

Department of Computer Science and Engineering 計算機科學與工程學系

Computer Science and Engineering (JS4412 / BCSEN)



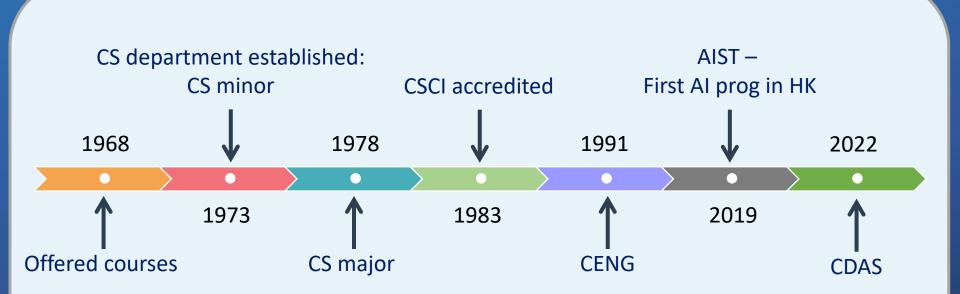






A Long History

- The first computer science department in HK
- Offering AIST, CDAS, CENG and CSCI programmes
- A strong alumni network



Our Undergraduate Programmes

Department of Computer Science and Engineering (CSE)

Artificial Intelligence:
Systems and
Technologies
(AIST)

Computer Science and Engineering (BCSE)

(Foundation 1st year)

Computational Data Science

(CDAS)

(Joint Programme with Department of Statistics)

Computer Engineering (CENG) Computer Science (CSCI)

Excellent Teaching and Research Team

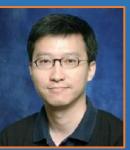












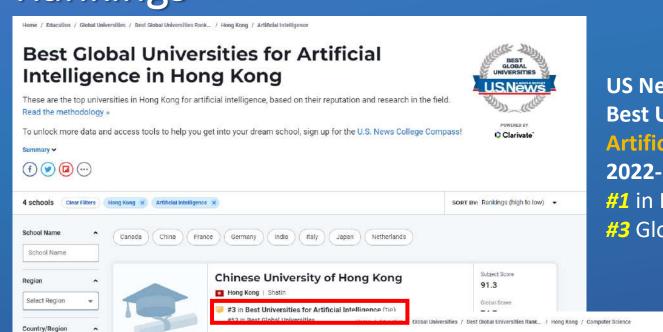


- 2021 Kyoto Prize Laureate and Turing Award Recipient
 Prof. Andrew Yao
- 7 ACM Fellows
 Prof. Benjamin Wah, Prof. John Lui, etc.
- 13 IEEE Fellows
 Prof. Irwin King, Prof. Evangeline Young,
 Prof. Yufei Tao, etc.
- 2022 IEEE CEDA Ernest S. Kuh Early Career Award
 Prof. Bei Yu

- Hong Kong Academy of Engineering Sciences Fellows 2021 Prof. Michael Lyu
- InnoStars Award 2021
 Prof. Jiaya Jia
- Forbes 30 Under 30 Asia
 (Healthcare & Science Category) –
 Class of 2022
 Prof. Yu Li
- Distinguished Fellow of the Hong Kong Computer Society 2022
 Prof. Jimmy Lee

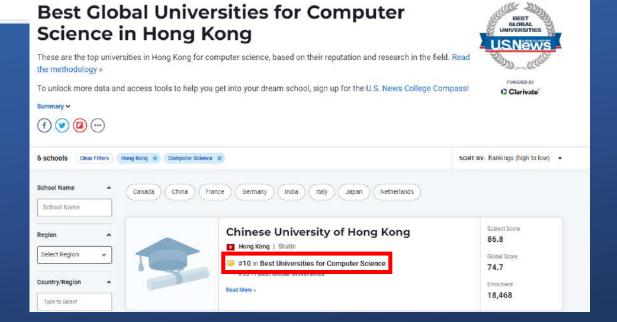
Rankings

Type to Select



US News and World Report:
Best Universities in
Artificial Intelligence
2022-2023
#1 in Hong Kong
#3 Globally

US News and World Report:
Best Universities in
Computer Science
2022-2023
#1 in Hong Kong
#10 Globally



Strong Alumni Network

IT Industry





NOKIA amazon.com

facebook.

