



香港中文大學計算機科學與工程學系  
Department of Computer Science and Engineering  
The Chinese University of Hong Kong



香港中文大學統計學系  
**Department of Statistics**  
THE CHINESE UNIVERSITY OF HONG KONG

**Joint Programme:**

**Computational Data Science (CDASN)  
Academic Counselling for New Students 2022**



## Agenda

1. Introduction of CSD & STA Department
2. Introduction of CDAS programme
3. Diverse Experiential Learning
4. Facilities
5. Curriculum Structure
6. Faculty Package
7. Useful links

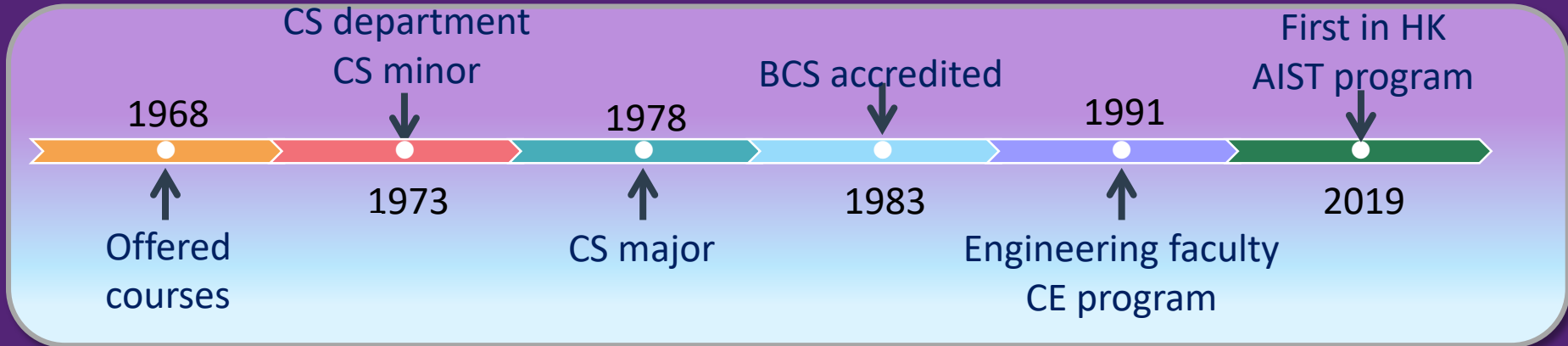


# Introduction of CSD & STA Department



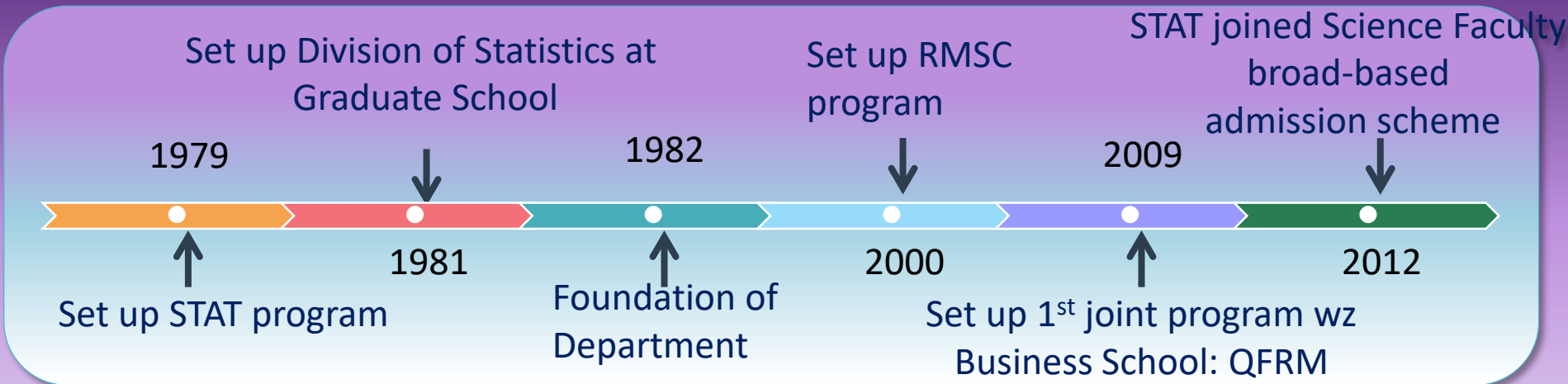
# Department of Computer Science and Engineering

