หลักสูตรวิทยาศาสตรมหาบัณฑิต
สาขาวิชาทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม
(หลักสูตรนานาชาติ / หลักสูตรปรับปรุง พ.ศ.๒๕๖๖)

MASTER OF SCIENCE PROGRAM
IN
BIORESOURCES AND ENVIRONMENTAL BIOLOGY

(INTERNATIONAL PROGRAM / REVISED PROGRAM B.E.2566)

FACULTY OF SCIENCE
AND
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY

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Master of Science Program in
Bioresources and Environmental Biology
(International Program)
Revised 2023

Name of Institution Mahidol University

Campus/Faculty/Department Faculty of Science, Department of Biology

Section 1 General Information

1. **Curriculum Name**

   Thai หลักสูตรวิทยาศาสตรมหาบัณฑิต สาขาวิชาทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม (หลักสูตรนานาชาติ)

   English Master of Science Program in Bioresources and Environmental Biology (International Program)

2. **Name of Degree and Major**

   Full Title Thai: วิทยาศาสตรมหาบัณฑิต (ทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม)

   Abbreviation Thai: วท.ม. (ทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม)

   Full Title English: Master of Science (Bioresources and Environmental Biology)

   Abbreviation English: M.Sc. (Bioresources and Environmental Biology)

3. **Major Subjects (if any)**: none

4. **Required Credits:** not less than 36 credits

5. **Curriculum Characteristics**

   5.1 Curriculum type/model: Master of Science

   5.2 Language: English

   5.3 Recruitment: Both Thai and international students

   5.4 Collaboration with Other Universities: This program is Mahidol University's program

   5.5 Graduate Degrees Offered to the Graduates: One degree

6. Curriculum Status and Curriculum Approval

6.1 Revised program 2023

6.2 Starting in semester 1, academic year B.E. 2566 onwards

6.3 Curriculum screening committee approved the program in its meeting 46/2022 on October 17, 2022

6.4 The Mahidol University Council approved the program in its meeting 586 on November 16, 2022

7. Readiness to Implement/Promote the Curriculum

The curriculum from the program is readily implemented and promoted its quality and standard according to criteria set by Thai Qualification Framework for Higher Education in academic year B.E. 2025 (2 years after implementation).

8. Career Opportunities of the Graduates

8.1 Researchers, technologists, or specialists in bioresources and environmental biology in governmental agencies, private sectors, and non-profit organizations

8.2 Specialists in bioresources and environmental biology in schools or institutes of higher education

8.3 Business owners and entrepreneurs

9. Name, ID Number, Title and Degree of the Faculty in Charge of the Program

No.	Identification Card Number Academic position - Name – Surname	Degree (Field of Study) University: Year of graduate	Department
1.	x xxxx xxxxxx xx x Assoc. Prof. Dr.Prinpida Sonthiphand	Ph.D. (Biology) University of Waterloo, Canada: 2014 M.Sc. (Environmental Management) Chulalongkorn University: 2009 B.Sc. (Biochemistry) Chulalongkorn University: 2005	Department of Biology Faculty of Science

No.	Identification Card Number Academic position - Name – Surname	Degree (Field of Study) University: Year of graduate	Department
2.	x xxxx xxxxxx xx x Asst. Prof. Dr.Chalita Kongrit	Ph.D. (Biology) Mahidol University: 2010 B.Sc. (Biology) Mahidol University: 2002	Department of Biology Faculty of Science
3.	x xxxx xxxxxx xx x Asst. Prof. Dr.Metha Meetam	Ph.D. (Horticulture) Purdue University, U.S.A.: 2006 B.A. (Biology) Washington University, U.S.A.: 1999	Department of Biology Faculty of Science
4.	x xxxx xxxxxx xx x Asst. Prof. Dr.Puey Ounjai	Ph.D. (Molecular Genetics and Genetic Engineering) Mahidol University: 2007 B.Sc. (Biotechnology) King Mongkut's Institute of Technology Ladkrabang: 2001	Department of Biology Faculty of Science

10. Venue for Instruction

Buildings B and N, Department of Biology, Faculty of Science, Mahidol University, Phayathai Campus

Building SC-2, Department of Biology, Faculty of Science, Mahidol University, Salaya Campus

Common online plateforms

11. External Factors to Be Considered in Curriculum Planning

11.1 Economic Situation/Development

The rapid changes in technological landscape including digital transformation, development postgenomic technology, and medical advancement have driven tremendous changes in the environment as well as the changes in human society. In 2016, United Nations has set the global goals for sustainable development

known as the SDGs with the aim to end all forms of poverty. In response to the SDG movement as well as to supply the society with highly qualified experts to mitigate the local and global environmental problems and drive the establishment of sustainable scientific and technological development of Thailand, the Master of Science Program in Bioresources and Environmental Biology (International Program) by Department of Biology, Faculty of Science, Mahidol University is revised.

11.2 Social and Cultural Situation/Development

Climate change, over- utilization of biological resources and environmental problems of the modern world are currently the problems of great concern worldwide. These problems can often result in severe catastrophe including toxic pollution, global starvation or emerging diseases. The program expects our graduate to be global citizens with entrepreneurial mindset who are able to apply their skills and expertise to contribute professional services or development of innovative and sustainable technology to alleviate the problem of the global crisis aforementioned as well as to improve the quality of life of people in society through scientific advancement and entrepreneurial establishment

12. The Effects Mentioned in No. 11. 1 and 11. 2 on Curriculum Development and Relevance to the Missions of the University/Institution

12.1 Curriculum Development

According to items 11.1 and 11.2, the curriculum for the Master of Science Program in Bioresources and Environmental Biology is revised to prepare the students with world class, up to date, professional knowledge together with soft skills to tackle the current global challenges.

12.2 Relevance to the Missions of the University/Institution

This curriculum is well aligned with the mission of the university on the part of academic excellence in medical, science and technological innovation as the objectives of this curriculum are to generate graduates with advanced knowledge and mastery skills in Bioresources and Environmental Biology. The graduates are

not only fully trained with strong scientific commands and research skills but also with soft skills, professional conduct and entrepreneurial mindset.

13. Collaboration with Other Curricula of the University (if any)

None

Section 2 Information of the Curriculum

1. Philosophy, Justification, and Objectives of the Curriculum

1.1 Philosophy and Justification of the Curriculum

The Master of Science Program in Bioresources and Environmental Biology (International Program) aims to provide world-class education and research training to produce academic, professional, and ethical leaders in the field of bioresources and environmental biology. Our program focuses on the fundamentals of biological systems and their interactions with the environment and on applications of the knowledge toward efficient and innovative management of bioresources and the environment. Our graduates shall be able to conduct basic or applied research and utilize innovative approaches in problem-solving and implementing the technology and possess professional and ethical integrity. Our graduates shall play pivotal roles in key areas in their professions, organizations, and society, contributing to the advancement of science and technology, enrichment of biodiversity and environmental sustainability, and improvement of economic and social wellness.

1.2 Objectives of the Program

By the end of the study, students are able to

1.2.1 Have self-integrity, self-descipline, and morality, and follow ethical conduct for academic and scientific profession

1.2.2 Explain important concepts and theories in bioresources and environmental biology, connect to current situations, and have life-long learning attitude

1.2.3 Provide critical assessment and integrate knowledge toward problem solving and conduct research to generate new knowledge, solution and innovation in bioresources and environmental biology

1.2.4 Demonstrate responsibility, good human relations, and effective team working skills as a leader as well as a team member

1.2.5 Perform numerical analyses, communicate effectively and appropriately, and apply information technology in data collection, assessment, presentation, and communication

1.3 Program Learning Outcomes (PLOs)

1.3.1 Demonstrate self- integrity, self- descipline, morality, and ethical conduct for academic and scientific profession

1.3.2 Explain important concepts and theories in bioresources and environmental biology in connection to the current situations

1.3.3 Have critical and knowledge integration skills toward problem solving

1.3.4 Conduct research to find new knowledge, solution and innovation

1.3.5 Demonstrate responsibility, good human relations, and effective team working skills

1.3.6 Apply effective and appropriate numerical analyses, communication techniques, and information technology for data collection, analyses and presentation

1.3.7 Present and publish research findings

2. Plan for Development and Improvement

Plan for Development/Revision	Strategies	Evidences/Indexes
The curriculum is to be evaluated annually in order to maintain our standard and solve case-by-case implementation problems	1. End-of-semester and end-of-academic-year evaluation of the program	1. TQF5 report 2. TQF7 report 3. Student and graduate survey reports
The program's TQF2 is subjected to major (every 5 years) or minor (as needed) revisions based on stakeholders' needs, program's outcomes, and benchmarks	1. Continuous monitoring of students' and employers' satisfaction and program's outcomes 2. Assessed by independent internal and external quality-standard committees	1. Survey reports of stakeholder's needs and satisfaction, and benchmark comparison reports 2. Faculty of Science self-assessment report (SAR) 3. AUN-QA report 4. TQF2 approval by Mahidol University and national agencies

Plan for Development/Revision	Strategies	Evidences/Indexes
	3. Major revision of the program every five years or as needed	
The curriculum is to provide support for competency trainings of staff and faculty members, and improvement of facilities/equipments	1. Support and encouragement for staff and faculty members to conduct in-depth research and/or attend trainings 2. Provide equipments for teaching/learning and advanced research	1. Research publication records 2. Self-assessment reports

Section 3 Educational Management System, Curriculum Implementation, and Structure

1. Educational Management System

1.1 System: Two Semester Credit system. 1 academic year consists of 2 regular semesters, each with not less than 15 weeks of study.

1.2 Summer Session: The program does not offer summer session.

1.3 Credit Equivalence to Semester System: None

2. Curriculum Implementation

2.1 Teaching Schedule

Weekdays from Monday to Friday (8:30 A.M. – 4:30 P.M.)

Semester 1 August – December

Semester 2 January – May

2.2 Qualifications of Prospective Students

2.2.1 Plan A1 Applicants

2.2.1.1 Holding a Bachelor's degree in biology or in related fields such as microbiology, bioscience, zoology, botany, and environmental science, which are accredited by the Ministry of Higher Education, Science, Research and Innovation.

2.2.1.2 Having cumulative GPA not less than 3.0

2.2.1.3 Having an English Proficiency Examination score as the requirement of Faculty of Graduate Studies

2.2.1.4 Having at least 1 published or accepted research article that is indexed in accepted journal database in which the prospective student is the major author and/or corresponding author; or patent in which the prospective student is a major contributor

2.2.1.5 Having a research plan that demonstrates understanding of the subject, novelty, and achievable outcome

2.2.1.6 Applicant with other qualifications that differ from 2.2.1.2, 2.2.1.3, 2.2.1.5 may be considered by the Program Committee and the Dean of Faculty of Graduate Studies

2.2.2 Plan A2 Applicants

2.2.2.1 Holding a Bachelor's degree in biology or in related fields such as microbiology, bioscience, zoology, botany, and environmental science, which are accredited by the Ministry of Higher Education, Science, Research and Innovation.

2.2.2.2 Having cumulative GPA not less than 2.5

2.2.2.3 Having an English Proficiency Examination score as the requirement of Faculty of Graduate Studies

2.2.2.4 Applicant with other qralifications that differ from 2.2.2.2-2.2.2.3 may be considered by the Program committee and the Dean of Faculty of Graduate Studies

2.3 Problems Encountered of New Students

Insufficient English skills, insufficient academic background in certain areas, inadequate technical lab skills

2.4 Strategies for Problem Solving/Limited Requirement in No.2.3

Problems Encountered of New Students	Strategies for Problem Solving
Insufficient English skills	Students who have not met the English proficiency score requirement are required to take English language courses offered by Graduate School
Inadequate academic background in certain areas	Students in plan A1 who have not had sufficient background knowledge in some areas of bioresources and environmental biology may be recommended to take additional non-credit courses
Inadequate technical lab skills	Students in plan A2 are required to take the course Research Techniques in Bioresources and Environmental Biology which introduces students to basic techniques

2.5 Five-Year-Plan for Recruitment and Graduation of Students

Plan A1

Academic Year	2066	2067	2068	2068	2070
1st	5	5	5	5	5
2nd	-	5	5	5	5
Cumulative numbers		10	10	10	10
Expected number of students graduated	-	5	5	5	5

Plan A2

Academic Year	2066	2067	2068	2068	2070
1st	10	10	10	10	10
2nd	-	10	10	10	10
Cumulative numbers		20	20	20	20
Expected number of students graduated	-	10	10	10	10

2.6 Budget based on the plan

Budget: The budget is from Department of Biology, Faculty of Science, Mahidol University.

Plan A1

Estimated income per student

Registration fee	-	Baht
Thesis	xxxxx	Baht
Thesis research fee	xxxxxx	Baht
Total income per student	**xxxxxx**	**Baht**

Estimated expenses

Variable expenses per student

College/university allocation	-	Baht
Position allowance of thesis advisor and committee	xxxxx	Baht
Total variable expenses per student	**xxxxx**	**Baht**

Fixed expenses		
Program director payment	-	Baht
Program secretary payment	-	Baht
Staff salary	xxxxxx	Baht
Utility fee	xxxxx	Baht
Material fee	xxxxx	Baht
Equipment fee	xxxxx	Baht
Total Fixed expenses	**xxxxxx**	**Baht**
Number of students at break-even point	3	persons
Cost of students at break-even point	xxxxxx	Baht
Expenses per student per academic year	xxxxx	Baht

Plan A2

Estimated income per student

Registration fee	-	Baht
Tuition (xxxx x 24 credits x 80%)	xxxxxx	Baht
Thesis	xxxxx	Baht
Thesis research fee	xxxxxx	Baht
Total income per student	**xxxxxx**	**Baht**

Estimated expenses

Variable expenses per student		
College/university allocation	-	Baht
Position allowance of thesis advisor and committee	xxxxx	Baht
Total variable expenses per student	xxxxx	**Baht**
Fixed expenses		
Program director payment	-	Baht
Program secretary payment	-	Baht
Staff salary	xxxxxx	Baht
Teaching payment	xxxxx	Baht
Utility fee	xxxxx	Baht
Material fee	xxxxx	Baht

Equipment fee	xxxxx	Baht
Total Fixed expenses	**xxxxxx**	**Baht**

Number of students at break-even point	2	persons
Cost of students at break-even point	300,820	Baht
Expenses per student per academic year	150,410	Baht

2.7 Educational System: Classroom Mode (some courses are available through internet-based distance education system)

2.8 Transfer of Credits, Courses and Cross University Registration (If any)

Credits transferring must be in compliance with Mahidol University's regulations on Graduate Studies.

3. Curriculum and Instructors

3.1 Curriculum

3.1.1 **Number of credits** (not less than) 36 credits

3.1.2 **Curriculum Structure**

The curriculum structure is set in compliance with Announcement of Ministry of Education on the subject of Criteria and Standards of Graduate Studies B.E. 2558, Master's Degree, Plan A1, A2 as below:

Plan A1

1) Thesis	36	credits
Total not less than	36	credits

Plan A2

1) Required courses	12	credits
2) Elective courses not less than	12	credits
3) Thesis	12	credits
Total not less than	36	credits

3.1.3 Courses in the curriculum

Plan A1

1) Thesis **Credits (lecture – laboratory – self-study)**

SCBI 798	Thesis	36 (0-108-0)
วทชว ๗๙๘	วิทยานิพนธ์	

Plan A2

1) Required Course **Credits (lecture – practice – self-study)**

SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
วทชว ๖๕๕	เทคนิคการวิจัยทางทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม	
SCBI 619	Environmental Science	3 (3-0-6)
วทชว ๖๑๙	วิทยาศาสตร์สิ่งแวดล้อม	
SCBI 650	Research Seminar in Bioresources and Environmental Biology	1 (1-0-2)
วทชว ๖๕๐	สัมมนาการวิจัยทางทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม	
SCBI 651	Advanced Research Seminar in Bioresources and Environmental Biology	1 (1-0-2)
วทชว ๖๕๑	สัมมนาการวิจัยทางทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อมขั้นสูง	
SCID 518	Generic Skills in Science Research	1 (1-0-2)
วทคร ๕๑๘	ทักษะทั่วไปในการวิจัยทางวิทยาศาสตร์	
*SCBI 588	Bioresources and Environmental Management	3 (3-0-6)
วทชว ๕๘๘	ทรัพยากรชีวภาพและการจัดการสิ่งแวดล้อม	

2) Elective Courses **Credits (lecture – laboratory – self-study)**

SCBI 505	Population and Community Ecology	3 (2-3-5)
วทชว ๕๐๕	นิเวศวิทยาของประชากรและชุมชน	
SCBI 519	Microbial Ecology	3 (3-0-6)
วทชว ๕๑๙	นิเวศวิทยาจุลินทรีย์	

SCBI 520	Climate Change Biology	3 (3-0-6)
วทชว ๕๒๐	ชีววิทยาการเปลี่ยนแปลงภูมิอากาศ	
SCBI 525	Molecular Approaches to Problems in Environmental Biology	2 (2-0-4)
วทชว ๕๒๕	แนวทางการแก้ปัญหาด้วยวิธีทางโมเลกุลในชีววิทยาสภาวะแวดล้อม	
SCBI 584	Plant Responses to Environmental Stresses	3 (3-0-6)
วทชว ๕๘๔	การตอบสนองของพืชต่อความเครียดในสิ่งแวดล้อม	
SCBI 652	Special Problems in Bioresources and Environmental Biology	2 (0-6-3)
วทชว ๖๕๒	ปัญหาพิเศษทางทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม	
SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
วทชว ๖๕๓	หัวข้อเรื่องปัจจุบันทางทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม	
SCBI 654	Environmental Pollution and Hazardous Waste	3 (2-3-5)
วทชว ๖๕๔	มลพิษสิ่งแวดล้อมและกากของเสียอันตราย	
*SCBI 589	Economic Invertebrates	3 (3-0-6)
วทชว ๕๘๙	สัตว์ไม่มีกระดูกสันหลังทางเศรษฐกิจ	
*SCBI 590	Innovation and Commercialization of Bioresources	3 (3-0-6)
วทชว ๕๙๐	นวัตกรรมและการใช้ประโยชน์ทางการค้าจากทรัพยากรชีวภาพ	
*SCBI 591	Water and Wastewater Treatment	3 (3-0-6)
วทชว ๕๙๑	การบำบัดน้ำและน้ำเสีย	
*SCBI 592	Environmental Analysis Laboratory	1 (0-3-1)
วทชว ๕๙๒	ปฏิบัติการวิเคราะห์ทางสิ่งแวดล้อม	
*SCBI 593	Environmental Impact Assessment	3 (3-0-6)
วทชว ๕๙๓	การประเมินผลกระทบทางสิ่งแวดล้อม	
SCID 500	Cell and Molecular Biology	3 (3-0-6)
วทคร ๕๐๐	ชีววิทยาระดับเซลล์และโมเลกุล	
SCID 507	Microscopic Techniques	1 (0-2-1)
วทคร ๕๐๗	เทคนิคการใช้กล้องจุลทรรศน์	
SCID 509	Separation Techniques	1 (0-2-1)
วทคร ๕๐๙	เทคนิคการแยกสาร	
SCID 511	Gene Technology	1 (0-2-1)
วทคร ๕๑๑	เทคโนโลยีด้านยีน	
SCID 516	Biostatistics	3 (3-0-6)
วทคร ๕๑๖	ชีวสถิติ	

* New course

In addition to the elective courses mentioned above, students may register other courses in an international program offered by other faculties equivalent to the Faculty of Graduate Studies, Mahidol University or the ones offered by other universities according to the student's interest subjected to approval by the curriculum committee, the student's advisor, and the Faculty of Graduate Studies

3) Thesis **Credits (lecture – laboratory – self-study)**

SCBI 698 Thesis 12 (0-36-0)
วทชว ๖๙๘ วิทยานิพนธ์

3.1.4 Research Project of the Program

Guidelines for conducting a research project are as follows:

(1) Tick biology and tick-borne diseases
(2) Population genetics and ecology of wild populations
(3) Systematics and biogeography of invertebrates
(4) Ecology and genetics of vertebrate populations
(5) Plant response to environment
(6) Root biology
(7) Molecular biology of antibiotic resistance
(8) Heavy metal transformation and bioremediation
(9) Structural biology and biophysics of viruses and molecular machines
(10) Immunological characterization of pit viper venom proteins
(11) Bacteriophage-based biocontrol
(12) Cytogenetics, cyto-molecular genetics and genetics toxicology
(13) Cancer biology
(14) Host-microbe interaction
(15) Endocrine disrupting chemical and antibiotic residual in environment
(16) Animal physiology
(17) Renewable energy from plant biomass and agricultural wastes
(18) Invertebrate zoology and biogeography

3.1.5 Definition of Course Codes

Four main alphabets are defined as follows:

The first two alphabets are abbreviation of the faculty offering the course.

