**TQF 3 Course Specifications**

**Section 1 General Information**

1. Course code and course title

 Thai

 English Practical Freshwater Ecology and Conservation

2. Number of credits 2 (0-4-2) (Lecture/Lab/Self-study)

3. Program and type of subject

 3.1 Program Undergraduate Degree (International Program)

 3.2 Type of Subject Elective co-course for Ecology and Conservation 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 2

 5.2 Course Capacity Approximately…25 .students

6. Pre-requisite ICBI 101 or its equivalent

ICBI 262 Practical Field Ecology and Conservation

7. Co-requisites ICBI 385 Freshwater Ecology and Conservation

ICBI 262 Practical Field Ecology and Conservation

8. Venue of Study Mahidol University International College

9. Date of Latest Revision 01 April 2018

**Section 2 Goals and Objectives**

1. Course Goals

Upon successful completion of this course, students should be able to describe, explain, safely perform and record the results of methods and techniques to investigate biotic interactions and abiotic conditions of freshwater habitats and ecosystems to assess their health and resilience in the face of disruptive global climate change. Skills gained will allow students to contribute to long-term projects aimed at the restoration and rehabilitation of local flowing and standing waters.

2. Objectives of Course Development/Revision

 2.1 Course Objectives

2.1.1 Define, describe, explain and safely perform laboratory methods and techniques to investigate abiotic conditions of flowing and standing waters

2.1.2 Define, describe, explain and safely perform field methods and techniques to investigate biotic interactions in flowing and standing waters

2.1.3 Define, describe, explain and measure the impact of human activities on flowing and standing waters

2.1.4 Define, describe and explain the steps necessary to improve freshwater ecosystem resilience in the face of global climate change

2.1.5 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 Practical Freshwater Ecology and Conservation
2. CLO 2 Apply knowledge in Practical Freshwater Ecology and Conservation
3. CLO 3 Possess technical skills in Practical Freshwater Ecology and Conservation
4. CLO 4 Apply technical skills in Practical Freshwater Ecology and Conservation
5. CLO 5 Draw meaningful conclusions from scientific data/materials (quantitative and qualitative)
6. CLO 6 Demonstrate proficiency in oral communication of Practical Freshwater Ecology and Conservation
7. CLO 7 Demonstrate proficiency in written communication of Practical Freshwater Ecology and Conservation
8. CLO 8 Demonstrate accountability and responsibility
9. CLO 9 Apply concept of lab safety and field study safety
10. CLO 10 Able to set, plan and accomplish assigned project in a timely manner
11. CLO 11 Formulate a process for data acquisition
12. CLO 12 Demonstrate systematic and logical thinking

**Section 3 Course Management**

1. Course Description

(Thai)

(English) Laboratory procedures; field techniques; experimental design; communities; diversity indices; similarity indices; measuring abiotic conditions; assessing biotic interactions; headwater streams; floodplains; standing waters; evaluating anthropogenic impacts; restoration & rehabilitation; water resource conservation

2. Credit hours per trimester

|  |  |  |
| --- | --- | --- |
| Lecture(Hour(s)) | Laboratory/field trip/internship(Hour(s)) | Self-study(Hour(s)) |
| - | 24 | 48 |

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 Practical Freshwater Ecology and Conservation

CLO 2 Apply knowledge in Practical Freshwater Ecology and Conservation

CLO 3 Possess technical skills in Practical Freshwater Ecology and Conservation

CLO 4 Apply technical skills in Practical Freshwater Ecology and Conservation

CLO 5 Draw meaningful conclusions from scientific data/materials (quantitative and qualitative)

CLO 6 Demonstrate proficiency in oral communication of Practical Freshwater Ecology and Conservation

CLO 7 Demonstrate proficiency in written communication of Practical Freshwater Ecology and Conservation