- The first “Computer Science” department in Hong Kong
- Offering **AIST**, **CENG** and **CSCI** programmes



# Department of Statistics

- Statistics (STAT) was set up as an individual programme of study in 1979
- Offering **STAT**, **RMSC** and **QFRM** programmes



# Excellence in Research and Teaching



## Turing Award Recipient

Prof. Andrew Yao

## State Natural Science Award (Second class)

Prof. Qiman Shao

## ACM Fellows

Prof. Martin Wong, Prof. Irwin King, Prof. Michael Lyu, Prof. John Lui, Prof. Yufei Tao, etc.

## ASA Fellows

Prof. Ngai Hang Chan

## IEEE Fellows

Prof. Irwin King, Prof. John Lui, Prof. Leo Jia, etc.

## IMS Fellows

Prof. Ngai Hang Chan, Prof. Qiman Shao

## AI 2000 Most Influential Scholar Annual List (2021)

Prof. Irwin King, Prof. Jiaya Jia, Prof. Yufei Tao, and some professors are named in the list, recognizing their research excellence in AI fields

## Outstanding Fellow of the Faculty of Science

Prof. Isabella Wai Yin Poon

Prof. Hoi Ying Wong

## Outstanding Fellow of the Faculty of Engineering

Prof. Yip Yuk Lap

## UGC - Early Career Award 2019/20

Prof. Kin Wai Chan



# Excellence in Research and Teaching



**Journal of Time Series Analysis Distinguished Author Award**

Prof. Ngai Hang Chan (2020)

**The IMA Journal of Management Mathematics Best Paper of 2018**

Prof. Hoi Ying Wong

**W. J. Youden Award in Interlaboratory Testing in JSM 2019**

Prof. Yingying Wei

**Vice-Chancellor's Exemplary Teaching Award**

Prof. Hoi Ying Wong (2015, 2020)

Mr. Michael Fung, Senior Lecturer (2019)

Prof. Yuanyuan Lin (2016)

Prof. Irwin King (2016)

Prof. Jimmy Lee (2015)

Prof. Isabella Wai Yin Poon (2013)

**CUHK University Education Award 2020**

Prof. Irwin King

**University Education Award 2017**

Prof. Jimmy Lee



# Ranking

## ➤ QS World University

CUHK: **#7** (#30) in QS 2020 in  
Computer Science in Asia (World)

CUHK: **#14** (#51-100) in QS 2020 in  
Statistics & Operational Research in Asia (World)



## ➤ U.S. News Best Global Universities

#4 (#11) in Best Global Universities for  
Computer Science in Asia (World)



# Introduction of CDAS programme





# What's Computational Data Science?



Computer Science

Statistics



# Power of Computational Data Science

How can we know the average salary in Hong Kong?

$$\frac{1}{7 \text{ Million}} \sum_{i=1}^{7 \text{ Million}} X_i$$



- Computer Science Approach:

Distribute to  $m$  computers  $\rightarrow \frac{1}{7 \text{ Million}} \left( \sum_{i \in \text{Group 1}} X_i + \sum_{i \in \text{Group 2}} X_i + \dots + \sum_{i \in \text{Group } m} X_i \right)$

Skills: Parallel computing, cloud computing, distributed system

- Statistics Approach:

Strategically sample  $X_{(1)}, \dots, X_{(m)} \rightarrow \frac{1}{m} \sum_{i=1}^m X_{(i)}$

Skills: Sampling theory

- Computational Data Science Approach: Statistics + Computer Science



# Recent News

Thursday, January 28, 2021, 19:45

## Data Technology Hub debuts as cornerstone of data economy

By Oswald Chan in Hong Kong



The iconic Charles K Kao Auditorium stands among buildings in Hong Kong Science Park. The Science Park is a hub for innovation in the city. (JUSTIN CHIN / BLOOMBERG)

**Hong Kong** Science and Technology Parks Corp launched its Data Technology Hub on Thursday in a bid to fortify the development of the data economy, which is crucial for implementing the government's reindustrialization initiative.