SC is Faculty of Science.

The latter two alphabets are abbreviation of the department or the major offering the course.

ID means inter-department or programs

BI means Department of Biology

3 digits of number are 5XX and 6XX indicate that the courses are in the graduate study level.

3.1.6 Study Plan

Plan A1

Year	Semester 1		Semester 2	
1	SCBI 798 Thesis	9 (0-27-0)	SCBI 798 Thesis	9 (0-27-0)
	Total 9 credits		**Total 9 credits**	
2	SCBI 798 Thesis	9 (0-27-0)	SCBI 798 Thesis	9 (0-27-0)
	Total 9 credits		**Total 9 credits**	

Plan A2

Year	Semester 1		Semester 2	
1	SCBI 619 Environmental Science	3 (3-0-6)	SCBI 588 Bioresources and Environmental Management	3 (3-0-6)
	SCBI 650 Research Seminar in Bioresources and Environmental Biology	1 (1-0-2)	SCBI 651 Advanced Research Seminar in Bioresources and Environmental Biology	1 (1-0-2)
	SCBI 655 Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)	Elective	6 credits
	SCID 518 Generic Skills in Science Research	1 (1-0-2)		
	Total 8 credits		**Total 10 credits**	
2	Elective	3 credits	Elective	3 credits
	SCBI 698 Thesis	6 (0-18-0)	SCBI 698 Thesis	6 (0-18-0)
	Total 9 credits		**Total 9 credits**	

3.1.7 Course Description

Please see Appendix A.

3.2 Name, I.D. Number, Title and Degree of Instructors

3.2.1 Full time instructors of the curriculum (Please see Appendix B**)**

No.	Identification Card Number Academic position - Name – Surname	Degree (Field of Study) University: Year of graduate	Department
1.	x xxxx xxxxxx xx x Assoc. Prof. Dr.Arunee Ahantarig	Ph.D. (Biology) University of Texas at San Antonio, U.S.A.: 2003 M.Sc. (Biology) University of Texas at San Antonio, U.S.A.: 1996 B.Sc. (Medical Technology) Chulalongkorn University: 1992	Department of Biology Faculty of Science
2.	x xxxx xxxxxx xx x Assoc. Prof. Dr.Prinpida Sonthiphand	Ph.D. (Biology) University of Waterloo, Canada: 2014 M.Sc. (Environmental Management) Chulalongkorn University: 2009 B.Sc. (Biochemistry) Chulalongkorn University: 2005	Department of Biology Faculty of Science
3.	x xxxx xxxxxx xx x Assoc. Prof. Dr.Surang Chankhamhaengdecha	Ph.D. (Biotechnology) Mahidol University: 2003 M.Sc. (Biotechnology) Mahidol University: 1999 B.Sc. (Microbiology) Burapha University: 1997	Department of Biology Faculty of Science
4.	x xxxx xxxxxx xx x Assoc. Prof. Dr.Wachareeporn Trinachartvanit	Ph.D. (Ecology, Ethology, and Evolution) University of Illinois at Urbana-Champaign, U.S.A.: 2004 M.Sc. (Environmental Biology) Mahidol University: 1995 B.Sc. (Biology) Mahidol University: 1992	Department of Biology Faculty of Science

No.	Identification Card Number Academic position - Name – Surname	Degree (Field of Study) University: Year of graduate	Department
5.	x xxxx xxxxxx xx x Asst. Prof. Dr.Chalita Kongrit	Ph.D. (Biology) Mahidol University: 2010 B.Sc. (Biology) Mahidol University: 2002	Department of Biology Faculty of Science
6.	x xxxx xxxxxx xx x Asst. Prof. Dr.Ekgachai Jeratthitikul	D.Sc. (Biological Sciences) Kyoto University, Japan: 2013 M.Sc. (Biological Sciences) Kyoto University, Japan: 2009 B.Sc. (Zoology) Chulalongkorn University: 2006	Department of Biology Faculty of Science
7.	x xxxx xxxxxx xx x Asst. Prof. Dr.Jenjit Khudamrongsawat	Ph.D. (Biology) University of Alabama, U.S.A.: 2007 M.Sc. (Botany and Plant Sciences) University of California-Riverside, U.S.A.: 2002 B.Sc. (Biology) Rochester Institute of Technology, U.S.A.: 2000	Department of Biology Faculty of Science
8.	x xxxx xxxxxx xx x Asst. Prof. Dr.Metha Meetam	Ph.D. (Horticulture) Purdue University, U.S.A.: 2006 B.A. (Biology) Washington University, U.S.A.: 1999	Department of Biology Faculty of Science
9.	x xxxx xxxxxx xx x Asst. Prof. Dr.Parinda Thayanukul	Ph.D. (Urban Engineering) The University of Tokyo, Japan: 2012 M.E. (Urban Engineering) The University of Tokyo, Japan: 2009 B.Sc. (Biotechnology) Mahidol University: 2006	Department of Biology Faculty of Science

No.	Identification Card Number Academic position - Name – Surname	Degree (Field of Study) University: Year of graduate	Department
10.	x xxxx xxxxxx xx x Asst. Prof. Dr.Patompong Saengwilai	Ph.D. (Plant Biology) Pennsylvania State University, U.S.A.: 2013 B.Sc. (Biology) Mahidol University: 2007	Department of Biology Faculty of Science
11.	x xxxx xxxxxx xx x Asst. Prof. Dr.Phurt Harnvoravongchai	D.Eng. (Bioengineering) Tokyo Institute of Technology, Japan: 2015 M.Eng. (Bioengineering) Tokyo Institute of Technology, Japan: 2012 B.Sc. (Biotechnology) Mahidol University: 2010	Department of Biology Faculty of Science
12.	x xxxx xxxxxx xx x Asst. Prof. Dr.Puey Ounjai	Ph.D. (Molecular Genetics and Genetic Engineering) Mahidol University: 2007 B.Sc. (Biotechnology) King Mongkut's Institute of Technology Ladkrabang: 2001	Department of Biology Faculty of Science
13.	x xxxx xxxxxx xx x Asst. Prof. Dr.Supeecha Kumkate	Ph.D. (Biology) University of York, U.K.: 2004 M.Sc. (Environmental Biology) Mahidol University: 1999 B.Sc. (Microbiology) Chulalongkorn University: 1995	Department of Biology Faculty of Science

No.	Identification Card Number Academic position - Name – Surname	Degree (Field of Study) University: Year of graduate	Department
14.	x xxxx xxxxxx xx x Lect. Dr. Alisa Damnernsawad	Ph.D. (Cancer Biology) University of Wisconsin-Madison, U.S.A.: 2015 B.Sc. (Biology) Mahidol University: 2007	Department of Biology Faculty of Science
15.	x xxxx xxxxxx xx x Lect. Dr.Pahol Kosiyachinda	Ph.D. (Plant Pathology) Cornell University, U.S.A.: 2002 B.Sc. (Biology) Mahidol University: 1996	Department of Biology Faculty of Science
16.	x xxxx xxxxxx xx x Lect. Dr.Siravit Sitprija	Ph.D. (Physiology) Chulalongkorn University: 2003 M.Sc. (Industrial Microbiology) Chulalongkorn University: 1999 B.Sc. (Biology) Kasetsart University: 1996	Department of Biology Faculty of Science
17.	x xxxx xxxxxx xx x Lect. Dr.Thitinun Sumranwanich	Ph.D. (Horticulture) Pennsylvania State University, U.S.A.: 2003 B.Sc. (Biology) Chiang Mai University: 1997	Department of Biology Faculty of Science
18.	x xxxx xxxxxx xx x Lect. Dr.Toemthip Poolpak	Ph.D. (Biology) Mahidol University: 2008 M.Sc. (Environmental Biology) Mahidol University: 2002 B.Sc. (Biology) Mahidol University: 1998	Department of Biology Faculty of Science

No.	Identification Card Number Academic position - Name – Surname	Degree (Field of Study) University: Year of graduate	Department
19.	x xxxx xxxxxx xx x Lect. Dr.Warut Siriwut	Ph.D. (Biological Science) Chulalongkorn University: 2016 B.Sc. (Biology) Khon Kaen University: 2010	Department of Biology Faculty of Science

3.2.2 Full time instructors

No.	Identification Card Number Academic position - Name – Surname	Degree (Field of Study) University: Year of graduate	Department
1.	x xxxx xxxxxx xx x Asst. Prof. Dr.Intanon Kolasartsanee	Ph.D. (Biology) Mahidol University: 2014 B.Sc. (Biology) Mahidol University: 2006	Department of Biology Faculty of Science
2.	x xxxx xxxxxx xx x Lect. Dr.Nuttaphon Onparn	Ph.D. (Biological Sciences) Exeter University, U.K.:2004 M.Sc. (Ecosystem Analysis) University of Warwick, And Governance, U.K.: 1999 B.Sc. (Biology) Mahidol University: 1996	Department of Biology Faculty of Science

3.2.3 Part time instructors

The program will invite special instructors upon necessities.

4. Details of Practicum (if any)

None

5. Thesis requirement

Thesis must be relevant to knowledge of bioresources and/or environmental biology as suggested in 3.1.4 and completed in the format and time frame specified by the program.

5.1 Short Description

Thesis must be relevant to knowledge of bioresources and/or environmental biology as suggested by the program and approved by the thesis committee. Students are required to develop research proposal related to the topic, conduct the research including research ethics, data collection, synthesis, analysis, interpretation of the result and dissertation report, present and publish the research outcome in a peer-reviewed journal or conference proceeding within specified time frame.

5.2 Standard Learning Outcomes

5.2.1 Graduates are able to conduct research leading to new findings, solutions, applications and/or innovations in the field of bioresources and environmental biology.

5.2.2 Graduates are able to present and publish research at the international level and have communication skills for audiences from both academic- and non- academic communities.

5.3 Time Frame

Plan A1 Semester 1 Academic Year 1 onwards

Plan A2 Semester 1 Academic Year 2 onwards

5.4 Number of credits

Plan A1 36 Credits

Plan A2 12 Credits

5.5 Preparation

Advising time must be provided to introduce students to faculty members and research topics in the department. Students will be provided with information related to current research topics, publications as well as examples of thesis through various venues including the departmental website, seminar classes, and regular meetings with the advisor.

5.6 Evaluation Process

Research progress will be evaluated by the advisor, program's committee, and/or thesis committee of the students every semester during conducting the research. The final oral examination is systematically evaluated by the graduate committee.

Plan A1

The thesis work or part(s) of the student's thesis must be published or accepted to be published in at least one academic peer-reviewed journals following the standards of the Faculty of Graduate Studies, Mahidol University.

Plan A2

The thesis work or part(s) of the student's thesis must be published or accepted to be published in at least one academic peer-reviewed journals following the standards of the Faculty of Graduate Studies, Mahidol University, or presented at an academic conference that has a peer review and publishes the full paper in the proceedings according to the standards of the Faculty of Graduate Studies, Mahidol University.

Section 4 Learning Outcome, Teaching Strategies and Evaluation

1. Development of Students' Specific Qualifications

Special Characteristics	Teaching Strategies or Student Activities
Being able to create comprehensive and innovative solutions and applications in the field of bioresources and environmental biology	1. Lectures, case studies, discussion, course projects, thesis 2. Seminars and special seminars by distinguished researchers and specialists in various disciplines to share experiences with students 3. National and international conferences and workshops
Being able to conduct research and analyze data following scientific process	Thesis and course projects
Being cooperative, helpful and having good attitude toward team-working and social responsibilities	Extracurricular activities such as Mahidol Day, Open House activity, exhibitions, big cleaning day, and cultural activities
Being adaptable, and having good attitude and personality toward internationalization	Extracurricular activities such as sport days, and cultural activities arranged for both Thai and international students and staffs

2. Development of Learning Outcome in Each Objective

Expected Outcome	Teaching Strategies	Evaluation Strategies
1. Morality and Ethics 1) Be honest, responsible, respect and follow social and organization rules and regulations 2) Follow research and professional ethics	1) Specify times of turning in assignments 2) Conduct theses with international standard, no plagiarism, under ethical and professional regulations	1) Being on-time for classes 2) Being on-time for assignment due dates 3) Strictly follow regulations of laboratories 4) Strictly follow standard professional regulations, no

Expected Outcome	Teaching Strategies	Evaluation Strategies
	3) Follow rules and regulations of laboratories	plagiarism, and no falsification of research results
2. Knowledge 1) Explain and connect concepts and theories in environmental biology 2) Provide integrated and updated solutions toward the problems in bioresources and environmental biology	1) Group lecture, discussion, presentations, and laboratory practice 2) Specialist invitation for short lectures and seminar 3) Self-study and literature review	1) Academic achievement and laboratory practice using exams, reports and presentations 2) Evaluation of student proposals 3) Quality of reports and presentations should be correct and follow contemporary trends
3. Intellectual Development 1) Be able to conduct research for new findings, solutions, applications or innovations in the field of bioresources and environmental biology 2) Be able to continuously acquire new knowledge and stay updated with current trends in the field of bioresources and environmental biology	1) Seminars 2) Group discussion 3) Presentation of research or any topics of interests related to research to improve presentation skills 4) Class projects 5) Thesis 6) Publications of thesis or parts of thesis in proceeding conferences or academic journals	1) Class participation, discussion, and project outcomes and outputs. 2) Quality of thesis based on the standards of the Faculty of Graduate Studies, Mahidol University 3) Quality of publications based on the standards of the Faculty of Graduate Studies, Mahidol University

Expected Outcome	Teaching Strategies	Evaluation Strategies
4. Interpersonal Relationship and Responsibility 1) Be responsible for assigned work 2) Have good human relations, be a good leader and follower, giver and receiver, work as a team, listen to other people's opinions, and analyze the opinion with reasons	1) In-class discussion and group assignments such as laboratory practice, mini-projects 2) Thesis conduction	1) Behavioral observation and assignment results 2) Behavioral observation and interactions with people in laboratory and/ or during field work 3) Thesis progress evaluation
5. Mathematical Analytical Thinking, Communication Skills, and Information Technology Skills 1) Search, gather, and statistically analyze data correctly and systematically as well as selection and utilization of appropriate data to reach reasonable academic conclusion 2) Properly and effectively use the information technology for literature searching, communication, discussion, and	1) Assignments that require the use of information technology for research 2) Statistical analysis in theses 3) Thesis progress every semester and presentation	1) Using appropriate information technology for literature search and presentation 2) Correctly use statistics for data analyses 3) Quality of reports and thesis 4) Quality of presentation and class discussion and evaluation by faculty members and peers with clear criteria

Expected Outcome	Teaching Strategies	Evaluation Strategies
presentation for audiences from both academic- and non-academic communities as well as using English language for communication correctly		

3. Curriculum Mapping

Please see Appendix C**.**

Section 5 Criteria for Student Evaluation

1. Grading System

Grading system and graduation shall be complied with the criteria stated in Regulations of Mahidol University on Graduate studies.

2. Evaluation Process for the Learning Outcome of Students

Accomplishments of the learning outcomes are assessed by courses using both written and oral examinations (passing score is 75%). All assessments conducted by the program use standardized methods to ensure validity, reliability and fairness of student evaluation. For knowledge-based courses, assessments are typically in the form of written examination (essay questions). For evaluation of soft skills, assessment rubrics are provided and applied. Accomplishment of research will be evaluated by thesis progress, writing and defense within limited time frame.

3. Graduation Requirement

3.1 Plan 1

1) Students should graduate within time specified in the study plan.
2) Students must complete at least 36 credits for thesis.
3) A minimum cumulative GPA is 3.00.
4) Students must meet the English Competence Standard of Graduate Students, Mahidol University defined by the Faculty of Graduate Studies, Mahidol University.
5) Students must participate in and pass skill development activities required by the Faculty of Graduate Studies, Mahidol University.
6) Students must submit thesis and pass the thesis defense by the standards of the Faculty of Graduate Studies, Mahidol University. The defense examination must be publicly open to general audiences.
7) The thesis work or part(s) of the student's thesis must be published or accepted to be published in at least one academic peer-reviewed journals in compliance with Announce of the Higher Education Commission on the subject of Criteria and Regulation of Publishing, and according to the announcement of the Faculty of Graduate Studies, Mahidol University.

3.2 Plan 2

1) Students should graduate within time specified in the study plan.

2) Students must complete at least 36 credits including 24 credits for course work and 12 credits for thesis.

3) A minimum cumulative GPA is 3.00.

4) Students must meet the English Competence Standard of Graduate Students, Mahidol University defined by the Faculty of Graduate Studies, Mahidol University.

5) Students must participate in and pass skill development activities required by the Faculty of Graduate Studies, Mahidol University.

6) Students must submit thesis and pass the thesis defense by the standards of the Faculty of Graduate Studies, Mahidol University. The defense examination must be publicly open to general audiences.

7) The thesis work or part(s) of the student's thesis must be published or accepted to be published in at least one academic peer-reviewed journals or presented at an academic conference that has a peer review and publishes the full paper in the proceedings in compliance with Announce of the Higher Education Commission on the subject of Criteria and Regulation of Publishing, and according to the announcement of the Faculty of Graduate Studies, Mahidol University.

Section 6 Faculty Development

1. The Orientation for New Faculty Members

1.1 Mahidol University and the Faculty of Science regularly organize orientation sessions for welcoming new faculty members as well as introducing the University policies to the new staff.

1.2 Full-time and part-time faculty members are well informed regarding the curriculum design and teaching philosophy of the program. The curriculum book is also provided for all new faculty members both in electronic form and hardcopy.

2. Skill and Knowledge Development for New Faculty Members

2.1 Skills Development in Teaching and Evaluation

2.1.1 New faculty members have to attend workshops to develop insights on teaching philosophy, utilization of different pedagogical techniques and evaluation methods offered by Mahidol University.

2.1.2 New faculty members are encouraged to attend and participate in workshops and seminars related to development of novel educational methods as well as pedagogical design.

2.1.3 The assessment of teaching performance as well as student satisfaction of new faculty members are regularly surveyed. Feedbacks from students, fellow faculty members, and program director are often given to the instructors.

2.2 Other Academic and Professional Skill Development

2.2.1 New faculty members are encouraged to attend plethora of workshops and seminars related to professional career development including preparation of a research proposal, how to obtain research grant, how to setup a laboratory as well as how to write a textbook.

2.2.2 New faculty members are encouraged to apply for internal and extramural research grants. Research mentorship for new faculty members can also be arranged as needed. Funding of multi-generation research collaboration is also offered from the University.

2.2.3 New faculty members are encouraged to attend and present their research in national and international conferences.

Section 7 Quality Assurance

1. Regulatory Standard

The Master of Science Program in Bioresources and Environmental Biology (International Program) has set a standard following the regulations of Graduate School and the Higher Education Commission as following:

1.1 The Faculty in Charge of the Program is appointed based on the qualification of Graduate School. The person must be knowledgeable in the field or related fields stated in the program and have continuous publications at international level as well as administering the program and teaching following the standard.

1.2 The program must plan course schedule in advance in order to meet the quality assurance corresponded to the Higher Education frame work.

1.3 The program must provide a report of activities and course work at the end of each semester in order to evaluate the process.

1.4 The program must have meetings to evaluate, follow and direct all program activities that should follow the program standard. Information from the meetings provides guidelines for further improvement and development of the program.

2. M.Sc. Graduates

Students who earn a M.Sc. degree must have the following characteristics.

2.1 Students exhibit moral and ethical conducts towards scientific profession as well as life-long learning attitude for the advancement of biology.

2. 2 Students are knowledgeable in bioresources and environmental biology, able to independently acquire new knowledge, and able to apply information toward solutions and innovations.

2.3 Students are able to perform proper literature search and conduct research in order to develop new ideas, knowledge, and solutions.

2. 4 Students are responsible and exhibit good human relations as well as team-working skills.