CLO 8 Demonstrate accountability and responsibility

CLO 9 Apply concept of lab safety and field study safety

CLO 10 Able to set, plan and accomplish assigned project in a timely manner

CLO 11 Formulate a process for data acquisition

CLO 12 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 |  Discussion; laboratory; field study  | Laboratory report; field report; assignment report; participation in discussions |
| CLO 2 |  Discussion; laboratory; field study  | Laboratory report; field report; assignment report; participation in discussions |
| CLO 3 |  Discussion; demonstration; laboratory;field study | Laboratory report; field report; assignment report; participation in activities |
| CLO 4 |  Discussion; demonstration; laboratory;field study | Laboratory report; field report; assignment report; participation in activities |
| CLO 5 | Discussion; case study | Laboratory report; field report; assignment report; presentation |
| CLO 6  | Discussion; case study | Participation in discussions; presentation |
| CLO 7 | Discussion; case study | Laboratory report; field report; Assignment report |
| CLO 8 | Discussion | Attendance |
| CLO 9 | Discussion; case study | Laboratory report; field report; Assignment report |
| CLO 10 | Discussion; case study | Laboratory report; field report; Assignment report |
| CLO 11 | Discussion; case study | Laboratory report; field report; Assignment report |
| CLO 12 | Discussion, case study | Laboratory report; field report; 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/InternshipHours |  |
| 1 | Sampling in freshwater ecosystemsDefining the investigation:What parameters to measure?Practical considerationsProfiling sampling sites |  |  | Discussion; case study; field study; assignment | WNP |
| 23 | Water quality testingNutrientsTrace elementsPlastics |  |  | Discussion; laboratory; case study; field study; assignment | WNP |
| 456 | Headwater StreamsAssessing abiotic conditions & biotic interactionsSteps to sustainability |  |  | Discussion; laboratory; case study; field study; assignment | WNP |
| 789 | High Order Streams and FloodplainsAssessing abiotic conditions & biotic interactionsSteps to sustainability  |  |  | Discussion; laboratory; case study; field study; assignment | WNP |
| 101112 | Standing watersAssessing abiotic conditions & biotic interactionsSteps to sustainability  |  |  | Discussion; laboratory; case study; field study; assignment | WNP |
|  | Submission of Laboratory report; Field report and 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 | Laboratory report | 2 | 7 |
| Field report | 2 |
| Assignment report | 1 |
| Participation in discussions | 2 |
| CLO 2 | Laboratory report | 2 | 7 |
| Field report | 2 |
| Assignment report | 1 |
| Participation in discussions | 2 |
| CLO 3 | Laboratory report | 2 | 15 |
| Field report | 2 |
| Assignment report | 1 |
| Participation in activities | 10 |
| CLO 4 | Laboratory report | 2 | 20 |
| Field report | 2 |
| Assignment report | 1 |
| Participation in activities | 15 |
| CLO 5 | Laboratory report | 2 | 12 |
| Field report | 2 |
| Assignment report | 6 |
| Presentation | 2 |
| CLO 6 | Participation in discussions | 1 | 2 |
| Presentation | 1 |
| CLO 7 | Laboratory report | 2 | 8 |
| Field report | 2 |
| Assignment report | 4 |
| CLO 8 | Attendance | 5 | 5 |
| CLO 9 | Laboratory report | 2 | 5 |
| Field report | 2 |
| Assignment report | 1 |
| CLO 10 | Laboratory report | 2 | 5 |
| Field report | 2 |
| Assignment report | 1 |
| CLO 11 | Laboratory report | 2 | 5 |
| Field report | 2 |
| Assignment report | 1 |
| CLO 12 | Laboratory report | 2 | 9 |
| Field report | 2 |
| Assignment report | 3 |
| 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

Brower, Zar and von Ende. Field and Laboratory methods for general ecology. McGraw Hill, 1997.

Weltzel RG. Limnological analyses. Springer, 2000

Hauer and Lamberti (Eds). Methods in stream ecology Vol 1 Ecosystem Structure. Academic Press, 2017

Hauer and Lamberti (Eds). Methods in stream ecology Vol 2 Ecosystem Function. Academic Press, 2017

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 NamePractical Freshwater Ecology and Conservation | Program Learning Outcomes (PLOs) |
| PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 |
| ICBI 386 | 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 386 | 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  | 1.3 |  |  |  |  |  |
| CLO 4 | 1.4 |  |  |  |  |  |
| CLO 5 |  | 2.2 |  |  |  |  |
| CLO 6 |  |  | 3.1 |  |  |  |
| CLO 7 |  |  | 3.2 |  |  |  |
| CLO 8 |  |  |  | 4.2 |  |  |
| CLO 9 |  |  |  | 4.4 |  |  |
| CLO 10 |  |  |  | 4.5 |  |  |
| CLO 11 |  |  |  |  |  | 6.2 |
| CLO 12 |  |  |  |  |  | 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 Practical Freshwater Ecology and Conservation |
| 1.2 Apply knowledge in Practical Freshwater Ecology and Conservation |
| 1.3 Possess technical skills in Practical Freshwater Ecology and Conservation |
| 1.4 Apply technical skills in Practical Freshwater Ecology and Conservation |
| PLO 2 Appraise scientific information critically | 2.2 Draw meaningful conclusions from scientific data/materials (quantitative and qualitative) |
| PLO 3 Demonstrate proficiency in oral and written communication of scientific concepts | 3.1 Demonstrate proficiency in oral communication of Practical Freshwater Ecology and Conservation |
| 3.2 Demonstrate proficiency in written communication of Practical Freshwater Ecology and Conservation |
| PLO 4 Apply scientific integrity and professionalism | 4.2 Demonstrate accountability and responsibility |
| 4.4 Apply concept of lab safety and field study safety |
| 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 | 6.2 Formulate a process for data acquisition |
| 6.3 Demonstrate systematic and logical thinking |