### References:

<https://www.chinadailyhk.com/article/156335>

<https://www.edigest.hk/article/136089/職場/最有前景行業-網絡保安-大數據分析-缺人才/>



## 5大最有前景行業2020 網絡保安、大數據分析缺人才 轉工薪酬可高3成!

職場 | Jan 12 2020 - 10:43



2020年伊始，打工仔當然期望升職加薪，惟近期遇上經濟不穩，大環境未必樂觀，雖然如此，始終有某些行業無懼經濟起伏，勢頭依然良好。今期找來安俊人力資源顧問有限公司董事總經理周綺萍及合眾人顧問有限公司總經理蘇偉忠，為讀者解構2020年數個最有前景的行業，分析來龍去脈，讓打工仔審視度勢，看看自己現時工作前景如何，或者有沒有機會跳槽至前景最佳的行業。



# Recent News

## InnoHK Clusters Being Developed by the Government

POSTED ON: 1st April 2020

CATEGORIZED IN: News and Happenings

According to The 2020-21 Budget, the Government is developing two InnoHK research clusters at the Hong Kong Science Park (Science Park), one focusing on healthcare technologies and the other on artificial intelligence and robotics technologies.

InnoHK is a major initiative of the Hong Kong Special Administrative Region Government to develop Hong Kong as the hub for global research collaboration. This involves the establishment of world-class research clusters at the Hong Kong Science Park with research laboratories set up by world renowned institutions and / or commercial entities to conduct collaborative researches.

**Health@InnoHK** and **AIR@InnoHK** will be the first two research clusters to be established progressively in the next few months.

Health@InnoHK will focus on all types of healthcare-related technologies, including for instance drug discovery, personalized medicine, molecular diagnostics, bioengineering, chemical biology, bioinformatics, vaccine development, medical instrumentation, alternative medicine etc.

AIR@InnoHK will focus on the development of Artificial Intelligence and Robotics technologies, as applied to areas like financial services, smart city and advanced manufacturing. Research focuses may cover big data analytics, machine learning, cognitive systems, intelligent agents, classification for diagnosis, medical robotics, mobile robots and assistive / service / construction robots etc.

Reference:

<https://www.startmeup.hk/zh-hant/innohk-clusters-being-developed-by-the-government/>



# Programme Objective

- Equip students with the **capabilities of developing mathematical, analytical and technical skills to create solutions** to guide data-driven decision making from massive information
- Backed by **rigorous foundations** like data structures, algorithms, statistical modeling and analysis and distributed computing system programming.