2. 5 Students are adept at utilizing information technology in order to search and analyze information for appropriate communication and presentation.

3. Students

The program has an admission process, student orientation and preparation, student advisory system, and graduation process as well as evaluation of student satisfaction and appeal process.

3.1 Admission process

Applicants are selected based on academic/ research credentials and/ or written examination and interview according to rules and regulation of the Faculty of Graduate Studies, Mahidol University. Final judgment will be made under the consideration of the Administrative Program Committee in concurrence with the Dean of Faculty of Graduate Studies, Mahidol University.

3.2 Student orientation and preparation

Program director and committee prepare a protocol and recommendation for new students through orientation. New students are informed with program structure, courses, and suggested plans for graduation.

3.3 Student advisory system and graduation

The program assigns academic advisors to assist students with registration, research topic selection, and graduation as well as other personal problems such as financial problems.

3.4 student satisfaction and appeal process

Evaluations of courses and activities are done every semester on reviews of student feedback and satisfaction surveys in order to evaluate all teaching and learning processes in our program. In addition, students can send the formal appeal through the Faculty of Graduate Study system. Informal appeals or specific appeals regarding the coursework or course assessment can be made directly to the instructor and/or course coordinators (as well as to the program director. Students may approach instructors by e- mail or during their office hours and discuss their class performance as well as other issues that could improve their grades.

4. Instructors

The Department of Biology and the program have long- term planning for new staff recruitment and development to fulfill the disciplines needed and to retain high quality of teaching and training as well as advancing in their academic career.

4.1 Staff recruitment plan

All academic staff must hold a Ph.D. degree with an English proficiency test score as announced by Mahidol University. A candidate must have at least one publication with his/her name as the first or corresponding author. Specific areas of expertise must be identified and match to the needs of the program and emerging trends of the field. In addition, the qualification of a candidate is also aligned with regulations on human resource development of MUSC and Mahidol University by which ethics and academic freedom for appointment, deployment and promotion are determined.

4.2 Training, career development and advancement

Academic staff is encouraged to attend training workshops for teaching methods, course evaluation, research methods, publications as well as professional ethics and regulations to improve their skills and quality to meet the standard. All faculty members in the program must be continually active in research and demonstrate a publication record that meets the minimum requirement by the Faculty of Graduate Studies, Mahidol University and the Commission of Higher Education.

5. Program, Study and Student Assessment

Program committee have plans in order to efficiently and effectively administer the program as following.

5.1 Study planning

The program is designed based on current economic and social development as stated in the National Plan of Economic and Social Development as well as the surveys from job markets and stakeholders including potential employers, alumni and current students so that program will be contemporary and match the demands of stakeholders.

5.2 Staff assignment and teaching strategies

Program committee and instructors have a meeting for assignments of course coordinators, which are based on expertise and experiences. Schedule of courses offered in each semester is also carefully planned to accommodate both instructors and students.

5.3 Student learning assessment

Student learning is evaluated based on course learning outcomes (ELOs) that follow the standard developed by the program committee according to the requirement of the Commission of Higher Education. Course-coordinators are responsible for managing courses, following course activities, and evaluation as well as reporting all activities and suggestions to program committee.

6. Learning Support

Program committee and instructors have regular meetings to discuss about teaching and learning facilities and equipment as well as library materials to support education and research.

7. Key Performance Indicators

The Master of Science program in Bioresources and Environmental Biology, Department of Biology divides key performance based on the curriculum that meets the standards of Thai Qualifications Framework following conditions: (1) the compulsory performance indicators (numbers 1-5) must pass beyond expectations and (2) the total number of performance indicators must reach their goal by no less than 80 percent each year. The Key Performance Indicators are as follows:

Key Performance Indicators	Academic Year				
	2023	2024	2025	2026	2027
1. At least 80% of all full-time instructors in each program have to participate in meetings that set up plans to evaluate and revise the curriculum.	✓	✓	✓	✓	✓
2. The program must have the details of the curriculum according to TQF2 which is associated with the Thai Qualifications Framework or the standards of the program (if any)	✓	✓	✓	✓	✓
3. The program must have course specifications and field experience specifications (if any) according to TQF3 and TQF4 before the beginning of each trimester	✓	✓	✓	✓	✓
4. Instructors must produce course reports and file experience reports (if any) according to TQF5 and TQF6 within 30 days after the end of the trimester.	✓	✓	✓	✓	✓

Key Performance Indicators	Academic Year				
	2023	2024	2025	2026	2027
5. Instructors must produce program reports according to TQF7 within 60 days after the end of the academic year	✓	✓	✓	✓	✓
6. Instructors must revise the grading of students according to learning standards indicated in TQF3 and TQF4 (if any) for at least 25 percent of courses that are offered each academic year.	✓	✓	✓	✓	✓
7. Instructors must assess the development and/ or improvement of teaching methods, teaching techniques or the grading system from the evaluation results in TQF 7 of the previous year.		✓	✓	✓	✓
8. Every new instructor (if any) has to participate in the orientation and receive adequate information on the college' s teaching requirements.	✓	✓	✓	✓	✓
9. Full- time instructors must demonstrate academic and/ or profession improvement at least once a year.	✓	✓	✓	✓	✓
10. The number of supporting staff (if any) who demonstrate academic and/ or professional improvement by at least 50 percent each year.	✓	✓	✓	✓	✓
11. The level of satisfaction from the previous year' s students and new graduates toward curriculum quality, with an average score of at least 3.5 out of 5		✓	✓	✓	✓
12. The level of satisfaction from employers of new graduates with an average score of at least 3.5 out of 5			✓	✓	✓

Key Performance Indicators	Academic Year				
	2023	2024	2025	2026	2027
13. Instructors have been evaluated by students after teaching at 100 percent.	✓	✓	✓	✓	✓
14. The number of accepted students in accordance with the program's plan.	✓	✓	✓	✓	✓
15. Graduates who get a job with a starting rate salary not lower than the rate stated by the Office of the Civil Service Commission (OCSC).			✓	✓	✓
Total key performance indicators (items) for each year	11	13	15	15	15
Required performance indicators (items)	5	5	5	5	5
Performance indicators that need to pass expectations	80%	80%	80%	80%	80%

Section 8 Evaluation and Improvement of the Curriculum Implementation

1. Evaluation on the Teaching Efficiency

1.1 Evaluation of Teaching Strategies

1.1.1 Students evaluate courses and instructors.

1.1.2 Students' evaluation towards courses and instructors is analyzed, and program director informs the instructors of the results

1.2 Evaluation of Instructors' Skills in Using Teaching Strategies

Instructors are evaluated by students, program committee or department head based on teaching strategies, punctuality, clarification of course objectives and learning outcomes as well as evaluation process, and use of proper teaching media.

2. Overall Evaluation of the Curriculum

2.1 Survey on alumni satisfaction towards utilization of knowledge and skills developed from entering the program in work.

2.2 Survey the number of alumni getting jobs directly related to the fields of study

2.3 Survey on employers' satisfaction with graduates and desired characteristics

2.4 Program evaluation from external expertise, academic qualified experts, and employers in order to brainstorm for ideas of improvement and development of the program

3. Evaluation of Curriculum Implementation in Accordance with the Curriculum

Annual evaluation is assigned as indicated in Section 7, number 7 with at least five evaluators including employers, and at least two academic qualified experts. The criteria are as following.

"unsatisfactory" means the program does not cover the first 10 Key Performance Indicators.

"good" means the program shows all first 10 Key Performance Indicators.

"very good" means the program has all Key Performance Indicators.

The university requires all programs to revise their curriculum to meet with contemporary changes and improving academic standards every 3 years and must be evaluated for new development and improvement every 5 years.

4. Review of the Evaluation and Plans for Improvement

4.1 Collecting all information, advices, and evaluations of the newly graduates, users/stakeholders, and experts

4.2 Evaluation of students' satisfaction towards course

4.3 Program revision and evaluation every 5 years

APPENDIX A

Course Description

Appendix A
Course Description

1) Required Courses Credits (lecture – practice – self-study)

SCBI 588 Bioresources and Environmental Management 3 (3-0-6)
วทชว ๕๘๘ ทรัพยากรชีวภาพและการจัดการสิ่งแวดล้อม

Theory and management strategies for efficient use of bioresources; environmental factors that affect bioresources; measures to minimize adverse effects on bioresources and environment; laws and legislations related to bioresources and environment; concepts of sustainable utilization of bioresources, sustainable development, and environmental ethics

ทฤษฎีและกลยุทธ์การจัดการเพื่อให้เกิดการใช้ประโยชน์จากทรัพยากรชีวภาพอย่างมีประสิทธิภาพ ปัจจัยทางสิ่งแวดล้อมที่ส่งผลต่อทรัพยากรชีวภาพ มาตรการในการควบคุมผลเสียต่อทรัพยากรชีวภาพและสิ่งแวดล้อม กฎหมายและข้อบังคับเกี่ยวกับทรัพยากรชีวภาพและสิ่งแวดล้อม หลักการการใช้ทรัพยากรชีวภาพอย่างยั่งยืน การพัฒนาอย่างยั่งยืนและจริยธรรมทางสิ่งแวดล้อม

SCBI 650 Research Seminar in Bioresources and Environmental Biology 1 (1-0-2)
วทชว ๖๕๐ สัมมนาการวิจัยทางทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม

Methods for searching published research articles; methods for reading and summarizing research articles; techniques for scientific presentations; research ethics; seminar on current research articles in general topics related to bioresources and environmental biology

วิธีการสืบค้นผลงานวิจัยทางวิทยาศาสตร์ วิธีการอ่านและสรุปผลงานวิจัย เทคนิคการนำเสนอข้อมูลทางวิทยาศาสตร์ จริยธรรมการวิจัย สัมมนาบทความวิจัยปัจจุบันในหัวข้อทั่วไปที่เกี่ยวกับทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม

SCBI 651 Advanced Research Seminar in Bioresources and Environmental Biology 1 (1-0-2)
วทชว ๖๕๑ สัมมนาการวิจัยทางทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อมขั้นสูง

Methods for critical reading of research articles; methods for application of research findings; techniques for scientific presentations; research ethics; seminar on integrated research articles in specialized topics related to bioresources and environmental biology

วิธีการอ่านผลงานวิจัยเชิงวิเคราะห์ วิธีการประยุกต์ผลงานวิจัย เทคนิคการนำเสนอข้อมูลทางวิทยาศาสตร์ จริยธรรมการวิจัย สัมมนาบทความวิจัยแบบบูรณาการในหัวข้อเฉพาะด้านที่เกี่ยวกับทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม

SCBI 655 Research Techniques in Bioresources and Environmental Biology 3 (0-9-3)
วทชว ๖๕๕ เทคนิคการวิจัยทางทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม

Techniques in collecting samples, research methodology and data analysis in the fields of bioresources and environmental biology; moral and ethics in conduction of research

เทคนิคการเก็บตัวอย่าง ขั้นตอนการดำเนินงานวิจัย และการวิเคราะห์ผลทางทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม คุณธรรมและจริยธรรมในการดำเนินงานวิจัย

SCBI 619 Environmental Science 3 (3-0-6)
วทชว ๖๑๙ วิทยาศาสตร์สิ่งแวดล้อม

Principles of ecology, pollution biology and environmental toxicology; the balance of nature and the effect of pollution on ecosystems; effects of environmental pollutants on health; air pollution problems; sustainable and non-sustainable sources of energy; ethics in resource exploitation

หลักนิเวศวิทยา ชีววิทยาภาวะมลพิษ และพิษวิทยาสิ่งแวดล้อม ความสมดุลของสภาวะแวดล้อมตามธรรมชาติ และผลของภาวะมลพิษที่เกิดขึ้นต่อระบบนิเวศ ผลของสารก่อมลภาวะต่อสุขภาพ ปัญหามลพิษทางอากาศ แหล่งพลังงานที่ยั่งยืนและไม่ยั่งยืน จริยธรรมในการเก็บเกี่ยวทรัพยากร

SCID 500 Cell and Molecular Biology 3 (3-0-6)
วทคร ๕๐๐ ชีววิทยาระดับเซลล์และโมเลกุล

Cell structure and function; life and information flow in cell, energy flow in biosystem; cell signaling; cell division; cellular differentiation; cell death and development

โครงสร้างและหน้าที่ของเซลล์ ชีวิตและการส่งผ่านข้อมูลภายในเซลล์ การส่งผ่านพลังงานในระบบชีวภาพ การส่งสัญญาณของเซลล์ การแบ่งตัวของเซลล์ การพัฒนาเป็นเซลล์ชนิดจำเพาะ การตายและการพัฒนาของเซลล์

SCID 518 Generic Skills in Science Research 1 (1-0-2)
วทคร ๕๑๘ ทักษะทั่วไปในการวิจัยทางวิทยาศาสตร์

Qualities of a good researcher; effective searching of the scientific information, laboratory safety, biosafety, chemical safety, radiation safety and electrical safety; ethics of

research in human subjects and experimental animals in science; Intellectual property rights; research misconduct attribution of credit and responsibility; techniques in formulating and writing thesis proposals, research projects, grant applications, research reports and manuscript for publication

คุณสมบัติของนักวิจัยที่ดี การค้นหาข้อมูลในฐานข้อมูลทางวิทยาศาสตร์อย่างมีประสิทธิภาพ ความปลอดภัยในห้องปฏิบัติการ ความปลอดภัยทางชีวภาพ เคมี รังสี และไฟฟ้า จริยธรรมในการวิจัยในมนุษย์และการทดลองสัตว์ในด้านวิทยาศาสตร์ สิทธิในทรัพย์สินทางปัญญา การกระทำผิด คุณลักษณะของความรับผิดชอบและการอ้างอิงผลงานวิจัย เทคนิคการสร้างและการเขียนโครงร่าง โครงการวิจัย การเขียนขอทุนวิจัย การเขียนรายงานวิจัย และต้นฉบับเพื่อส่งตีพิมพ์

2) Elective Courses **Credits (lecture – practice – self-study)**

SCBI 505 Population and Community Ecology 3 (2-3-5)

วทชว ๕๐๕ นิเวศวิทยาของประชากรและชุมชน

Methods of analysis of population growth, age structure and natural control mechanisms of population; population interactions and their effects on the diversity and stability of communities, the energy flow through communities; laboratory and field practice involve observation and analysis of representative sampling of populations and communities of plants and animals

วิธีการวิเคราะห์ความเจริญเติบโตของประชากร โครงสร้างของอายุและกลไกการควบคุมทางธรรมชาติของประชากร ปฏิกิริยาตอบสนองของประชากร ผลกระทบที่มีต่อความหลากหลายและความเสถียรของชุมชน พลังงานที่ถ่ายทอดผ่านชุมชน ปฏิบัติการและการปฏิบัติภาคสนามเกี่ยวกับการศึกษาและการวิเคราะห์ตัวอย่างกลุ่มประชากรและชุมชนของพืชและสัตว์

SCBI 519 Microbial Ecology 3 (3-0-6)

วทชว ๕๑๙ นิเวศวิทยาจุลินทรีย์

Interrelationship between microorganisms and their living (biotic) and nonliving (abiotic) environments; importance of microorganisms in maintaining ecological balance; microbial cell structure, function, and diversity with special emphasis on *Bacteria* and *Archaea*; microbial habitats including natural and engineered environments; microbial regulation of global biogeochemical cycles; methods in microbial ecology and their applications; microbial interactions: microbes-microbes and microbes-other organisms; disturbances and environmental

factors affecting microbial communities; applications of microbial ecology in bioremediation, wastewater treatments, health industries, food industries, and agriculture

ความสัมพันธ์ระหว่างจุลินทรีย์และสิ่งแวดล้อมทั้งส่วนที่มีชีวิตและไม่มีชีวิต ความสำคัญของจุลินทรีย์ในการรักษาสมดุลของระบบนิเวศ โครงสร้างเซลล์ หน้าที่ และความหลากหลายของจุลินทรีย์โดยมุ่งเน้นที่แบคทีเรียและอาร์เคีย ถิ่นที่อยู่ของจุลินทรีย์ทั้งในธรรมชาติและสิ่งแวดล้อมที่มนุษย์สร้างขึ้น บทบาทของจุลินทรีย์ในการควบคุมวัฏจักรของสาร ระเบียบวิธีวิทยาศาสตร์สำหรับศึกษานิเวศวิทยาจุลินทรีย์และการนำไปใช้ ปฏิสัมพันธ์ระหว่างจุลินทรีย์และจุลินทรีย์รวมทั้งปฏิสัมพันธ์การตอบโต้ระหว่างจุลินทรีย์และสิ่งมีชีวิตชนิดอื่น สิ่งรบกวนและปัจจัยทางสิ่งแวดล้อมที่มีผลต่อกลุ่มประชากรจุลินทรีย์ การนำความรู้ด้านนิเวศวิทยาจุลินทรีย์ไปประยุกต์ใช้ประโยชน์ในการบำบัดสารมลพิษทางชีวภาพ การบำบัดน้ำเสีย อุตสาหกรรมด้านสุขภาพ อุตสาหกรรมอาหาร และเกษตรกรรม

SCBI 520 Climate Change Biology 3 (3-0-6)
วทชว ๕๒๐ ชีววิทยาการเปลี่ยนแปลงภูมิอากาศ

Current climate change situation analysis; species distribution model; impacts on world major biomes; impacts on major groups of organisms; climate change-related extinction; evolutionary aspects of climate change; solution and recommendations; communicating climate change

วิเคราะห์สถานการณ์การเปลี่ยนแปลงภูมิอากาศ แบบจำลองการกระจายตัวของสปีชีส์ ผลกระทบต่อชีวนิเวศหลักของโลก ผลกระทบต่อกลุ่มสิ่งมีชีวิตหลักของโลก การสูญพันธุ์ของสิ่งมีชีวิตที่สัมพันธ์กับการเปลี่ยนแปลงภูมิอากาศ มุมมองเชิงวิวัฒนาการกับการเปลี่ยนแปลงภูมิอากาศ แนวทางการแก้ปัญหาและข้อเสนอแนะ การสื่อสารการเปลี่ยนแปลงภูมิอากาศ

SCBI 525 Molecular Approaches to Problems in Environmental Biology 2 (2-0-4)
วทชว ๕๒๕ แนวทางการแก้ปัญหาด้วยวิธีทางโมเลกุลในชีววิทยาสภาวะแวดล้อม

Molecular approaches to understand and assess impact of pollution and environmental stress on organisms; molecular approaches to evaluate biodiversity and environmental status; modern bioremediation and environmental management technologies or concepts that use molecular approaches

แนวทางที่ใช้วิธีทางโมเลกุลในการสร้างความเข้าใจถึงผลกระทบและการประเมินผลกระทบของมลภาวะและความเครียดจากสิ่งแวดล้อมต่อสิ่งมีชีวิต แนวทางที่ใช้วิธีทางโมเลกุลในการประเมินความหลากหลายทางชีวภาพและสถานะของสิ่งแวดล้อม เทคโนโลยีหรือแนวทางการบำบัดสารพิษด้วยวิธีทางชีวภาพและการบริหารจัดการสิ่งแวดล้อมสมัยใหม่ที่ใช้แนวทางทางโมเลกุล

SCBI 584 Plant Responses to Environmental Stresses 3 (3-0-6)

วทชว ๕๘๔ การตอบสนองของพืชต่อความเครียดในสิ่งแวดล้อม

Responses to environmental stresses at cellular levels and in plant system; patterns of signal transduction in stress response; molecular mechanism of regulation of gene expression and signal transduction in response to thermal stress, light stress, osmotic stress, oxidative stress, nutrient stress, nitrogen and phosphate starvation, toxic substances, and biotic stresses; illustration of plants interact with the environment, mechanisms that plants used to cope with environmental stresses, alteration of physiological, biochemical processes and gene expression after receiving stress

การตอบสนองต่อความเครียดในสิ่งแวดล้อมทั้งในระดับเซลล์และระบบภายในพืช รูปแบบในการส่ง สัญญาณเพื่อตอบสนองต่อความเครียด กลไกระดับโมเลกุลที่ใช้ในการควบคุมการแสดงออกของยีนและการส่งสัญญาณตอบสนองต่อความเครียดชนิดต่างๆ ความเครียดจากความร้อน ความเครียดจากแสง ความเครียดจากแรงดันออสโมติก ความเครียดจากออกซิเดชัน ความเครียดจากการขาดธาตุอาหาร การขาดคาร์บอน ไนโตรเจน และฟอสเฟต ความเครียดจากสารพิษ และความเครียดจากสิ่งมีชีวิต ปฏิสัมพันธ์ระหว่างพืชและสิ่งแวดล้อม กลไกที่พืชใช้ในการจัดการกับความเครียดในสิ่งแวดล้อม การเปลี่ยนแปลงในกระบวนการทางสรีรวิทยาและชีวเคมีและการแสดงออกของยีนเมื่อพืชได้รับความเครียด

