. 6. Pelczar, MJ, ECS, Chan, NR, Krieg. 2001. Microbiology. 5th edition. McGraw Hill Education. New York. 7. Waluyo, L. 2019. Mikrobiologi Umum. Univ. Muhammadiyah Malang Press. 8. Patantis, G., Y.N.Fawzya. 2009. Teknik Identifikasi Mikroorganisme Secara Molekuler. Squalen 4 (2) : 72-82. 9. Sogandi. 2018. Biologi Molekuler : Identifikasi Bakteri Secara Molekuler. Univ. 17 Agustus 1945. Jakarta.
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3. SEMESTER LEARNING PLAN

RPS MK MIKROBIOLOGI PERTANIAN

		NAMA UNIVERSITAS : UNIVERSITAS PEMBANGUNAN NASIONAL “VETERAN” JAWA TIMUR NAMA FAKULTAS : PERTANIAN NAMA JURUSAN/DEP : AGROTEKNOLOGI NAMA PRODI : S1 AGROTEKNOLOGI					
		MATA KULIAH	KODE	Rumpun MK	BOBOT (sks)		SEMESTER
MIKROBIOLOGI PERTANIAN		PG 141102	Eksakta	2	1	2	23 Juli 2021
		Pengembang RPS		Koordinator RMK		Ka PRODI	
		Dr. Ir. Arika Purnawati,MP		Dr. Ir. Arika Purnawati,MP		Dr.Ir. Bakti Wisnu Widjajani, MP.	
Capaian Pembelajaran (CP)	CPLPRODI						
	CPL 2 Internalize academic values, norms, and ethics; spirit of independence, struggle, and entrepreneurship CPL 3 Being able to maintain and develop collaborative networks with supervisors, colleagues, colleagues both inside and outside the institution CPL 5 Ability to master the principles of applying agricultural technology to solve problems in agriculture						
	CP MK	<ol style="list-style-type: none"> Being able to describe the importance of microbiology and distinguish microorganismsMampu melaksanakan metode dan teknik dasar mikrobiologi, teknik molekuler pada mikroorganism Being able to describe and relate the influence of the biotic and abiotic environment on microorganisms Being able to implement the role of microbiology to solve problems in agriculture, biotechnology, food, and the environment 					

Peta CPL dan CPMK		CPL 2	CPL 3	CPL 5
	CP MK 1	V	V	
	CP MK 2	V	V	V
	CP MK 3		V	V
	CP MK 4	V	V	V
Diskripsi Singkat MK	Microbiology is a compulsory subject that discusses the importance of studying microbiology and knowing microorganisms which include nutrition and metabolism, reproduction and growth. Discusses basic methods and techniques in microbiology, molecular techniques on microorganisms. Discusses the influence of the biotic and abiotic environment on microorganisms. Discuss the role of microorganisms in agriculture and other fields			
Pokok Bahasan / Bahan Kajian	<ol style="list-style-type: none"> 1. Definition of microbiology and microorganisms which include types of microorganisms, nutrition and metabolism, reproduction and growth 2. Basic methods and techniques in microbiology, molecular techniques on microorganisms 3. The biotic and abiotic environment of microorganisms 4. The role of microorganisms in agriculture, biotechnology, food, and the environment 			
Pustaka	<p>Utama:</p> <ol style="list-style-type: none"> 1. Black, J.G. 2008. Microbiology, Principles and Explorations, 7th ed. John Wiley & Sons, Inc. 2. Hajoeningtjas, OD. 2012. Mikrobiologi Pertanian. Graha Ilmu. Yogyakarta. 3. Hastuti, US. 2012. Petunjuk Praktikum Mikrobiologi. UMM Press. Malang. 4. Machmud, M. 2011. Teknik penyimpanan dan pemeliharaan mikroba. Bulletin Agrobio 4 (1) : 24-32 5. Madigan,MT., Martinko, JM, Dunlap, PV., Clark, D.P. 2009. Biology of Microorganisms. 12th ed. Pearson Benjamin Cummings, San Francisco, USA. 6. Pelczar, MJ, ECS, Chan, NR, Krieg. 2001. Microbiology. 5th edition. McGraw Hill Education. New York. 10. Waluyo, L. 2019. Mikrobiologi Umum. Univ. Muhammadiyah Malang Press. <p>Pendukung :</p> <ol style="list-style-type: none"> 11. Patantis, G., Y.N.Fawzya. 2009. Teknik Identifikasi Mikroorganisme Secara Molekuler. Squalen 4 (2) : 72-82. 12. Sogandi. 2018. Biologi Molekuler : Identifikasi Bakteri Secara Molekuler. Univ. 17 Agustus 1945. Jakarta. 			
Media Pembelajaran	Perangkat lunak :		Perangkat keras :	
			Laptop, LCD	
Team Teaching	<p>Dr. Ir. Arika Purnawati, MP. Dr. Ir. Yenny Wuryandari, MP.</p>			

