

**RENCANA PROGRAM DAN  
KEGIATAN PEMBELAJARAN SEMESTER  
(RPKPS)**



Mikrobiologi Lingkungan  
Semester 2/2 SKS/KUI-6111)  
Program Studi S2 Ilmu Kesehatan Masyarakat

Oleh:

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Prof. DR. Soewarno Hadisusanto, SU

**Universitas Gadjah Mada  
Fakultas Kedokteran, Kesehatan Masyarakat dan Keperawatan  
2019**



## Universitas Gadjah Mada

Fakultas Fakultas Kedokteran, Kesehatan Masyarakat, dan Keperawatan  
Departemen/Program Studi S2 Ilmu Kesehatan Masyarakat

### RENCANA PROGRAM DAN KEGIATAN PEMBELAJARAN SEMESTER (RPKPS)

Kode Mata Kuliah	Nama Mata Kuliah	Bobot (sks)	Semester	Status Mata Kuliah	Mata Kuliah Prasyarat																									
KUI-6111	Environmental Microbiology	2	2	Core	-																									
Capaian Pembelajaran Lulusan (CPL) yang dibebankan pada MK	<p><i>ELO 2. Able to analyze public health programs from 5 core public health principles</i>  <i>ELO 3. Able to conduct and publish research</i>  <i>ELO 4. Able to create effective, efficient and sustainable public health programs and health service deliveries</i></p>																													
Capaian Pembelajaran Mata Kuliah (CPMK)	<b>CPMK1</b>	Understanding environmental microbiology applications to clean the environment of organic and inorganic pollutants related to environmental health																												
	<b>CPMK2</b>	Analyze environmental problems using appropriate analytical techniques																												
	<b>CPMK3</b>	Design a microbial management program in the environment																												
Pemetaan CPL dengan CPMK	<table border="1"> <thead> <tr> <th></th> <th>CPMK 1</th> <th>CPMK 2</th> <th>CPMK 3</th> </tr> </thead> <tbody> <tr> <td>ELO 2</td> <td>X</td> <td>X</td> <td></td> </tr> <tr> <td>ELO 3</td> <td></td> <td>x</td> <td></td> </tr> <tr> <td>ELO 4</td> <td>x</td> <td></td> <td>x</td> </tr> </tbody> </table>						CPMK 1	CPMK 2	CPMK 3	ELO 2	X	X		ELO 3		x		ELO 4	x		x									
	CPMK 1	CPMK 2	CPMK 3																											
ELO 2	X	X																												
ELO 3		x																												
ELO 4	x		x																											
Deskripsi Singkat Mata Kuliah	<p>Microorganisms or microbes are one of the most common forms of life on earth and are very unique affecting natural conditions and often have a real impact on all aspects of life in nature. Microbes in the environment have an important role in various habitats: terrestrial, aquatic (water) and air (atmospheric) systems, especially in biogeochemical cycle processes and are related to human health. Lecture material is designed to provide an understanding of principles and concepts that are correct and appropriate for post-graduate students or other scientists who need and principle interactions between microbes with systems and other organisms and their role in a wider ecosystem. Topics covered include an understanding of 1. Diversity and Role of Microorganisms in the Environment: Bacteria, Fungi, Algae, and Viruses; 2. The effects of microbes on human activity and human health; 3. Habitat and nature of different environments where microbes are present; 4. Environmental factors that influence Discuss the impact of microbial activity on