TQF 3 Course Specifications
Section 1 General Information

1. Course code and course title

Thai	
English	Freshwater Ecology and Conservation
2. Number of credits	4 (4-0-8) (Lecture/Lab/Self-study)
3. Program and type of subject	
3.1 Program	Undergraduate Degree (International Program)
3.2 Type of Subject	Required course for Ecology Module
4. Course Coordinator and Course Lecturer	
4.1 Course Coordinator	Dr Wayne Phillips
4.2 Course Lecturer	Dr Wayne Phillips
5. Trimester/ Year of Study	
5.1 Trimester	
5.2 Course Capacity	Approximately…25 .students
6. Pre-requisite	ICBI 262 Practical Field Ecology and Conservation
7. Co-requisites	ICBI 386 Practical Freshwater Ecology and Conservation ICBI 262 Practical Field Ecology and Conservation
8. Venue of Study	Mahidol University International College
9. Date of Latest Revision	29 March 2018

Section 2 Goals and Objectives

1. Course Goals

Upon successful completion of this course students should be able to describe and explain the significance of natural disturbance; human activities; and disruptive global climate change on the biology and ecology of freshwater ecosystems and resources. Students should be able to describe and explain the necessary steps, protocols, agreements, rules and regulations to protect and conserve our freshwater ecosystems for the physical health and mental wellbeing of human society.

2. Objectives of Course Development/Revision

2.1 Course Objectives

2.1.1 Define, describe and explain the significance of abiotic conditions on primary and secondary production in flowing and standing waters
2.1.2 Define, describe and explain the significance of biotic interactions that take place in flowing and standing waters
2.1.3 Evaluate the connections between the health of freshwater ecosystems and the health of human society
2.1.4 Evaluate the significance of global climate change on freshwater ecosystem health and survival
2.1.5 Evaluate methods and techniques for the restoration and conservation of freshwater habitats; ecosystems; and resources
2.1.6 Exercise intellectual curiosity, critical thinking and independent learning

2.2 Course-level Learning Outcomes: CLOs

By the end of the course, students will be able to (CLOs)

1. CLO 1 Possess knowledge in Freshwater Ecology and Conservation
2. CLO 2 Apply knowledge in Freshwater Ecology and Conservation
3. CLO 3 Comprehend qualitative, quantitative data and/or ideas
4. CLO 4 Draw meaningful conclusions from scientific data/materials (quantitative and qualitative)
5. CLO 5 Retrieve relevant scientific information independently
6. CLO 6 Demonstrate proficiency in oral communication of Freshwater Ecology and Conservation
7. CLO 7 Demonstrate proficiency in written communication of Freshwater Ecology and Conservation
8. CLO 8 Demonstrate accountability and responsibility
9. CLO 9 Able to set, plan and accomplish assigned project in a timely manner
10. CLO 10 Demonstrate systematic and logical thinking

Section 3 Course Management

1. Course Description

(Thai)

(English) Adaptations; behaviour; diversity; physiology; ecological roles; human activities; significance of global climate change; increasing competition for water resources; sustainable management; conservation measures

2. Credit hours per trimester

Lecture (Hour(s))	Laboratory/field trip/internship (Hour(s))	Self-study (Hour(s))
48	0	96

3. Number of hours that the lecturer provides individual counseling and guidance.

4 hours per week

Section 4 Development of Students' Learning Outcome

1. Short summary on the knowledge or skills that the course intends to develop in students (CLOs)

By the end of the course, students will be able to

CLO 1 Possess knowledge in Freshwater Ecology and Conservation
CLO 2 Apply knowledge in Freshwater Ecology and Conservation
CLO 3 Comprehend qualitative, quantitative data and/or ideas
CLO 4 Draw meaningful conclusions from scientific data/materials (quantitative and qualitative)
CLO 5 Retrieve relevant scientific information independently
CLO 6 Demonstrate proficiency in oral communication of Freshwater Ecology and Conservation
CLO 7 Demonstrate proficiency in written communication of Freshwater Ecology and Conservation
CLO 8 Demonstrate accountability and responsibility
CLO 9 Able to set, plan and accomplish assigned project in a timely manner
CLO 10 Demonstrate systematic and logical thinking