Dr. Ir. Tri Mujoko, MP.,
 Dr. Ir. Sri Wiyatiningsih, MP.
 Noni Rahmadini, SP., MSc.
 Dra. Endang Triwahyu Prasetyawati, MP.

Matakuliah syarat Biologi

Mg Ke-	Kemampuan akhir pada tiap tahap pembelajaran (Sub-CP-MK)	Penilaian		Bentuk Pembelajaran, Metode Pembelajaran dan Penugasan Mhs [Estimasi Waktu]		Materi Pembelajaran [Pustaka]	Bobot Penilaian (%)
		Indikator Penilaian	Kriteria & Bentuk Penilaian	Daring (online)	Luring (offline)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Students are able to describe microbiology and Distinguish between microorganisms including fungi, yeasts, bacteria, viruses	Ability to correctly describe knowledge about microbiology and distinguish the types of microorganisms, namely fungi, yeasts, bacteria, viruses	Non-test: Make independent assignments or papers on the meaning of microbiology and the different types of microorganisms Criteria: the truth and accuracy of students to describe the meaning of microbiology and the different types of microorganisms which include fungi, yeasts, bacteria	1. Explaining lesson plans, lecture contracts, learning methods 2. Discussion on the implementation of tasks Studying : a. Definition and importance of microbiology b. Distinguish between types of microorganisms which include fungi, yeasts, bacteria, viruses Watch youtube about the different types of microorganisms		a. Definition and importance of microbiology b. Distinguish between types of microorganisms including fungi, yeasts, bacteria	

				https://www.youtube.com/watch?v=YSitT0oOoyc After watching youtube, students make independent assignments or papers about the different types of micro-organisms TM = 2 x 50 menit BT = 2 x 50 menit BM = 2 x 50 menit		References : (1, 5, 6, 7)	
2 dan 3	Students are able to carry out basic microbiological techniques (sterilization of tools, manufacture and sterilization of media, aseptic techniques)	Ability to carry out instrument sterilization techniques, make and sterilize media, aseptic techniques	Non-test: Practicum Report Presentation Criteria: the ability of students to convey and discuss the results of practical observations	Studying : Instrument sterilization technique, media making and sterilization, aseptic technique Carrying out practicum on equipment sterilization techniques, making and sterilizing media, aseptic techniques		Instrument sterilization technique, media making and sterilization, aseptic technique References : (2, 3)	
				Kuliah TM = 2 x 50 BT = 2 x 50 BM = 2 x 50	Praktikum 1x1 x 100		
4 dan 5	Students are able to carry out basic microbiological techniques (isolation, purification, rejuvenation and storage of	Students are able to carry out basic microbiological techniques (isolation, purification, rejuvenation and storage of microorganisms:	Non-test: Practical report Criteria: the ability of students			Isolation techniques purification, rejuvenation, and storage of	

	microorganisms: fungi and bacteria)	gi and bacteria)	to convey and discuss the results of practical observations			microorganisms References : (2, 3, 4)	
				Kuliah TM = 2x 50 BT = 2 x 50. BM = 2 x50	Praktikum 1x1 x 100		
6 dan 7	Mahasiswa mampu menganalisa populasi mikroorganisme menggunakan metode dan teknik pada mikrobiologi dasar	Students are able to analyze the population of microorganisms using methods and techniques in basic microbiology	Non-test: Practicum report presentation Criteria: student's ability to analyze the results of observations of the microorganism population in the practicum	Studying : The technique of observing and counting microorganisms using the dilution method Carry out practicum on the technique of observing and counting microorganisms using the dilution method		The technique of observing and counting microorganisms using the dilution method References : (2, 3)	
				Kuliah TM = 2x 50 BT = 2 x 50. BM = 2 x50	Praktikum 1x1 x 100		
8	UJIAN TENGAH SEMESTER (UTS)						
9 dan 10	Students are able a. Explain and identify the nutrients needed for the growth of microorganisms, namely fungi, yeasts,	Ability to explain and identify nutrients needed for the growth of microorganisms, namely fungi, yeasts, bacteria,	Non-test: Make a paper on nutrition for the growth of microorganisms and the metabolism of	Studying : Nutrients (macro-nutrients, micro-nutrients, function of macronutrients and micronutrients) metabolism		Nutrisi dan dan metabolisme mikroorganisme	

