

## **SEMESTER LESSON PLAN**



### **LESSON PLAN DEVELOPER(S):**

**Prof. Dr. Ir. Maftuch, M.Si**

Lecturer in Molecular Immunology  
Faculty of Fisheries and Marine Science, Universitas Brawijaya

**AQUACULTURE MASTER'S PROGRAM  
FACULTY OF FISHERIES AND MARINE SCIENCE  
UNIVERSITAS BRAWIJAYA  
2021**

## SEMESTER LESSON PLAN

### 1. Course Identity

Study Program : Aquaculture Master's Program  
Course : Molecular Immunology  
Course Code : PIB 8108  
Course Group : Health and Diseases in fish  
Credit : 3  
Degree : Master's Degree  
Semester : 1  
Pre-requisite : *(if any, write down the course code)*  
Status : Elective  
Lecturers' names and codes: Prof. Dr. Ir. Maftuch, M.Si  
Dr. Uun Yanuhar, S.Pi., M.Si  
Dr. Yuni Kilawati, S.Pi, M.Si.  
Prof. Dr. Edi Widjajanto, MS., Sp.PK. (K)

### 2. Course Descriptive

This lecture discusses immunological processes, molecular immune responses in aquaculture animals to be applied in research in order to improve the health of aquaculture animals based on their respective immunology.

### 3. Program Learning Outcomes (PLO)

1. Being able to develop the existing concept and create new knowledge in disease control and aquatic animal health management (CPL-9).

#### 4. Course Learning Outcomes

After completing this course, students will be able to:

1. understand and explain the molecular immune response in aquaculture animals.
2. detect diseases in fish and conduct proper fish health management based on fish molecular immunology.
3. understand and explain immunomodulators and their application.

#### 5. Lesson Plan

Week	PLO Indicator	Topics	Teaching Strategies	Time (hour)	Learning Activities	Assessment	Learning Sources
1	1.1 Mastery of the concept of molecular immunology. 1.2 Accuracy in explaining the basic physiology of molecular immunology.	- Introduction to molecular immunology - Basic physiology concepts of molecular immunology.	• Lecture (S)	2	Note taking (A) Working on assignments(A)	Criteria: Scoring Guidelines  Non-test: summarizing lecture materials (A)	1) Roitt I., 1997, <b><i>Essential Immunology</i></b> , 9th Ed., Blackwell Co., London. 2) Baratawidjaja K. G., 2002, <b><i>Imunologi Dasar</i></b> , Edisi V, Balai penerbit FKUI, Jakarta
2	1.3 Accuracy in explaining the scope of immunology and immunology of infection in fish	- The concept of immunology and immunology of infection in fish	• Lecture (S) • Assignment (A) & Presentation (S)	2	Note taking (A) Working on assignments(A)	Criteria: Scoring Guidelines  Non-test: - summarizing lecture materials (A) - group or independent presentation(S)	1) Roitt I., 1997, <b><i>Essential Immunology</i></b> , 9th Ed., Blackwell Co., London. 2) Baratawidjaja K. G., 2002, <b><i>Imunologi Dasar</i></b> , Edisi V, Balai penerbit FKUI, Jakarta

Week	PLO Indicator	Topics	Teaching Strategies	Time (hour)	Learning Activities	Assessment	Learning Sources
3	2.1 Accuracy in explaining the effect of stress on immunity and blood biochemistry	- Mechanism of stress in fish and its effect on the immune and blood biochemistry of fish	<ul style="list-style-type: none"> <li>Lecture (S)</li> <li>Assignment (A) &amp; Presentation (S)</li> </ul>	2	Note taking (A) Working on assignments(A)	Criteria: Scoring Guidelines  Non-test: - summarizing lecture materials (A) - group or independent presentation(S)	1) Roitt I., 1997, <b><i>Essential Immunology</i></b> , 9th Ed., Blackwell Co., London. 2) Baratawidjaja K. G., 2002, <b><i>Imunologi Dasar</i></b> , Edisi V, Balai penerbit FKUI, Jakarta
4	2.2 2.2 Accuracy in explaining phagocytosis mechanism in non-specific immune responses.	- Determination of the types of non-specific immune responses. - Phagocytosis mechanism as a non-specific immune response	<ul style="list-style-type: none"> <li>quiz 1 (S)</li> <li>Lecture (S)</li> <li>Assignment (A) &amp; Presentation (S)</li> </ul>	2	Note taking (A) Working on assignments(A)	Criteria: Scoring Guidelines  Non-test: - summarizing lecture materials (A) - group or independent presentation(S)	1) Roitt I., 1997, <b><i>Essential Immunology</i></b> , 9th Ed., Blackwell Co., London. 2) Baratawidjaja K. G., 2002, <b><i>Imunologi Dasar</i></b> , Edisi V, Balai penerbit FKUI, Jakarta
5	2.3 Accuracy in explaining the causal relationship between environment and fish health.	- Causal relationship between environment and fish health.	<ul style="list-style-type: none"> <li>Lecture (S)</li> <li>Assignment (A) &amp; Presentation (S)</li> </ul>	2	Note taking (A) Working on assignments(A)	Criteria: Scoring Guidelines  Non-test: - summarizing lecture materials (A)	1) Roitt I., 1997, <b><i>Essential Immunology</i></b> , 9th Ed., Blackwell Co., London. 2) Baratawidjaja K. G., 2002, <b><i>Imunologi Dasar</i></b> , Edisi V,