2. Teaching methods for developing the knowledge or skills specified in item 1 and evaluation methods of the course learning outcomes

CLO	Teaching methods	Evaluation Methods
CLO 1	Lecture; discussion; assignment	Assignment report; participation in discussions; written examination
CLO 2	Lecture; discussion; assignment	Assignment report; participation in discussions; written examination
CLO 3	Lecture; discussion; case study	Assignment report; participation in discussions; written examination
CLO 4	Lecture; discussion; case study	Assignment report; presentation; written examination
CLO 5	Lecture; demonstration; discussion	Assignment report; presentation; written examination
CLO 6	Lecture; discussion; case study	Participation in discussions; presentation
CLO 7	Lecture; discussion; case study	Assignment report; written examination
CLO 8	Discussion	Attendance
CLO 9	Lecture; discussion; case study	Assignment report
CLO 10	Lecture; discussion; case study	Assignment report; presentation

Section 5 Teaching and Evaluation Plans

1. Teaching plan

Week	Topic	Number of Hours		Teaching Activities/ Media	Lecturer
		Lecture Hours	Lab/Field Trip/Internship Hours		
1	Properties of water and its significance to the biota Water as a resource Recycling of key elements and the role of light in aquatic systems	8	-	Lecture; discussion; assignment	WNP
2	Global biodiversity of freshwater ecosystems Local; regional; global threats Sustainable use of water	4	-	Lecture; discussion; assignment	WNP
3 4 5	Headwater Streams Abiotic/biotic interactions Global climate change; and other human activities as threats to Headwater Streams Group Presentation	12	-	Lecture; discussion; assignment	WNP
6 7 8	High Order Streams and Flood plains Abiotic/biotic interactions Global climate change; and other human activities as threats to High Order Streams and Floodplains Group Presentation	12	-	Lecture; discussion; case study; assignment	WNP
9 10 11	Standing Waters Abiotic/biotic interactions Global climate change; and other human activities as threats to Standing Waters Group Presentation	12	-	Lecture; discussion; case study; assignment	WNP
12	Institutions; regulations and agreements for the protection and	4	-	Lecture; discussion; case study; assignment	WNP

	conservation of freshwater ecosystems and resources				
13	Submission of Assignment Report				

2. Plan for Assessing Course Learning Outcomes

2.1 Assessing and Evaluating Learning Achievement

a. Formative Assessment

Participation rubrics

Attendance rubrics

Discussion rubrics

b. Summative Assessment

(1) Tools and Percentage Weight in Assessment and Evaluation

Learning Outcomes	Assessment Methods	Assessment Ratio (Percentage)	
CLO 1	Assignment report	5	14
	Participation in discussions	5	
	Written examination	4	
CLO 2	Assignment report	3	11
	Participation in discussions	4	
	Written examination	4	
CLO 3	Assignment report	5	12
	Participation in discussions	3	
	Written examination	4	
CLO 4	Assignment report	5	19
	Written examination	4	
	Presentation	10	
CLO 5	Assignment report	3	13
	Presentation	8	
	Written examination	2	
CLO 6	Participation in discussions	6	16
	Presentation	10	
CLO 7	Assignment report	5	7
	Written examination	2	
CLO 8	Attendance	2	2
CLO 9	Assignment report	2	2
CLO 10	Assignment report	2	4
	Presentation	2	

	Total	100	100

(2) Grading System

100%-90%	A
89%-85%	B+
84%-80%	B
79%-75%	C+
74%-70%	C
69%-65%	D+
64%-60%	D
< 60%	F

(3) Re-examination (If course lecturer allows to have re-examination)

N/A - (Not applicable with MUIC)

3. Student Appeals

Students are able to submit appeals either in person or via email to course coordinator within 7 days of receiving the final grade.