the environment (microbial and organic pollutants, microbes and heavy metals) and 5. Exploitation of microbes to help solve environmental problems (biogeochemical cycles, estimates and bioremediation of organic and metal pollutants), 6. Studying the latest method used to detect transmission, Risk assessment and control of microbial pathogens in the environment; through various approaches (social &amp; cultural, microscopic, physiological, molecular, and immunological); 7. Management of microbes in health facilities (pathogens in the environment, water and food). Each topic is an opportunity for students to expand their microbial knowledge in the environment and develop microbiology techniques and improve learning skills. Class activities include the presentation of various studies related to the important role of microbial diversity in the environment and beneficial or detrimental effects on human health. Students are expected to be able to understand the application of environmental microbiology to clean the environment of organic and organic pollutants, study environmental problems, and design microbial management programs in the environment.</p>																													
Bahan Kajian/Materi Pembelajaran	<ol style="list-style-type: none"> <li>Scope of Environmental Microbiology</li> <li>Effect of Microbes toward Human Activity and Health</li> <li>Different Habitats and Environmental Characteristics of Microbes</li> <li>Environmental Factors which Affect the Distribution of Living Microbes</li> <li>Effect of Microbial Activity toward the environment</li> <li>Latest Methods to Detect Transmission, Risk Assessment, and Management of Microbial Pathogens in the Environment</li> <li>Managing Microbes in Health Facilities (Pathogens in the Environment, Water, and Food)</li> </ol>																													
Metode Penilaian dan Kaitan dengan CPMK	<table border="1"> <thead> <tr> <th>Komponen Penilaian</th> <th>Persentase</th> <th>CPMK 1</th> <th>CPMK 2</th> <th>CPMK 3</th> </tr> </thead> <tbody> <tr> <td>Exam</td> <td>70%</td> <td>X</td> <td>X</td> <td></td> </tr> <tr> <td>Discussion</td> <td>10%</td> <td>X</td> <td>X</td> <td></td> </tr> <tr> <td>Assignment</td> <td>5%</td> <td>x</td> <td>x</td> <td>X</td> </tr> <tr> <td>Attendance</td> <td>15%</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>					Komponen Penilaian	Persentase	CPMK 1	CPMK 2	CPMK 3	Exam	70%	X	X		Discussion	10%	X	X		Assignment	5%	x	x	X	Attendance	15%	-	-	-
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Daftar Bahan dan Referensi	<ol style="list-style-type: none"> <li>1. Brock, T. D., and Madigan, M. T., 1991. Biology of Microorganisms. Prentice Hall. Englewood Cliffs, New Jersey</li> <li>2. Pepper I, Gerba C, and Gentry T; 2014. Environmental Microbiology. 3rd Edition. Academic Press 2015. eBook ISBN: 9780123948175</li> </ol>			
Nama Dosen Pengampu ( <i>Team Teaching</i> )	Prof. Dra. A. Endang Sutariningsih Soetarto, M.Sc, Ph.D Prof. DR. Soewarno Hadisusanto, SU			
<b>Otorisasi</b>	Tanggal Penyusunan	Koordinator Mata Kuliah	Koordinator Bidang Keahlian (Jika Ada)	Ketua Program Studi
		<i>Tanda Tangan Nama Terang</i>	<i>Tanda Tangan Nama Terang</i>	<i>Tanda Tangan Nama Terang</i>

