

**Course Syllabus**  
**MBSB 505 Molecular Diagnosis and Therapy**  
**Academic Year 2021**

**Course ID and name:** MBSB 505 Molecular Diagnosis and Therapy  
**Course coordinator:** Assistant Professor Dr. Alisa Tubsuwan  
Email: alisa.tub@mahidol.ac.th,

**Instructors:**

- |                                         |                                  |
|-----------------------------------------|----------------------------------|
| 1. Assoc. Prof. Dr. Panat Anuracpreeda  | 8. Dr. Kittiphong Paiboonsukwong |
| 2. Assoc. Prof. Dr. Natini Jinawat      | 9. Dr. Natee Jearawiriyapaisarn  |
| 3. Asst. Prof. Dr. Alisa Tubsuwan       | 10. Dr. Phatchariya Phannasil    |
| 4. Asst. Prof. Dr. Duangrudee Tanramluk | 11. Dr. Promsin Masrinoul        |
| 5. Asst. Prof. Dr. Narisorn Kitiyanant  | 12. Dr. Sirirat Kumarn           |
| 6. Dr. Chutima Thepparit                | 13. Dr. Alita Kongchanagul       |
| 7. Dr. Duangnapa Kovanich               |                                  |

**Credits:** 3 (3-0-6)

**Curriculum:** Doctor of Philosophy Program in Systems Biosciences (Required course)

**Semester offering:** Second semester

**Prerequisite:** None

**Course level:** Advanced

**Course Description:**

Molecular diagnosis, molecular diagnostic techniques; DNA-based diagnosis; RNA-based diagnosis; protein-based diagnosis; applications of molecular techniques for prenatal diagnosis; paternity testing; forensic medicine; molecular therapy; drug delivery; nucleic acid-based therapy, gene therapy, and genome editing technology; protein-based therapy; cell-based therapy

**Course Learning Outcomes (CLOs)**

Upon completion of this course, students are able to:

1. Identify the role and importance of molecular diagnostics in genetic and acquired diseases
2. Demonstrate knowledge and principle in molecular techniques for diagnosis and monitoring of genetic and acquired diseases
3. Identify limitation in molecular diagnostics strategy and ethical issue in molecular diagnostics strategy
4. Apply knowledge in molecular techniques for development of diagnostic kit based on patients and disease specific information and parameters

### Constructive Alignment of Course Content to CLOs and Program ELOs

Lecture No.	Topic	CLOs	Program ELOs
1	Introduction to molecular diagnosis	1	1, 2
2	DNA-based diagnosis	1-3	1, 2
3	RNA-based diagnosis	1-3	1, 2
4	Protein-based diagnosis		1, 2
5	Application of molecular techniques for prenatal diagnosis, paternity testing, forensic medicine	1-3	1,2
6	Group activities: Development of new diagnostic kits	1-4	1-6, 8
7	Introduction to molecular therapy	1	1, 2
8	Drug development	1-3	1, 2
9	Drug Delivery Systems and targeted delivery	1-3	1, 2
10	Nucleic acid-based therapy	1-3	1, 2
11	Gene therapy	1-3	1, 2
12	Genome editing technology	1-3	1, 2
13	Protein-based therapy	1-3	1, 2
14	Cell-based therapy	1-3	1, 2
15	Group activities: Development of new molecular therapy	1-4	1-6, 8

**Course Schedule 2021**

Friday, Time 10.00-12:00, Room A107

Date	Lecture No.	Topic	Teaching & Learning Strategy	Assessment	Instructor
	1	Introduction to molecular diagnosis	Lecture	Behavior in class, Written examination	Alisa
	2	DNA-based diagnosis	Lecture	Behavior in class, Written examination	Nathini
	3	RNA-based diagnosis	Lecture and group discussion	Behavior in class, Written examination	Phatchariya
	4	Protein-based diagnosis	Lecture	Behavior in class, Written examination	Panat
	5	Application of molecular techniques for prenatal diagnosis, paternity testing, forensic medicine	Lecture	Behavior in class, Written examination	Kittiphong
	6	Group activities: Development of new diagnostic kits	Group activity problem-based learning, presentation	Behavior in class, performance and participation in class activities, assessment of presentation Behavior in class, performance and participation in class activities, assessment of presentation	All

Date	Lecture No.	Topic	Teaching & Learning Strategy	Assessment	Instructor
	7	Introduction to molecular therapy	Lecture and group discussion	Assignment	Alisa
	8	Drug development	Lecture	Written examination	Sirirat
	9	Drug Delivery Systems and targeted delivery	Lecture	Written examination	Sirirat
	10	Nucleic acid-based therapy	Lecture and group discussion	Assignment	Natee
	11	Gene therapy	Lecture and group discussion	Written examination	Alisa
	12	Genome editing technology	Lecture and group discussion	Assignment	Alisa
	13	Protein-based therapy	Lecture	Written examination, Assignment	Panat Chutima
	14	Cell-based therapy	Lecture	Written examination	Narisorn
	15	Group activities: Development of new molecular therapy	Group activity problem-based learning, presentation	Behavior in class, performance and participation in class activities, assessment of presentation	All

