2025 Summer Biotech Camp

Heartbeaters × NTU Center for Biotechnology

April 28, 2025

2025 Summer Biotech Core Techniques Practical Program

Organized by: Heartbeaters iGEM Team × NTU Center for Biotechnology × Taikang Foundation

Date: January 6, 2025

Program Purpose

In response to Taiwan's 2019 Curriculum Guidelines emphasizing competency-based education and the increasing importance of hands-on learning in international university admissions, the Heartbeaters iGEM Team, in collaboration with the National Taiwan University Center for Biotechnology (hereafter referred to as NTU Biotech Center) and the Taikang Foundation for Science and Technology Education (hereafter referred to as Taikang Foundation), has launched a program to bridge the gap between high school and university laboratory resources. This initiative aims to foster foundational education in biotechnology and inspire high school students to explore biochemistry more deeply.

The program is designed to align with the core experiments outlined in high school elective biology curricula—such as RNA extraction and PCR—while incorporating key AP Biology concepts. It serves as a comprehensive training module combining advanced theoretical understanding with practical laboratory techniques. Through a well-structured and rigorous experimental curriculum, students will gain proficiency in essential biochemical skills, expand their academic interests, and accumulate valuable hands-on experience. Looking forward, this program is envisioned as a launchpad for nurturing Taiwan’s future biomedical talents and enhancing the nation's presence on the global scientific stage.

Program Objectives

The Heartbeaters iGEM Team leads the program planning, with Taikang Foundation coordinating administration, and NTU Biotech Center providing instruction. This course is designed to equip students with foundational and advanced knowledge in biochemistry through a sequence of well-planned laboratory sessions. Students will undergo periodic assessments and a final evaluation to ensure steady progress toward defined learning goals. Those who successfully pass the final assessment will receive an official certificate from NTU Biotech Center, affirming their competency in biotechnology and biochemistry laboratory techniques—providing a strong foundation for future academic or professional pursuits in science and technology.

Target Participants

Students from Grade 9 to Grade 12 (equivalent to junior and senior high school levels).

Program Tuition

Tuition (including certification exam and lunch):

• Small class (10–12 students): NT$98,500 per student

• Group Discount: NT$2,500 off per student for groups of 3 registering together

To ensure the quality of instruction and account for pre-purchased laboratory materials, full tuition must be paid in advance. No refunds will be issued for mid-course withdrawal.

Students from economically disadvantaged backgrounds may be eligible for financial aid. Please contact us via email with supporting documents. An interview will be arranged to determine eligibility.

Course Schedule

Note: NTU Center for Biotechnology reserves the right to make minor adjustments based on student performance.

Session 1

No.	Date	Time	Content
1	6/30 (Mon)	13:00–16:00	Lab Safety Rules Molecular Models of Macromolecules
2	7/01 (Tue)	09:00–16:00	Basic Lab Techniques Molecular Biology Operations Plasmid DNA Preparation Restriction Enzyme Digestion Pipetting
3	7/02 (Wed)	09:00–16:00	PCR Agarose Gel Electrophoresis
4	7/03 (Thu)	09:00–16:00	Chromatography Microscopy Observing Cell Division
5	7/04 (Fri)	09:00–16:00	Fermentation Cell Culture Chlamydomonas reinhardtii
6	7/07 (Mon)	09:00–16:00	Protein Expression and Purification
7	7/08 (Tue)	09:00–16:00	Microbiology Applications Bacterial Colony Isolation Antibiotic Resistance Assay
8	7/09 (Wed)	09:00–16:00	Gram Staining Plant Reproduction & Growth Seed Sterilization & Germination
9	7/10 (Thu)	09:00–16:00	Anatomy Insect Diversity
10	7/11 (Fri)	09:00–16:00	Final Exam

Session 2

No.	Date	Time	Content
1	7/14 (Mon)	13:00–16:00	Lab Safety Rules Molecular Models of Macromolecules
2	7/15 (Tue)	09:00–16:00	Basic Lab Techniques Molecular Biology Operations Plasmid DNA Preparation Restriction Enzyme Digestion Pipetting

3	7/16 (Wed)	09:00–16:00	PCR Agarose Gel Electrophoresis
4	7/17 (Thu)	09:00–16:00	Chromatography Microscopy Observing Cell Division
5	7/18 (Fri)	09:00–16:00	Fermentation Cell Culture Chlamydomonas reinhardtii
6	7/21 (Mon)	09:00–16:00	Protein Expression and Purification
7	7/22 (Tue)	09:00–16:00	Microbiology Applications Bacterial Colony Isolation Antibiotic Resistance Assay
8	7/23 (Wed)	09:00–16:00	Gram Staining Plant Reproduction & Growth Seed Sterilization & Germination
9	7/24 (Thu)	09:00–16:00	Anatomy Insect Diversity
10	7/25 (Fri)	09:00–16:00	Final Exam

Faculty Profiles

- Chia-An Ho – Director

Professor, Dept. of Biochemical Science and Technology, NTU
Former Professor, Dept. of Chemistry, National Tsing Hua University
Ph.D., Cornell University, USA

- Shi-Kuo Chen – Deputy Director

Professor, Dept. of Life Science, NTU
Ph.D., University of Houston, USA

- Jin-Xuan Lin – Professor

Professor, Dept. of Biochemical Science and Technology, NTU
Postdoctoral Researcher, Dept. of Molecular Microbiology & Immunology, Brown University
Postdoctoral Researcher, Dept. of Plant Pathology, University of Florida

- Li-Guan Chang – Professor

Professor, Dept. of Biochemical Science and Technology, NTU
Former Assistant Professor, Dept. of Biomedical and Environmental Biology, Kaohsiung Medical University
Ph.D., Graduate Institute of Basic Medical Sciences, Chang Gung University

- Ren-Zhi Chen – Professor

Associate Professor, Graduate Institute of Biotechnology, NTU
Ph.D., Dept. of Plant Biology, University of California, Davis

- Kuo-Kai Hsu – Teaching Assistant

Teaching Assistant, NTU Center for Biotechnology

- Yung-Cheng Hsin – Teaching Assistant

Teaching Assistant, NTU Center for Biotechnology

Note: An additional 5–6 student teaching assistants will be assigned to support learning during the program.

Location & Contact Information

- Class Location: 3rd Floor Laboratory, College of Life Science, National Taiwan University
- Emergency Contact Number: +886-2-3366-5800