

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



Pengendalian Lingkungan dan Vektor Secara Biologi  
Semester 2/2 SKS/KUI-7212  
Program Studi S2 Ilmu Kesehatan Masyarakat

Oleh:

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**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 7212	Biological Control of the Environment and Vectors	2	2	Compulsory	-																				
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 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>	Students are expected to be able to describe various methods of environmental and vector control																							
	<b>CPMK2</b>	Students are able to evaluate the impact of biological vector control efforts																							
	<b>CPMK3</b>	Students are able to select the environment and vector control methods that are biologically appropriate in designing of health programs																							
	<b>CPMK4</b>																								
	<b>CPMK5</b>																								
	<b>CPMK n</b>																								
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>X</td> </tr> <tr> <td>ELO 4</td> <td></td> <td>x</td> <td>x</td> </tr> </tbody> </table>						CPMK 1	CPMK 2	CPMK 3	ELO 2	x	X	X	ELO 4		x	x								
	CPMK 1	CPMK 2	CPMK 3																						
ELO 2	x	X	X																						
ELO 4		x	x																						
Deskripsi Singkat Mata Kuliah	<p>This lecture will provide opportunities for students to study variations in biological environmental and vector control methods. This lecture discusses the principles of environmental and vector control, the use of pesticides, secondary metabolites, biomonitoring methods, bioremediation, phytoremediation, use of bacterial bacillus turingiensis, bacteriophage, genetic engineering, and biosafety principles. Lectures are conducted with face-to-face lectures and discussions. Through this lecture, students are expected to be able to understand the principles of environmental and vector control in biology, the advantages and disadvantages of various methods used so that students are able to choose biologically appropriate environmental and vector control methods to design health programs.</p>																								
Bahan Kajian/Materi Pembelajaran	<ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Pesticides</li> <li>3. Secondary Metabolites</li> <li>4. Biomonitoring</li> <li>5. Bioremediation</li> <li>6. Bioremediation of Radioactive Waste</li> <li>7. Phytoremediation</li> <li>8. Vector Control</li> <li>9. Bacillus turingiensis</li> <li>10. Bacteriophage</li> <li>11. Genetic Engineering</li> <li>12. Biosafety</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>X</td> </tr> <tr> <td>Discussion</td> <td>20%</td> <td>x</td> <td>x</td> <td>X</td> </tr> <tr> <td>Attendance</td> <td>10%</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>					Komponen Penilaian	Persentase	CPMK 1	CPMK 2	CPMK 3	Exam	70%	X	X	X	Discussion	20%	x	x	X	Attendance	10%	-	-	-
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Discussion	20%	x	x	X																					
Attendance	10%	-	-	-																					
Daftar Bahan dan Referensi	<ol style="list-style-type: none"> <li>1. Emden, H., Service, M. Pest and Vector Control. Cambridge: Cambridge University Press; 2004</li> <li>2. Damalas, C., Eleftherohorinos, I. Pesticide Exposure, Safety Issues, and Risk Assessment Indicators. Int. J. Environ. Res. Public Health 2011, 8, 1402-1419;</li> <li>3. Hutchison, C., Decker, H., Guifoile, P., Shen, B., Summers, R. Secondary-Metabolite Biosynthesis and Metabolism. New York: Springer;1992</li> <li>4. Angerer, J., Ewers, U., Wilhelm, M. Human Biomonitoring: State of the Art. Int. J. Hyg. Environ.-Health 210 (2007) 201–228</li> <li>5. Singh, A., Ward, O. Biodegradation and Bioremediation. Berlin: Springer-Verlag;</li> </ol>																								

	<p>2004</p> <p>6. Ali, H., Khan, E., Sajad, M. Phytoremediations of Heavy Metals – Concepts and Applications. Chemosphere (2013) Vol 91, Issue 7</p> <p>7. Schnepf, E. et al. Bacillus thuringiensis and Its Pesticidal Crystal Proteins. Microbiology and Molecular Biology Reviews.1998.Vol 6. No. 3</p> <p>8. Sulakvelidze, A., Alavidze, Z., &amp; Morris, J. G. (2001). <i>Bacteriophage Therapy. Antimicrobial Agents and Chemotherapy</i>, 45(3), 649–659. doi:10.1128/aac.45.3.649-659.2001</p> <p>9. WHO. Laboratory Biosafety Manual Third Edition. 2004</p>			
Nama Dosen Pengampu (Team Teaching)	<p>dr. Titik Nuryastuti, M.Si, Ph.D  Dr. Dra. Suhartini, Apt., M.S  Prof. Dr. Suwarno Hadisusanto, M.Si</p>			
<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 environmental control and vector biology	Answer exam questions correctly  Active in discussion	Exam  Discussion	6%  1.5%	Introduction	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Emden, H., Service, M. Pest and Vector Control. Cambridge: Cambridge University Press; 2004
2	Students are expected to be able to explain the function of pesticides in environmental control and vectors  Students are able to evaluate the positive and negative values of using pesticides in environmental control and vectors	Answer exam questions correctly  Active in discussion	Exam  Discussion	6%  1.5%	Pesticides	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Emden, H., Service, M. Pest and Vector Control. Cambridge: Cambridge University Press; 2004  Damalas, C., Eleftherohorinos, I. Pesticide