### Assignments

- 1) Assignment from instructors
- 2) Group activity

## Assessment Criteria

Assessment Criteria	Assessment Method	Scoring Rubric
Written examination/ Assignment (60%)	1) Take-home assignments 2) Written Exam	1) Punctual assignment submission 2) Content accuracy
Attendance/participation (10%)	1) Direct observation 2) Group activities and discussion	1) Attendance and punctuality 2) Participation 3) Distracting behaviors 4) General attitude towards learning
Group activity and presentation (30%)	1) Presentations	1) Content 2) Organization 3) Understanding of scientific content 4) Presentation style 5) Question handling 6) Shark's score 7) Product 8) Informative 9) Time management

Students must receive a score of 60% or more to pass the course. Student's achievement will be graded using symbols: A, B+, B, C+, C and F based on the following criteria;

Percentage	Grade	Description
≥ 80%	A	Excellent
75-79.99%	B <sup>+</sup>	Good
70-74.99%	B	Fairly good
65-69.99%	C <sup>+</sup>	Fair
60-64.99%	C	Poor
< 60%	F	Fail

However, a final grade will be adjusted based on frequency distribution of student's scores from the whole course.

## Appeal Procedure

Should the students have any appeal regarding the assessments or grade, inquiry can be made to the instructors and/or the course coordinator immediately either by direct contact, telephone or email.

**Course Reading Materials**

A series of textbooks, online resources and appropriate journal articles will be introduced throughout the course by the instructors. These materials may be found on the google classroom.

**General Inquiry**

Ms. Siriporn Monkasemsiri [siriporn.mon@mahidol.edu](mailto:siriporn.mon@mahidol.edu); Tel. 02-441-9003-7 ext. 1314

**Date revised:** October 17, 2021

Criteria	Rubic Score for Attendance and participation				
	0	1	2	3	4
<b>Attendance and puntuallity</b>	More than 15 min late of absent	less than 15 min late	less than 10 min late	less than 5 min late	Punctual
<b>Paticipation</b>	Never participates in class, appears apathetic towards class activities	Seldom paticipates in class	Moderately participates in class, is able to answer when called on, appears interested	Frequently participates in class, asks thouht provoking question, appears enthusiastic	Frequently/always participates in class, often asks thought provoking question, shows much effort in going beyond the scope of the book
<b>Distracting behaviors</b>	Frequently shows disrespect for others or frequently distracts the others in class	Shows some verbal/nonverbal behaviour/disrespect the others inclass	Shows few verbal/nonverbal behaviors that distract the other in class	Hardly shows any verbal/nonverbal behavior that is distracting	Never shows any verbal/nonverbal behavior that is distracting to others in class
<b>General attitude towards learning</b>	Lack the desire to learn, contributes nothing	Shows little evidence of williness to learn and/or questionable motives	Exhibits some willingness to learn	Exhibits some willingness to learn, makes and above average effort in learning	Exhibits a desire/passion to learn and encourages the others to learn

Criteria	Scientific presentation (score); total score= 75			
	0-5 points	6-10 points	11-15 points	16-20 points
<b>Structure (15%)</b>	Poor structure - difficult to follow	Some structure demonstrated - can be followed but with difficulty	Acceptable structure - can be followed	Logical structure - easy to follow
<b>Scientific content and understanding (25%)</b>	Major improvement required	Lack of comprehensiveness and/or correctness	Acceptable comprehensive and correct knowledge and principles demonstrated	Adequate comprehensive and correct knowledge and principles demonstrated
<b>Presentation skills, including eye contact, laser pointing, body language (10%)</b>	Major improvement required	Attempts to comply with basic presentation skills demonstrated	Acceptable engagement, clarity and good presentation skills demonstrated	Engagement, confidence, fluency and excellent presentation skills demonstrated
<b>Question handling (10%)</b>	Inadequate (<50%)	Able to answer or respond to only a few questions (50-70%)	Able to answer or respond to majority of questions (70-90%)	Able to answer or respond to most/all questions (90-100%)
<b>Time management (2.5%)</b>	15± 8 min	15±6 min	15±4 min	15±2 min



	Sale presentation (total score =15)		
	0-5 points	6-10 points	11-15 points
<b>Introduction</b>	Insufficient introduction	Acceptable introduction, but clarity still required	Good introduction
<b>Informativeness</b>	Very little information on the product and/ or product backgroud	Moderate amount of information on the product	Sufficient information of the product to spark interest
<b>Product</b>	Not sellable. Unlikely for product development	The product is interesting, but not neccesarly something many people would buy. The product may not be entirely realistic. Students propably would need a fair bit of outside help/expertise to develop this product.	The product is useful or sell-able. There is a place for this product in the market. Likely for product development
<b>Presentation</b>	Poor presentation. Not much effort presented. No engagement. No convincingness for purchase. Not many questions answered.	Average presentation. Engagement still required but decent presentation demonstrated. Might be able to sell to few buyers	Engaging and creative presentation showing confidence and knowledge. High chance of sales/marketability.
<b>Shark's Score</b>	No purchase likely. Poor marketability.	Some good ideas but extra work required for actual purchase/sales.	The product was good. Purchase highly likely. Good marketability.
<b>Time management</b>	5±3	5±2	5±1