



School of Bioinnovation and Bio-based Product Intelligence (SCIN)

Degree Bachelor Master Doctoral

Program in Bioinnovation (International Program, Multidisciplinary Program)

Faculty of Science

Course: SCIN 392 Synthetic Biology

Course Code and Course Title	English SCIN 392 Synthetic Biology Thai วิชา 392 ชีววิทยาเชิงสังเคราะห์
Number of Credits	3 (3-0-6)
Curriculum and Course Type	Program of Study Bachelor's Degree Program in Bioinnovation (International Program, Multidisciplinary Program) Course Type: Major Course
Course Coordinator	Patompon Wongtrakoongate, Ph.D Address: Department of Biochemistry, Faculty of Science, Mahidol University Tel: 02-201-5376 email: patompon.won@mahidol.ac.th
Semester/Year of Study	Academic Year 2021 First Semester (1/2021) / Third Year
Prerequisite	None
Co-requisite	None
Day/Time/Study Site Location	Monday / 9.00 AM-12.00 PM / Webex Faculty of Science, Mahidol University, Salaya Campus
Date of Latest Revision	18 June 2021

Course Learning Outcomes (CLOs)

After successful completion of this course, students are able to

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.



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Credit Hours / Trimester

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

2 hours per week or student requirement during prescribed date and time

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 course, students will be evaluated using a scoring scheme based upon the overall class's performance. An example of a scoring criterion is shown in the table below. Evaluation and achievement will be justifying according to Faculty and University code, conducted by grading system of A, B+, B, C+, C, D and F. To pass this course, student must earn a grade of a least D.

Total Percentage of Evaluation	Below 50	50-54.99	55-59.99	60-64.99	65-69.99	70-74.99	75-79.99	80-100
Grade	F	D	D+	C	C+	B	B+	A



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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
TT	Tatpong Tulyananda (TT) Office: SC1-316 (Salaya Campus) Lab: SC1-353 (Salaya Campus)	tatpong.tul@mahidol.ac.th



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Teaching Schedule 1st Semester of Academic Year 2022

Friday 9.00 AM - 12.00 PM, B400 Faculty of Science, Phayathai Campus

No	Date	Time	Topic	Lecturer
1	Aug 19	9.00-9.15	Course Orientation	PW
	Aug 19	9.15-12.00	L1: A Glimpse of Synthetic Biology	PW
2	Aug 26	9.00-12.00	L2: Molecular Concept of Synthetic Biology	PW
3	Sep 2	9.00-12.00	L3: Cellular Concept of Synthetic Biology	PW
4	Sep 9	9.00-12.00	P1: Synthetic Biology in Regenerative Medicine	PW
5	Sep 16	9.00-12.00	P2: Synthetic Biology in Cancer Therapeutics	PW
6	Sep 23	9.00-12.00	P3: Synthetic Biology in Neuroscience	PW
7	Sep 30	9.00-12.00	P4: Synthetic Biology in COVID-19	PW
	Oct 7	9.00-12.00	EXAMINATION I (L1-L4)	PW
8	Oct 14	9.00-12.00	L5: Synthetic Biology in Plant Biotechnology	TT
9	Oct 21	9.00-12.00	P5: Synthetic Biology in Plant Biotechnology	TT
10	Oct 28	9.00-12.00	L6: Site-Selective Protein Modification for Synthetic Biology	SC
11	Nov 4	9.00-12.00	P6: Site-Selective Protein Modification for Synthetic Biology	SC
12	Nov 11	9.00-12.00	L7: Small Molecules Drug Discovery	SC
13	Nov 18	9.00-12.00	P7: Small Molecules Drug Discovery	SC
14	Nov 25	9.00-12.00	L8: Antibody Drug Conjugates	SC
15	Dec 2	9.00-12.00	P8: Antibody Drug Conjugates	SC
	Dec 9	9.00-12.00	EXAMINATION II (L5-L7)	PW

L: Lecture

P: Paper discussion



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Webex links for lecture

PW; <https://mahidol.webex.com/meet/patompon.won>

TT; <https://mahidol.webex.com/meet/tatpong.tul>

SC; <https://mahidol.webex.com/meet/sitthivut.cha>