SCBI 654 Environmental Pollution and Hazardous Waste 3 (2-3-5)

วทชว ๖๕๔ มลพิษสิ่งแวดล้อมและกากของเสียอันตราย

Nature, distribution and ecological effects of pollutants and hazardous waste in air, soil and water; sampling techniques and analytical skill in environmental contamination and hazardous waste; methods of environmental pollutant and hazardous waste detection and remediation techniques; ecological impacts of pollution problems and hazardous waste from a variety of sources; causes and problems of pollution in the environment including water, soil, sediment, and air; effects of pollutants and hazardous waste on human and other organisms

ธรรมชาติของสารมลพิษและกากของเสียอันตราย การกระจายตัว และผลทางนิเวศวิทยาของสารมลพิษในอากาศ ดิน และน้ำ ทักษะการเก็บตัวอย่างและวิเคราะห์ตัวอย่างมลพิษสิ่งแวดล้อมและกากของเสียอันตราย การตรวจสอบสารมลพิษและการบำบัดฟื้นฟูสภาพแวดล้อมที่ปนเปื้อนด้วยมลพิษและกากของเสียอันตราย ผลกระทบต่อระบบนิเวศของปัญหาภาวะมลพิษและกากของเสียอันตรายจากแหล่งต่างๆ ต้นเหตุและปัญหาของภาวะมลพิษในสิ่งแวดล้อมทั้งในน้ำ ดิน ตะกอน และอากาศ ผลของสารมลพิษและกากของเสียอันตรายต่อมนุษย์และสิ่งมีชีวิตอื่นๆ

SCID 511 Gene Technology 1 (0-2-1)

วทคร ๕๑๑ เทคโนโลยีด้านยีน

Gene manipulation and recombinant DNA techniques; principles of gene technology; mini-projects involving handling of nucleic acid and proteins; evaluation of the quality of data generated; laboratory rules and regulations

เทคนิคการจัดการยีนและการตัดต่อยีน หลักการเทคโนโลยีด้านยีน โครงการทดลองย่อยที่เกี่ยวข้องกับกรดนิวคลิอิกและโปรตีน การประเมินคุณภาพของข้อมูลจากผลการทดลอง กฎและระเบียบการใช้ห้องปฏิบัติการ

SCBI 652 Special Problems in Bioresources and Environmental Biology 2 (0-6-3)

วทชว ๖๕๒ ปัญหาพิเศษทางทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม

Experiments to solve specific problems in bioresources and environmental biology; experiment planning; selecting proper experimental methods, result interpretation and data analysis methods

การทดลองเพื่อแก้ปัญหาเฉพาะทางด้านทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม การวางแผนการวิจัย การเลือกวิธีการวิจัยที่เหมาะสม วิธีการแปลและวิเคราะห์ผล

SCBI 653 Current Topics in Bioresources and Environmental Biology 2 (2-0-4)

วทชว ๖๕๓ หัวข้อเรื่องปัจจุบันทางทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม

Current and interesting topics in bioresources and environmental biology; analysis, discussion and application of modern knowledge and technology in bioresources and environmental biology

หัวข้อเรื่องที่ทันสมัยและน่าสนใจทางทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม การวิเคราะห์ วิจารณ์ และประยุกต์ใช้ความรู้และวิทยาการสมัยใหม่ทางทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม

SCID 507 Microscopic Techniques 1 (0-2-1)

วทคร ๕๐๗ เทคนิคการใช้กล้องจุลทรรศน์

Structure and operation of light microscope, phase, dark field and differential interference contrast microscopes, confocal microscope, fluorescence microscope, transmission electron microscope (TEM), scanning electron microscope (SEM); specimen collection, fixation, sectioning, basic staining and immunocytochemical methods; microscopic examination, photography and interpretation of the results; laboratory rules and regulations

โครงสร้างและการใช้งาน กล้องจุลทรรศน์ แบบธรรมดา แบบเฟส แบบพื้นมืด และแบบดิฟเฟอเรนเชียล อินเตอร์เฟอเรนซ์ คอนทราสท์ กล้องคอนโฟคัล กล้องฟลูออเรสเซนต์ กล้องจุลทรรศน์อิเล็กตรอนชนิดส่องผ่าน กล้องจุลทรรศน์อิเล็กตรอนชนิดส่องกราด การเก็บตัวอย่าง การตรึง การตัดชิ้นเนื้อให้บาง การย้อมสีขั้นพื้นฐานและการย้อมสีเซลล์โดยใช้วิธีทางเคมีที่เกี่ยวกับวิทยาภูมิคุ้มกัน การตรวจสอบ การถ่ายภาพและการแปลผลภาพ กฎและระเบียบการใช้ห้องปฏิบัติการ

SCID 509 Separation Techniques 1 (0-2-1)

วทคร ๕๐๙ เทคนิคการแยกสาร

Separation of biomolecules and biochemicals, based on size, shape, charge and state, using centrifugation, chromatography, electrophoresis and dialysis; laboratory rules and regulations

การแยกสารชีวโมเลกุลและสารชีวเคมี ตามขนาด รูปร่าง ประจุ และสถานะ โดยใช้วิธีการหมุนเหวี่ยง โครมาโทกราฟี การเคลื่อนย้ายสู่ขั้วไฟฟ้า และการแยกสารผ่านเยื่อ กฎและระเบียบการใช้ห้องปฏิบัติการ

SCID 516 Biostatistics 3 (3-0-6)

วทคร ๕๑๖ ชีวสถิติ

Scientific methods and biostatistical analysis; statistical principles and application for planning and analyzing data from experiment; probability distribution; estimation; hypothesis testing; chi-square test and frequencies analysis; regression and correlation analysis, analysis of variance, analysis of covariance, probit analysis, non-parametic statistics, and using the statistical package programs

วิธีการทางวิทยาศาสตร์และการวิเคราะห์ข้อมูลเชิงชีวสถิติ หลักการทางสถิติและการประยุกต์เพื่อวางแผนและวิเคราะห์ข้อมูลที่ได้จากการทดลอง การแจกแจงความน่าจะเป็น การประมาณค่า การทดสอบสมมุติฐาน การทดสอบด้วยไคกำลังสองและการวิเคราะห์ความถี่ การวิเคราะห์การถดถอยและสหสัมพันธ์ การวิเคราะห์ความแปรปรวน การวิเคราะห์ความแปรปรวนร่วมเกี่ยว การวิเคราะห์การเบี่ยงเบนของเส้นโค้งปรกติ สถิติศาสตร์ไม่อิงพารามิเตอร์ และการใช้โปรแกรมสำเร็จรูปสถิติ

SCBI 589 Economic Invertebrates 3 (3-0-6)

วทชว ๕๘๙ สัตว์ไม่มีกระดูกสันหลังทางเศรษฐกิจ

Integrative knowledge on species diversity, ecology, behavior and life history to recruit and apply invertebrate animas for economic proposes; cultivation system condition and rearing process; recent approaches and obstacles in invertebrate utilization; future trends of utilization and trading

การประยุกต์ใช้และพัฒนาสัตว์ไม่มีกระดูกสันหลังร่วมกับข้อมูลทางความหลากหลายทางชนิดพันธุ์ นิเวศวิทยา พฤติกรรมและวงชีวิตเพื่อเพิ่มมูลค่าทางเศรษฐกิจ วิธีการเพาะเลี้ยงและขยายพันธุ์สัตว์ไม่มีกระดูกสันหลังในปัจจุบัน ปัจจัยที่ส่งผลต่อการพัฒนาด้านความหลากหลายของสัตว์ไม่มีกระดูกสันหลัง แนวโน้มการนำไปใช้ประโยชน์ในเชิงพาณิชย์และการประเมินมูลค่าทางการตลาด

SCBI 590 Innovation and Commercialization of Bioresources 3 (3-0-6)
วทชว ๕๙๐ นวัตกรรมและการใช้ประโยชน์ทางการค้าจากทรัพยากรชีวภาพ

Process of innovation; design thinking; product differentiation; business model canvas and technology evaluation canvas; marketing strategy; entrepreneurship skills; intellectual property and laws related to bioresource utilization

กระบวนการของนวัตกรรม; การคิดเชิงออกแบบ; การสร้างความแตกต่างให้กับผลิตภัณฑ์; แผนโมเดลธุรกิจ และแผนการประเมินความพร้อมทางเทคโนโลยี; กลยุทธการตลาด; ทักษะผู้ประกอบการ; ทรัพย์สินทางปัญญาและกฎหมายที่เกี่ยวข้องการใช้ประโยชน์จากทรัพยากรชีวภาพ

SCBI 591 Water and Wastewater Treatment 3 (3-0-6)
วทชว ๕๙๑ การบำบัดน้ำและน้ำเสีย

Water resource; Types of water and wastewater; water pollution; water supply production process, wastewater treatment process, biological water treatment process, chemical water treatment process; physical water treatment process; water quality standard, water quality index; water treatment technology; technical visit of water treatment plant

ทรัพยากรน้ำ ประเภทของแหล่งน้ำและน้ำเสีย มลภาวะทางน้ำ กระบวนการผลิตน้ำประปา กระบวนการบำบัดน้ำเสีย กระบวนการบำบัดน้ำทางชีวภาพ กระบวนการบำบัดน้ำทางเคมี กระบวนการบำบัดน้ำกายภาพ มาตรฐานคุณภาพน้ำ ตัวชี้วัดคุณภาพน้ำ การปฏิบัติการณ์เทคโนโลยีการบำบัดน้ำ และการดูงานโรงบำบัดน้ำ

SCBI 592 Environmental Analysis Laboratory 1 (0-3-1)
วทชว ๕๙๒ ปฏิบัติการวิเคราะห์ทางสิ่งแวดล้อม

Analysis skill and proper analytical equipment handling; analytical uncertainty assessment; experimental data recording; sample preservation and storage; analysis of water and soil characteristics; acidity and alkalinity; solid; dissolved oxygen; biological oxygen demand; chemical oxygen demand; nitrogen, phosphorus, and metal; general microbiology analysis; sterile technique; microscopic observation; bacterial and protozoa staining; microorganism enumeration

and growth monitoring; coliform and *E. coli* bacteria determination; biosafety and biosecurity concepts

ทักษะการวิเคราะห์และการใช้เครื่องมือที่ถูกต้อง การประเมินความแปรปรวนในการวิเคราะห์ การบันทึกข้อมูลการทดลอง การเก็บและการรักษาสภาพตัวอย่าง การตรวจวิเคราะห์ลักษณะสมบัติของน้ำและดิน ความเป็นกรดด่าง ของแข็ง ปริมาณออกซิเจนละลายน้ำ ปริมาณความต้องการออกซิเจนทางชีวเคมี และเคมี ปริมาณไนโตรเจน ฟอสฟอรัส และธาตุโลหะ การวิเคราะห์ทางจุลินทรีย์วิทยาทั่วไป เทคนิคปลอดเชื้อ การใช้กล้องจุลทรรศน์ การย้อมสีแบคทีเรียและโพรโทซัว การนับจำนวน การวัดการเจริญเติบโตของจุลินทรีย์ การวิเคราะห์ปริมาณโคลิฟอร์มและอีโคไลแบคทีเรีย หลักการความปลอดภัยทางชีวนิรภัยและชีวนิรภัย

SCBI 593 Environmental Impact Assessment 3 (3-0-6)

วทชว ๕๙๓ การประเมินผลกระทบสิ่งแวดล้อม

Importance and historical development of environmental impact assessment (EIA) and environmental health impact assessment (EHIA); legislation and governmental processes; the conceptual process; various case studies encompassing the terrestrial ecosystem, aquatic ecosystem, water resource, noise, vibration, air quality, solid waste, hazardous waste, and health and social impact assessment; report preparation

ความสำคัญและประวัติการพัฒนาของการประเมินผลกระทบสิ่งแวดล้อม และการประเมินผลกระทบสิ่งแวดล้อมและสุขภาพ ข้อบังคับและขั้นตอนของภาครัฐ หลักการและขั้นตอนการประเมิน กรณีศึกษาที่หลากหลายทั้งทางด้านระบบนิเวศวิทยาบนบก ระบบนิเวศวิทยาในน้ำ ทรัพยากรทางน้ำ เสียง การสั่นสะเทือน คุณภาพอากาศ ขยะ ของเสียอันตราย และการประเมินทางสุขภาพและสังคม การเตรียมรายงาน

3) Thesis Credits (lecture – practice – self-study)

SCBI 698 Thesis 12 (0-36-0)

วทชว ๖๙๘ วิทยานิพนธ์

Research proposal's design for problem solving and quality development, which reflects new discovery; research process, compilation, proposed dissertation, research ethics, dissertation for academic publishing; ethics in academic publishing

การออกแบบโครงการวิจัยเพื่อการแก้ปัญหาและพัฒนาคุณภาพที่แสดงถึงสิ่งที่ได้ค้นพบใหม่ การดำเนินการวิจัย การเรียบเรียงวิทยานิพนธ์ การเสนอวิทยานิพนธ์ จริยธรรมในการวิจัย การเรียบเรียงวิทยานิพนธ์เพื่อเผยแพร่เชิงวิชาการ จริยธรรมในการเผยแพร่ผลงานวิชาการ

SCBI 798 Thesis 36 (0-108-0)

วทชว ๗๙๘ วิทยานิพนธ์

Research proposal’s design for problem solving and quality development, which reflects new discovery; research process, compilation, proposed dissertation, research ethics, dissertation for academic publishing; ethics in academic publishing

การออกแบบโครงการวิจัยเพื่อการแก้ปัญหาและพัฒนาคุณภาพที่แสดงถึงสิ่งที่ได้ค้นพบใหม่ การดำเนินการวิจัย การเรียบเรียงวิทยานิพนธ์ การเสนอวิทยานิพนธ์ จริยธรรมในการวิจัย การเรียบเรียงวิทยานิพนธ์เพื่อเผยแพร่เชิงวิชาการ จริยธรรมในการเผยแพร่ผลงานวิชาการ

APPENDIX B

Curriculum Vitae of the Faculty in Charge of the Program

Appendix B

Curriculum Vitae of the Faculty in Charge of the Program

1. Name Associate Professor Dr.Arunee Ahantarig

Education

Degree	Degree Name	Institute	Year
Ph.D.	Biology	University of Texas at San Antonio, U.S.A.	2003
M.Sc.	Biology	University of Texas at San Antonio, U.S.A.	1996
B.Sc.	Medical Technology	Chulalongkorn University	1992

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Tick biology and tick-borne diseases
2. Ectoparasite and vector-borne diseases

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Apanaskevich DA, Apanaskevich MA, Nooma W, **Ahantarig A**, Trinachartvanit W. Reinstatement of *Dermacentor tricuspis* (Schulze, 1933) n. comb., n. stat. (Acari: Ixodidae) as a valid species, synonymization of *D. atrosignatus* Neumann, 1906 and description of a new species from Indonesia, Malaysia and Thailand. Syst Parasitol. 2021;98(3):207-230.	12, 1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Nooroong P, Trinachartvanit W, Baimai V, Anuracpreeda P, **Ahantarig A.** Partial DnaK protein expression from *Coxiella*-like endosymbiont of *Rhipicephalus annulatus* tick. PLoS One. 2021;16(4):e0249354.	12, 1	2021
	Kaenkan W, Nooma W, Chelong IA, Baimai V, Trinachartvanit W, **Ahantarig A.** Reptile-associated *Borrelia* spp. in *Amblyomma* ticks, Thailand. Ticks Tick Borne Dis. 2020;11(1):101315.	12, 1	2020

Current Teaching Load

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
4.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
6.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
4.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
6.	SCBI 698	Thesis	12 (0-36-0)
7.	SCBI 798	Thesis	36 (0-108-0)

2. Name Associate Professor Dr.Prinpida Sonthiphand

Education

Degree	Degree Name	Institute	Year
Ph.D.	Biology	University of Waterloo, Canada	2014
M.Sc.	Environmental Management	Chulalongkorn University	2009
B.Sc.	Biochemistry	Chulalongkorn University	2005

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Environmental biology
2. Heavy metal transformation and bioremediation

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Pipattanajaroenkul P, Chotpantarat S, Termsaithong T, **Sonthiphand P**. Effects of arsenic and iron on the community and abundance of arsenite-oxidizing bacteria in an arsenic-affected groundwater aquifer. Curr Microbiol. 2021;78(4):1324-1334.	12, 1	2021
	Sonthiphand P, Rattanaroongrot P, Mek-yong K, Kusonmano K, Rangsiwutisak C, Uthaipaisanwong P, Chotpantarat S, Termsaithong T. Microbial community structure in aquifers associated with arsenic: analysis of 16S rRNA and arsenite oxidase genes. PeerJ. 2021;9: e10653.	12, 1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Boonkaewwan S, **Sonthiphand P**, Chotpantarat S. Mechanisms of arsenic contamination associated with hydrochemical characteristics in coastal alluvial aquifers using multivariate statistical technique and hydrogeochemical modeling: a case study in Rayong province, eastern Thailand. Environ Geochem Health. 2021;43:537-566.	12, 1	2021
	Martin MA, Sivaguru J, McEvoy J, **Sonthiphand P**, Delorme A, Khan E. Photodegradation of (E)-and (Z) endoxifen in water by ultraviolet light: efficiency, kinetics, by-products, and toxicity assessment. Water Res. 2020;171:115451.	12, 1	2020
	Sonthiphand P, Ruangroengkulrith S, Mhuantong W, Charoensawan V, Chotpantarat S, Boonkaewwan S. Metagenomic insights into microbial diversity in a groundwater basin impacted by a variety of anthropogenic activities. Environ Sci Pollut Res. 2019;26:26765–26781.	12, 1	2019
	Kunapongkiti P, Limpiyakorn T, **Sonthiphand P**, Rongsayamanont C. Partial nitrification in entrapped-cell-based reactors with two different cell-to-matrix ratios: performance, microenvironment, and microbial community. J Environ Sci Health A. 2019;54(9):874-883.	12, 1	2019

Current Teaching Load

1. SCBI 518 Environmental Aquatic Toxicology 3 (2-3-5)
2. SCBI 519 Microbial Ecology 3 (3-0-6)
3. SCBI 603 Research Seminar in Environmental Biology 1 (1-0-2)
4. SCBI 604 Advanced Research Seminar in Environmental Biology 1 (1-0-2)

5.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
6.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
7.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
8.	SCBI 624	Hazardous Waste Management	3 (3-0-6)
9.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 519	Microbial Ecology	3 (3-0-6)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
5.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
7.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)
8.	SCBI 591	Water and Wastewater Treatment	3 (3-0-6)
9.	SCBI 592	Environmental Analysis Laboratory	1 (0-3-1)
10.	SCBI 698	Thesis	12 (0-36-0)
11.	SCBI 798	Thesis	36 (0-108-0)

3. Name Associate Professor Dr.Surang Chankhamhaengdecha

Education

Degree	Degree Name	Institute	Year
Ph.D.	Biotechnology	Mahidol University	2003
M.Sc.	Biotechnology	Mahidol University	1999
B.Sc.	Microbiology	Burapha University	1997

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Antimicrobial drug discovery
2. Bacteriophage-based biocontrol
3. Molecular biology

