

### Master of Science Program in Biotechnology (International Program)

M.Sc. (Biotechnology)

#### Philosophy:

Biotechnology is the science of utilizing living things to produce useful matter beneficial for human beings in agriculture, medicine and the environment. Thailand is a country which is rich in biodiversity so we should make full use of this advantage. This aim can be achieved by having highly qualified personnel in utilizing these living resources. It must be started from research and development, followed by production process and industrial application for commercial purposes. This Master Degree Program is intended to produce skillful graduates in biotechnology with various attributes. They can conduct in-depth research and apply biotechnology knowledge in several industries, for example, food industry, drugs, biomedical matter, energy, environment, etc. Additionally, they can be skilled in running businesses related to biotechnology applications.

#### Objectives:

1. To produce graduates with ample knowledge in multidisciplinary biotechnologies and sufficient skills as stipulated in the study plan such as research skills, application skills in applying biotechnology knowledge in industry for solving research problems and business management skills in biotechnology.
2. To promote and produce research studies in biotechnology with international standard to meet the demand of the country to serve the free education policy of the ASEAN community.

#### Qualifications of a prospective candidate:

1. Has at least a bachelor's degree in science, medical science, engineering or other related fields.
2. Has enough background or qualification to study in this program as approved by the program committee or the entrance exam committee.
3. Has other qualifications as stipulated by KMUTT's graduate study regulations BE 2547 No. 15
  - KMUTT will consider the suitability of an applicant through a written exam and/or an interview or any other measures as approved by the department or the faculty.
  - In the case of any applicant who is currently studying for a master's or a bachelor's degree, the application is considered completed when he/she submits necessary documents to the university within the deadline stated by the university.
  - A Master degree student cannot simultaneously study in more than one institute.

#### Professions after graduation:

1. Academics in biotechnology or bioscience in research institutes, and government and industrial sectors
2. Researchers in biotechnology in research institutes, government and industrial sectors
3. Biotechnology product analysts and designers
4. Entrepreneurs or biotechnology business owners
5. Project consultants in biotechnology business
6. Standard examiners of biotechnology related work such as ISO, GMP and HACCP

### Curriculum Components

#### Plan 1.2 Dissertation

Type 1 Biotechnology	36 Credits
Major Course	11 Credits
Elective Course	13 Credits
Dissertation	12 Credits
Type 2 Biopharmaceutical Biotechnology	36 Credits
Major Course	17 Credits
Elective Course	7 Credits
Dissertation	12 Credits

#### Plan 1.2 Dissertation

Major Course	11 Credits
Elective Course	1 Credits
Dissertation	24 Credits

#### Plan 2 Independent Study

Type 1 Biotechnology Practice School	39 Credits
Major Course	18 Credits
Elective Course	15 Credits
Dissertation	6 Credits
Type 2 Biotechnopreneur	37 Credits
Major Course	19 Credits
Elective Course	12 Credits
Dissertation	6 Credits

### COURSE STRUCTURE

#### Plan 1.2 Dissertation

##### Type 1 Biotechnology

##### First Year

##### First Semester

##### Credits

BIT 612 Cellular and Molecular Physiology	3(3-0-9)
BIT 631 Molecular Biotechnology	3(3-0-9)
BIT 651 Applied Computational Methods in Life Science	3(3-0-9)
Xxx xxx Elective Course 1	3(3-0-9)
Total	12(12-0-36)

### First Year

#### Second Semester

#### Credits

Xxx xxx Elective Course 2	3(3-0-9)
Xxx xxx Elective Course 3	3(3-0-9)
Xxx xxx Elective Course 4	3(3-0-9)
Xxx xxx Elective Course 5	1(1-0-3)
BIT 691 Seminar I	1(0-2-3)
Total	11(10-2-33)

### Second Year

#### First Semester

#### Credits

BIT 692 Seminar II	1(0-2-3)
BIT 697 Thesis	6(0-12-24)
Total	7(0-14-27)

### Second Year

#### Second Semester

#### Credits

BIT 697 Thesis	6(0-12-24)
Total	6(0-12-24)

### Type 2 Biopharmaceutical Biotechnology

#### First Year

#### First Semester

#### Credits

BIT 612 Cellular and Molecular Physiology	3(3-0-9)
BIT 631 Molecular Biotechnology	3(3-0-9)
BIT 651 Applied Computational Methods in Life Science	3(3-0-9)
BIT 671 Technical Bioprocess Systems	(3-0-9)
Total	12(12-0-36)