Section 6 Teaching Materials and Resources

1. Textbooks and/or other documents/materials

Moss BR Ecology of Fresh Waters: A View for the Twenty-First Century. Wiley-Blackwell, 2011

Moss BR Ecology of Freshwaters: Earth's Bloodstream. Wiley-Blackwell, 5th ed., 2018

Giller and Malmqvist. The Biology of Streams and Rivers. OUP, 1999

Bronmark and Hansson. The biology of lakes and ponds. OUP 2017

Kalff and Downing. Limnology: Inland Water Ecosystems. Bibliogenica LLC, 2016

2. Recommended textbooks and/or other documents/materials

1) Scientific articles chosen from relevant databases

3. Other Resources (If any)

Lecture handouts

Section 7 Evaluation and Improvement of Course Management

1. Strategies for evaluating course effectiveness by students

1.1 Student feedback of instructors, teaching methods and materials, and course content through MUIC student evaluation forms

1.2 Written feedback submitted via Program Director

2. Strategies for evaluating teaching methods
   2.1 Evaluation of effectiveness based on student evaluation scores and comments
   2.2 Evaluation through peer observations by co-instructor or other Division faculty

3. Improvement of teaching methods
   3.1 Adjustments based on student feedback, personal observations, comments from peer observations and discussions with supervisor and/or other Division faculty in one-on-one and/or group meetings as specified by MUIC guidelines.
   3.2 Adjustments based on recommendations from peer-observation, co-instructor or other faculty members

4. Verification process for evaluating students' standard achievement outcomes in the course
   4.1 Verification through student performance on assessments based on MUIC/Division standards

5. Review and plan for improving the effectiveness of the course
   5.1 Course instructors (and coordinator/supervisor) will meet to discuss results of student evaluations and student performance based on learning outcomes in order to identify points for improvement
   5.2 Program instructors meet to discuss curriculum evaluation and improvement in the monthly Program meetings chaired by the Program Director

Appendix
Alignment between Courses and Program

Table 1 The relationship between course and Program Learning Outcomes (PLOs)

Course Name	Program Learning Outcomes (PLOs)					
Freshwater Ecology and Conservation	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
ICBI 385	R	R	R	R	-	R

Note: Indicate the level of CLOs by letter I, R, P or M. Using the information as shown in the Curriculum Mapping of TQF2

Table 2 The relationship between CLOs and PLOs

(Course code) ICBI 383	Program Learning Outcomes (PLOs)					
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
CLO 1	1.1					
CLO 2	1.2					
CLO 3		2.1				
CLO 4		2.2				
CLO 5		2.3				
CLO 6			3.1			
CLO 7			3.2			
CLO 8				4.2		
CLO 9				4.5		
CLO 10						6.3

Table 3 The description of PLOs and Sub Los of the course

PLOs	SubPLOs
PLO 1 Apply discipline-specific knowledge and technical skills in biological sciences	1.1 Possess knowledge in Freshwater Ecology and Conservation
	1.2 Apply knowledge in Freshwater Ecology and Conservation
PLO 2 Appraise scientific information critically	2.1 Comprehend qualitative, quantitative data and/or ideas
	2.2 Draw meaningful conclusions from scientific data/materials (quantitative and qualitative)
	2.3 Retrieve relevant scientific information independently
PLO 3 Demonstrate proficiency in oral and written communication of scientific concepts	3.1 Demonstrate proficiency in oral communication of Freshwater Ecology and Conservation
	3.2 Demonstrate proficiency in written communication of Freshwater Ecology and Conservation
PLO 4 Apply scientific integrity and professionalism	4.2 Demonstrate accountability and responsibility
	4.5 Able to set, plan and accomplish assigned project in a timely manner
PLO 6 Able to integrate different disciplines to formulate solutions for novel situations	6.3 Demonstrate systematic and logical thinking