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Sridapan T, Tangkawsakul W, Janvilisri T, Kiatpathomchai W, Dangtip S, Ngamwongsatit N, Nacapricha D, Ounjai P, **Chankhamhaengdecha S**. Rapid detection of *Clostridium perfringens* in food by loop-mediated isothermal amplification combined with a lateral flow biosensor. PLoS One. 2021;16(1):e0245144.	12, 1	2021
	Wongkuna S, Ghimire S, **Chankhamhaengdecha S**, Janvilisri T, Scaria J. *Mediterraneibacter catenae* SW178 sp. nov., an intestinal bacterium of feral chicken. PeerJ. 2021;9: e11050.	12, 1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Wongkuna S, Ghimire S, Janvilisri T, Doerner K, **Chankhamhaengdecha S**, Scaria J. Taxono-genomics description of *Olsenella lakotia* SW165 T sp. nov., a new anaerobic bacterium isolated from cecum of feral chicken. F1000Res. 2020;9:1103.	12, 1	2020
	Harnvoravongchai P, Singwisut R, Ounjai P, Aroonnual A, Kosiyachinda P, Janvilisri T, **Chankhamhaengdecha S**. Isolation and characterization of thermophilic cellulose and hemicellulose degrading bacterium, *Thermoanaerobacterium* sp. R63 from tropical dry deciduous forest soil. PLoS One. 2020;15(7):e0236518.	12, 1	2020
	Dowdell P, **Chankhamhaengdecha S**, Panbangred W, Janvilisri T, Aroonnual A. Probiotic activity of *Enterococcus faecium* and *Lactococcus lactis* isolated from Thai fermented sausages and their protective effect against *Clostridium difficile*. Probiotics Antimicrob Proteins. 2020;12(2):641-648.	12, 1	2020
	Phanchana M, Phetruen T, Harnvoravongchai P, Raksat P, Ounjai P, **Chankhamhaengdecha S**, Janvilisri T. Repurposing a platelet aggregation inhibitor ticagrelor as an antimicrobial against *Clostridioides difficile*. Sci Rep. 2020;10:6497.	12, 1	2020

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Wongkuna S, Ghimire S, Antony L, **Chankhamhaengdecha S**, Janvilisri T, Scaria J. *Sellimonas caecigallum* sp. nov., description and genome sequence of a new member of the *Sellimonas* genus isolated from the cecum of feral chicken. New Microbes New Infect. 2020;33:100626.	12, 1	2020
	Thomas M, Wongkuna S, Ghimire S, Kumar R, Antony L, Doerner KC, Singery A, Nelson E, Woyengo T, **Chankhamhaengdecha S**, Janvilisri T, Scaria J. Gut microbial dynamics during conventionalization of germfree chicken. mSphere. 2019;4(2):e00035-19.	12, 1	2019
	Kampeera J, Pasakon P, Karuwan C, Arunrut N, Sappat A, Sirithammajak S, Nipaphorn Dechokiattawan, Sumranwanich T, Chaivisuthangkura P, Ounjai P, **Chankhamhaengdecha S**, Wisitsoraat A, Tuantranont A, Wansika K. Point-of-care rapid detection of Vibrio parahaemolyticus in seafood using loop-mediated isothermal amplification and graphene-based screen-printed electrochemical sensor. Biosens Bioelectron. 2019;132:271-278.	12, 1	2019

Current Teaching Load

1. SCBI 603 Research Seminar in Environmental Biology 1 (1-0-2)
2. SCBI 604 Advanced Research Seminar in Environmental Biology 1 (1-0-2)
3. SCBI 611 Research Techniques in Environmental Biology 2 (0-6-3)
4. SCBI 612 Special Problems in Environmental Biology 2 (0-6-3)
5. SCBI 613 Current Topics in Enviromental Biology 2 (2-0-4)

6.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
4.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
6.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)
7.	SCBI 698	Thesis	12 (0-36-0)
8.	SCBI 798	Thesis	36 (0-108-0)

4. Name Associate Professor Dr.Wachareeporn Trinachartvanit

Education

Degree	Degree Name	Institute	Year
Ph.D.	Ecology, Ethology, and Evolution	University of Illinois at Urbana-Champaign, U.S.A.	2004
M.Sc.	Environmental Biology	Mahidol University	1995
B.Sc.	Biology	Mahidol University	1992

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Biology and biodiversity of tick and tick-born microorganisms
2. Cytogenetics, Cyto-molecular genetics and Genetics toxicology

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Apanaskevich DA, Apanaskevich MA, Nooma W, Ahantarig A, **Trinachartvanit W**. Reinstatement of *Dermacentor tricuspis* (Schulze, 1933) n. comb., n. stat. (Acari: Ixodidae) as a valid species, synonymization of *D. atrosignatus* Neumann, 1906 and description of a new species from Indonesia, Malaysia and Thailand. Syst Parasitol. 2021;98(3):207-230.	12, 1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Olanratmanee P, Baimai V, Ahantarig A, **Trinachartvanit W**. Novel Supergroup U *Wolbachia* in bat mites of Thailand. Southeast Asian J Trop Med Public Health. 2021;51(2):48-55.	12, 1	2021
	Apanaskevich DA, Vongphayloth K, Jeangkhwoa P, Chaloemthanetphong A, Ahantarig A, Apanaskevich MA, Brey PT, Lakeomany K, **Trinachartvanit W.** Description of a new species of *Dermacentor* Koch, 1844 (Acari: Ixodidae) from the mountains of Laos and Thailand. Syst Parasitol. 2020;97(4):347-355.	12, 1	2020
	Nontaleerak B, Duang-Nkern J, Wongsaroj L, **Trinachartvanit W,** Romsang A, Mongkolsuk S. Roles of RcsA, an AhpD family protein, in reactive chlorine stress resistance and virulence in *Pseudomonas aeruginosa*. Appl Environ Microbiol. 2020;86(20):e01480-20.	12, 1	2020
	Kaenkan W, Nooma W, Chelong IA, Baimai V, **Trinachartvanit W**, Ahantarig A. Reptile-associated *Borrelia* spp. in *Amblyomma* ticks, Thailand. Ticks Tick-Borne Dis. 2020;11(1): 101315.	12, 1	2020
	Ahantarig A, Hirunkanokpun S, Naksatit A, Ongin T, Baimai V, **Trinachartvanit W**. Etiological agents of tortoise tick in Thailand. Southeast Asian J Trop Med Public Health. 2019;50(1): 79-85.	12, 1	2019

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Apanaskevich DA, Chaloemthanetphong A, Vongphayloth K, Ahantarig A, Apanaskevich MA, Brey PT, Hertz JC, Lakeomany K, Sutherland IW, **Trinachartvanit W**. Description of a new species of *Dermacentor* Koch, 1844 (Acari: Ixodidae) from Laos and Thailand. Syst Parasitol. 2019;96(6):475-484.	12, 1	2019
	Trinachartvanit W, Wutha W, Kaenkan W, Chelong I, Bahakheeree M, Baimai V, Ahantarig A. Co-infection with *Coxiella*-like bacteria and *Babesia* in goat ticks from southern Thailand. Southeast Asian J Trop Med Public Health. 2019;50(4):643-650.	12, 1	2019

Current Teaching Load

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
4.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
6.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
4.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
6.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)
7.	SCBI 698	Thesis	12 (0-36-0)
8.	SCBI 798	Thesis	36 (0-108-0)

5. Name Assistant Professor Dr.Chalita Kongrit

Education

Degree	Degree Name	Institute	Year
Ph.D.	Biology	Mahidol University	2010
B.Sc.	Biology	Mahidol University	2002

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Wildlife genetics and conservation
2. Population genetics and ecology of wild populations

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Promnun P, Tandavanit, N, **Kongrit C**, Kongsatree K, Kongpraphan P, Dongkumfu W, Kumsuan D, Khudamrongsawat J. Phylogeography and ecological niche modeling reveal evolutionary history of *Leiolepis ocellata* (Squamata, Leiolepidae). Ecol Evol. 2021;11:2221-2233.	12, 1	2021
	Promnun P, **Kongrit** C, Tandavanit N, Techachoochert S, Khudamrongsawat J. Predicting potential distribution of an endemic butterfly lizard, *Leiolepis ocellata* (Squamata: Agamidae). Trop Nat Hist. 2020;20:60-71.	12, 1	2020

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Kongrit C, Markviriya D, Laithong P, Khudamrongsawat J. Species identification and unlocking hidden genetic diversity of confiscated slow lorises (*Nycticebus* spp.) based on mitochondrial DNA markers. Folia Primatol. 2020;91:1-14.	12, 1	2020

Current Teaching Load

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
4.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
6.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 505	Population and Community Ecology	3 (2-3-5)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
5.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
7.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)
8.	SCBI 698	Thesis	12 (0-36-0)
9.	SCBI 798	Thesis	36 (0-108-0)

6. Name Assistant Professor Dr.Ekgachai Jeratthitikul

Education

Degree	Degree Name	Institute	Year
D.Sc.	Biological Sciences	Kyoto University, Japan	2013
M.Sc.	Biological Sciences	Kyoto University, Japan	2009
B.Sc.	Zoology	Chulalongkorn University	2006

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Systematics and biogeography of invertebrates
2. Molecular phylogeny
3. DNA barcoding

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Jeratthitikul E**, Paphatmethin S, Zieritz A, Lopes-Lima M., Ngor PB. *Hyriopsis panhai*, a new species of freshwater mussel from Thailand (Bivalvia: Unionidae). Raffles Bull Zool. 2021;69:124-136.	12, 1	2021
	Macharoenboon K, Siriwut W, **Jeratthitikul E**. A review of the taxonomy of spiny-backed orb-weaving spiders of the subfamily Gasteracanthinae (Araneae, Araneidae) in Thailand. ZooKeys. 2021;1032:17-62.	12, 1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Sutcharit C, **Jeratthitikul E**, Tongkerd P, Panha S. Reassessment and systematic position of the sinistral snails of genus *Hemiplecta* from Thailand (Eupulmonata: Ariophantidae), with description of two new species. Contrib Zool. 2021;90(2):183-215.	12, 1	2021
	Siriwut W, **Jeratthitikul E**, Panha S, Chanabun R, Ngor PB, Sutcharit C. Evidence of cryptic diversity in freshwater *Macrobrachium* prawns from Indochinese riverine systems revealed by DNA barcode, species delimitation and phylogenetic approaches. PLoS ONE. 2021;16(6):e0252546.	12, 1	2021
	Pholyotha A, Sutcharit C, Tongkerd P, **Jeratthitikul E**, Panha S. Integrative systematics reveals the new land-snail genus *Taphrenalla* (Eupulmonata: Ariophantidae) with a description of nine new species from Thailand. Contrib Zool. 2021;90:21-69.	12, 1	2021
	Jeratthitikul E, Jiranuntskul P, Nakano T, Sutcharit C, Panha S. A new species of buffalo leech in the genus *Hirudinaria* Whitman, 1886 (Arhynchobdellida, Hirudinidae) from Thailand. ZooKeys. 2020;933:1-14.	12, 1	2020
	Ng TH, **Jeratthitikul E**, Sutcharit C, Chhuoy S, Pin K, Pholyotha A, Siriwut W, Srisonchai R, Hogan, ZS, Ngor PB Annotated checklist of freshwater molluscs from the largest freshwater lake in Southeast Asia. ZooKeys. 2020;958:107-141.	12, 1	2020

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Sutcharit C, **Jeratthitikul E**, Pholyotha A, Lin A, Panha S. Molecular phylogeny reveals high diversity and endemism in the limestone karst□restricted land snail genus *Sophina* Benson, 1859 from Myanmar (Eupulmonata: Helicarionidae), with description of four new species. J Zool Syst Evol Res. 2020;58:957-981.	12, 1	2020
	Jeratthitikul E, Sutcharit C, Prasankok P. Molecular phylogeny of the Indochinese freshwater mussel genus *Scabies* Haas, 1911 (Bivalvia: Unionidae). Trop Nat Hist. 2019;19(1):21-36.	12, 1	2019
	Jeratthitikul E, Phuangphong S, Sutcharit C, Prasankok P, Kongim B, Panha, S. Integrative taxonomy reveals phenotypic plasticity in the freshwater mussel *Contradens contradens* (Bivalvia: Unionidae) in Thailand, with a description of a new species. Syst Biodivers. 2019;17(2):134-147.	12, 1	2019
	Muanta S, **Jeratthitikul E**, Panha S, Prasankok P. Phylogeography of the freshwater bivalve genus *Ensidens* (Unionidae) in Thailand. J Molluscan Stud. 2019;85:224-231.	12, 1	2019

Current Teaching Load

1.	SCBI 511	Biogeography	3 (3-0-6)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
5.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
7.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 505	Population and Community Ecology	3 (2-3-5)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
5.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
7.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)
8.	SCBI 589	Economic Invertrebrates	4 (3-0-6)
9.	SCBI 698	Thesis	12 (0-36-0)
10.	SCBI 798	Thesis	36 (0-108-0)

7. Name Assistant Professor Dr.Jenjit Khudamrongsawat

Education

Degree	Degree Name	Institute	Year
Ph.D.	Biology	University of Alabama, U.S.A.	2007
M.Sc.	Botany and Plant Sciences	University of California-Riverside, U.S.A.	2002
B.Sc.	Biology	Rochester Institute of Technology, U.S.A.	2000

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Biodiversity and conservation
2. Ecology and genetics of vertebrate populations

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Khudamrongsawat J**, Kettratad J, Intasorn P, Pinyo N, Tapcheewin S, Wanusrut P. Pattern of genetic structure of the common stream fish, *Neolissochilus soroides* (Pisces: Cyprinidae), addresses the importance of protected areas in eastern Thailand. J Fish Biol. 2021;99: 175-185.	12, 1	2021
	Promnun P, Tandavanitj N, Kongrit C, Kongsatree K, Kongpraphan P, Dongkumfu W, Kumsuan D, **Khudamrongsawat J**. Phylogeography and ecological niche modeling reveal evolutionary history of *Leiolepis ocellata* (Squamata, Leiolepidae). Ecol Evol. 2021;11:2221-2233.	12, 1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Krajangdara T, Fahmi, Ebert DA, Chaorattana C, **Khudamrongsawat J**. Morphological and genetic evidence confirmed three new records of ghost shark species from the Andaman Sea of Thailand. Trop Nat Hist. 2021;21:218-233.	12, 1	2021
	Khudamrongsawat J, Meetan D, Chansue N. Turtles in temple ponds in Thailand: Species, abundance, and health issues. Soc Anim. 2020;28(3):215-232.	12, 1	2020
	Promnun P, Kongrit C, Tandavanitj N, Techachoochert S, **Khudamrongsawat J**. Predicting potential distribution of an endemic butterfly lizard, *Leiolepis ocellate* (Squamata: Agamidae). Trop Nat Hist. 2020;20:60-71.	12, 1	2020
	Kongrit C, Markviriya D, Laithong P, **Khudamrongsawat J**. Species identification and unlocking hidden genetic diversity of confiscated slow lorises (*Nycticebus* spp.) based on mitochondrial DNA markers. Folia Primatol. 2020;91:1-14.	12, 1	2020

Current Teaching Load

1.	SCBI 518	Environmental Aquatic Toxicology	3 (2-3-5)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
5.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
7.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 505	Population and Community Ecology	3 (2-3-5)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
5.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
7.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)
8.	SCBI 698	Thesis	12 (0-36-0)
9.	SCBI 798	Thesis	36 (0-108-0)

8. Name Assistant Professor Dr.Metha Meetam

Education

Degree	Degree Name	Institute	Year
Ph.D.	Horticulture	Purdue University, U.S.A.	2006
B.A.	Biology	Washington University, U.S.A.	1999

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Plant response to environment
2. Heavy metal toxicity
3. Bioremediation
4. Biomass energy

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Promsing S, Pokethitiyook P, Kruatrachue M, Ounjai P, **Meetam M**, Onparn N, Kumsopa A. Rhizoremediation of fuel oil by *Vetiveria zizanioides* in association with *Kocuria* sp. no MU1 and *Micrococcus luteus* WN01. ScienceAsia, 2021;47(1):96-105.	12, 1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Meetam M, Sripintusorn N, Songnuan W, Siriwattanakul U, Pichakum A. Assessment of physiological parameters to determine drought tolerance of plants for extensive green roof architecture in tropical areas. Urban For Urban Gree. 2020;56:1618-8667.	12, 1	2020
	Pakdee O, Songnuan W, Panvisavas N, Pokethitiyook P, Yokthongwattana K, **Meetam M**. Functional characterization of metallothionein-like genes from *Physcomitrella patens*: expression profiling, yeast heterologous expression, and disruption of PpMT1.2a gene. Planta. 2019;250(2):427-443.	12, 1	2019
	Charoonnart P, Worakajit N, Zedler JAZ, **Meetam M**, Robinson C, Saksmerprome V. Generation of microalga *Chlamydomonas reinhardtii* expressing shrimp antiviral dsRNA without supplementation of antibiotics. Sci Rep. 2019;9:3164.	12, 1	2019
	Pugkaew W, **Meetam M**, Yokthongwattana K, Leeratsuwan N, Pokethitiyook P. Effects of salinity changes on growth, photosynthetic activity, biochemical composition, and lipid productivity of marine microalga *Tetraselmis suecica*. J Appl Phycol. 2019;31:969-979.	12, 1	2019

Current Teaching Load

1.	SCBI 525	Molecular Approaches to Problems in Environmental Biology	2 (2-0-4)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)

4.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
5.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
7.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 525	Molecular Approaches to Problems in Environmental Biology	2 (2-0-4)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
5.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
7.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)
8.	SCBI 698	Thesis	12 (0-36-0)
9.	SCBI 798	Thesis	36 (0-108-0)

9. Name Assistant Professor Dr.Parinda Thayanukul

Education

Degree	Degree Name	Institute	Year
Ph.D.	Urban Engineering	The University of Tokyo, Japan	2012
M.E.	Urban Engineering	The University of Tokyo, Japan	2009
B.Sc.	Biotechnology	Mahidol University	2006

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Environmental impacts on mosquitoes, *Wolbachia* bacteria, and mosquito borne diseases
2. Antibiotic resistance gene and antibiotic residual in environment
3. Endocrine disrupting chemical in wastewater and biological treatment
4. Microbial regrowth in water distribution system

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Srikwan P, Niamhom B, Yagi T, **Thayanukul P.** Characterization of methyltestosterone degrading bacteria isolated from tilapia masculinizing ponds: metabolic intermediate, glucose amendments effects, and other hormones transformation. Water Air Soil Pollut. 2020; 231(10):498.	12, 1	2020

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Krainara S, Suraraksa B, Prommeenate P, **Thayanukul P**, Luepromchai E. Enrichment and characterization of bacterial consortia for degrading 2-mercaptobenzothiazole in rubber industrial wastewater. J Hazard Mater. 2020;400:123291.	12, 1	2020
	Sruamsiri D, **Thayanukul P**, Boonchayaanant BS. In situ identification of polyhydroxyalkanoate (PHA)-accumulating microorganisms in mixed microbial cultures under feast/famine conditions. Sci Rep. 2020:10(1):3752.	12, 1	2020
	Nguyen TKX, Pinyakong O, **Thayanukul P.** Bacterial community structures and biodegradation kinetic of Tiamulin antibiotic degrading enriched consortia from swine wastewater. J Environ Health Sci Eng. 2019;17:1131-1160.	12, 1	2019
	Suttakun S, Rattanakul S, **Thayanukul P.** Hydrogen peroxide production in *Anubias barteri*, *Echinodorus ozelot* and *Cabomba caroliniana* by induction of 17α-Ethinylestradiol. Thai Environ Eng J 2019;33(2):41-49.	9, 0.6	2019
	Mrozik W, Vinitnantharat S, Thongsamer T, Pansuk N, Pattanachan P, **Thayanukul P**, Acharya K, Baluja MQ, Hazlerigg C, Robson AF, Davenport RJ, Werner D. The food-water quality nexus in periurban aquacultures downstream of Bangkok, Thailand. Sci Total Environ. 2019;695:133923.	12, 1	2019

Current Teaching Load

1. SCBI 518 Environmental Aquatic Toxicology 3 (2-3-5)
2. SCBI 519 Microbial Ecology 3 (3-0-6)

3.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
5.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
6.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
7.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
8.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

2.	SCBI 519	Microbial Ecology	3 (3-0-6)
3.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
5.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
6.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
7.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
8.	SCBI 624	Hazardous Waste Management	3 (3-0-6)
9.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)
10.	SCBI 591	Water and Wastewater Treatment	3 (3-0-6)
11.	SCBI 593	Environmental Impact Assessment	3 (3-0-6)
12.	SCBI 592	Environmental Analysis Laboratory	1 (0-3-1)
13.	SCBI 698	Thesis	12 (0-36-0)
14.	SCBI 798	Thesis	36 (0-108-0)