## Rencana Kegiatan Pembelajaran Mingguan (RKPM)

Minggu Ke-	Sub-CPMK (Kemampuan Akhir yang Direncanakan)	Metode Penilaian			Bahan Kajian (Materi Pembelajaran)	Metode Pembelajaran	Beban Waktu Pembelajaran	Pengalaman Belajar Mahasiswa	Media Pembelajaran	Pustaka dan Sumber Belajar Eksternal
		Indikator	Komponen	Bobot (%)						
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Students are expected to be able to explain the principles of microbiology and the role of microbiology in the environment	Answering exam questions correctly  Active participation in discussion	Exam  Discussion	7%  1%	Scope of Environmental Microbiology	Face to face Discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Brock, T. D., and Madigan, M. T., 1991. Biology of Microorganisms. Prentice Hall. Englewood Cliffs, New Jersey  Pepper I, Gerba C, and Gentry T; 2014. Environmental Microbiology. 3rd Edition.

										Academic Press 2015 eBook ISBN: 9780123948175
2	Students are expected to be able to explain the effects of microbes on human activities and health	Answering exam questions correctly  Active participation in discussion	Exam  Discussion	7%  1%	Scope of Environmental Microbiology	Face to face Discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Brock, T. D., and Madigan, M. T., 1991. Biology of Microorganisms. Prentice Hall. Englewood Cliffs, New Jersey  Pepper I, Gerba C, and Gentry T; 2014. Environmental Microbiology. 3rd Edition. Academic Press 2015

										eBook ISBN: 978012394 8175
3	Students are expected to be able to compare various types of habitats and microbial environmental properties	Answering exam questions correctly  Active participation in discussion	Exam  Discussion	7%  1%	Effect of Microbes toward Human Activity and Health	Classroom discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Brock, T. D., and Madigan, M. T., 1991. Biology of Microorganisms. Prentice Hall. Englewood Cliffs, New Jersey  Pepper I, Gerba C, and Gentry T; 2014. Environmental Microbiology. 3rd Edition. Academic Press 2015 eBook ISBN: 978012394 8175

4	Students are expected to be able to describe the relationship of environmental factors to the microbial distribution of life	Answering exam questions correctly  Active participation in discussion	Exam  Discussion	7%  1%	Different Habitats and Environmental Characteristics of Microbes	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	<p>Brock, T. D., and Madigan, M. T., 1991. Biology of Microorganisms. Prentice Hall. Englewood Cliffs, New Jersey</p> <p>Pepper I, Gerba C, and Gentry T; 2014. Environmental Microbiology. 3rd Edition. Academic Press 2015 eBook ISBN: 9780123948175</p>
5	Students are expected to be able to describe the	Answering exam questions correctly	Exam	7%	Different Habitats and Environmental	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Brock, T. D., and Madigan,

	relationship of environmental factors to the microbial distribution of life	Active participation in discussion	Discussion	1%	Characteristics of Microbes					<p>M. T., 1991. Biology of Microorganisms. Prentice Hall. Englewood Cliffs, New Jersey</p> <p>Pepper I, Gerba C, and Gentry T; 2014. Environmental Microbiology. 3rd Edition. Academic Press 2015 eBook ISBN: 9780123948175</p>
6	Students are expected to be able to describe the relationship of environmental factors to the	Answering exam questions correctly  Active participation	Exam  Discussion	7%  1%	Different Habitats and Environmental Characteristics of Microbes	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Brock, T. D., and Madigan, M. T., 1991. Biology of Microorganism



	microbial distribution of life	ion in discussion								<p>sms. Prentice Hall. Englewood Cliffs, New Jersey</p> <p>Pepper I, Gerba C, and Gentry T; 2014. Environmental Microbiology. 3rd Edition. Academic Press 2015 eBook ISBN: 9780123948175</p>
7	Students are expected to be able to understand environmental microbiology applications to clean the environment of organic and inorganic	<p>Answering exam questions correctly</p> <p>Active participation in discussion</p>	<p>Exam</p> <p>Discussion</p>	<p>7%</p> <p>1%</p>	Environmental Factors which Affect the Distribution of Living Microbes	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Brock, T. D., and Madigan, M. T., 1991. Biology of Microorganisms. Prentice Hall.

	pollutants related to environmental health									Englewood Cliffs, New Jersey  Pepper I, Gerba C, and Gentry T; 2014. Environmental Microbiology. 3rd Edition. Academic Press 2015 eBook ISBN: 9780123948175
8	Students are expected to be able to understand environmental microbiology applications to clean the environment of organic and inorganic pollutants related to	Answering exam questions correctly  Active participation in discussion	Exam  Discussion	7%  1%	Environmental Factors which Affect the Distribution of Living Microbes	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Brock, T. D., and Madigan, M. T., 1991. Biology of Microorganisms. Prentice Hall. Englewood Cliffs, New Jersey