Week	PLO Indicator	Topics	Teaching Strategies	Time (hour)	Learning Activities	Assessment	Learning Sources
						- group or independent presentation(S)	Balai penerbit FKUI, Jakarta
6	2.4 Accuracy in explaining the fish immune response during adaptation process	- Respon imun ikan saat beradaptas - Immune response in fish during adaptation process	<ul style="list-style-type: none"> <li>Lecture (S)</li> <li>Lecture (S)</li> <li>Assignment (A) &amp; Presentation (S)</li> </ul>	2	Note taking (A) Working on assignments(A)	Criteria: Scoring Guidelines  Non-test: - summarizing lecture materials (A) - group or independent presentation (S)	1) Roitt I., 1997, <b><i>Essential Immunology</i></b> , 9th Ed., Blackwell Co., London. 2) Baratawidjaja K. G., 2002, <b><i>Imunologi Dasar</i></b> , Edisi V, Balai penerbit FKUI, Jakarta
7	2.5 Accuracy in explaining specific (adaptive) immune response in fish	- Specific (adaptive) immune response in fish	<ul style="list-style-type: none"> <li>Lecture (S)</li> <li>Assignment (A) &amp; Presentation (S)</li> </ul>	2	Note taking (A) Working on assignments(A)	Criteria: Scoring Guidelines  Non-test: - summarizing lecture materials (A) - group or independent presentation (S)	1) Roitt I., 1997, <b><i>Essential Immunology</i></b> , 9th Ed., Blackwell Co., London. 2) Baratawidjaja K. G., 2002, <b><i>Imunologi Dasar</i></b> , Edisi V, Balai penerbit FKUI, Jakarta
8	<b>MIDTERM EXAM</b>						
9	2.6 Accuracy in explaining fish health management	- Guidelines and methods for proper fish health management	<ul style="list-style-type: none"> <li>Lecture (S)</li> <li>Assignment (A) &amp; Presentation (S)</li> </ul>	2	Note taking (A) Working on assignments(A)	Criteria: Scoring Guidelines  Non-test:	1) Roitt I., 1997, <b><i>Essential Immunology</i></b> , 9th Ed., Blackwell Co., London.

Week	PLO Indicator	Topics	Teaching Strategies	Time (hour)	Learning Activities	Assessment	Learning Sources
						<ul style="list-style-type: none"> <li>- summarizing lecture materials (A)</li> <li>- group or independent presentation(S)</li> </ul>	2) Baratawidjaja K. G., 2002, <b><i>Imunologi Dasar</i></b> , Edisi V, Balai penerbit FKUI, Jakarta
10	3.1 Accuracy in explaining the concept of vaccines and vaccinations	- Vaccines and vaccination	<ul style="list-style-type: none"> <li>• Lecture (S)</li> <li>• Assignment (A) &amp; Presentation (S)</li> </ul>	2	Note taking (A) Working on assignments(A)	<p>Criteria: Scoring Guidelines</p> <p>Non-test:</p> <ul style="list-style-type: none"> <li>- summarizing lecture materials (A)</li> <li>- group or independent presentation(S)</li> </ul>	<ol style="list-style-type: none"> <li>1) Roitt I., 1997, <b><i>Essential Immunology</i></b>, 9th Ed., Blackwell Co., London.</li> <li>2) Baratawidjaja K. G., 2002, <b><i>Imunologi Dasar</i></b>, Edisi V, Balai penerbit FKUI, Jakarta</li> <li>3) Brown F., Dougan, Hocy E.M., Martin S.J., Rima, B.K., and Trudgett A., 1993, <b><i>Vaccine Design</i></b>, John Wiley &amp; Son, West Sussex.</li> </ol>
11	3.2 Accuracy in explaining antigen recognition molecules 3.3 Accuracy in explaining	- Antigen recognition molecules	<ul style="list-style-type: none"> <li>• Lecture (S)</li> <li>• Assignment (A) &amp; Presentation (S)</li> </ul>	2	Note taking (A) Working on assignments(A)	<p>Criteria: Scoring Guidelines</p> <p>Non-test:</p>	<ol style="list-style-type: none"> <li>1) Roitt I., 1997, <b><i>Essential Immunology</i></b>, 9th Ed., Blackwell Co., London.</li> <li>2) Baratawidjaja K.</li> </ol>

