King Mongkut's University of Technology Thonburi

PhD in Bioinformatics & Systems Biology

Our international PhD programs are designed for students who desire focused training in the elements of biology, computer science, and information technology needed for a successful career in the exciting new discipline of Bioinformatics & Systems Biology. Students in our programs will receive comprehensive training in omics analysis, database design and management, software engineering and programming (including web-based development), simulation techniques and modeling, and data integration. Each student will apply their skills to a practical research project, where they will design and implement a solution to a real-world problem under the guidance of an experienced mentor.

PROGRAM LEARNING OUTCOMES

1) Synthesises new knowledge or creates innovative bioinformatics and systems biology approaches to solve biological problems

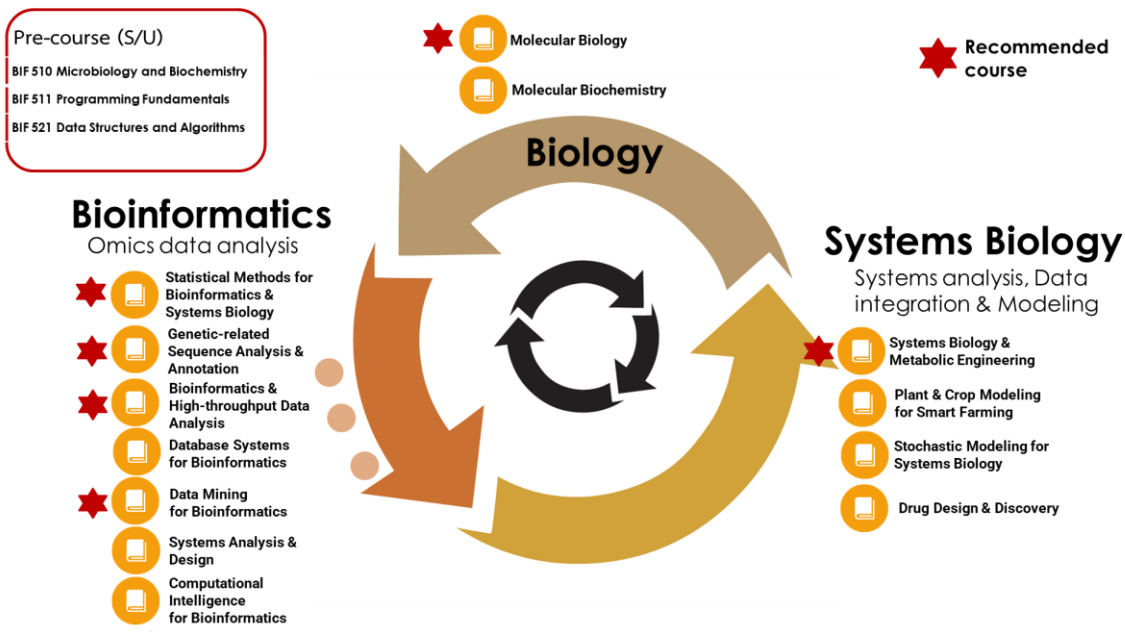
1A: Explains foundations of biology, computing statistics, and mathematics, relating to bioinformatics and systems biology.
1B: Analyses high-throughput biological data by integration of knowledge from different disciplines (biology, computing, statistics, and mathematics).
1C: Formulates research questions or hypotheses based on experience, expertise and literature with an understanding of the role of bioinformatics and systems biology in it.
1D: Synthesises new knowledge or creates innovation by designing effective bioinformatics and systems biology methods.

2) Communicates accurate information relating to bioinformatics and systems biology to diverse stakeholders in both oral and written formats through the publication standard

3) Coordinates team members from diverse disciplines to accomplish a common goal by sharing their own ideas, accepting others' opinion and leading a team

4) Values self and others with an understanding of ethical and social issues

CURRICULUM



PhD Track 1.1	PhD Track 2.1	PhD Track 2.2
3 Seminar Courses (S/U)	3 Seminar Courses (3 credits)	6 Seminar Courses (6 credits)
–	3 Elective Courses (9 credits)	6 Elective Courses (18 credits)
Dissertation (48 credits)	Dissertation (36 credits)	Dissertation (48 credits)
TOTAL = 48 credits		TOTAL = 72 credits

STUDY PLAN

STUDY @

Schools of Bioresources and Technology (Bangkhuntein)

Schools of Information Technology (Bangmod)

Criteria for applicants

- A bachelor's or master's degree in biological sciences, computer science, computer engineering, medical sciences, chemistry, mathematics, statistics, or related disciplines.
- (Required) English test score (TOEFL iBT≥42, IELTS≥4.0 or TETET≥3.0)

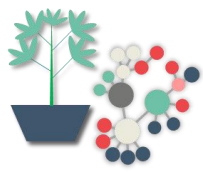
Bioinformatics and Systems Biology Research → Deep-tech Applications

Microbiome & Metagenomic Analysis

Metagenomics is the study of genetic materials (of microbiome) derived directly from environmental samples using high-throughput sequencing technology. Microbiome is important for human, animal and plant health, including maintaining environmental balance.

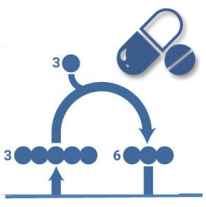
Medical Bioinformatics

Bioinformatics plays an important role to analyze biomedical data for studying human health and diseases e.g. cancer, Alzheimer, Autism, etc. The research leads identifications of biomarkers for diagnosis, prognosis and prediction of drug response.



Plant Systems Biology

Modeling a (crop) plant to predict the phenotype under the exposed condition. Omics data analysis, biological network reconstruction and mathematical modeling have been applied to study the dynamic regulation inside plant cells, aiming to precision science for tailor-made yield and quality of phyto-products.



Drug Design and Discovery

Bioinformatics & systems biology empower the research to gain insights into drug-receptor interactions, potential gene / protein targets, structures and functions of biomolecules, allowing the designing of new effective drugs and therapies while saving cost and time.

- Personalized medicine
- Personalized nutrigenomics
- *In silico* drug discovery and design
- Microbiome for heath & well-being
- Smart farming & breeding
- Synthetic biology for future food

International journal publications from our academic staffs & students

nature COMMUNICATIONS · nature microbiology · nature genetics · COMMUNICATIONS BIOLOGY · frontiers in Microbiology · SCIENTIFIC REPORTS · BMC Genomics · BMC Systems Biology · Nucleic Acids Research · Genes & Development · THE EMBO JOURNAL · PLoS one · Biotechnology Journal · Systems & Synthetic Biology · Nanobiotech · Medicine · AMERICAN SOCIETY FOR MICROBIOLOGY Journal of Bacteriology · OMICS A Journal of Integrative Biology · BIOTECHNOLOGY and BIOENGINEERING · processes · PeerJ · GCAT TACG GCAT · genes · FEMS MICROBIOLOGY LETTERS

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Updated in 2021 (Improved PhD curriculum in 2021)