	environmental health									Pepper I, Gerba C, and Gentry T; 2014. Environmental Microbiology. 3rd Edition. Academic Press 2015 eBook ISBN: 9780123948175
9	Students are expected to be able to select and design transmission detection methods, risk assessment, and control of microbial pathogens in the environment	Answering exam questions correctly  Active participation in discussion	Exam  Discussion	7%  1%	Effect of Microbial Activity toward the environment	Face to face lecture and group discussion	2 x 50 minutes	Discussion Group work	Powerpoint presentation	Brock, T. D., and Madigan, M. T., 1991. Biology of Microorganisms. Prentice Hall. Englewood Cliffs, New Jersey  Pepper I, Gerba C,

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10	Students are expected to be able to select and design transmission detection methods, risk assessment, and control of microbial pathogens in the environment	Based on assignment rubric	Assignment	2.5%	Effect of Microbial Activity toward the environment	Face to face lecture and discussion Presentation	2 x 50 minutes	Discussion Group work and presentation	Powerpoint presentation	Brock, T. D., and Madigan, M. T., 1991. Biology of Microorganisms. Prentice Hall. Englewood Cliffs, New Jersey  Pepper I, Gerba C, and Gentry T; 2014. Environmen

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12	Students are expected to be able to choose and design transmission detection methods, risk assessment, and control of microbial pathogens in the environment	Answering exam questions correctly  Active participation in discussion	Exam  Discussion	7%  1%	Latest Methods to Detect Transmission, Risk Assessment, and Management of Microbial Pathogens in the Environment	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Brock, T. D., and Madigan, M. T., 1991. Biology of Microorganisms. Prentice Hall. Englewood Cliffs, New Jersey  Pepper I, Gerba C, and Gentry T; 2014. Environmental Microbiology. 3rd Edition. Academic Press 2015

										eBook ISBN: 978012394 8175
13	Students are expected to be able to select and design methods for managing microbes in health facilities	Answering exam questions correctly  Active participation in discussion	Exam  Discussion	7%  1%	Managing Microbes in Health Facilities (Pathogens in the Environment, Water, and Food)	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Brock, T. D., and Madigan, M. T., 1991. Biology of Microorganisms. Prentice Hall. Englewood Cliffs, New Jersey  Pepper I, Gerba C, and Gentry T; 2014. Environmental Microbiology. 3rd Edition. Academic Press 2015 eBook ISBN: 9780123948175





**Keterangan :**

**Penilaian pembelajaran (3), (4), (5) dapat berupa:**

Metode:

Tatap muka: observasi, tes tertulis, kuis, dsb

Daring: tugas *essay*, *feedback*, penilaian teman sejawat, penyusunan proposal, penyusunan paper, dsb

Instrumen

Tatap muka: soal *essay*, dsb

Daring: pilihan ganda, dsb

Bobot nilai

**Bahan kajian (6) dapat berupa:**

Sumber belajar yang diberikan oleh pengampu MK, jelaskan substansinya

Sumber belajar yang diperoleh mahasiswa secara online dalam bentuk teks, *slides*, *audio*, *video* dsb, jelaskan substansinya.

**Metode pembelajaran (7) dapat berupa:**

Metode tatap muka: pemaparan, *collaborative learning*, *problem based learning*, dsb

Metode daring: *self learning*, tugas terstruktur, *essay writing*, dsb

**Beban waktu pembelajaran (8):**

Tatap muka 2 x 50 menit, atau

Daring 2 x 60 menit belajar mandiri, 2 x 60 menit tugas terstruktur

**Pengalaman belajar/aktivitas mahasiswa (9) dapat berupa:**

Tatap muka: belajar berkelompok, berdiskusi, berdebat secara konstruktif, pemecahan masalah, dsb

Daring: belajar mandiri, berlatih mengkaji literature, berlatih menulis *essay*, dsb

**Media pembelajaran (10) dapat berupa:**

Tatap muka: computer, in focus, alat tulis, alat peraga, dsb

Daring: computer, *gadget*, akses internet, dsb