

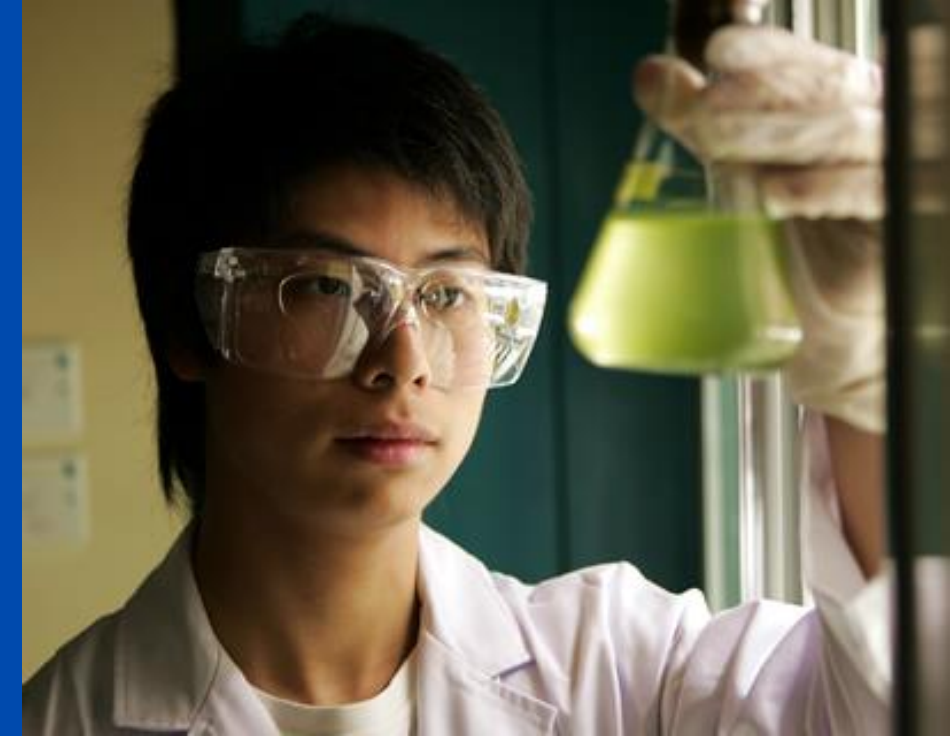
Bachelor of Science in

# Biotechnology & Business

A joint school program offered by  
The School of Science and The School of Business and Management



香港科技大學  
THE HONG KONG  
UNIVERSITY OF SCIENCE  
AND TECHNOLOGY



# **BSc in Biotechnology & Business**

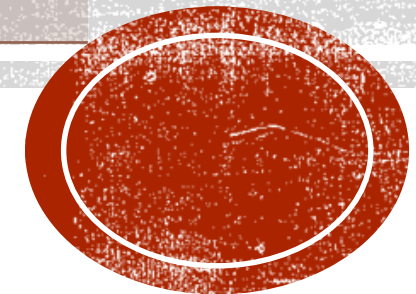
## **Program Directorship:**

### **Prof. Kenny Chung**

**Co-Director, BSc in Biotechnology and  
Business Program**  
Associate Professor, Division of Life Science

### **Prof. Ellick WONG**

**Co-Director, BSc in Biotechnology and  
Business Program**  
Professor, Department of Management



***Jointly developed by the School of Science and the  
School of Business and Management***





# International Rankings



QS World University  
Ranking 2022  
(No. 2 in Hong Kong)

Times Higher Education  
World University  
Ranking 2021

**# 34 in the World**



**# 56 in the World**



QS Asian University  
Rankings 2021  
(No. 2 in Hong Kong)

Times Higher Education  
Asia University  
Ranking 2021

**# 8 in Asia**



**# 8 in Asia**



QS Top 50 Under 50  
Rankings 2021  
(No. 1 in Hong Kong)

Times Higher Education  
Young University  
Ranking 2021

**# 2 Young University**



**# 3 Young University**

# QS World University Rankings 2021 (By Subject)



Chemistry  
(No. 1 in HK)

31

16



Materials  
Sciences  
(No. 1 in HK)

42

36



Mathematics  
(No. 1 in HK)