	<p>bacteria, viruses</p> <p>b. Describe the mechanism of metabolism of microorganisms, namely the transport system</p>	<p>viruses</p> <p>Ability to describe the mechanism of metabolism of microorganisms, namely the transport system</p>	<p>microorganisms, namely the transport system</p> <p>Criteria: the truth to describe and identify nutrients for the growth of microorganisms, namely fungi, yeasts, bacteria, viruses and describe the metabolism of microorganisms, namely the transport system</p>	<p>of microorganisms (transport systems, enzymes)</p> <p>Watching youtube on the metabolism of microorganisms, namely the transport system https://www.youtube.com/watch?v=C8wfyp-4F8</p> <p>After watching youtube, students analyze the transport system of microorganisms collected in the form of independent papers</p>		<p>Pustaka : (1, 5, 6, 7)</p>	
				<p>Kuliah TM = 2 x 50 BT = 2 x 50 BM = 2 x 50</p>			
11	<p>Students are able to describe and compare several molecular techniques on microorganisms</p>	<p>Ability describe and compare several molecular techniques on microorganisms</p>	<p>Non-test: Group assignment presentation</p> <p>Criteria: sharpness to compare several molecular techniques on microorganisms</p>	<p>Studying : Several molecular techniques on microorganisms include: PCR, electrophoresis, RAPD, RFLP</p>		<p>Molecular techniques on microorganisms</p>	
				<p>Kuliah : TM = 2 x 50 menit BT = 2 x 50 menit</p>		<p>References : (8, 9)</p>	

				BM = 2 x 50 menit			
12 dan 13	Students are able to analyze and relate the influence of the biotic and abiotic environment on microorganisms	Being able to analyze and relate the influence of the biotic and abiotic environment on microorganisms	<p>Non-test:</p> <p>1. Problem based learning from the results of the practicum: analyze and relate the influence of the abiotic environment on microorganisms (specifically: the growth of microorganisms: fungi and bacteria)</p> <p>2. Group practicum report</p> <p>Criteria: sharpness in analyzing and relating the influence of the abiotic environment on microorganisms (specifically: growth of microorganism : fungi and bacteria)</p>	<p>Studying :</p> <p>The influence of the biotic environment on microorganisms and the influence of the abiotic environment on</p> <p>Presentation of group assignments and discussion on the relationship between the abiotic environment and microorganisms (specifically: growth of microorganisms: fungi and bacteria)</p>		<p>Effect of biotic and abiotic environment on microorganisms</p> <p>References : (1, 5, 6, 7)</p>	
				<p>TM = 2 x 50 menit</p> <p>BT = 2 x 50 menit</p> <p>BM = 2 x 50 menit</p>	<p>Praktikum</p> <p>1 x 1x 100</p>		

14 dan 15	Students are able to analyze the results of implementing the role of microorganisms in agriculture, biotechnology, food, the environment	Being able to analyze the results of implementing the role of microorganisms in agriculture, biotechnology, food, the environment	<p>Non-test:</p> <p>1. Problem based learning: analyzing case studies from articles or literature on the implementation of the role of microorganisms in agriculture, biotechnology, food, the environment</p> <p>2. Presentation of group assignments</p> <p>Criteria: sharpness in analyzing the implementation of the role of microorganisms in agriculture, biotechnology, food, the environment</p>	<p>Studying :</p> <p>Implementation of the role of useful microorganisms in agriculture, biotechnology, food, the environment</p> <p>Presentation of group assignments and discussions on the implementation of the role of useful microorganisms in agriculture, biotechnology, food, the environment</p>		<p>Implementation of the role of useful microorganisms in agriculture, biotechnology, food, the environment</p> <p>References : (7)</p>	
16	UJIAN AKHIR SEMESTER						

