Course Code and Course Title	English SCIN 392 Synthetic Biology Thai วทนว 392 ชีววิทยาเชิงสังเคราะห์
Number of Credits	3 (3-0-6)
Curriculum and Course Type	Program of Study Bachelor's Degree Program in Bioinnovation (International Program) Course Type: Major Elective Course
Course Coordinator	Dr Sitthivut Charoensutthivarakul (SC) Address: K618 Chalermphrakiat Building School of Bioinnovation and Bio-based Product Intelligence, Faculty of Science, Mahidol University Tel: 0-2201-5956 email: sitthivut.cha@mahidol.edu
Semester/Year of Study	Academic Year 2024 First Semester (1/2024) / Third Year
Prerequisite	None
Co-requisite	None
Day/Time/Study Site Location	Monday / 9.00 AM-12.00 PM / B400 for the first half of the semester and SC1-154 for the second half of the semester Faculty of Science, Mahidol University, Salaya Campus
Date of Latest Revision	18 July 2024

Course Learning Outcomes (CLOs)

After successful completion of this course, students can

1. Utilize knowledge in fundamental processes in life science to artificial systems and synthetic biology
2. Apply appropriate materials for biological tools toward problems in life science, agricultural technology, environmental management and medicine
3. Develop innovative approaches for synthetic biology to translate to innovation

Course Description

Fundamental concepts of biopolymers; bioengineering of proteins and nucleic acids; metabolic pathways and engineering; biosensors and reporters; cellular reprogramming; synthetic tissues and tissue engineering; nanobiotechnology, integrations of omics to control diverse bioprocesses; and modern techniques in synthetic biology.

Credit Hours / Semester

Theory (Hours)	Addition Class (Hours)	Laboratory/Field trip/ Internship (Hours)	Self-study (Hours)
45 Hours/Semester (3 Hours x 15 Weeks)	-	-	90 Hours/Semester (6 Hours x 15 Weeks)

Number of Hours per Week for Individual Advice

1 hour per week by appointment at **K618** Faculty of Science, Mahidol University, Phyathai Campus or online via https://mahidol.webex.com/meet/sitthivut.cha. Students can contact the instructors by email or via Google Classroom which will be responded to during the office hour.

Evaluation of the CLOs

Course Learning Outcomes		Measurement Method			Weight (%)
		Class Attendance, Participation and Behavior in Class	Written Exam	Class Project	
CLO1	Utilize knowledge in fundamental processes in life science to artificial systems and synthetic biology.	5%	10%	5%	20%
CLO2	Apply appropriate materials for biological tools toward problems in life science, agricultural technology, environmental management and medicine.	5%	25%	10%	40%
CLO3	Develop innovative approaches for synthetic biology to translate to innovation.	5%	25%	10%	40%
	Total	15%	60%	25%	100%

Measurement and evaluation

After completion of the evaluation process each student is assigned a criterion-referenced grade (as shown in the table below). Evaluation and achievement will be justified according to Faculty and University code, conducted by grading system of A, B+, B, C+, C, D and F. To pass this course, students must earn a grade of at least a D.

Total Percentage of Evaluation	Below 49.5	49.5-54.5	54.5-59.5	59.5-64.5	64.5-69.5	69.5-74.5	74.5-79.5	79.5-100
Grade	F	D	D+	C	C+	B	B+	A

Teaching staff:

Code	Name	Email
PW	Patompon Wongtrakoongate Office: R305 (Phayathai Campus) Lab: R302 (Phayathai Campus)	patompon.won@mahidol.ac.th
SC	Sitthivut Charoensutthivarakul Office: K618 (Phayathai Campus) Lab: K617 (Phayathai Campus)	sitthivut.cha@mahidol.ac.th

Teaching Schedule 1st Semester of Academic Year 2024

Monday 9.00 AM - 12.00 PM, B400 for the first half of the semester and SC1-154 for the second half of the semester, Faculty of Science, Mahidol University

Week	Date	Topic	Hour		Instructor
			Lecture	Lab	
1	5 Aug	Course Orientation and Introduction to Protein	3	0	SC
2	12 Aug	No class	-	-	-
3	19 Aug	mRNA vaccines	3	0	PW
4	26 Aug	Gene organization and vaccination	3	0	PW
5	2 Sep	Gene design	3	0	PW
6	9 Sep	Primer design and molecular cloning	3	0	PW
7	16 Sep	Engineering a novel vaccine with mRNA	3	0	PW
8	23 Sep	Writing a grant for mRNA vaccine	3	0	PW
Midterm examination period					
10	7 Oct	Site-Selective Protein Modification for Synthetic Biology	3	0	SC
11	14 Oct	No class	-	-	-
12	21 Oct	Site-Selective Protein Modification for Synthetic Biology	3	0	SC
13	28 Oct	No class (Self-Study/Assignment)	3	0	SC
14	4 Nov	Site-Selective Protein Modification for Synthetic Biology	3	0	SC
15	11 Nov	Site-Selective Protein Modification for Synthetic Biology	3	0	SC
16	18 Nov	Antibody Drug Conjugates	3	0	SC
17	25 Nov	Final examination	3	0	SC
Final examination period					