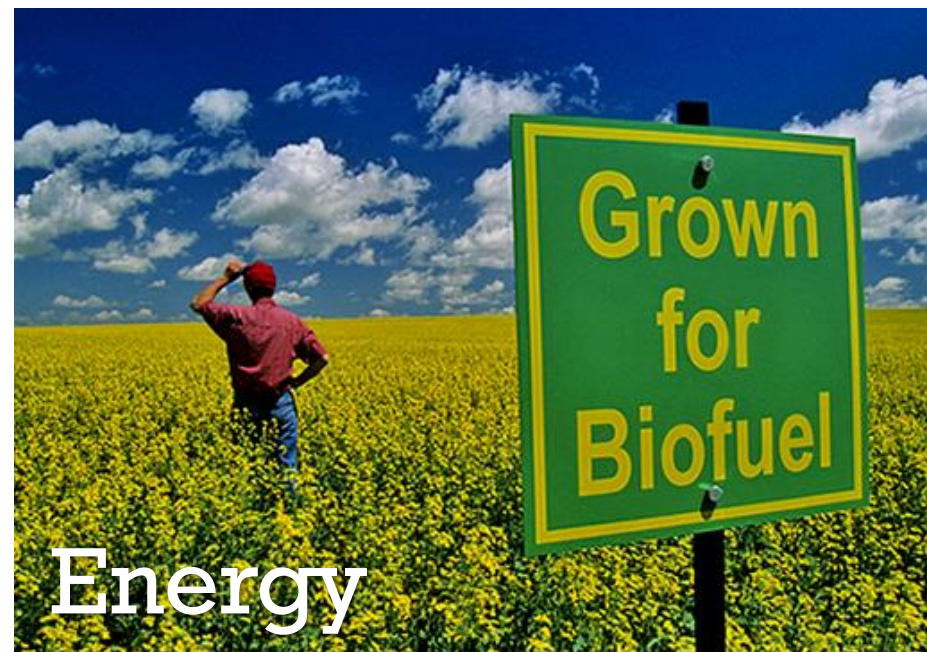


Natural Science  
(No. 1 in HK)

Statistics and Operational Research: #47 (No. 1 in HK)  
Physics and Astronomy: #37 (No. 1 in HK)  
Environmental Sciences: #41 (No. 1 in HK)

# Biotechnology

*The application of techniques and processes that utilize **biological systems** to provide innovative solutions to complex issues in many aspects of our daily life.*