#### First Year

#### Second Semester

#### Credits

BIT 674 Bioprocessing of Biopharmaceuticals	3(3-0-9)*
Xxx xxx Elective Course 1	3(3-0-9)
Xxx xxx Elective Course 2	3(3-0-9)
BIT 687 Good Practice quality guidelines for biopharmaceutical Manufacturing	1(1-0-3)*
BIT 691 Seminar I	1(0-2-3)
Total	11(10-2-33)

### Second Year

#### First Semester

#### Credits

BIT 692 Seminar II	1(0-2-3)
BIT 697 Thesis	6(0-12-24)
Total	7(0-14-27)

**Second Year**

**Second Semester**

BIT 697 Thesis

**Credits**

6(0-12-24)

Total

6(0-12-24)

**Plan 1.2 Dissertation (Dissertation 24 Credits)**

**First Year**

**First Semester**

BIT 612 Cellular and Molecular Physiology

**Credits**

3(3-0-9)

BIT 631 Molecular Biotechnology

3(3-0-9)

BIT 651 Applied Computational Methods in Life Science

3(3-0-9)

BIT 691 Seminar I

1(0-2-3)

Total

10(9-2-30)

**First Year**

**Second Semester**

BIT 698 Thesis

**Credits**

5(0-10-20)

Xxx xxx Elective Course 1

1(1-0-3)

BIT 692 Seminar II

1(0-2-3)

Total

7(1-12-26)

**Second Year**

**First Semester**

BIT 698 Thesis

**Credits**

10(0-20-40)

Total

10(0-20-40)

**Second Year**

**Second Semester**

BIT 698 Thesis

**Credits**

9(0-18-36)

Total

9(0-18-36)

**Plan 2 Independent Study**

Type 1 Biotechnology Practice School

**First Year**

**First Semester**

BIT 612 Cellular and Molecular Physiology

**Credits**

3(3-0-9)

BIT 631 Molecular Biotechnology

3(3-0-9)

BIT 681 Business and Management of Biotechnology Enterprise

3(3-0-9)

BIT 671 Technical Bioprocess Systems

3(3-0-9)

Total

12(12-0-36)

### First Year

#### Second Semester

	<b>Credits</b>
Xxx xxx Elective Course 1	3 (3-0-9)
Xxx xxx Elective Course 2	3(3-0-9)
Xxx xxx Elective Course 3	3(3-0-9)
Xxx xxx Elective Course 4	3(3-0-9)
Xxx xxx Elective Course 5	3(3-0-9)
Total	15(15-0-45)

### Second Year

#### First Semester

	<b>Credits</b>
BIT 694 Research Project I	3 (0-6-12)
BIT 695 Research Project II	3 (0-6-12)
Total	6(0-12-24)

### Second Year

#### Second Semester

	<b>Credits</b>
BIT 690 Special Project Study	6(0-12-24)
Total	6(0-12-24)

### Type 2 Biotechnopreneur

#### First Year

#### First Semester

	<b>Credits</b>
BIT 631 Molecular Biotechnology	3(3-0-9)
BIT 612 Cellular and Molecular Physiology	3(3-0-9)
BIT 681 Business and Management of Biotechnology Enterprise	3(3-0-9)
BIT 671 Technical Bioprocess Systems	3(3-0-9)
Total	12(12-0-36)

#### First Year

#### Second Semester

	<b>Credits</b>
BIT 682 Biotechnology Enterprise Initiative	3(3-0-9)*
BIT 683 Marketing of Biotechnological Products	3(3-0-9)*
BIT 685 Ethical, Legal, and Regulatory Issues in Biotechnology	3(3-0-9)*
Xxx xxx Elective Course 1	3(3-0-9)
Total	12 (12-0-36)



**Second Year**

**First Semester**

BIT 694 Research Project I

**Credits**

3(0-6-12)

BIT 695 Research Project II

3(0-6-12)

BIT 691 Seminar I

1(0-2-3)

Total

7(0-14-27)

**Second Year**

**Second Semester**

BIT 690 Special Project Study

**Credits**

6(0-12-24)

Total

6 (0-12-24)