Week	PLO Indicator	Topics	Teaching Strategies	Time (hour)	Learning Activities	Assessment	Learning Sources
	antigen-recognition molecules					<ul style="list-style-type: none"> <li>- summarizing lecture materials (A)</li> <li>- group or independent presentation(S)</li> </ul>	<p>G., 2002, <b><i>Imunologi Dasar</i></b>, Edisi V, Balai penerbit FKUI, Jakarta</p> <p>3) Brown F., Dougan, Hocy E.M., Martin S.J., Rima, B.K., and Trudgett A., 1993, <b><i>Vaccine Design</i></b>, John Wiley &amp; Son, West Sussex.</p>
12	3.3 Accuracy in explaining fish immune system	- Fish immune system and immune response	<ul style="list-style-type: none"> <li>• Lecture (S)</li> <li>• Assignment (A) &amp; Presentation (S)</li> </ul>	2	Note taking (A) Working on assignments(A)	<p>Criteria: Scoring Guidelines</p> <p>Non-test:</p> <ul style="list-style-type: none"> <li>- summarizing lecture materials (A)</li> <li>- group or independent presentation (S)</li> </ul>	<p>1) Roitt I., 1997, <b><i>Essential Immunology</i></b>, 9th Ed., Blackwell Co., London.</p> <p>2) Baratawidjaja K. G., 2002, <b><i>Imunologi Dasar</i></b>, Edisi V, Balai penerbit FKUI, Jakarta</p> <p>3) Brown F., Dougan, Hocy E.M., Martin S.J., Rima, B.K., and Trudgett A., 1993, <b><i>Vaccine Design</i></b>, John Wiley &amp; Son, West Sussex.</p>

Week	PLO Indicator	Topics	Teaching Strategies	Time (hour)	Learning Activities	Assessment	Learning Sources
							Sussex.
13	3.4 Accuracy in explaining fish immune system	- Immune system and immune responses in fish	<ul style="list-style-type: none"> <li>Lecture (S)</li> <li>Assignment (A) &amp; Presentation (S)</li> </ul>	2	Note taking (A) Working on assignments(A)	Criteria: Scoring Guidelines  Non-test: - summarizing lecture materials (A) - group or independent presentation\ (S)	1) Roitt I., 1997, <b><i>Essential Immunology</i></b> , 9th Ed., Blackwell Co., London. 2) Baratawidjaja K. G., 2002, <b><i>Imunologi Dasar</i></b> , Edisi V, Balai penerbit FKUI, Jakarta 3) Brown F., Dougan, Hocy E.M., Martin S.J., Rima, B.K., and Trudgett A., 1993, <b><i>Vaccine Design</i></b> , John Wiley & Son, West Sussex.
14	3.5 Accuracy in describing the crustacean immune system	- Immune system and immune responses in fish	<ul style="list-style-type: none"> <li>Lecture (S)</li> <li>Assignment (A) &amp; Presentation (S)</li> </ul>	2	Note taking (A) Working on assignments(A)	Criteria: Scoring Guidelines  Non-test: - summarizing lecture materials (A) - group or independent presentation (S)	1) Roitt I., 1997, <b><i>Essential Immunology</i></b> , 9th Ed., Blackwell Co., London. 2) Baratawidjaja K. G., 2002, <b><i>Imunologi Dasar</i></b> , Edisi V, Balai penerbit FKUI, Jakarta 3) Brown F.,