Energy



Health



Food



Environment

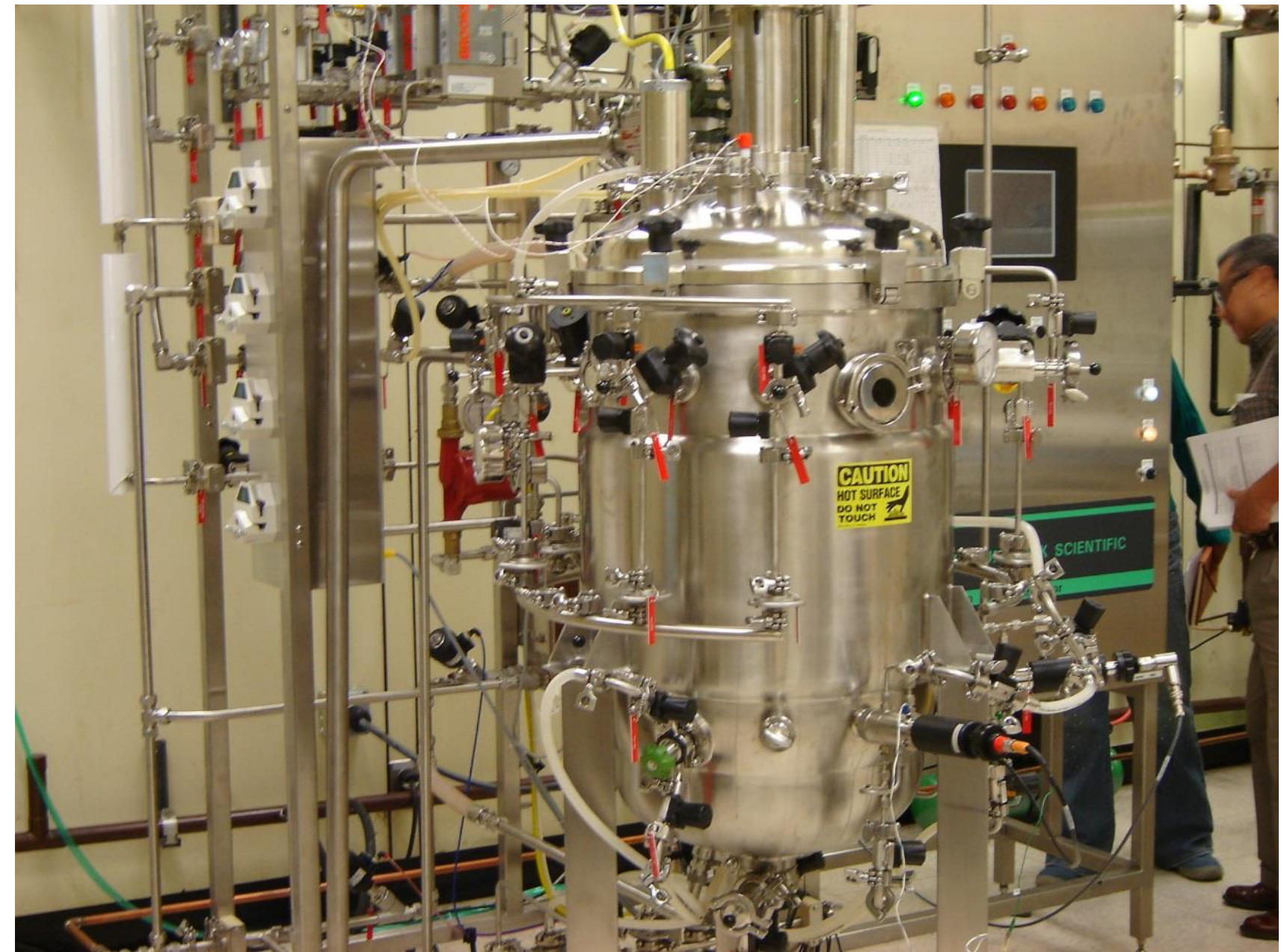




# *Genetic Engineering*



*Often involves the isolation, manipulation and reintroduction of **DNA** into **model organisms**, usually to express a **protein**.*





# Increase Food Production



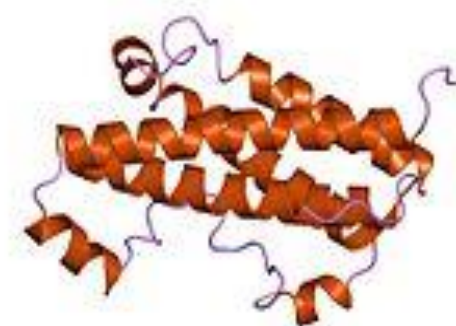
**Create *wheat with a minty aroma*** - a cheap and green way to keep the pests away



***AquAdvantage salmons*** grow year-round by overexpressing the gene controlling growth hormone production



An effective, nontoxic insect repellent. Particularly useful in keeping mosquitoes, ants, and flies away.



Human growth hormone is used to treat dwarfism, Turner syndrome, Prader-Willi syndrome and other disorders





# Bioremediation To Remove Contaminants

*Bioremediation: the use of organisms to remove contaminants in soil and groundwater*

*Contaminants:*

- *oil and other petroleum products*
- *solvents*
- *pesticides*



***Example: Pseudomonas putida MHF 7109 can be isolated from cow dung microbial consortia for the biodegradation of selected petroleum hydrocarbon compounds, such as benzene and toluene.***





# Human Whole-genome Sequencing To Identify The Cause Of Genetic Diseases

***James Watson's genome  
at a cost of USD 2M***

***J. Craig Venter had his  
genome published in  
PLOS Biology***

***Illumina's genome  
sequencing service costs  
USD 1,000 per genome***





# Biochip Likely To Dominate Medical Practice In The Coming Millennium

*Many genetic diseases are associated with SNPs*

*Researchers plan to compile SNP database over the next two years*

*Screening SNPs and comparing them to known database will allow doctors to screen for genes leading to genetic diseases*



In the future you can ask your doctor to check your genome for predisposition of genetic diseases

*SNP: single-nucleotide polymorphism, a single change in genetic code*





# **What is the scope of biotechnology business?**





# Examples of Biotechnology-related Industries



## **Alcohol Industry - USD 1161 Billion**

The production of fermented alcoholic drinks from starch containing raw materials has been practiced for centuries.