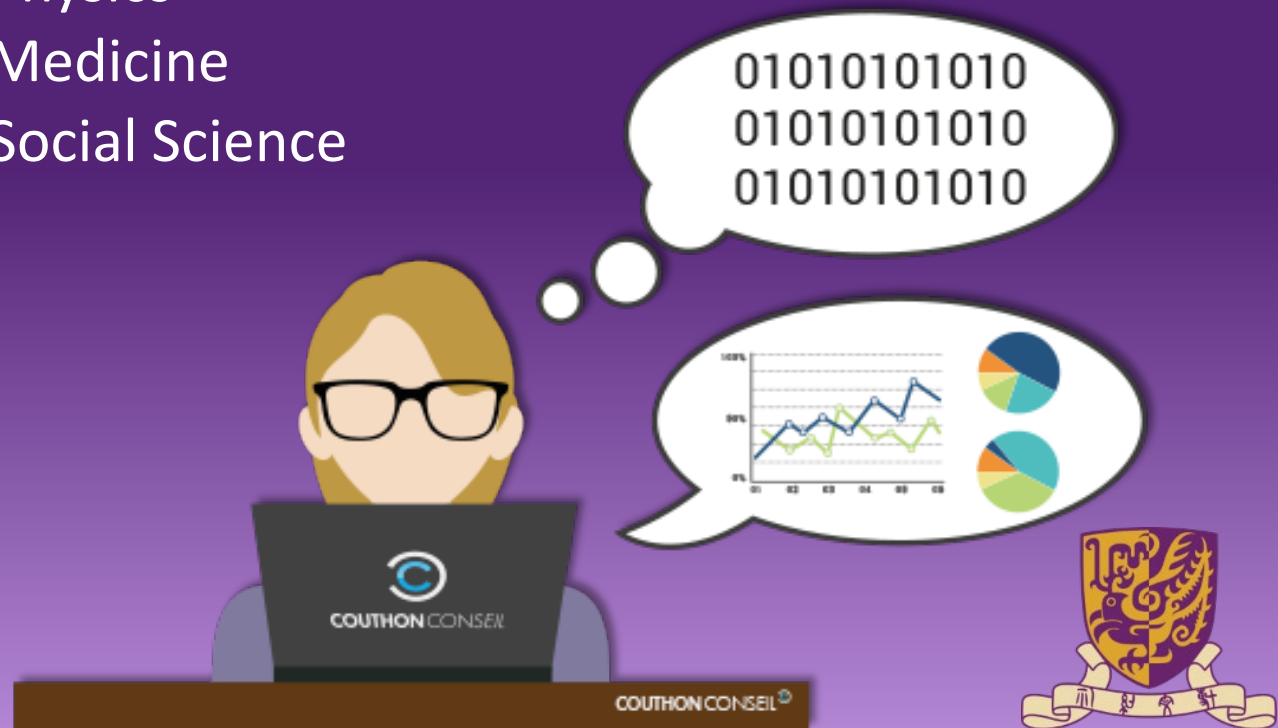
# Mission

- Enable students to develop cutting-edge massive data analytics and management solutions that are of practical interest to academics, industry, and society
- Nurture local talents in computational statistics related applications to meet rising demand for data driven in the Information Age



# Special Features

- A "Computer Science/Statistics + X" programme (i.e., the X component)
- 3 specialized streams
  - » Computational Physics
  - » Computational Medicine
  - » Computational Social Science



# Academic Advising

- Every student is assigned an academic advisor who meets with the students at least once per term for purposes of general supervision such as course selection, guided study, adaptation to University learning modes and disciplinary fundamentals, etc.
- Students with academic problems or on academic probation / extended probation are required to have a regular meeting with the academic advisor.





# Academic Honesty

- <https://www.cuhk.edu.hk/policy/academichonesty/>
- Guideline from the Faculty of Engineering

[https://www.erg.cuhk.edu.hk/erg/sites/default/files/Academic\\_Honesty\\_Guidelines\\_2020.pdf](https://www.erg.cuhk.edu.hk/erg/sites/default/files/Academic_Honesty_Guidelines_2020.pdf)



# Diverse Experiential Learning



# Exchange to Overseas Universities

- You are encouraged to join the exchange programme to **broaden your horizon** and **learn with peers from diverse background**
- List of some overseas universities for the exchange
  - » Macquarie University, Australia
  - » University of Toronto, Canada
  - » Shanghai Jiao Tong University, China
  - » Telecom & Management SudParis, France
  - » Royal Institute of Technology (KTH), Sweden
  - » University of California, Davis, USA
  - ...

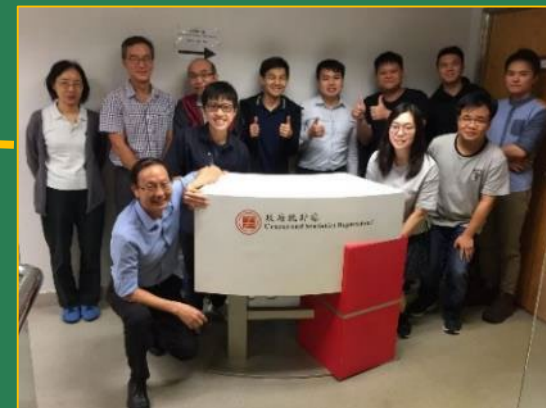
Submit you application via Office of Academic Links (OAL) !