10. Name Assistant Professor Dr.Patompong Saengwilai

Education

Degree	Degree Name	Institute	Year
Ph.D.	Plant Biology	Pennsylvania State University, U.S.A.	2013
B.Sc.	Biology	Mahidol University	2007

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Plant physiology and genetics
2. Root biology
3. Bio-phytoremediation of heavy metals and metalloids

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Busener N, Kengkanna J, **Saengwilai PJ**, Bucksch A. Image-based root phenotyping links root architecture to micronutrient concentration in cassava. Plants People Planet. 2020;2(6):678-87.	12, 1	2020
	Salungyu J, Thaitad S, Bucksch A, Kengkanna J, **Saengwilai PJ**. From lab to field: Open tools facilitating the translation of maize root traits. Field Crops Res. 2020;255:107872.	12, 1	2020
	Saengwilai P, Meeinkuirt W, Phusantisampan T, Pichtel J. Immobilization of Cadmium in contaminated soil using organic amendments and its effects on rice growth performance. Expos Health. 2020;12(2):295-306.	12, 1	2020

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Meeinkuirt W, Phusantisampan T, **Saengwilai P**. Root system architecture influencing cadmium accumulation in rice (*Oryza sativa* L.). Int J Phytoremediation. 2019;21(1):19-26.	12, 1	2019
	Kengkanna J, Jakaew P, Amawan S, Busener N, Bucksch A, **Saengwilai P**. Phenotypic variation of cassava root traits and their responses to drought. Appl Plant Sci. 2019;7(4):e01238.	12, 1	2019

Current Teaching Load

1.	SCBI 519	Microbial Ecology	3 (3-0-6)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
5.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
7.	SCBI 619	Environmental Science	3 (3-0-6)
8.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 519	Microbial Ecology	3 (3-0-6)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
5.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
7.	SCBI 619	Environmental Science	3 (3-0-6)
8.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)
9.	SCBI 698	Thesis	12 (0-36-0)
10	SCBI 798	Thesis	36 (0-108-0)

11. Name Assistant Professor Dr.Phurt Harnvoravongchai

Education

Degree	Degree Name	Institute	Year
D.Eng.	Bioengineering	Tokyo Institute of Technology, Japan	2015
M.Eng.	Bioengineering	Tokyo Institute of Technology, Japan	2012
B.Sc.	Biotechnology	Mahidol University	2010

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Antibiotic resistance
2. Extremophile
3. Molecular biology

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Pipatthana M, **Harnvoravongchai P,** Pongchaikul P, Likhitrattanapisal S, Phanchana M, Chankhamhaengdecha S, Janvilisri T. The repertoire of ABC proteins in *Clostridioides difficile*. Comput. Struct. Biotechnol J. 2021;19:2905-2920.	12, 1	2021
	Ojha SC, Phanchana M, **Harnvoravongchai P**, Chankhamhaengdecha S, Singhakaew S, Ounjai P, Janvilisri T. Teicoplanin suppresses vegetative Clostridioides difficile and spore outgrowth. Antibiotics. 2021;10:984.	12, 1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Harnvoravongchai P, Singwisut R, Ounjai P, Aroonnual A, Kosiyachinda P, Janvilisri T, Chankhamhaengdecha S. Isolation and characterization of thermophilic cellulose and hemicellulose degrading bacterium, *Thermoanaerobacterium* sp. R63 from tropical dry deciduous forest soil. PLoS One. 2020;15(7):e0236518.	12, 1	2020

Current Teaching Load

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
4.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
6.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
4.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
6.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)
7.	SCBI 698	Thesis	12 (0-36-0)
8.	SCBI 798	Thesis	36 (0-108-0)

12. Name Assistant Professor Dr.Puey Ounjai

Education

Degree	Degree Name	Institute	Year
Ph.D.	Molecular Genetics and Genetic Engineering	Mahidol University	2007
B.Sc.	Biotechnology	King Mongkut's Institute of Technology Ladkrabang	2001

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Structural biology and biophysics of viruses and molecular machines
2. Molecular cell biology and biochemistry
3. Microbiology and biotechnological application

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Asawasriworanan T, Harnvoravongchai P, Somana J, Chankhamhaengdecha S, **Ounjai P**. Draft genome sequence of *Neobacillus cucumis* strain T4S4, a stevioside and rebaudioside A hydrolytic strain isolated from tropical forest soil. Microbiol Resour Announc. 2021;10(21):e0149120.	12, 1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Wannigama DL, Amarasiri M, Hurst C, Phattharapornjaroen P, Abe S, Hongsing P, Hosseini Rad SMA, Pearson L, Saethang T, Luk-in S, Kueakulpattana N, Storer RJ, **Ounjai P**, Kavquet A, Leelahavanichkul A, Chatsuwan T. Tracking COVID-19 with wastewater to understand asymptomatic transmission. Int J Infect Dis. 2021;108:296-299.	12, 1	2021
	Promsing S, Pokethitiyook P, Kruatrachue M, **Ounjai P**, Meetam M, Onparn N, Kumsopa A. Rhizoremediation of fuel oil by *Vetiveria zizanioides* in association with *Kocuria* sp. no MU1 and *Micrococcus luteus* WN01. ScienceAsia, 2021;47(1):96-105.	12, 1	2021
	Sridapan T, Tangkawsakul W, Janvilisri T, Kiatpathomchai W, Dangtip S, Ngamwongsatit N, Nacapricha D, **Ounjai P**, Chankhamhaengdecha S. Rapid detection of *Clostridium perfringens* in food by loop-mediated isothermal amplification combined with a lateral flow biosensor. PLoS One. 2021;16(1):e0245144.	12, 1	2021
	Sonpho E, Wootthichairangsan C, Ishida M, Inoue T, Agata K, Maleehuan A, Charngkaew K, Chomanee N, Moonsom S, Wongtrakoongate P, Chairoungdua A, **Ounjai P**. ECM-body: A cell-free 3D biomimetic scaffold derived from intact planarian body. Zool Sci. 2020;37(4): 307-313.	12, 1	2020

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Harnvoravongchai P, Singwisut R, **Ounjai P**, Aroonnual A, Kosiyachinda P, Janvilisri T, Chankham haengdecha S. Isolation and characterization of thermophilic cellulose and hemicellulose degrading bacterium, *Thermoanaero-bacterium* sp. R63 from tropical dry deciduous forest soil. PLoS One. 2020;15(7):e0236518.	12, 1	2020
	Kitdumrongthum S, Reabroi S, Suksen K, Tuchinda P, Munyoo B, Mahalapbutr P, Rungrotmongkol T, **Ounjai P**, Chairoungdua A. Inhibition of topoisomerase IIα and induction of DNA damage in cholangiocarcinoma cells by altholactone and its halogenated benzoate derivatives. Biomed Pharmacother. 2020;127: 110149.	12, 1	2020
	Phanchana M, Phetruen T, Harnvoravongchai P, Raksat P, **Ounjai P**, Chankhamhaengdecha S, Janvilisri T. Repurposing a platelet aggregation inhibitor ticagrelor as an antimicrobial against *Clostridioides difficile*. Sci Rep. 2020;10:6497.	12, 1	2020
	Jampasri K, Pokethitiyook P, Poolpak T, Kruatrachue M, **Ounjai P**, Kumsopa A. Bacteria-assisted phytoremediation of fuel oil and lead co-contaminated soil in the salt-stressed condition by *Chromolaena odorata* and *Micrococcus luteus*. Int J Phytoremediation. 2020;22(3):322-333.	12, 1	2020
	Samranwanich T, Boonthaworn K, Singhakaew S, **Ounjai P**. Time-restricted inquiry-based learning promotes student active engagement in undergraduate zoology laboratory. J Microbiol Biol Educ. 2019;20(1): 20.1.2	12, 1	2019

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Kampeera J, Pasakon P, Karuwan C, Arunrut N, Sappat A, Sirithammajak S, Nipaphorn Dechokiattawan, Sumranwanich T, Chaivisuthangkura P, **Ounjai P**, Chankhamhaengdecha S, Wisitsoraat A, Tuantranont A, Wansika K. Point-of-care rapid detection of Vibrio parahaemolyticus in seafood using loop-mediated isothermal amplification and graphene-based screen-printed electrochemical sensor. Biosens Bioelectron. 2019;132:271-278.	12, 1	2019
	Taweewattanapaisan P, Jantarat J, **Ounjai P**, Janebodin K. The effects of EDTA on blood clot in regenerative endodontic procedures. J Endod. 2019;45(3):281-286.	12, 1	2019

Current Teaching Load

1.	SCID 500	Cell and Molecular Biology	3 (3-0-6)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
5.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
7.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCID 500	Cell and Molecular Biology	3 (3-0-6)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)

5.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
7.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)
8.	SCBI 698	Thesis	12 (0-36-0)
9.	SCBI 798	Thesis	36 (0-108-0)

13. Name Assistant Professor Dr.Supeecha Kumkate

Education

Degree	Degree Name	Institute	Year
Ph.D.	Biology	University of York, U.K.	2004
M.Sc.	Environmental Biology	Mahidol University	1999
B.Sc.	Microbiology	Chulalongkorn University	1995

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Immunological characterization of pit viper venom proteins
2. Anti-cancerous properties of herbal extracts

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Balasubramanian B, Venkatraman S, Myint KZ, Janvilisri T, Wongprasert K, **Kumkate S**, Bates DO, Tohtong R. Co-clinical trials: An innovative drug development platform for cholangiocarcinoma. Pharmaceuticals (Basel). 2021;14(1):51.	12, 1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Boonsri B, Yacqub-Usman K, Thintharua P, Myint KZ, Sae-Lao T, Collier P, Suriyonplengsaeng C, Larbcharoensub N, Balasubramanian B, Venkatraman S, Egbuniwe IU, Gomez D, Mukherjee A, **Kumkate S**, Janvilisri T, Zaitoun AM, Kuakpaetoon T, Tohtong R, Grabowska AM, Bates DO, Wongprasert K. Effect of combining EGFR tyrosine kinase inhibitors and cytotoxic agents on cholangiocarcinoma cells. Cancer Res Treat. 2021;53(2):457-470.	12, 1	2021
	Likhitrattanapisal S, **Kumkate S**, Ajawatanawong P, Wongprasert K, Tohtong R, Janvilisri T. Dysregulation of microRNA in cholangiocarcinoma identified through a meta-analysis of microRNA profiling. World J Gastroenterol. 2020;26(29):4356-4371.	12, 1	2020
	Kumkate S, Chanhome L, Thiangtrongjit T, Noiphrom J, Laoungboa P, Khow O, Vasaruchapong T, Sitprija S, Chaiyabutr N, Reamtong O. Venomics and cellular toxicity of Thai pit vipers (*Trimeresurus macrops* and *T. hageni*). Toxins. 2020;12(1):54.	12, 1	2020
	Seeree P, Janvilisri T, Kangsamaksin T, Tohtong R, **Kumkate S**. Downregulation of ABCA1 and ABCG1 transporters by simvastatin in cholangiocarcinoma cells. Oncol Lett. 2019;18:5173-5184.	12, 1	2019

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Pearngam P, **Kumkate S**, Okada S, Janvilisri T. Andrographolide inhibits cholangiocarcinoma cell migration by down-regulation of claudin-1 *via* the p-38 signaling pathway. Front Pharmacol. 2019;10:827.	12, 1	2019

Current Teaching Load

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
4.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
6.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
4.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
6.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)
7.	SCBI 698	Thesis	12 (0-36-0)
8.	SCBI 798	Thesis	36 (0-108-0)

14. Name Lecturer Dr.Alisa Damnernsawad

Education

Degree	Degree Name	Institute	Year
Ph.D.	Cancer Biology	University of Wisconsin-Madison, U.S.A.	2015
B.Sc.	Biology	Mahidol University	2007

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Cancer biology
2. Cell biology

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	You X, Ryu MJ, Cho E, Sang Y, **Damnernsawad A**, Zhou Y, Liu Y, Zhang J, Lee Y. Embryonic expression of NrasG12D leads to embryonic lethality and cardiac defects. Front Cell Dev Biol. 2021;9:633661.	12, 1	2021
	Wen Z, Yun G, Hebert A, Kong G, Ranheim EA, Finn R, Rajagoplan A, Li S, Zhou Y, Yu M, **Damnernsawad A**, Roose J, Coon J, Wen R, Wang D, Zhang J. *Nras*$^{Q61R/+}$ and *Kras*$^{-/-}$ cooperate to downregulate Rasgrp1 and promote lympho-myeloid leukemia in early T-cell precursors. Blood 2021;137(23):3259-3271.	12, 1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Lim SL, **Damnernsawad A**, Shyamsunder P, Chng WJ, Han BC, Xu L, Pan J, Pravin DP, Alkan S, Tyner JW, Koeffler HP. Proteolysis targeting chimeric molecules as therapy for multiple myeloma: efficacy, biomarker and drug combinations. Haematologica. 2019;104(6):1209-1220.	12, 1	2019
	Edwards DK, Watanabe-Smith K, Rofelty A, **Damnernsawad A**, Laderas T, Lamble A, Lind EF, Kaempf A, Mori M, Rosenberg M, d'Almeida A, Loriaux M, McWeeney SK, Tyner JW. CSF1R inhibitors exhibit antitumor activity in acute myeloid leukemia by blocking paracrine signals from support cells. Blood. 133(6): 588-599.	12, 1	2019

Current Teaching Load

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
4.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
6.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
4.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
6.	SCBI 698	Thesis	12 (0-36-0)
7.	SCBI 798	Thesis	36 (0-108-0)

15. Name Lecturer Dr.Pahol Kosiyachinda

Education

Degree	Degree Name	Institute	Year
Ph.D.	Plant Pathology	Cornell University, U.S.A.	2002
B.Sc.	Biology	Mahidol University	1996

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Environmental biology and toxicology
2. Host-microbe interactions
3. Natural products

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Harnvoravongchai P, Singwisut R, Ounjai P, Aroonnual A, **Kosiyachinda P**, Janvilisri T, Chankham haengdecha S. Isolation and characterization of thermophilic cellulose and hemicellulose degrading bacterium, *Thermoanaero-bacterium* sp. R63 from tropical dry deciduous forest soil. PLoS One. 2020;15(7):e0236518.	12, 1	2020
	Palasai A, Senarat S, Kettratad J, Jiraungkoorskul W, **Kosiyachinda P**, Poolprasert P. Ovarian structure and oogenesis with emphasis on nuclear characteristics in the shortfin neoscopelid, *Neoscopelus microchir* Matsubara, 1943. Adv. Sci J. 2020;20(1):105-123.	13, 0.8	2020

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Other types of academic work	Wiwatanaratanabutr I, **Kosiyachinda P**, Boonplueang R, Onparn N. (2019) Essential Biology 1. (Mader S. and Windelspecht M., Trans.) Bangkok, Thailand. McGrawHill.	8, 1	2019
	Wiwatanaratanabutr I, **Kosiyachinda P**, Boonplueang R, Onparn N. (2019) Essential Biology 2. (Mader S. and Windelspecht M., Trans.) Bangkok, Thailand. McGrawHill.	8, 1	2019

Current Teaching Load

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
4.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
4.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
6.	SCBI 698	Thesis	12 (0-36-0)
7.	SCBI 798	Thesis	36 (0-108-0)

16. Name Lecturer Dr.Siravit Sitprija

Education

Degree	Degree Name	Institute	Year
Ph.D.	Physiology	Chulalongkorn University	2003
M.Sc.	Industrial Microbiology	Chulalongkorn University	1999
B.Sc.	Biology	Kasetsart University	1996

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Animal physiology

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Chaiyabutr N, **Sitprija S**, Chanpongsang S, Thammacharoen S. Exogenous bovine somatotropin and mist-fan cooling synergistically promote the intramammary glucose transport for lactose synthesis in crossbred Holstein cows in the tropics. Vet World, 2021;14(5):1247-1257.	12, 1	2021
	Kumkate S, Chanhome L, Thiangtrongjit T, Noiphrom J, Laoungboa P, Khow O, Vasaruchapong T, **Sitprija S**, Chaiyabutr N, Reamtong O. Venomics and cellular toxicity of Thai pit vipers (*Trimeresurus macrops* and *T. hageni*). Toxins. 2020;12(1):54.	12, 1	2020
	Sitprija V, **Sitprija S**. Marine toxins and nephrotoxicity: Mechanism of injury. Toxicon. 2019;161:44-49.	12, 1	2019

Current Teaching Load

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
4.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
4.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
6.	SCBI 698	Thesis	12 (0-36-0)
7.	SCBI 798	Thesis	36 (0-108-0)

17. Name Lecturer Dr.Thitinun Sumranwanich

Education

Degree	Degree Name	Institute	Year
Ph.D.	Horticulture	Pennsylvania State University, U.S.A.	2003
B.Sc.	Biology	Chiang Mai University	1996

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Metal toxicity on plants and microorganisms
2. Phytoremediation
3. Renewable energy from plant biomass and agricultural wastes

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Leartsiwawinyu W, **Sumranwanich T.** Screening of Plant Growth Promoting Rhizobacteria from Cadmium Contaminated Area. In the 6th EnvironmentAsia Virtual International Conference; 20-21 December 2021, Bangkok, Thailand. p. 85-93.	11/0.4	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Trakankul P, Viwatsukseree W, Pongtharangkul T, **Sumranwanich T,** Saengwilai PJ. Effects of Plant Growth-promoting Rhizobacteria Co-inoculated with Mycorrhizal Fungi on Growth and Development of Thai Jasmine Rice-Khao Dawk Mali 105 Variety. In the 33rd Annual Meeting of the Thai Society for Biotechnology and International Conference (TSB 2021); 25 November 2021; Bangkok, Thailand, Online format. p. 132-7.	11/0.4	2021
	Kampeera J, Pasakon P, Karuwan C, Arunrut N, Sappat A, Sirithammajak S, Dechokiattawan N, **Sumranwanich T**, Chaivisuthangkura P, Ounjai P, Chankhamhaengdecha S, Wisitsoraat A, Tuantranont A, Kiatpathomchai W. Point-of-care rapid detection of *Vibrio parahaemolyticus* in seafood using loop-mediated isothermal amplification and graphene-based screen-printed electrochemical sensor. Biosens Bioelectron, 2019;132:271-278.	12, 1	2019
	Samranwanich T, Boonthaworn K, Singhakaew S, Ounjai P. Time-restricted inquiry-based learning promotes student active engagement in undergraduate zoology laboratory. J Microbiol Biol Educ. 2019;20(1): 20.1.2	12, 1	2019

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Amosu E, Ounjai P, **Sumranwanich T**, Harnvoravongchai P, Chankhamhaengdecha S. Isolation of potential lignin-degrading bacteria from tropical forest soils in Thailand. In The 31st Annual Meeting of the Thai Society for Biotechnology and International Conference (TSB2019); 2019 November 10-12; Duangjitt Resort & Spa, Patong Beach, Phuket, Thailand. p.371-387.	11, 0.4	2019

Current Teaching Load

1.	SCBI 584	Plant Responses to Environmental Stresses	3 (3-0-6)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
5.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
7.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 584	Plant Responses to Environmental Stresses	3 (3-0-6)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
5.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
7.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)
8.	SCBI 698	Thesis	12 (0-36-0)
9.	SCBI 798	Thesis	36 (0-108-0)

18. Name Lecturer Dr.Toemthip Poolpak

Education

Degree	Degree Name	Institute	Year
Ph.D.	Biology	Mahidol University	2008
M.Sc.	Environmental Biology	Mahidol University	2002
B.Sc.	Biology	Mahidol University	1998

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Bacterial biodegradation of organic chemicals contamination
2. Plant-bacteria partnership for organic and inorganic pollutants bioremediation

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Choden D, Pokethitiyook P, **Poolpak T**, Kruatrachue M. Phytoremediation of soil co-contaminated with zinc and crude oil using *Ocimum gratissimum* (L.) in association with *Pseudomonas putida* MU02. Int J Phytoremediation. 2021;23:181-189.	12, 1	2021
	Yang KM, **Poolpak T**, Pokethitiyook P, Kruatrachue M, Saengwilai P. Responses of oil degrader enzyme activities, metabolism and degradation kinetics to bean root exudates during rhizoremediation of crude oil contaminated soil. Int. J. Phytoremediation. 2021: 1-9.	12, 1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Jampasri K, Pokethitiyook P, Poolpak T, Kruatrachue M, **Ounjai P**, Kumsopa A. Bacteria-assisted phytoremediation of fuel oil and lead co-contaminated soil in the salt-stressed condition by *Chromolaena odorata* and *Micrococcus luteus*. Int J Phytoremediation. 2020;22(3):322-333.	12, 1	2020