## **OPEC Revenue – USD 1027 Billion**

The petroleum industry's interest is now in biotechnology as an alternative technology to resolve the challenges and needs of this worldwide important sector.



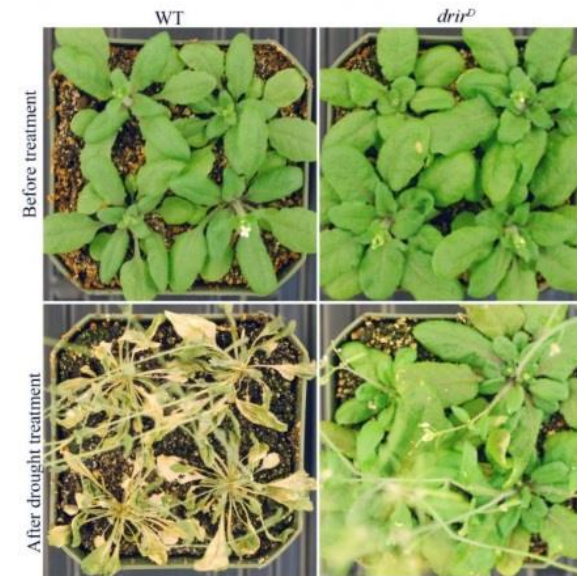
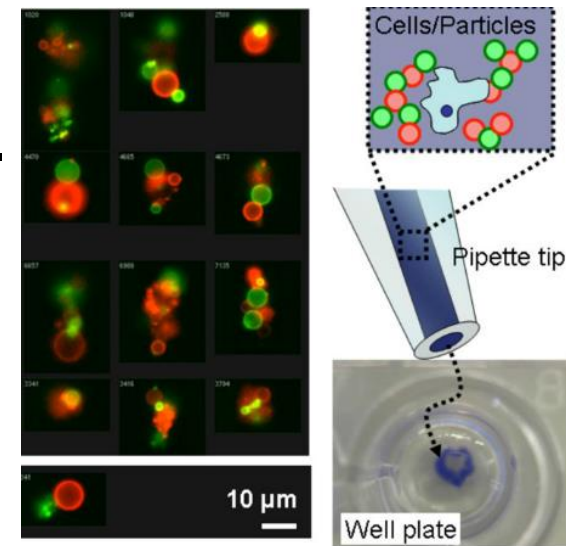
## **Pharmaceuticals – USD 1072 Billion**

There will always be people who need medication of some sort and treatment for serious illnesses.