# Student Internship

## Internship

- Census and Statistics Department, HKSAR
- Centre for Clinical Research and Biostatistics
- New Media Group
- Beta Labs under  
The Lane Crawford Joyce Group
- Hong Kong Monetary Authority
- Office of the Government Chief Information Officer
- HSBC
- The Bank of East Asia Limited
- IBM China/Hong Kong Limited
- Information Technology and Health Informatics Division, Hospital Authority
- Cisco Systems, Inc.
- Fujitsu Hong Kong Limited
- SenseTime Group Limited
- Solomon Systech Limited
- Madhead Limited



# Recent Achievements in Intl'/local Competitions

## International Collegiate Programming Contest (ICPC)

*(formerly named as ACM Programming Competition)*

- 2019: ranked 12th (over 3000 universities)
- 2012: ranked 8th
- 2011: ranked 13th
- 2001: ranked 8th



## International Quant Championship 2018

- National Winner
- competed in the Global Final in Singapore

## PwC's HackaDay

- 2021: champion
- 2019: 2<sup>nd</sup> place



# Student Training

## CUHK Amazon Deep Learning Workshop 2019 & AWSome Day - 2020

- Cooperated with Amazon to offer student training in deep neural networks and machine learning



## City Challenge – Bridge to a Smarter City 2016

Designed technology-based living applications for the elderly and won the second runner-up



# Industrial Visits

- Visit to companies / relevant Government Departments to learn latest market development



# What's More?

- Chances to **create your own project and innovation** with support and advice from CSE and STA professors
- **Exchange opportunities** to world-class universities
- **High competitiveness** in job market with **90%** of CSE and STA graduates employed within one month of graduation
- CSE and STA teachers usually have the **highest teaching evaluation scores**





# Facilities



# CSD Lab Facilities

Room no.	Teaching and research lab	Area (sq. m.)	Capacity	No. of PC / Mac / workstation
101	Video Over Internet and Wireless Technologies Lab	50	5	18
102	Microprocessor Systems Lab	131	70	36
116	Computer Game Technology Centre	36	20	14
122	PC Lab	133	78	60
123	Teaching and General Computing Lab	109	52	50
901	Virtual Reality, Visualization & Imaging Research Centre	80	17	21
904	Teaching and General Computing Lab	105	62	60
924	Teaching and General Computing Lab	248	128	128
1004	Student Project Lab	105	40	15



# CSD Lab Facilities



# Important reminders

- A CSE lab account will be given to you in early Sep. This allows you to use the CSD lab facilities

([xxx@cse.cuhk.edu.hk](mailto:xxx@cse.cuhk.edu.hk))



# STA Facilities

Room no.	Teaching and research lab	Area (sq. m.)	Capacity	No. of PC
125-127	STAT Lab	N/A	56	56
G25-G27	RMSC Lab	N/A	56	56

Including:

- Bloomberg terminals
- Digital Blackboard
- High-Performance Computing(HCP)



# Other facilities/support

- Data Resources
- STAT Society Room
- STA Job Post Intranet
- Printing Quotas



# Curriculum Structure



# University Core Requirements

University Core Courses		4-year	Advance Standing
Language	English	8	2-5
	Chinese	5	0
General Education	University Foundation	6	3-6
	University GE	7 (At least 2 units in Area A + 1 course (2-3 units) in each Area C & D)	2 (in Area A)
	College GE	6	6
Understanding China (UGCP1001) <i>(online course - complete before graduation in any one term, including summer term)</i>		1	1
Hong Kong in the Wider Constitutional Order (UGCP1002) <i>(online course - complete before graduation in any one term, including summer term)</i>		1	1
Digital Literacy and Computational Thinking (ENGG1003 or ENGG1004)		3	0
Physical Education		2	1
<b>Total of units required</b>		<b>39</b>	<b>16-22</b>