4. RENCANA ASESMEN DAN EVALUASI

	RENCANA ASSESSMENT & EVALUASI PRODI S1 AGROTEKNOLOGI FP, UPN"VETERAN"JAWA TIMUR MIKROBIOLOGI PERTANIAN		RA & E
			Edisi : Agustus 2021
Kode: FP191108	Bobot sks (T/P): (2/1)	Rumpun MK: Eksakta	Smt : 3
OTORISASI	Penyusun RA & E Dr.Ir. Arika Purnawati, MP	Koordinator RMK	Koord. Prodi Dr.Ir. Bakti W W

Tugas/minggu ke	Sub CP-MK (2)	Bentuk Asesmen (Penilaian) (3)	Bobot(%) (4)
1	Being able to describe about microbiology and Distinguish between microorganisms including fungi, yeasts, bacteria, viruses	Non-test: Write a paper on knowledge about microbiology and the types of microorganisms Criteria: truth and accuracy describe knowledge about microbiology and distinguish the types of microorganisms which include fungi, yeasts, bacteria	
2	Being able to carry out basic microbiological engineering methods (sterilization of tools, manufacture and sterilization of media, aseptic techniques)	Non-test: Practical report Criteria: the ability of students to convey and discuss the results of practical observations	
3	Being to carry out basic microbiological engineering methods (sterilization of tools, manufacture and sterilization of media, aseptic techniques)	Non-test: Practical report Criteria: the ability of students to convey and discuss the results of practical observations	
4	able to carry out basic microbiological engineering methods (isolation, purification, rejuvenation and storage of microorganisms) for fungi	Non-test: Practical report Criteria: the ability of students to convey and discuss the results of practical observations	
5	Being able to carry out basic microbiological engineering methods (isolation, purification, rejuvenation and storage of microorganisms) rejuvenation and storage of microorganisms) for bacteria	Non-test: Practical report Criteria: the ability of students to convey and discuss the results of non-test practicum observations	
6	Being able to analyze the population of	Non-test: Practical report	

	microorganisms (fungi) using methods and techniques in basic microbiology	Criteria: the ability of students to analyze the results of observations of the population of microorganisms (fungus) in the practicum	
7	Being able to analyze the population of microorganisms (bacteria) using methods and techniques in basic microbiology	Non-test: Practical report Criteria: the ability of students to analyze the results of observations of the population of microorganisms (bacteria) in the practicum	
8	UJIAN TENGAH SEMESTER (UTS)		
9	Being able to explain and identify the nutrients needed for the growth of microorganisms, namely fungi, yeasts, bacteria, viruses	Non-test: Write a paper on nutrition for the growth of microorganisms Criteria: The truth to describe and identify nutrients for the growth of microorganisms, namely fungi, yeasts, bacteria, viruses	
10	Being able to describe the mechanism of metabolism of microorganisms, namely the transport system	Non-test: Write a paper on the metabolism of microorganisms, namely the transport system Criteria: The truth to describe the metabolic mechanism of microorganisms i.e. the transport system	
11	Being able to describe and compare molecular techniques on microorganisms	Non-test: Group assignment presentation Criteria: Sharpness to compare the molecular techniques of microorganisms	
12	Being able to analyze and relate the influence of the biotic and abiotic environment on microorganisms	Non-test: Problem based learning from the results of the practicum: analyze and relate the influence of the abiotic environment on microorganisms (specifically: the growth of microorganisms: fungi and bacteria) Format: practical report Criteria: Sharpness analyzes and relates the influence of the abiotic environment on microorganisms	
13	Being able to analyze and relate the influence of the biotic and abiotic environment on microorganisms	Non-test: Problem based learning: analyze and relate the influence of the biotic environment on microorganisms from articles or literature Format: group assignment presentation Criteria: Sharpness analyzes and relates the influence of the biotic environment on microorganisms	
14	Being able to analyze the results of the implementation of the role of microorganisms in agriculture, biotechnology, food, the environment	Non-test: Problem based learning: analyzing case studies from articles or literature on the implementation of the role of microorganisms in agriculture, biotechnology, food, the environment Format: group assignment presentation Criteria: sharpness in analyzing the implementation of the role of microorganisms in agriculture, biotechnology, food, the environment	

15	able to analyze the results of the implementation of the role of microorganisms in agriculture, biotechnology, food, the environment	Non-test: Problem based learning: analyzing case studies from articles or literature on the implementation of the role of microorganisms in agriculture, biotechnology, food, the environment Format: group assignment presentation Criteria: sharpness in analyzing the implementation of the role of microorganisms in agriculture, biotechnology, food, the environment	
16	UJIAN AKHIR SEMESTER (UAS)		

