

## Master of Science Program in Bioinformatics and Systems Biology (International Program)

### M.Sc. (Bioinformatics and Systems Biology)

#### Philosophy:

This program was developed by integrating strong knowledge, ability, expertise, and skills of faculties and researchers of the School of Biotechnology and the School of Information Technology to balance system biology particularly Omics sciences including Genomics, Transcriptomics, Proteomics, and Metabolomics with computer science. Students are encouraged to study through integrating projects in which they learn in-depth theories together with strengthening practical skills. They have opportunities to be trained to solve actual problems nationally and internationally by experts in the laboratories or other institutes where bioinformatics and system biology are utilized. After graduation, the graduates are ready to join work clusters and research clusters where bioinformatics and system biology are needed to meet the demand for human resources. The graduates are skillful and can conduct research studies in the post-genomics era to develop biotechnology, agriculture and medical science. Nowadays bioinformatics and system biology get good responses from every sector of the industry therefore the scientists who are experts in this field are needed nationally and internationally.

#### Objectives:

1. To produce graduates who are knowledgeable in theories and practice in bioinformatics and system biology in order to design and create innovative systems for solving problems or discovering new body of knowledge in biology, medicine, pharmacy, agriculture, bioscience, etc.
2. To promote human resources development for government and private sectors focusing on appropriate use of bioinformatics and system biology.
3. To promote research work based on knowledge and expertise, or to create new body of knowledge in bioinformatics and/or system biology with a high standard to meet the urgent demand of the country and the world.

#### Qualifications of a prospective candidate:

1. The applicant must hold at least a bachelor's degree in science, medical science, chemical engineering, computer engineering, information technology or other related fields with a GPA higher than 2.75 or be approved by the program committee.
2. The qualifications of applicants for admission to all study plans are in accordance with the regulations of the King Mongkut's University of Technology Thonburi on Graduate Studies, B.E. 2562 (2019)



**Professions after graduation:**

1. Researchers/Academics in bioinformatics and system biology, computer, bioscience and medical science
2. Computer system analyst and designers in bioinformatics and/or system biology
3. Program/website developers in bioinformatics and/or system biology
4. Software managers in bioinformatics and/or system biology
5. Computer inspectors in bioinformatics and/or system biology

**Curriculum**

Total Program Credits            38 Credits

**Curriculum Components**

Plan 1.2 Dissertation

Major Course	17 Credits
Elective Course	9 Credits
Dissertation	12 Credits

Plan 2 Independent Study

Major Course	17 Credits
Elective Course	9 Credits
Independent Study	6 Credits
Training	6 Credits

**COURSE STRUCTURE**

**Plan 1.2 Dissertation**

**Foundation Course**

BIF 510 Microbiology and Biochemistry	3(3-0-9)
BIF 511 Programming Fundamentals	3(2-2-9)
BIF 521 Data Structures and Algorithms	3(3-0-9)



**First Year**

<b>First Semester</b>	<b>Credits</b>
BIF 512 Molecular Biology	3(3-0-9)
BIF 622 Experimental Techniques in Molecular Biology	3(2-2-9)
BIF 633 Data Mining for Bioinformatics	3(3-0-9)
BIF xxx Elective Course	3(3-0-9)
BIF 692 Seminar in Bioinformatics and Systems Biology I	1(0-2-3)
Total	13 (11-4-39)

**First Year**

<b>Second Semester</b>	<b>Credits</b>
BIF 612 Molecular Biochemistry	3(3-0-9)
BIF 621 Sequence Analysis and Annotation	3(3-0-9)
BIF xxx Elective Course	3(3-0-9)
BIF xxx Elective Course	3(3-0-9)
BIF 694 1 Seminar in Bioinformatics and Systems Biology II	1(0-2-3)
Total	13 (12-2-39)

**Second Year**

<b>First Semester</b>	<b>Credits</b>
BIF 698 Thesis	6 (0-12-24)
Total	6 (0-12-24)

**Second Year**

<b>Second Semester</b>	<b>Credits</b>
BIF 698 Thesis	6 (0-12-24)
Total	6 (0-12-24)

**Plan 2 Independent Study Credits : (Independent Study)**

**Foundation Course**

BIF 510 Microbiology and Biochemistry	3(3-0-9)
BIF 511 Programming Fundamentals	3 (2-2-9)
BIF 521 Data Structures and Algorithms	3(3-0-9)



**First Year**

**First Semester**

**Credits**

BIF 512 Molecular Biology	3(3-0-9)
BIF 622 Experimental Techniques in Molecular Biology	3(2-2-9)
BIF 633 Data Mining for Bioinformatics	3(3-0-9)
BIF xxx Elective Course	3(3-0-9)
BIF 692 Seminar in Bioinformatics and Systems Biology I	1(0-2-3)
Total	13 (11-4-39)

**First Year**

**Second Semester**

**Credits**

BIF 612 Molecular Biochemistry	3(3-0-9)
BIF 621 Sequence Analysis and Annotation	3(3-0-9)
BIF xxx Elective Course	3(3-0-9)
BIF xxx Elective Course	3(3-0-9)
BIF 694 Seminar in Bioinformatics and Systems Biology II	1(0-2-3)
Total	13 (12-2-39)

**Second Year**

**First Semester**

**Credits**

BIF 696 Special Research Study	6(0-12-24)
Total	6 (0-12-24)

**Second Year**

**Second Semester**

**Credits**

BIF 699 Internship	6(0-12-24)
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