Current Teaching Load

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
4.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
6.	SCBI 624	Hazardous Waste Management	3 (3-0-6)
7.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
4.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
6.	SCBI 619	Environmental Science	3 (3-0-6)
7.	SCBI 654	Environmental Pollution and Hazardous Waste	3 (2-3-5)
8.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)
9.	SCBI 591	Water and Wastewater Treatment	3 (3-0-6)
10.	SCBI 592	Environmental Analysis Laboratory	1 (0-3-1)
11.	SCBI 698	Thesis	12 (0-36-0)
12.	SCBI 798	Thesis	36 (0-108-0)

19. Name Lecturer Dr. Warut Siriwut

Education

Degree	Degree Name	Institute	Year
Ph.D.	Biological Science	Chulalongkorn University	2016
B.Sc.	Biology	Khon Kaen University	2010

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Molecular phylogeny and evolutionary systematics
2. Invertebrate zoology and biogeography

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Macharoenboon K, **Siriwut W**, Jeratthitikul E. A review of the taxonomy of spiny-backed orb-weaving spiders of the subfamily Gasteracanthinae (Araneae, Araneidae) in Thailand. ZooKeys. 2021;1032:17-62.	12, 1	2021
	Siriwut W, Jeratthitikul E, Panha S, Chanabun R, Ngor PB, Sutcharit C. Evidence of cryptic diversity in freshwater *Macrobrachium* prawns from Indochinese riverine systems revealed by DNA barcode, species delimitation and phylogenetic approaches. PLoS ONE. 2021;16(6):e0252546.	12, 1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Sutcharit C, Thach P, Chhuoy S, Ngor PB, Jeratthitikul E, **Siriwut W**, Srisonchai R, Ng TH, Pholyotha A, Jirapatrasilp P, Panha S. Annotated checklist of the land snail fauna from southern Cambodia (Mollusca, Gastropoda). ZooKeys. 2020;948:1-46.	12, 1	2020
	Siriwut W, Jeratthitikul E, Panha S, Chanabun R, Sutcharit C. Molecular phylogeny and species delimitation of the freshwater prawn Macrobrachium pilimanus species group, with descriptions of three new species from Thailand. PeerJ. 2020;8:e10137.	12, 1	2020
	Srisonchai R, Likhitrakarn N, Sutcharit C, Jeratthitikul E, **Siriwut W**, Thrach P, Chhuoy S, Ngor PB, Panha S. A new micropolydesmoid millipede of the genus *Eutrichodesmus* silvestri, 1910 from Cambodia, with a key to species in mainland southeast Asia (Diplopoda, Polydesmida, Haplodesmidae). ZooKeys. 2020;996:59-91.	12, 1	2020
	Ng TH, Jeratthitikul E, Sutcharit C, Chhuoy S, Pin K, Pholyotha A, **Siriwut W**, Srisonchai R, Hogan, ZS, Ngor PB Annotated checklist of freshwater molluscs from the largest freshwater lake in Southeast Asia. ZooKeys. 2020;958:107-141.	12, 1	2020
	Inkhavilay K, Sutcharit C, Bantaowong U, Chanabun R, **Siriwut W**, Srisonchai R, Polyotha A, Jirapatrasilp P, Panha S. Annotated checklist of the terrestrial molluscs from Laos (Gastropoda: Neritimorpha, Caenogastropoda and Heterobranchia). ZooKeys. 2019;834: 1-166.	12, 1	2019

Current Teaching Load

1.	SCBI 511	Biogeography	3 (3-0-6)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
5.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
7.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 505	Population and Community Ecology	3 (2-3-5)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
5.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
7.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)
8.	SCBI 589	Economic Invertrebrates	4 (3-0-6)
9.	SCBI 698	Thesis	12 (0-36-0)
10.	SCBI 798	Thesis	36 (0-108-0)

Full time instructors

1. Name Assistant. Professor. Dr.Intanon Kolasartsanee

Education

Degree	Degree Name	Institute	Year
Ph.D.	Biology	Mahidol University	2014
B.Sc.	Biology	Mahidol University	2006

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Ecology
2. Wildlife conservation

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Kolasartsanee I. Diversity and habitat use of terrestrial mammals in the area proposed for water resource development in Khao Soi Dao Wildlife Sanctuary, Thailand. Environ Nat Resour J. 2021;19(3):186-194.	12, 1	2021
	Kolasartsanee I, Srikosamatara S. Evidence of pileated gibbons *Hylobates pileatus* recolonization in an area proposed for water resource development in Khao Soi Dao Wildlife Sanctuary, Thailand. Asian Primates J. 2019;8(1):41-44.	12, 1	2019

Current Teaching Load

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
4.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
6.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
2.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
4.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
5.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
6.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)

2. Name Lecturer Dr.Nuttaphon Onparn

Education

Degree	Degree Name	Institute	Year
Ph.D.	Biological Sciences	Exeter University, U.K.	2004
M.Sc.	Ecosystem Analysis	University of Warwick, And Governance, U.K.	1999
B.Sc.	Biology	Mahidol University	1996

Faculty/Institute/College

Department of Biology, Faculty of Science, Mahidol University

Interesting Research Topics or Specialties

1. Evolution
2. Population genetics
3. Ecology

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years *

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Promsing S, Pokethitiyook P, Kruatrachuea M, Ounjai P, Meetam M, Onparn N, Kumsopa A. Rhizoremediation of fuel oil by *Vetiveria zizanioides* in association with *Kocuria* sp. no. MU1 and *Micrococcus luteus* WN01. Sci Asia 2021;47:96-105.	12, 1	2021

Current Teaching Load

1. SCBI 520 Climate Change Biology 3 (3-0-6)
2. SCBI 603 Research Seminar in Environmental Biology 1 (1-0-2)
3. SCBI 604 Advanced Research Seminar in Environmental Biology 1 (1-0-2)

4.	SCBI 611	Research Techniques in Environmental Biology	2 (0-6-3)
5.	SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 613	Current Topics in Enviromental Biology	2 (2-0-4)
7.	SCBI 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

1.	SCBI 520	Climate Change Biology	3 (3-0-6)
2.	SCBI 603	Research Seminar in Environmental Biology	1 (1-0-2)
3.	SCBI 604	Advanced Research Seminar in Environmental Biology	1 (1-0-2)
4.	SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)
5.	SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)
6.	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)
7.	SCBI 588	Bioresources and Environmental Management	3 (3-0-6)

APPENDIX C

Curriculum Mapping

Appendix C

Curriculum Mapping

● Major responsibility ○ Minor responsibility

	1. Morality and Ethics		2. Knowledge		3. Intellectual skills		4. Interpersonal relationship and Responsibility		5. Mathematical Analytical thinking	
	1	2	1	2	1	2	1	2	1	2
(1) Required Courses										
SCBI 655 Research Techniques in Bioresources and Environmental Biology	●	●	●	●	●	●	●	●	●	●
SCBI 619 Environmental Science	●	●	●	●	●	○	●	●	●	●
SCBI 650 Research Seminar in Bioresources and Environmental Biology	●	●	●	●	●	●	●	●	●	●
SCBI 651 Advanced Research Seminar in Bioresources and Environmental Biology	●	●	●	●	●	●	●	●	●	●
SCID 518 Generic Skills in Science Research	●	●	○	○	●	●	●	●	●	●
SCBI 588 Bioresources and Environmental Management	●	●	●	●	●	○	●	●	●	●
(2) Elective Courses										
SCBI 505 Population and Community Ecology	●	●	●	●	●	○	●	●	●	●
SCBI 519 Microbial Ecology	●	●	●	●	●	○	●	●	●	●

	1. Morality and Ethics		2. Knowledge		3. Intellectual skills		4. Interpersonal relationship and Responsibility		5. Mathematical Analytical thinking	
	1	2	1	2	1	2	1	2	1	2
SCBI 520 Climate Change Biology	●	●	●	●	●	O	●	●	●	●
SCBI 525 Molecular Approaches to Problems in Environmental Biology	●	●	●	●	●	●	●	●	●	●
SCBI 584 Plant Responses to Environmental Stresses	●	●	●	●	●	O	●	●	●	●
SCBI 652 Special Problems in Environmental Biology	●	●	●	●	●	●	●	●	●	●
SCBI 653 Current Topics in Bioresources and Environmental Biology	●	●	●	●	●	●	●	●	●	●
SCBI 654 Environmental Pollution and Hazardous Waste	●	●	●	●	●	●	●	●	●	●
SCID 500 Cell and Molecular Biology	●	●	●	●	●	O	●	●	●	●
SCID 507 Microscopic Techniques	●	●	●	●	●	●	●	●	●	●
SCID 509 Separation Techniques	●	●	●	●	●	●	●	●	●	●
SCID 511 Gene Technology	●	●	●	●	●	●	●	●	●	●
SCID 516 Biostatistics	●	●	●	●	●	●	●	●	●	●
SCBI 589 Economic Invertebrates	●	●	●	●	●	●	●	●	●	●
SCBI 590 Innovation and Commercialization of Bioresources	●	●	O	●	●	●	●	●	●	●
SCBI 591 Water and Wastewater Treatment	●	●	●	●	●	O	●	●	●	●

	1. Morality and Ethics		2. Knowledge		3. Intellectual skills		4. Interpersonal relationship and Responsibility		5. Mathematical Analytical thinking	
	1	2	1	2	1	2	1	2	1	2
SCBI 592 Environmental Analysis Laboratory	●	●	●	●	●	O	●	●	●	●
SCBI 593 Environmental Impact Assessment	●	●	●	●	●	O	●	●	●	●
(3) Thesis										
SCBI 698 Thesis	●	●	●	●	●	●	●	●	●	●
SCBI 798 Thesis	●	●	●	●	●	●	●	●	●	●

● for major responsibility and O for minor responsibility.

Table of Relationship between Learning Outcomes of the Program and Core Value of Mahidol University

Learning Outcomes (as stated in Section 4, item no. 2)	Core value of Mahidol University
1. Morality and Ethics	
1.1 Be honest, responsible, respect and follow social and organization rules and regulations	Integrity, Altruism
1.2 Follow academic and professional ethics	Mastery, Integrity
2. Knowledge	
2.1 Explain important concepts and theories in bioresources and environmental biology	Mastery, Determination, Originality
2.2 Connect knowledge in bioresources and environmental biology with current situations	Mastery, Determination, Originality
3. Intellectual Skills	
3.1 Have critical and knowledge integration skills toward problem solving	Determination, Mastery, Originality
3.2 Be able to conduct research for new findings, solutions, applications or innovations in the field of bioresources and environmental biology	Determination, Mastery, Originality
4. Interpersonal Relationship and responsibility	
4.1 Be responsible	Determination, Altruism
4.2 Have good human relations, be a good leader and team member	Harmony, Altruism, Leadership
5. Mathematical Analytical Thinking, Communication Skills, and Information	
5.1 Perform appropriate numerical analyses and communicate methods	Mastery, Determination, Originality

Learning Outcomes (as stated in Section 4, item no. 2)	Core value of Mahidol University
5. 2 Properly apply the information technology for literature searching, communication, discussion, and presentation	Determination, Mastery

APPENDIX D

Program Learning Outcome

Appendix D

Program Learning Outcomes

Table 1: Comparison between before and after revised objective of the program

Objective of the Program ...	Revised Objective of the Program ...
Demonstrate moral and ethical conduct for research and scientific professions	Have self- integrity, self- descipline, and morality, and follow ethical conduct for academic and scientific profession
Understand concepts and theories in environmental biology and able to apply the knowledge that is appropriate and updated	Explain important concepts and theories in bioresources and environmental biology, connect to current situations, and have life-long learning attitude
Perform literature search, analyses, integration, and syntheses of information in environmental biology using proper and appropriate research methods	Provide critical assessment and integrate knowledge toward problem solving and conduct research to generate new knowledge, solution and innovation in bioresources and environmental biology
Exhibit responsibility, positive attitude, teamworking skills, and leadership	Demonstrate responsibility, good human relations, and effective team working skills as a leader as well as a team member
Use information technology appropriately and effectively for information gathering, statistical analysis, data presentation, and communication with various audiences	Perform numerical analyses, communicate effectively and appropriately, and apply information technology in data collection, assessment, presentation, and communication

Table 2: Relationship between objective of the program and program learning outcome

Objective of the Program	Program Learning Outcome*						
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
Have self- integrity, self- descipline, and morality, and follow ethical conduct for academic and scientific profession	✓						
Explain important concepts and theories in bioresources and environmental biology, connect to current situations, and have life-long learning attitude		✓					
Provide critical assessment and integrate knowledge toward problem solving and conduct research to generate new knowledge, solution and innovation in bioresources and environmental biology			✓	✓			✓
Demonstrate responsibility, good human relations, and effective team working skills as a leader as well as a team member					✓		
Perform numerical analyses, communicate effectively and appropriately, and apply information technology in data collection, assessment, presentation, and communication						✓	✓

* **PLO1** Demonstrate self-integrity, self-discipline, morality, and ethical conduct for academic and scientific profession

PLO2 Explain important concepts and theories in bioresources and environmental biology in connection to the current situations

PLO3 Have critical and knowledge integration skills toward problem solving

PLO4 Conduct research to find new knowledge, solution and innovation

PLO5 Demonstrate responsibility, good human relations, and effective team working skills

PLO6 Apply effective and appropriate numerical analyses, communication techniques, and information technology for data collection, analyses and presentation

PLO7 Present and publish research findings

Table 3: Standard domains of learning outcome and Program Learning Outcomes

Domains	Standard Learning Outcomes (TQF)	Program Learning Outcomes						
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
Morality and Ethics	1.1 Be honest, responsible, respect and follow social and organization rules and regulations	/						
	1.2 Follow research and professional ethics	/						
Knowledge	2.1 Explain important concepts and theories in bioresources and environmental biology		/					
	2.2 Connect knowledge in bioresources and environmental biology with current situations		/					
Intellectual Development	3.1 Have critical and knowledge integration skills toward problem solving			/				
	3.2 Be able to conduct research for new findings, solutions, applications or innovations in the field of bioresources and environmental biology				/			/

Domains	Standard Learning Outcomes (TQF)	Program Learning Outcomes						
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
Interpersonal Relationship and Responsibility	4.1 Be responsible					/		
	4.2 Have good human relations, be a good leader and team member					/		
Math, Communication, IT Skills	5.1 Perform appropriate numerical analyses and communicate methods						/	
	5.2 Properly apply the information technology for literature searching, communication, discussion, and presentation							/

Table 4: Learning and Assessment Strategies for Program Learning Outcomes Evaluation

PLOs	Learning Method	Assessment
Demonstrate self- integrity, self-descipline, morality, and ethical conduct for academic and scientific profession	1. Specify times of turning in assignments 2. Conduct thesis with international standard, no plagiarism, under ethical and professional regulations 3. Follow rules and regulations of laboratories	1. Being on-time for classes 2. Being on-time for assignment due dates 3. Strictly follow and regulations of laboratories 4. Strictly follow standard professional regulations, no plagiarism, and no falsification of research results
Explain important concepts and theories in bioresources and environmental biology in connection to the current situations	1. Lecture, group discussion, presentations, and laboratory practices 2. Specialist invitation for short lectures and seminars 3. Self-study and literature review	1. Examinations, presentations, laboratory practice performance and outputs, and reports

PLOs	Learning Method	Assessment
Conduct research to find new knowledge, solution and innovation	1. Courses with laboratory practices, and seminars 2. Thesis	1. Presentations, discussion, laboratory reports. 2. Research proposal, progress presentation, thesis defense examination
Demonstrate responsibility, good human relations, and effective team working skills	1. Students are assigned to work in groups such as during laboratory practice or mini projects. 2. Group discussions. 3. Involvement in extracurricular activities.	1. Presentations on project outcomes and outputs as well as their behaviors during group working.
Apply effective and appropriate numerical analyses, communication techniques, and information technology for data collection, analyses and presentation	1. Assignments that require the use of information technology for research 2. Statistical analysis in laboratory classes	1. Using appropriate information technology for literature search in reports, presentations, and thesis 2. Thesis progress reports, thesis defense and writing
Present and publish research findings	1. Seminar courses 2. Special seminars 3. Discussion with advisors 4. Special workshops	1. publication record

Table 5: Relationship between Courses of the Program and Program Learning Outcomes

Code	Name	Credits	PLOs						
			1	2	3	4	5	6	7
(1) Required Courses									
SCBI 655	Research Techniques in Bioresources and Environmental Biology	3 (0-9-3)	P	P	P	P	P	P	P
SCBI 619	Environmental Science	3 (3-0-6)	P	P	P	R	P	P	P
SCBI 650	Research Seminar in Bioresources and Environmental Biology	1 (1-0-2)	P	P	P	P	P	P	P
SCBI 651	Advanced Research Seminar in Bioresources and Environmental Biology	1 (1-0-2)	P	P	M	P	P	M	M
SCID 518	Generic Skills in Science Research	1 (1-0-2)	P	P	P	P	P	P	P

Code	Name	Credits	PLOs						
			1	2	3	4	5	6	7
SCBI 588	Bioresources and Environmental Management	3 (3-0-6)	P	P	P	R	P	P	P
(2) Elective Courses									
SCBI 505	Population and Community Ecology	3 (2-3-5)	P	P	P	R	P	P	P
SCBI 519	Microbial Ecology	3 (3-0-6)	P	P	P	R	P	P	P
SCBI 520	Climate Change Biology	3 (3-0-6)	P	P	P	R	P	P	P
SCBI 525	Molecular Approaches to Problems in Environmental Biology	2 (2-0-4)	P	P	P	R	P	P	P
SCBI 584	Plant Responses to Environmental Stresses	3 (3-0-6)	P	P	P	R	P	P	P
SCBI 652	Special Problems in Environmental Biology	2 (0-6-3)	P	P	P	P	P	P	P
SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)	P	P	P	R	P	P	P
SCBI 654	Environmental Pollution and Hazardous Waste	3 (2-3-5)	P	P	P	R	P	P	P
SCID 500	Cell and Molecular Biology	3 (3-0-6)	P	P	P	P	P	R	R
SCID 507	Microscopic Techniques	1 (0-2-1)	P	P	P	P	P	R	R
SCID 509	Separation Techniques	1 (0-2-1)	P	P	P	P	P	R	R
SCID 511	Gene Technology	1 (0-2-1)	P	P	P	P	P	R	R
SCID 516	Biostatistics	3 (3-0-6)	P	R	P	P	P	R	R
SCBI 589	Economic Invertebrates	3 (3-0-6)	P	P	P	R	R	P	R
SCBI 590	Innovation and Commercialization of Bioresources	3 (3-0-6)	P	P	P	R	P	P	P
SCBI 591	Water and Wastewater Treatment	3 (3-0-6)	P	P	P	R	P	P	P
SCBI 592	Environmental Analysis Laboratory	1 (0-3-1)	P	P	P	P	P	P	P
SCBI 593	Environmental Impact Assessment	3 (3-0-6)	P	P	P	R	P	P	P
(3) Thesis									
SCBI 698	Thesis	12 (0-36-0)	M	M	M	M	M	M	M
SCBI 798	Thesis	36 (0-108-0)	M	M	M	M	M	M	M

I = ELO is introduced & assessed R = ELO is reinforced & assessed

P = ELO is practiced & assessed M = Level of Mastery is assessed

Table 6: The expectation of learning outcomes at the end of the academic year

Plan A1

Year of study	Knowledge, skills, and any other expected learning outcomes
1st	Students demonstrate self-integrity, self-descipline, morality, and ethical conduct for academic and scientific profession in all academic, research, and extracurricular activities. Students acquire laboratory and research skills from coursework and thesis and apply effective and appropriate numerical analyses, communication techniques, and information technology for data collection, analyses and presentation in the process. As the students are engaged in formulating thesis proposal, they are able to explain important concepts and theories in bioresources and environmental biology in connection to the current situations and have critical and knowledge integration skills toward problem solving. Students demonstrate responsibility, good human relations, and effective team working skills in all academic, research, and extracurricular activities.
2nd	Students strictly adhere to self-integrity, self-descipline, morality, and ethical conduct for academic and scientific profession in all academic, research, and extracurricular activities. Students are able to explain important concepts and theories in bioresources and environmental biology to the mastery level in some areas of expertise and exhibit master-level critical and knowledge integration skills toward problem solving. Students demonstrate mastery in laboratory and research skills and expertly apply appropriate numerical analyses, communication techniques, and information technology for data collection, analyses and presentation. Students demonstrate responsibility, good human relations, and effective team working skills in all academic, research, and extracurricular activities.