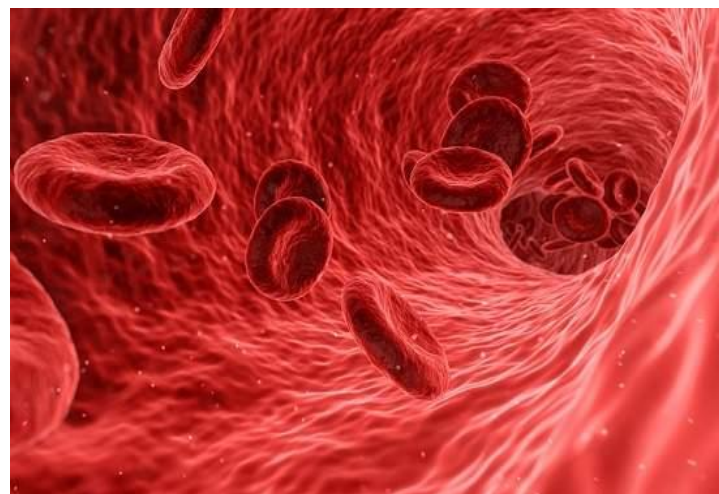


# Other New Biotech Discoveries With Exciting Opportunities

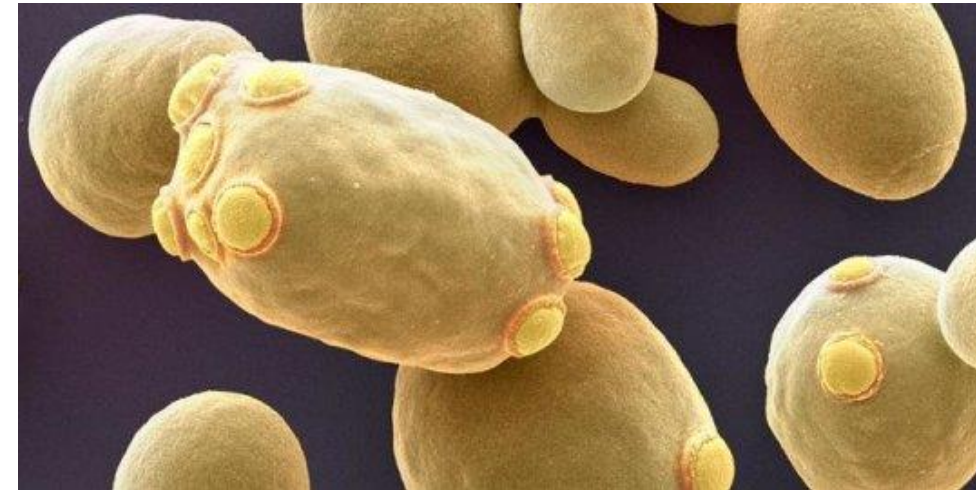
DNA as 'smart glue' for 3D bio-printing



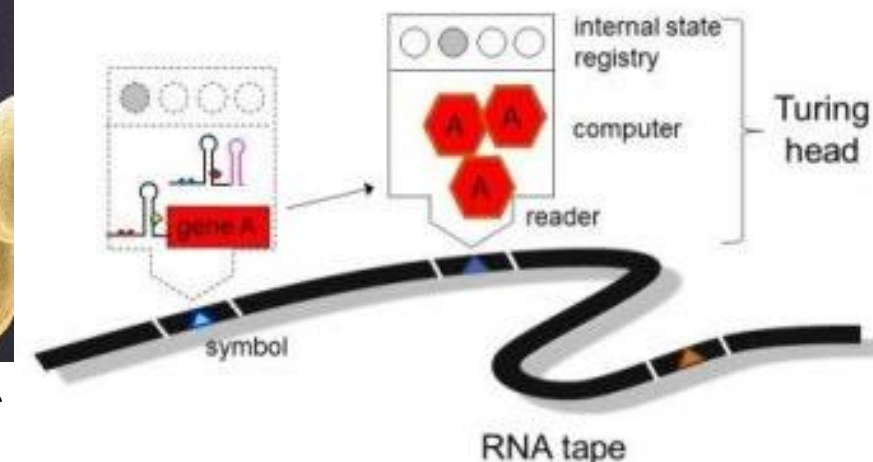
RNA discovery could help boost plant heat, drought tolerance



Blood transfusions through genome sequencing



Protein that extends life of yeast cells



Cells programmed like computers to fight disease





# Biotech Firms Looking To Hire More Employees Globally

*China is one of the Top 5 emerging biotech leaders in Asia Pacific, boasting **>1000** biotech firms*

*According to IMS Institute for Healthcare Informatics, the pharmaceutical market in **China was the world's second largest market** after the US in 2016*

*Hong Kong is poised to become an active player in the biotech arena*

*Talents equipped with both **biotech knowledge** and a **business mind** are scarce in the region*