										Exposure, Safety Issues, and Risk Assessment Indicators. Int. J. Environ. Res. Public Health 2011, 8, 1402-1419;
3	Understanding the definition and benefits of secondary metabolism  Understanding the class of secondary metabolites  Understanding the structure of secondary metabolites	Answer exam questions correctly  Active in discussion	Exam  Discussion	6%  1.5%	Secondary Metabolites	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Hutchison, C., Decker, H., Guifoile, P., Shen, B., Summers, R. Secondary-Metabolite Biosynthesis and Metabolism . New York: Springer; 1992
4	Students are expected to be able to explain the role of biomonitoring				Biomonitoring	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Angerer, J., Ewers, U., Wilhelm, M. Human

	in environmental health  Students are expected to be able to select the biomonitoring method for health programs									Biomonitoring: State of the Art. Int. J. Hyg. Environ.-Health 210 (2007) 201–228
5	Students are expected to be able to describe the functions and methods of bioremediation	Answer exam questions correctly  Active in discussion	Exam  Discussion	6%  1.5%	Bioremediation	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Singh, A., Ward, O. Biodegradation and Bioremediation. Berlin: Springer-Verlag; 2004
6	Students are expected to be able to apply radioactive waste bioremediation methods  Students are expected to be able to evaluate efforts to handle radioactive waste	Answer exam questions correctly  Active in discussion	Exam  Discussion	6%  1.5%	Bioremediation of Radioactive Waste	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Singh, A., Ward, O. Biodegradation and Bioremediation. Berlin: Springer-Verlag; 2004

7	Students are expected to be able to explain the concepts and applications of phytoremediation	Answer exam questions correctly  Active in discussion	Exam  Discussion	6%  1.5%	Phytoremediation	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Ali, H., Khan, E., Sajad, M. Phytoremediations of Heavy Metals – Concepts and Applications. Chemosphere (2013) Vol 91, Issue 7
8	Students are expected to be able to explain the principles of vector control  Students are expected to be able to choose vector control methods for health programs				Vector Control	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Emden, H., Service, M. Pest and Vector Control. Cambridge: Cambridge University Press; 2004
9	Students are expected to be able to explain the function of Bacillus thuringiensis in	Answer exam questions correctly  Active in	Exam  Discussion	6%  1.5%	Bacillus thuringiensis	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Schnepf, E. et al. Bacillus thuringiensis and Its

	environmental control and vectors	discussion								Pesticidal Crystal Proteins. Microbiology and Molecular Biology Reviews.1998.Vol 6. No. 3
10	Students are expected to be able to explain the role of bacteriophages in environmental control and vectors	Answer exam questions correctly  Active in discussion	Exam  Discussion	6%  1.5%	Bacteriophage	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Sulakvelidze, A., Alavidze, Z., & Morris, J. G. (2001). <i>Bacteriophage Therapy. Antimicrobial Agents and Chemotherapy</i> , 45(3), 649–659. doi:10.1128/aac.45.3.649-659.2001
11	Students are expected to be able to explain the application	Answer exam questions correctly	Exam	6%	Genetic Engineering	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	Emden, H., Service, M. Pest and



	of genetic engineering in vector control	Active in discussion	Discussion	1.5%						Vector Control. Cambridge: Cambridge University Press; 2004
12	Students are expected to be able to apply biosafety principles	Answer exam questions correctly  Active in discussion	Exam  Discussion	6%  1.5%	Biosafety	Face to face lecture and discussion	2 x 50 minutes	Discussion	Powerpoint presentation	WHO. Laboratory Biosafety Manual Third Edition. 2004

**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