5. ASSESSMENT RUBRIC FOR MICROBIOLOGY COURSE PRESENTATION

No	Komponen	Kriteria penilaian	Nilai
1	<i>Powerpoint</i>	Isi jelas dan benar, tampilan informatif dan menarik	> 80
		Isi jelas dan benar, tampilan menarik tetapi kurang informatif	> 75-80
		Isi jelas tetapi ada sedikit kesalahan bahasa/penulisan, tampilan informatif dan menarik	> 69-75
		Isi banyak yang salah, tampilan menarik dan informatif	> 60-69
		Isi banyak yang salah, tampilan kurang menarik dan kurang informatif	> 55-60
		Tidak Membuat <i>Powerpoint</i>	< 55
2	<i>Presentasi</i>	Presentasi dan berdiskusi dengan bahasa yang benar, intonasi jelas dan menarik, sikap yang baik, dan tepat waktu	> 80
		Presentasi dan berdiskusi dengan bahasa yang benar, intonasi jelas dan menarik, sikap yang baik, dan tidak tepat waktu	> 75-80
		Presentasi dan berdiskusi dengan bahasa yang benar, intonasi jelas dan menarik, sikap kurang baik, dan tidak tepat waktu	> 69-75
		Presentasi dan berdiskusi dengan bahasa yang benar, intonasi kurang jelas dan menarik, sikap kurang baik, dan tidak tepat waktu	> 60-69
		Presentasi dan berdiskusi dengan bahasa yang kurang benar, intonasi kurang jelas dan menarik, sikap kurang baik, dan tidak tepat waktu	> 55-60
		Tidak Presentasi	< 55

6. ASSESSMENT RUBRIC FOR MICROBIOLOGY COURSE ASSESSMENT

No	Komponen	Kriteria penilaian	Nilai
1	Paper	Paper jelas dan benar isinya, didukung pustaka yang relevan dan memadai jumlah dan kualitasnya, bahasanya jelas dan benar, sistematika penulisan benar.	> 80
		Paper jelas dan benar isinya, didukung pustaka yang relevan dan memadai jumlah dan kualitasnya, Redaksional jelas dan benar, sistematika penulisan kurang benar.	> 75-80
		Paper jelas dan benar isinya, didukung pustaka yang relevan dan memadai jumlah dan kualitasnya, redaksional kurang jelas dan benar, sistematika penulisan kurang benar.	> 69-75
		Paper jelas dan benar isinya, didukung pustaka yang kurang relevandan memadai jumlah dan kualitasnya, bahasanya kurang jelas dan benar, sistematika penulisan kurang benar.	> 60-69
		Paper tidak jelas dan benar isinya, didukung pustaka yang kurangrelevan dan memadai jumlah dan kualitasnya, bahasanya kurang jelas dan benar, sistematika penulisan kurang benar.	> 55-60
		Tidak membuat makalah	< 55
2	Pemahaman	Dapat menjelaskan > 80 % pertanyaan dengan benar secara interdisipliner	> 80
		Dapat menjelaskan semua pertanyaan dengan benar secara monodisipliner	> 75-80
		Dapat menjelaskan >75 % - 80 % pertanyaan dengan benar secara interdisipliner	> 69-75
		Dapat menjelaskan >70 % - 75 % pertanyaan dengan benar secara interdisipliner	> 60-69
		Dapat menjelaskan >75 % - 80 % pertanyaan dengan benar secara monodisipliner	> 55-60
		Tidak menjawab semua pertanyaan	< 55

7. ASSESSMENT RUBRIC FOR PROBLEM BASED LEARNING COURSES OF MICROBIOLOGY

No	Komponen	Kriteria penilaian	Nilai
1	Orientasi atau pemilihan pada masalah	Mahasiswa memperoleh masalah dari observasi di lapangan	> 80
		Mahasiswa memperoleh masalah dari artikel, jurnal	>75-80
2	Analisa masalah	Mahasiswa menganalisa data menggunakan sumber seperti buku, data statistik (misal : BPS), sumber akurat	> 75
		Mahasiswa menganalisa data tidak menggunakan sumber akurat	> 69-75
3	Penyusunan laporan	Mahasiswa menyusun laporan berdasar analisa masalah yang telah dilakukan	> 80
		Isi laporan sesuai masalah dan telah dianalisa	> 75-80