Week	PLO Indicator	Topics	Teaching Strategies	Time (hour)	Learning Activities	Assessment	Learning Sources
							Dougan, Hocy E.M., Martin S.J., Rima, B.K., and Trudgett A., 1993, <b>Vaccine Design</b> , John Wiley & Son, West Sussex.
15	3.5 Accuracy in describing the crustacean immune system	- Immune system and immune responses in fish	<ul style="list-style-type: none"> <li>Lecture (S)</li> <li>Assignment (A) &amp; Presentation (S)</li> </ul>	2	Note taking (A) Working on assignments(A)	Criteria: Scoring Guidelines  Non-test: - summarizing lecture materials (A) - group or independent presentation - (S)	1) Roitt I., 1997, <b>Essential Immunology</b> , 9th Ed., Blackwell Co., London. 2) Baratawidjaja K. G., 2002, <b>Imunologi Dasar</b> , Edisi V, Balai penerbit FKUI, Jakarta 3) Brown F., Dougan, Hocy E.M., Martin S.J., Rima, B.K., and Trudgett A., 1993, <b>Vaccine Design</b> , John Wiley & Son, West Sussex.
16	<b>FINAL EXAM</b>						

Notes: S = Synchronous, A = Asynchronous, all soft skills achievement will be scored based on the analysis referring to the Learning Management System

#### 6. References

- Roitt I., 1997, **Essential Immunology**, 9th Ed., Blackwell Co., London.

- 4) Baratawidjaja K. G., 2002, ***Imunologi Dasar***, Edisi V, Balai penerbit FKUI, Jakarta
- 5) Brown F., Dougan, Hocy E.M., Martin S.J., Rima, B.K., and Trudgett A., 1993, ***Vaccine Design***, John Wiley & Son, West Sussex.

## 7. Appendices

### Appendix 1. *Learning Materials*

- PPT 1 : Introduction
- PPT 2 : The scope of molecular immunology
- PPT 3 : Infection immunology of fish
- PPT 4 : The effect of stress on blood biochemistry
- PPT 5 : Non-specific immunity and phagocytosis
- PPT 6 : The relationship between the environment and fish health
- PPT 7 : Fish adaptation and immune response
- PPT 8 : Midterm exam
- PPT 9 : Specific (adaptive) immune response.
- PPT 10 : Fish health management
- PPT 11 : Vaccines and vaccination
- PPT 12 : Antigen recognition molecule
- PPT 13 : Immune system in fish
- PPT 14 : Immune system in crustaceans
- Online learning resources: (URL/link)
- and other learning resources: (URL/link)

### Appendix 2. *Media*

Zoom Meeting: (URL/link)

Google Meet: (URL/link)

### Appendix 3. *Assessment Instrument*

## Scoring Rubric

### Oral Presentation

Close to the Expectation (score 1-2)	Meeting the Expectation (score 3-4)	Exceeding the Expectation (score 5)
<ol style="list-style-type: none"> <li>1) Presentation is not organized and not well developed</li> <li>2) Material is not well-explained well</li> <li>3) Theories and concepts are not thoroughly discussed</li> <li>4) Presentation is not clear and not fluent</li> <li>5) Lack of confidence in delivery, mostly note reading</li> <li>6) Voice is unclear</li> <li>7) Presentation does not attract audiences' attention</li> <li>8) Inadequate responses to questions, inadequate comprehension of the material</li> <li>9) Unsynchronized presentations</li> <li>10) Exceeding the time limit, failing to complete the presentation</li> </ol>	<ol style="list-style-type: none"> <li>1) Presentation is rather well -organized and developed</li> <li>2) Fair comprehension of the material being delivered</li> <li>3) Theories and concepts are fairly discussed thoroughly</li> <li>4) Presentation is fairly clear and fluent</li> <li>5) Showing fairly strong confidence and speakers read notes wisely</li> <li>6) Voice is quite clear</li> <li>7) Able to engage audience's attention</li> <li>8) Fairly good in responding to questions, showing excellent comprehension of the material being presented</li> <li>9) Good synchronization of presentation flow</li> <li>10) Exceeding the time limit yet presenters managed to complete the presentation</li> </ol>	<ol style="list-style-type: none"> <li>1) Presentation is very well organized and creatively developed</li> <li>2) Very strong knowledge regarding the material being presented</li> <li>3) Theories and concepts are very thoroughly-discussed</li> <li>4) Presentation is very clear and smooth</li> <li>5) Excellent confidence in delivery, reading notes very wisely</li> <li>6) Voice is very clear</li> <li>7) Adequately attracts audiences' attention well</li> <li>8) Responding to questions very well, very strong comprehension of the material being delivered</li> <li>9) Very clear synchronization in presentation flow</li> <li>10) Not exceeding the time limit, presentation is completed</li> </ol>