# Hong Kong: Ideal For Biotechnology Development

## *Hong Kong's advantages:*

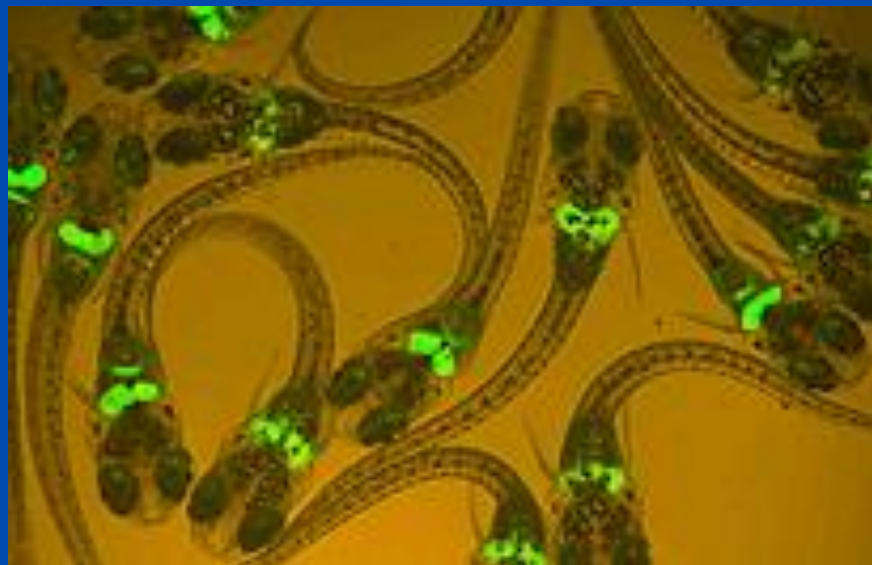
- ***Protected intellectual property***
- *Internationally recognized* ***enforcement of common law***
- ***Academic freedom***
- ***Sound financial system***
- ***An ideal location*** *for international companies* *that are interested in the growing market in China and for* ***Chinese companies*** *that are interested to expand their business globally*
- ***Productive and adaptive workforce***





# Biotechnology in Hong Kong

- In HKSAR Government Budget, biotechnology is one of the focused areas for development under the Innovation and Technology sector; over **ten billion Hong Kong Dollars** will be allocated for the development of the industry
- HK has **~300** biotech-related companies
  - >70 are listed in HK Stock Exchange/GEM
  - ~45 biotech start-ups based in HK Science Park
  - Some companies have grown to establish manufacturing plants
- The world-renowned **Karolinska Institute of Sweden** has established its first overseas research facility at HKSTP





# **Bachelor of Science in Biotechnology & Business (BIBU)**

*Our Solution To Address The Regional  
Demand For Professionals*







# **What is the program structure of Biotechnology and Business?**





# Biotechnology And Business (BIBU)

- A **joint school program** offered by the School of Science and the School of Business and Management **since 2016**
- A separate program choice in JUPAS and Direct Entry
  - Science or Business students may apply for transfer into the BIBU program after completing first year of study
- **Holistic curriculum** covers various domains in Science (life science and biotechnology) and in Business (managerial accounting, microeconomic / macroeconomic, operations management)
- Suitable for students who are eager to **develop a managerial or leadership career** in the biotechnology or life science related industries.
- Only a few universities around the world offer similar training





# Program Structure

*A tailor-made 4-year curriculum with a total of 124-131 credits:*

- **Science/Life Science:** 31-37 credits
- **Business:** 29 credits
- **Biotechnology and Business Electives:** 9 credits
- English Communication: 6 credits
- Mathematics: 3-4 credits
- Interdisciplinary Courses: 10 credits
- University Common Core: 36 credits

*Students may reuse a maximum of 9 credits of these courses to count towards both major and University Common Core requirements.*

For details: <http://bibu.ust.hk/curriculum/study-pathways>



# BIBU Program Structure

A holistic 4-year curriculum covering domains in **Science** (Life Science and Biotechnology) and **Business** (Managerial Accounting, Micro/Macroeconomics, Operations Management) with a total of 123-131 credits:

**Exclusive for BIBU Students**

- BIBU1010 – Biotechnology and Business Seminar
- BIBU4820 - Biotechnology Entrepreneurship and Business Operations
- BIBU4830 – Biotechnology Management
- BIBU4840/4850 – BIBU Capstone Project

Subject Area	Credits
Life Science	22-25
Science Core	11-16
Business Core	29
Interdisciplinary (BIBU)	10-13
Biotechnology/Business Electives	9
English for Science/Business	6-7
University Common Core	36

Students may reuse a maximum of 9 credits of these courses to count towards both major and University Common Core requirements.