# CDAS Curriculum – Overview

Year

4

Final Year  
Project

Major Electives

3

Major Core

Major  
Electives

2

Major  
Foundation

Major Core

1

Faculty  
Package

Major  
Foundation

University  
Common  
Core  
(Languages,  
GE, PE)  
*(39 Units)*

Free  
Electives  
*(Remaining  
Units)*

**123  
units**



# CDAS Curriculum – Major Requirements

Year

4

Final Year  
Project

Major Electives

3

Major Core

Major  
Electives

2

Major  
Foundation

Major Core

1

Faculty  
Package

Major  
Foundation

75 units



# CDAS Curriculum – Faculty Package and Foundation

Year

4

Final Year  
Project

Major Electives

3

Major Core

Major  
Electives

2

Major  
Foundation

Major Core

1

Faculty  
Package

Major  
Foundation

## Faculty Package (9 units):

- ★ Advanced Calculus
- ★ Linear Algebra
- ★ Programming

- » Programming (ENGG1110 / ESTR1002)
- » Linear Algebra (ENGG1120 / ESTR1005 / MATH1030)
- » Calculus for Engineers (MATH1510) or University Mathematics (MATH1010)



# CDAS Curriculum – Major Foundation

Year

4

Final Year  
Project

Major Electives

3

Major Core

Major  
Electives

2

Major  
Foundation

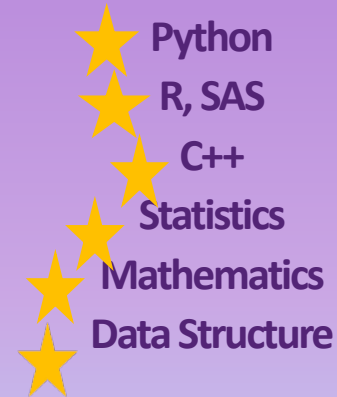
Major Core

1

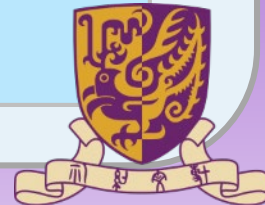
Faculty  
Package

Major  
Foundation

## Major Foundation (18 units)



- » Intro to Computing Using C++ (CSCI1120 / ESTR1100)
- » Data Structures (CSCI2100 / ESTR2102)
- » Discrete Mathematics (ENGG2440 / ESTR2004)
- » Basic Concepts in Statistics and Probability I & II (STAT2001 & STAT2006)
- » Programming Languages for Statistics (R and SAS) (STAT2005)



# CDAS Curriculum – Major Core

Year

4

Final Year  
Project

Major Electives

3

Major Core

Major  
Electives

2

Major  
Foundation

Major Core

1

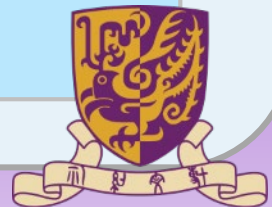
Faculty  
Package

Major  
Foundation

## Major Core (27 units)

- ★ Parallel Computing
- ★ Artificial Intelligence
- ★ Machine Learning
- ★ Statistical Learning
- ★ Data Mining

- » Algorithms and computer systems
- » Machine learning
- » Operating systems
- » Sampling
- » Statistical Inference
- » Statistical Modeling



# CDAS Curriculum – Major Electives

Year

4

Final Year  
Project

Major Electives

3

Major Core

Major  
Electives

2

Major  
Foundation

Major Core

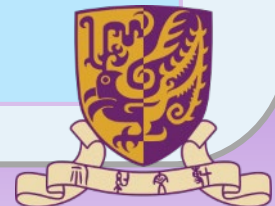
1

Faculty  
Package

Major  
Core

## Major Electives (15 units) Streams

1. Computational Data Science (General stream) ★
2. Computational Physics ★
3. Computational Medicine ★
4. Computational Social Science ★