### Written Assignments

#### Essay

Under the average (score 1 – 4)	Within the Average (score 5 – 8)	Above the Average (score 9 – 12)	Perfect (score 13 – 15)
<ol style="list-style-type: none"> <li>1) Not using the right analytical method</li> <li>2) Incorrect data analysis</li> <li>3) Making wrong conclusions</li> <li>4) No critical analysis of the data available</li> </ol>	<ol style="list-style-type: none"> <li>1) Using acceptable analytical methods</li> <li>2) Data are well analyzed</li> <li>3) Making relevant conclusions</li> <li>4) There is a fairly critical analysis of the data</li> <li>5) There are only one or two</li> </ol>	<ol style="list-style-type: none"> <li>1) Using a relatively precise analysis method</li> <li>2) Proper data analysis</li> <li>3) Making the right conclusion</li> <li>4) Critical analysis of the data is found</li> </ol>	<ol style="list-style-type: none"> <li>1) Using the correct analytical method</li> <li>2) Effective data analysis</li> <li>3) Making strongly effective conclusions</li> <li>4) There is a strong critical analysis of the data</li> </ol>

<ul style="list-style-type: none"> <li>5) No references</li> <li>6) Unmatched literature review (theory, research) and questions</li> <li>7) Using non-standardized language and poor cohesion</li> <li>8) No explanation about the implications of the topics being discussed</li> <li>9) Essay is not systematically-structured</li> </ul>	<ul style="list-style-type: none"> <li>references yet irrelevant</li> <li>6) Matching literature review (theory, research) and question</li> <li>7) Using standard language with good cohesion between sentences</li> <li>8) The implications of the topics being discussed are explained yet less thoroughly</li> <li>9) Essay is not systematically-structured</li> </ul>	<ul style="list-style-type: none"> <li>5) There are many references yet irrelevant at this point</li> <li>6) Matching literature review (theory, research) and questions</li> <li>7) Using standard language and sentences are cohesive</li> <li>8) There is a unique and critical explanation of the implications of the topics being discussed</li> <li>9) Essay is systematically-arranged</li> </ul>	<ul style="list-style-type: none"> <li>5) There are many references with strong relevancy</li> <li>6) Strongly matching literature review (theory, research) and questions</li> <li>7) Using standard language with strong cohesion between sentences</li> <li>8) There is a unique and very critical explanation of the implications of the topics being discussed</li> <li>9) Essay is systematically and neatly arranged</li> </ul>
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*Report*

<b>Under the average (score 1 – 4)</b>	<b>Within the Average (score 5 – 8)</b>	<b>Above the Average (score 9 – 12)</b>	<b>Perfect (score 13 – 15)</b>
<ul style="list-style-type: none"> <li>1) Not using the right analytical method</li> <li>2) Incorrect data analysis</li> <li>3) Making wrong conclusions</li> <li>4) No critical analysis of the data available</li> <li>5) No references</li> <li>6) Unmatched literature review (theory, research) and questions</li> <li>7) Using non-standardized language and poor cohesion</li> <li>8) No explanation about the implications of the topics being discussed</li> <li>9) Report is not systematically-structured</li> </ul>	<ul style="list-style-type: none"> <li>1) Using acceptable analytical methods</li> <li>2) Data are well analyzed</li> <li>3) Making relevant conclusions</li> <li>4) There is a fairly critical analysis of the data</li> <li>5) There are only one or two references yet irrelevant</li> <li>6) Matching literature review (theory, research) and question</li> <li>7) Using standard language with good cohesion between sentences</li> <li>8) The implications of the topics being discussed are explained yet less thoroughly</li> <li>9) Report is relatively not</li> </ul>	<ul style="list-style-type: none"> <li>1) Using a relatively precise analysis method</li> <li>2) Proper data analysis</li> <li>3) Making the right conclusion</li> <li>4) Critical analysis of the data is found</li> <li>5) There are many references yet irrelevant at this point</li> <li>6) Matching literature review (theory, research) and questions</li> <li>7) Using standard language and sentences are cohesive</li> <li>8) There is a unique and critical explanation of the implications of the topics being discussed</li> </ul>	<ul style="list-style-type: none"> <li>1) Using the correct analytical method</li> <li>2) Effective data analysis</li> <li>3) Making strongly effective conclusions</li> <li>4) There is a strong critical analysis of the data</li> <li>5) There are many references with strong relevancy</li> <li>6) Strongly matching literature review (theory, research) and questions</li> <li>7) Using standard language with strong cohesion between sentences</li> <li>8) There is a unique and very critical explanation of the implications of the topics being discussed</li> </ul>

	systematically-structured	9) Report is systematically-arranged	9) Report is systematically and neatly arranged
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