<b>Australia</b> Monash University	<b>France</b> Ecole Polytechnique	<b>Malaysia</b> Universiti Putra Malaysia	<b>Russia</b> National Research University Higher School of Economics	<b>Taiwan</b> National Taiwan University
<b>Austria</b> MCI Management Center Innsbruck	<b>Germany</b> University of Stuttgart	<b>Mexico</b> Tecnologico de Monterrey	<b>Singapore</b> National University of Singapore	<b>Netherlands</b> University of Groningen
<b>Canada</b> University of Toronto	<b>Ireland</b> Trinity College Dublin	<b>Norway</b> University of Bergen	<b>South Korea</b> Seoul National University	<b>Turkey</b> Koc University
<b>China</b> Peking University	<b>Japan</b> Kyoto University	<b>Philippines</b> Ateneo de Manila University	<b>Sweden</b> Lund University	<b>United Kingdom</b> University College London
<b>Denmark</b> University of Copenhagen	<b>Luxembourg</b> University of Luxembourg	<b>Poland</b> Jagiellonian University	<b>Switzerland</b> ETH Zurich	<b>United States</b> Cornell University

# Exchange Program

(Popular Destinations)

HKUST has approximately 230 exchange partners across 36 countries around the world. BIBU Students can join exchange programs offered by both School of Science & School of Business and Management.

# Career Prospects

- **Comprehensive** experience prepares BIBU students to excel in any career path they aspire to
- **Diversified** career opportunities available in both public and private sectors in HK & Greater China
- Potential employers include:
  - Multinational **pharmaceuticals**
  - **Bioproduct** vendors
  - **Biotech service** providers
  - **Medical device** manufacturers
  - **Consulting** firms focusing on the biotech/pharma industries
- **Postgraduate studies** to further specialize in biotechnology or business



L.E.K. CONSULTING





# JUPAS Admissions Requirements (JS5811)

## Minimum Requirements

Subject	Minimum Level Requirement
English Language	4
Chinese Language	3
Mathematics (Compulsory Part)	3
Liberal Studies	2
Elective 1 Must be <b>Biology</b> or <b>Chemistry</b>	3
Elective 2 Any Category A subjects or M1/M2	3

## JUPAS score calculation

**Best 6 subjects  
with weighting**

English & Math (Comp) x 2

Best Elective:  
Biology / Chemistry x 1.5

Subject 1	Weighted English Language
Subject 2	Weighted Mathematics (Compulsory Part)
Subject 3	Weighted Best Elective: Biology OR Chemistry
Subject 4, 5 & 6	Next best 3 subjects Can be Core OR any Category A subjects

# Admission Scores 2020

Admission Scores 2020												
		English	Chinese	Math (Comp)	Liberal Studies	Elective 1	Elective 2	Elective 3	M1/M2	Weighted Score <sup>#</sup>	Highest Attainable Weighted Score	
Best 5	JS5102 Science (Group A) Program (SSCI-A)	Median	3	3	5	4	4	3	-	4	27.5	52.5
		Lower Quartile	4	4	4	4	4	3	-	3	26	
	JS5103 Science (Group B) Program (SSCI-B)	Median	4	4	4	4	4	4	4	-	30	52.5
		Lower Quartile	3	4	4	3	4	4	-	-	28.5	
	JS5101 International Research Enrichment Program (IRE)	Median	5	4	5*	5*	5**	5*	5*	5*	30	35
		Lower Quartile	4	4	5**	3	5*	5	4	5**	29	
Best 6	JS5811 Biotechnology and Business Program (BIBU)	Median	5	5*	4	5	5*	5	5	-	42.5	59.5
		Lower Quartile	5	4	5	4	5	5	5	-	41.5	
	JS5813 Mathematics and Economics Program (MAEC)	Median	4	4	5	5*	5*	5	5	5	45	63
		Lower Quartile	4	4	5*	3	5	5	5	-	44	

Remarks:  
# For weighted score calculation, please refer to HKUST JUPAS Calculator <https://join.ust.hk/jupas-score> .