Plan A2

Year of study	Knowledge, skills, and any other expected learning outcomes
1st	Students demonstrate self-integrity, self-discipline, morality, and ethical conduct for academic and scientific profession in all academic, research, and extracurricular activities. Students are able to explain important concepts and theories in bioresources and environmental biology in connection to the current situations and have critical and knowledge integration skills toward problem solving. Students acquire laboratory and research skills from coursework and thesis and apply effective and appropriate numerical analyses, communication techniques, and information technology for data collection, analyses and presentation in the process. Students demonstrate responsibility, good human relations, and effective team working skills in all academic, research, and extracurricular activities.
2nd	Students strictly adhere to self-integrity, self-discipline, morality, and ethical conduct for academic and scientific profession in all academic, research, and extracurricular activities. Students are able to explain important concepts and theories in bioresources and environmental biology to the mastery level in some areas of expertise and exhibit master-level critical and knowledge integration skills toward problem solving. Students demonstrate mastery in laboratory and research skills and expertly apply appropriate numerical analyses, communication techniques, and information technology for data collection, analyses and presentation. Students demonstrate responsibility, good human relations, and effective team working skills in all academic, research, and extracurricular activities.

APPENDIX E

The Revised of Program

Appendix E

(For only Revised Curriculum)

The Revision of Master of Science Program

in Bioresources and Environmental Biology Volume B.E. 2566

Faculty of Science

and Faculty of Graduate Studies, Mahidol University

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1. **The Curriculum was approved by the Office of the Higher Education Commission on** .....

2. **The Mahidol University Council has approved this revised curriculum in the 586 meeting on November 16, 2022**

3. **The revised curriculum will be effective with student class 2023 from the 1 semester of the Academic Year 2023 onwards.**

4. **Rationale of revision**

4.1 The curriculum is revised to be in accordance with Thai Qualification Framework for Higher Education B.E. 2552.

4.2 The curriculum is revised to update the courses and curriculum structure according to the program learning outcomes that reflect the current needs of stakeholders.

5. **The details of the revision**

5.1 Change of program's name from "Environmental Biology" to "Bioresources and Environmental Biology."

Old

Curriculum Name

Thai : หลักสูตรวิทยาศาสตรมหาบัณฑิต
สาขาวิชาชีววิทยาสภาวะแวดล้อม (หลักสูตรนานาชาติ)

English : Master of Science Program in Environmental Biology
(International Program)

Name of Degree and Major

Full Title Thai : วิทยาศาสตรมหาบัณฑิต (ชีววิทยาสภาวะแวดล้อม)

Abbreviation Thai : วท.ม. (ชีววิทยาสภาวะแวดล้อม)

Full Title English : Master of Science (Environmental Biology)

Abbreviation English : M.Sc. (Environmental Biology)

New

Curriculum Name

Thai : หลักสูตรวิทยาศาสตรมหาบัณฑิต
สาขาวิชาทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม (หลักสูตรนานาชาติ)

English : Master of Science Program in Bioresources and Environmental Biology (International Program)

Name of Degree and Major

Full Title Thai : วิทยาศาสตรมหาบัณฑิต (ทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม)

Abbreviation Thai : วท.ม. (ทรัพยากรชีวภาพและชีววิทยาสภาวะแวดล้อม)

Full Title English : Master of Science (Bioresources and Environmental Biology)

Abbreviation English : M.Sc. (Bioresources and Environmental Biology)

5.2 Addition of Plan A2.

5.3 Change of required and elective courses in the program structure.

5.4 Request for offering new courses:

1) Required Courses **Credits (lecture – practice – self-study)**

SCBI 588 Bioresources and Environmental Management **3 (3-0-6)**

วทชว ๕๘๘ ทรัพยากรชีวภาพและการจัดการสิ่งแวดล้อม

Theory and management strategies for efficient use of bioresources; environmental factors that affect bioresources; measures to minimize adverse effects on bioresources and environment; laws and legislations related to bioresources and environment; concepts of sustainable utilization of bioresources, sustainable development, and environmental ethics

ทฤษฎีและกลยุทธ์การจัดการเพื่อให้เกิดการใช้ประโยชน์จากทรัพยากรชีวภาพอย่างมีประสิทธิภาพ ปัจจัยทางสิ่งแวดล้อมที่ส่งผลต่อทรัพยากรชีวภาพ มาตรการในการควบคุมผลเสียต่อทรัพยากรชีวภาพและสิ่งแวดล้อม กฎหมายและข้อบังคับเกี่ยวกับทรัพยากรชีวภาพและสิ่งแวดล้อม หลักการการใช้ทรัพยากรชีวภาพอย่างยั่งยืน การพัฒนาอย่างยั่งยืนและจริยธรรมทางสิ่งแวดล้อม

2) Elective Courses **Credits (lecture – practice – self-study)**

SCBI 593 Environmental Impact Assessment 3 (3-0-6)

วทชว ๕๙๓ การประเมินผลกระทบสิ่งแวดล้อม

Importance and historical development of environmental impact assessment (EIA) and environmental health impact assessment (EHIA); legislation and governmental processes; the conceptual process; various case studies encompassing the terrestrial ecosystem, aquatic ecosystem, water resource, noise, vibration, air quality, solid waste, hazardous waste, and health and social impact assessment; report preparation

ความสำคัญและประวัติการพัฒนาของการประเมินผลกระทบสิ่งแวดล้อม และการประเมินผลกระทบสิ่งแวดล้อมและสุขภาพ ข้อบังคับและขั้นตอนของภาครัฐ หลักการและขั้นตอนการประเมิน กรณีศึกษาที่หลากหลายทั้งทางด้านระบบนิเวศวิทยาบนบก ระบบนิเวศวิทยาในน้ำ ทรัพยากรทางน้ำ เสียง การสั่นสะเทือน คุณภาพอากาศ ขยะ ของเสียอันตราย และการประเมินทางสุขภาพและสังคม การเตรียมรายงาน

SCBI 591 Water and Wastewater Treatment 3 (3-0-6)

วทชว ๕๙๑ การบำบัดน้ำและน้ำเสีย

Water resource; Types of water and wastewater; water pollution; water supply production process, wastewater treatment process, biological water treatment process, chemical water treatment process; physical water treatment process; water quality standard, water quality index; water treatment technology; technical visit of water treatment plant

ทรัพยากรน้ำ ประเภทของแหล่งน้ำและน้ำเสีย มลภาวะทางน้ำ กระบวนการผลิตน้ำประปา กระบวนการบำบัดน้ำเสีย กระบวนการบำบัดน้ำทางชีวภาพ กระบวนการบำบัดน้ำทางเคมี กระบวนการบำบัดน้ำกายภาพ มาตรฐานคุณภาพน้ำ ตัวชี้วัดคุณภาพน้ำ การปฏิบัติการณ์เทคโนโลยีการบำบัดน้ำ และการดูงานโรงบำบัดน้ำ

SCBI 592 Environmental Analysis Laboratory 1 (0-3-1)

วทชว ๕๙๒ ปฏิบัติการวิเคราะห์ทางสิ่งแวดล้อม

Analysis skill and proper analytical equipment handling; analytical uncertainty assessment; experimental data recording; sample preservation and storage; analysis of water and soil characteristics; acidity and alkalinity; solid; dissolved oxygen; biological oxygen demand; chemical oxygen demand; nitrogen, phosphorus, and metal; general microbiology analysis; sterile technique; microscopic observation; bacterial and protozoa staining;

microorganism enumeration and growth monitoring; coliform and *E. coli* bacteria determination; biosafety and biosecurity concepts

ทักษะการวิเคราะห์และการใช้เครื่องมือที่ถูกต้อง การประเมินความแปรปรวนในการวิเคราะห์ การบันทึกข้อมูลการทดลอง การเก็บและการรักษาสภาพตัวอย่าง การตรวจวิเคราะห์ลักษณะสมบัติของน้ำและดิน ความเป็นกรดด่าง ของแข็ง ปริมาณออกซิเจนละลายน้ำ ปริมาณความต้องการออกซิเจนทางชีวเคมีและเคมี ปริมาณไนโตรเจน ฟอสฟอรัส และธาตุโลหะ การวิเคราะห์ทางจุลินทรีย์วิทยาทั่วไป เทคนิคปลอดเชื้อ การใช้กล้องจุลทรรศน์ การย้อมสีแบคทีเรียและโพรโทซัว การนับจำนวน การวัดการเจริญเติบโตของจุลินทรีย์ การวิเคราะห์ปริมาณโคลิฟอร์มและอีโคไลแบคทีเรีย หลักการความปลอดภัยทางชีวนิรภัยและชีวนิรภัย

SCBI 589 Economic Invertebrates 3 (3-0-6)

วทชว ๕๘๙ สัตว์ไม่มีกระดูกสันหลังทางเศรษฐกิจ

Integrative knowledge on species diversity, ecology, behavior and life history to recruit and apply invertebrate animals for economic proposes; cultivation system condition and rearing process; recent approaches and obstacles in invertebrate utilization; future trends of utilization and trading

การประยุกต์ใช้และพัฒนาสัตว์ไม่มีกระดูกสันหลังร่วมกับข้อมูลทางความหลากหลายทางชนิดพันธุ์ นิเวศวิทยา พฤติกรรมและวงชีวิตเพื่อเพิ่มมูลค่าทางเศรษฐกิจ วิธีการเพาะเลี้ยงและขยายพันธุ์สัตว์ไม่มีกระดูกสันหลังในปัจจุบัน ปัจจัยที่ส่งผลต่อการพัฒนาด้านความหลากหลายของสัตว์ไม่มีกระดูกสันหลัง แนวโน้มการนำไปใช้ประโยชน์ในเชิงพาณิชย์และการประเมินมูลค่าทางการตลาด

SCBI 590 Innovation and Commercialization of Bioresources 3 (3-0-6)

วทชว ๕๙๐ นวัตกรรมและการใช้ประโยชน์ทางการค้าจากทรัพยากรชีวภาพ

Process of innovation; design thinking; product differentiation; business model canvas and technology evaluation canvas; marketing strategy; entrepreneurship skills; intellectual property and laws related to bioresource utilization

กระบวนการของนวัตกรรม; การคิดเชิงออกแบบ; การสร้างความแตกต่างให้กับผลิตภัณฑ์; แผนโมเดลธุรกิจ และแผนการประเมินความพร้อมทางเทคโนโลยี; กลยุทธการตลาด; ทักษะผู้ประกอบการ; ทรัพย์สินทางปัญญาและกฎหมายที่เกี่ยวข้องการใช้ประโยชน์จากทรัพยากรชีวภาพ

3) Thesis **Credits (lecture – practice – self-study)**

SCBI 798 Thesis **36 (0-108-0)**

วทชว ๗๙๘ วิทยานิพนธ์

Research proposal’s design for problem solving and quality development, which reflects new discovery; research process, compilation, proposed dissertation, research ethics, dissertation for academic publishing; ethics in academic publishing

การออกแบบโครงการวิจัยเพื่อการแก้ปัญหาและพัฒนาคุณภาพที่แสดงถึงสิ่งที่ได้ค้นพบใหม่ การดำเนินการวิจัย การเรียบเรียงวิทยานิพนธ์ การเสนอวิทยานิพนธ์ จริยธรรมในการวิจัย การเรียบเรียงวิทยานิพนธ์เพื่อเผยแพร่เชิงวิชาการ จริยธรรมในการเผยแพร่ผลงานวิชาการ

The Comparison Table of Courses between the Current Program and Revising Program

Plan A1

Courses of the Current Program	Courses of the Revising Program	Remarks
Not offered	**Thesis (36 Credits)** SCBI 798 Thesis 36 (0-108-0)	Opening new course

Plan A2

Courses of the Current Program	Courses of the Revising Program	Remarks
Required Courses (14 Credits)	**Required Courses (12 Credits)**	
SCBI 524 Environmental Biology and Management 3 (3-0-6)	-	Removed
	SCBI 588 Bioresources and Environmental Management 3 (3-0-6)	Opening new course
SCBI 645 Research Seminar in Environmental Biology 1 (1-0-2)	SCBI 650 Research Seminar in Bioresources and Environmental Biology 1 (1-0-2)	Change title and Change code
SCBI 646 Advanced Research Seminar in Environmental Biology 1 (1-0-2)	SCBI 651 Advanced Research Seminar in Bioresources and Environmental Biology 1 (1-0-2)	Change title and Change code
SCBI 611 Research Techniques in Environmental Biology 2 (0-6-3)	SCBI 655 Research Techniques in Bioresources and Environmental Biology 3 (0-9-3)	Change title Increased credits
SCBI 619 Environmental Science 3 (3-0-6)	SCBI 619 Environmental Science 3 (3-0-6)	Not change
SCID 500 Cell and Molecular Biology 3 (3-0-6)	-	Removed from Required courses
SCID 518 Generic Skills in Science Research 1 (1-0-2)	SCID 518 Generic Skills in Science Research 1 (1-0-2)	Not change

Courses of the Current Program			Courses of the Revising Program			Remarks
Elective Courses (10 Credits)			**Elective Courses (12 Credits)**			
SCBI 505	Population and Community Ecology	3 (2-3-5)	SCBI 505	Population and Community Ecology	3 (2-3-5)	Not change
SCBI 511	Biogeography	3 (3-0-6)		-		Removed
SCBI 518	Environmental Aquatic Toxicology	3 (3-0-6)		-		Removed
SCBI 519	Microbial Ecology	3 (3-0-6)	SCBI 519	Microbial Ecology	3 (3-0-6)	Not change
SCBI 520	Climate Change Biology	3 (3-0-6)	SCBI 520	Climate Change Biology	3 (3-0-6)	Not change
SCBI 525	Molecular Approaches to Problems in Environmental Biology	2 (2-0-4)	SCBI 525	Molecular Approaches to Problems in Environmental Biology	2 (2-0-4)	Not change
SCBI 530	Conservation Biology	3 (3-0-6)		-		Removed
SCBI 539	Techniques in Ecology and Conservation	2 (0-6-3)		-		Removed
SCBI 577	Host-Microbe Interactions	3 (3-0-6)		-		Removed
SCBI 584	Plant Responses to Environmental Stresses	3 (3-0-6)	SCBI 584	Plant Responses to Environmental Stresses	3 (3-0-6)	Not change
SCBI 612	Special Problems in Environmental Biology	2 (0-6-3)	SCBI 652	Special Problems in Bioresources and Environmental Biology	2 (0-6-3)	Change title and Change code
SCBI 613	Current Topics in Environmental Biology	2 (2-0-4)	SCBI 653	Current Topics in Bioresources and Environmental Biology	2 (2-0-4)	Change title and Change code
SCBI 621	Environmental Pollution	3 (2-3-5)	SCBI 654	Environmental Pollution and Hazardous Waste	3 (2-3-5)	Change title and Change code

Courses of the Current Program			Courses of the Revising Program			Remarks
SCBI 624	Hazardous Waste Management	3 (3-0-6)		-		Removed
SCBI 625	Bioremediation			-		Removed
			SCID 500	Cell and Molecular Biology	3 (3-0-6)	Added to elective courses
SCID 507	Microscopic Techniques	1 (0-2-1)	SCID 507	Microscopic Techniques	1 (0-2-1)	Not change
SCID 509	Separation Techniques	1 (0-2-1)	SCID 509	Separation Techniques	1 (0-2-1)	Not change
SCID 511	Gene Technology	1 (0-2-1)	SCID 511	Gene Technology	1 (0-2-1)	Not change
SCID 516	Biostatistics	3 (3-0-6)	SCID 516	Biostatistics	3 (3-0-6)	Not change
SCID 505	Systematic Ecology and Disease Emergence	3 (3-0-6)		-		Removed
			SCBI 589	Economic Invertebrates	3 (3-0-6)	Opening new course
			SCBI 590	Innovation and Commercialization of Bioresources	3 (3-0-6)	Opening new course
			SCBI 591	Water and Wastewater Treatment	3 (3-0-6)	Opening new course
			SCBI 592	Environmental Analysis Laboratory	1 (0-3-1)	Opening new course
			SCBI 593	Environmental Impact Assessment	3 (3-0-6)	Opening new course
Thesis (12 Credits)			**Thesis (12 Credits)**			
SCBI 698	Thesis	12 (0-36-0)	SCBI 698	Thesis	12 (0-36-0)	Not change

The Comparison Table of Instructors between the Current Program and Revising Program

Instructors of the Current Program	Instructors of the Revising Program
Full time instructors of the curriculum	
Assoc. Prof. Dr.Arunee Ahantarig	Assoc. Prof. Dr.Arunee Ahantarig
Assoc. Prof. Dr.Surang Chankhamhaengdecha	Assoc. Prof. Dr.Surang Chankhamhaengdecha
Asst. Prof. Dr.Chalita Kongrit	Asst. Prof. Dr.Chalita Kongrit*
Asst. Prof. Dr.Ekgachai Jeratthitikul	Asst. Prof. Dr.Ekgachai Jeratthitikul
Asst. Prof. Dr.Jenjit Khudamrongsawat	Asst. Prof. Dr.Jenjit Khudamrongsawat
Asst. Prof. Dr.Metha Meetam	Asst. Prof. Dr.Metha Meetam*
Asst. Prof. Dr.Parinda Thayanukul	Asst. Prof. Dr.Parinda Thayanukul
Asst. Prof. Dr.Patompong Saengwilai	Asst. Prof. Dr.Patompong Saengwilai
Asst. Prof. Dr.Phurt Harnvoravongchai	Asst. Prof. Dr.Phurt Harnvoravongchai
Asst. Prof. Dr.Prinpida Sonthiphand	Asst. Prof. Dr.Prinpida Sonthiphand*
Asst. Prof. Dr.Puey Ounjai	Asst. Prof. Dr.Puey Ounjai*
Asst. Prof. Dr.Supeecha Kumkate	Asst. Prof. Dr.Supeecha Kumkate
Asst. Prof. Dr.Wachareeporn Trinachartvanit	Asst. Prof. Dr.Wachareeporn Trinachartvanit
Lect. Dr.Alisa Damnernsawad	Lect. Dr. Alisa Damnernsawad
-	Lect. Dr.Pahol Kosiyachinda
Lect. Dr.Siravit Sitprija	Lect. Dr.Siravit Sitprija
Lect. Dr.Thitinun Sumranwanich	Lect. Dr.Thitinun Sumranwanich
-	Lect. Dr.Toemthip Poolpak
Lect. Dr.Warut Siriwut	Lect. Dr.Warut Siriwut
Assoc. Prof. Dr.Choowong Auesukaree	-
Assoc. Prof. Dr.Sompoad Srikosamatara	-
Lect. Dr.Nuttapon Onparn	-
Full time instructors	
Lect. Dr.Intanon Kolasartsanee	Lect. Dr.Intanon Kolasartsanee
	Lect. Dr.Nuttaphon Onparn
Assoc. Prof. Dr.Theeraporn Puntheeranurak	-
Lect. Dr.Pahol Kosiyachinda	-

*The Faculty in Charge of the Program

6. The Comparison Table of the Curriculum Structure between the Current Program and Revised Program Based on Criteria on Graduate Studies B.E. 2558 (set by the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation.)

Plan A1

Course Category	Credits		
	Criteria on Graduate Studies B.E. 2558	Curriculum Structure of the Current Program	Curriculum Structure of the Revised Program
1. Required courses	-	-	-
2. Elective courses	-	-	-
3. Thesis	36	-	36
Total credits (not less than)	**36**	**-**	**36**

Plan A2

Course Category	Credits		
	Criteria on Graduate Studies B.E. 2558	Curriculum Structure of the Current Program	Curriculum Structure of the Revised Program
1. Required courses	} Not less than 12	14	12
2. Elective courses		Not less than 10	Not less than 12
3. Thesis	Not less than 12	12	12
Total credits (not less than)	**36**	**36**	**36**