# CDAS Curriculum – Final Year Project (FYP)

Year

4

Final Year  
Project

Major Electives

3

Major Core

Major  
Electives

2

Major  
Foundation

Major Core

1

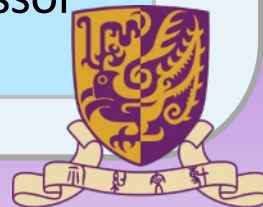
Faculty  
Package

Major  
Foundation

## Final Year Project (6 units)

- » Pick an interesting topic
- » Interdisciplinary nature
- » Apply the knowledge learnt in the previous courses
- » Many open topics. Your creativity and discussion with the supervisor
- » Complete a project under the supervision of an advisor

**Open topic FYP** – you may also propose a project to a professor



# Faculty Package





# CDAS Curriculum – Year 1 units requirements

## Term 1

### CDAS Major courses: 9 units

#### University Core courses:

- Chinese Language: 3 units
- Digital Literacy: 3 units
- College GE: 0-3 units
- PE: 1 unit

Max units taken: 19

## Term 2

### CDAS Major courses: 9 units

#### University Core courses:

- English Language: 3 units
- GE Foundation (UGFH / UGFN): 3 units
- PE: 1 unit
- College GE: 0-3 units

Max units taken: 18

\*



# CDAS Curriculum – Faculty Package

## Term 1

ENGG1110  
Problem Solving By Programming  
(Pre-assigned course)

MATH 1010 University Mathematics \*  
Or  
MATH 1510 Calculus for Engineers \*

## Term 2

ENGG 1120 linear Algebra for  
Engineers  
Or  
MATH 1030 - Linear Algebra I

- A placement test (on Aug 19) is required before enrolling MATH1510. If student failed the placement test, s/he is required to take MATH1020 in addition to MATH1510.



# CDAS Curriculum – Year 1 recommended major courses

## Term 1

ENGG1110  
Problem Solving By Programming

MATH 1010 University Mathematics  
Or  
MATH 1510 Calculus for Engineers \*

STAT 2001 Basic Concepts in Statistics  
and Probability I

## Term 2

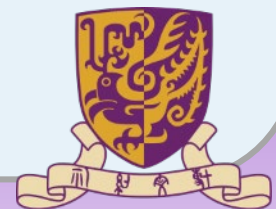
ENGG 1120 linear Algebra for  
Engineers  
Or  
MATH 1030 Linear Algebra I

STAT 2005 Programming Languages  
for Statistics

STAT 2006 Basic Concepts in Statistics  
and Probability II

\*

- A placement test (on Aug 19) is required before enrolling MATH1510. If student failed the placement test, s/he is required to take MATH1020 in addition to MATH1510.



# Where can I find course information?

## CUSIS

- Study scheme: [Browse Program Information](#)
- Course syllabus, learning outcomes: [Browse Course Catalog](#)
- Teaching Timetable: [Teaching timetable by Subj/Dept](#)



# Useful Links



# Useful Links

- Student Handbook

<https://www.aqs.cuhk.edu.hk/undergraduate-student-handbook/#undergraduate-student-handbook>

- Registration and Examinations Section

<http://www.res.cuhk.edu.hk/>

- Office of Academic Links (OAL)

<https://www.oal.cuhk.edu.hk/>

- Office of Student Affairs (OSA)

<http://www.osa.cuhk.edu.hk/>

- Financing Your Studies by the Office of Admissions and Financial Aid

<http://admission.cuhk.edu.hk/finance.html>

- ITSC

<https://www.itsc.cuhk.edu.hk/>

- Library

<https://www.lib.cuhk.edu.hk/>



# FAQs



**Q: How can I declare the specialized stream?**





# Stream Declaration

- You should check and **complete the required courses** of the respective stream.
- You will be invited for the stream declaration in the **final year** of study.
- You can declare in **at most one stream**

## Major Electives (15 units)

### Streams

1. Computational Data Science (General stream)
2. Computational Physics
3. Computational Medicine
4. Computational Social Science



# Contact Us



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(852) 3943 8402 (CSD)



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dept@cse.cuhk.edu.hk



[www.sta.cuhk.edu.hk/cdas2021/](http://www.sta.cuhk.edu.hk/cdas2021/)

[www.cse.cuhk.edu.hk/academics/cdasn/](http://www.cse.cuhk.edu.hk/academics/cdasn/)

