Course Syllabus
MBSB 505 Molecular Diagnosis and Therapy
Academic Year 2022

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
2. Assoc. Prof. Dr. Natini Jinawat
3. Asst. Prof. Dr. Alisa Tubsuwan
4. Asst. Prof. Dr. Duangrudee Tanramluk
5. Asst. Prof. Dr. Narisorn Kitiyanant
6. Dr. Chutima Thepparit
7. Dr. Duangnapa Kovanich

8. Dr. Kittiphong Paiboonsukwong
9. Dr. Natee Jearawiriyapaisarn
10. Dr. Phatchariya Phannasil
11. Dr. Promsin Masrinoul
12. Dr. Sirirat Kumarn
13. Dr. Alita Kongchanagul

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
5. Demonstrate knowledge in molecular therapeutic strategies such as nucleic acid-based therapy, protein-based therapy, gene and cell therapy
6. Apply their knowledge in molecular therapeutic strategies to develop molecular therapeutics based on patient- 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	Nucleic acid detection with CRISPR-Cas 13a/12a	1-3	1, 2
4	RNA-based diagnosis	1-3	1, 2
5	Protein-based diagnosis	1-3	1, 2
6	Application of molecular techniques for prenatal diagnosis, paternity testing, forensic medicine	1-3	1,2
7	Group activities: Development of new diagnostic kits	1-4	1-8
8	Introduction to molecular therapy	5	1, 2
9	Drug development	5	1, 2
10	Drug delivery systems and targeted delivery	5	1, 2
11	Nucleic acid-based therapy	5	1, 2
12	Gene therapy	5	1, 2
13	Genome editing technology	5	1, 2
14	Protein-based therapy	5	1, 2
15	Cell-based therapy	5	1, 2
16	Group activities: Development of new molecular therapy	5-6	1-8

Course Schedule 2022

Date	Time	Unit	Topic	Teaching & Learning Strategy	Assessment	Instructor
Jan 13	13.00-13.30	1	Course oreintation	-	-	Alisa
	13.30-16.30		Introduction to molecular diagnosis	Lecture	Behavior in class, Written examination	Kittiphong
Jan 20	13.30-16.30	2	RNA-based diagnosis	Lecture and group discussion	Behavior in class, Written examination	Phatchariya
Jan 24	13.30-15.30	3	DNA-based diagnosis	Lecture	Behavior in class, Written examination	Nathini
	15.30-16.30		Nucleic detection with CRISPR-Cas 13a /12a	Lecture	Behavior in class, Assignment	Alisa
Jan 25	13.30-16.30	4	Application of molecular techniques for prenatal diagnosis, paternity testing, and forensic medicine	Lecuture	Behavior in class, Written examination	Kittiphong
Jan 27	13.30-15.30	5	Protien-based diagnosis-Chromatography	Lecture	Behavior in class,Written examination	Duangnapa
Jan 31	13.30-15.30	6	Protien-based diagnosis-Antibody	Lecture	Behavior in class, Written examination	Panat
Feb 03	13.30-16.30		Exam I (unit 1-5)			All staff
Feb 07	13.30-16.30	7	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	All staff

Date	Time	Unit	Topic	Method	Assessment	Instructor
Feb 10	13.30-16.30	8	Introduction to molecular therapy	Lecture	Behavior in class, Assignment	Alisa
Feb 14	14.00-17.00	9	Drug Delivery I	Lecture	Behavior in class, Written examination	Sirirat
Feb 17	13.30-16.30	10	Drug Delivery II	Lecture	Behavior in class, Written examination	Sirirat
Feb 21	13.30-16.30		Exam II (unit 6-10)			All staff
Feb 24	13.30-16.30	11	Nucleic acid-based therapy	Lecture and group discussion	Behavior in class, Written examination	Natee
Feb 28	13.30-16.30	12	Genome editing technology	Lecture and group discussion	Behavior in class, Assignment	Alisa
March 03	13.30-15.30	13	Protein-based therapy-Antibody	Lecture	Behavior in class, Written examination	Panat
March 10	13.30-15.30	14	Protein-based therapy-Vaccine	Lecture	Behavior in class, Assignment	Chutima
March 14	13.30-16.30	15	Cell-based therapy	Lecture and group discussion	Behavior in class, Written examination	Narisorn
March 21	13.30-16.30		Exam III (Unit 11-15)			All staff
March 28	13.30-16.30	16	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 staff

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 2) Group discussion	1) Content 2) Organization 3) Understanding of scientific content 4) Presentation style 5) Question handing 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$^+$	Good
70-74.99%	B	Fairly good
65-69.99%	C$^+$	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; Tel. 02-441-9003-7 ext. 1314

Date revised: October 17, 2021