# Scholarship Schemes

## Scholarship Scheme for JUPAS – HKDSE

Students with any subject achieved Level 5\*\*

HKDSE Requirements	Total Award Level
6 subjects or above with 5**	Full tuition plus living allowance of \$55,000, renewable for normal duration of study
5 subjects with 5**	Full tuition plus living allowance of \$55,000, renewable for normal duration of study
4 subjects with 5**	Full tuition, one-off and HK\$40,000, one-off
3 subjects with 5**	Half tuition, one-off and HK\$30,000, one-off
2 subjects with 5**	HK\$30,000, one-off
1 subject with 5**	HK\$15,000, one-off

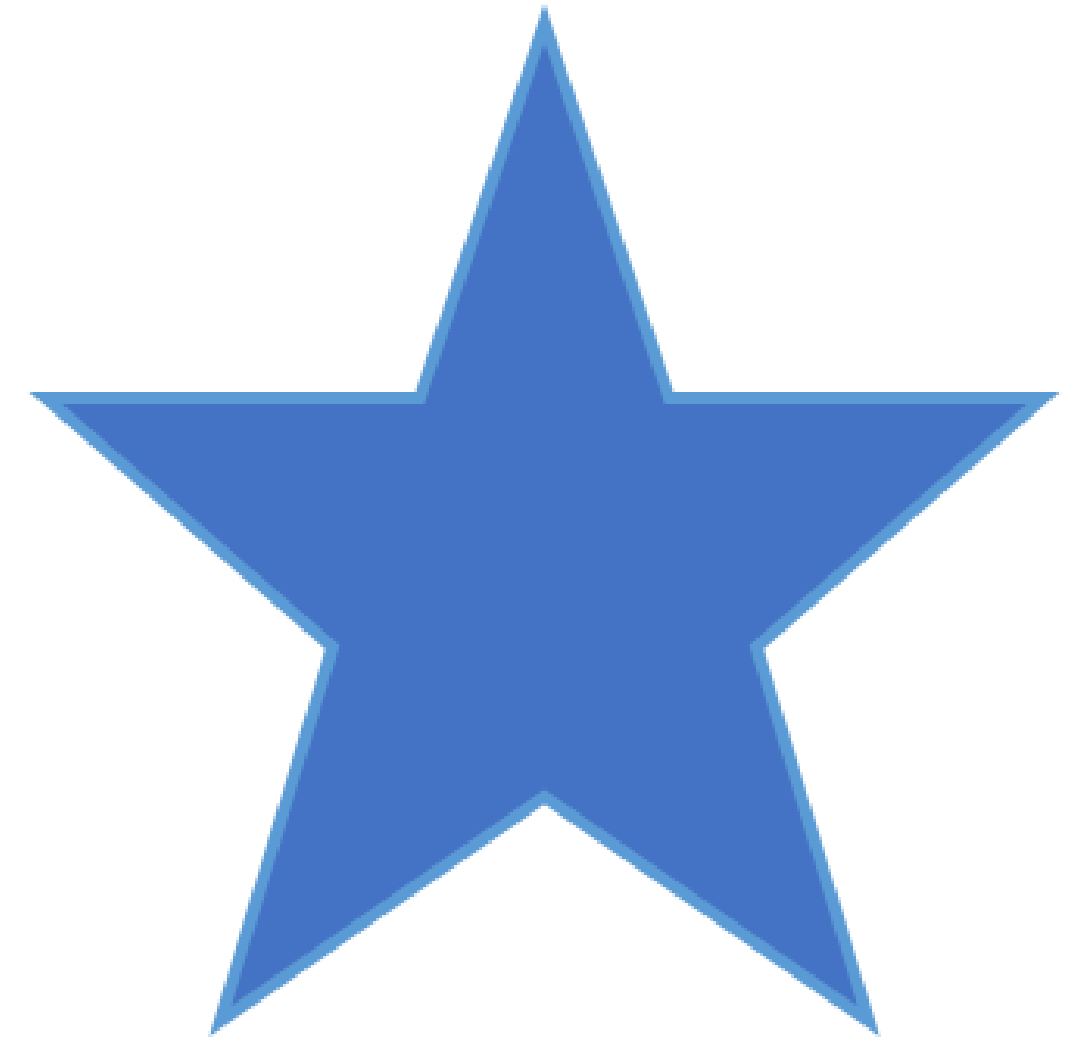
Students in SSCI program with the weighted DSE score achieved 31 or above

HKDSE Requirements	Exchange Scholarship
DSE score achieved 31 or above	HK\$10,000

# Special Considerations

## HKUST Scheme

- missed out 433233 by 1 level in 1 subject
- with at least 5 stars in total from ANY subjects
- Band A







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Think *Global*  
Think #KUST