Education















Banking





Morgan Stanley



Deutsche Bank

Deloitte.

Goldman Sachs

Sharing from our CSE Alumni

I'm now working in Deloitte's Cyber Risk Advisory Team. Cybersecurity is a promising job, you can equip yourself to be a cybersecurity expert by enrolling relevant courses provided by the Department of Computer Science and Engineering. Cybersecurity professionals, like information security analysts, protect businesses, governments, and individuals from criminal activities on the internet. With the explosive growth of the internet in business, education, and personal communication, computer experts with knowledge of cybersecurity are in high demand.



Ka Ki CHAU, CSCI Graduate of 2021

Sharing from our CSE Alumni



Hei Yiu LAW, CENG Graduate of 2021

During the 4 years of my study as a CENG student, I could take courses on different topics. These courses not only consolidate my knowledge related to my major but can also train up my critical thinking and logical thinking skills. We have to design and implement a smart hardware product in just a few weeks and this project not only gives me a hands-on experience on designing smart hardware product, but also improves my communication skill and time management skill.

Recent Achievements in Intl'/Local Competitions

Championship in Robocon Hong Kong Contest 2022



Hong Kong Computer Society Student Sponsorship 2022



First Prize in the Cloud Track of the Huawei ICT Competition



Industrial Visits

Visit to companies to learn latest development in industry



Work-Study Scheme

 One-year placement and internship for students to gain practical experience in a real working environment

Example of Previous Opportunities in CSE











恒生銀行 HANG SENG BANK











What's More?

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



Growing Demand and Opportunities

Due to the pandemic:

- workers going remote
- companies turning to e-commerce to survive,
- organizations needing to be more digitally agile
- Engineering is the fastest-growing field in the world
- ➤ 24 of 28 countries listed data engineer among its fastest-growing careers

Linkedin: The Fastest-Growing Jobs Around the World in 2023

(https://www.linkedin.com/business/talent/blog/talent-acquisition/fastest-growing-jobs-2023)

Growing Demand and Opportunities

- Hong Kong's start-up ecosystem is thriving. In 2022, the number of start-ups in Hong Kong grew by 6% to 3,985, employing nearly 15,000 people.
- Biotechnology, artificial intelligence, smart city and financial technologies were identified as the four key areas for Hong Kong's innovation and technology industry.
- Hong Kong's innovation and technology sector together with that
 of Shenzhen and Guangzhou the Shenzhen-Hong KongGuangzhou science and technology cluster ranks as the world's
 second performing according to the Global Innovation Index 2023.

Industry Data						
Global Rankings	2019	2020	2021	2022		
Global Innovation Index	11/131	14/132	14/132	17/132		
IMD Digital Competitiveness	5/63	2/64	9/63	N/A		

Reference: https://research.hktdc.com/en/article/MzEzOTIwMDIy

Things You Can Learn

- Artificial Intelligence
 - > Teach computers to think better
 - Learning, vision, voice recognition



- Algorithms and Complexity
 - > Find the most efficient ways to solve problems
 - Learn their limitations: things computers cannot do
- Systems and Networks
 - Find out how to build large services like Google and Facebook
 - Learn how cloud computing works

Things You Can Learn

- Software Engineering
 - Learn how to write very big programme projects and test that they work properly
- Graphics and Multimedia Technology
 - Build exciting new computer games
- Cyber-security
 - Apply your knowledge of algorithms, systems, networks to make application secure

Things You Can Learn

- VLSI and Embedded Systems
 - Design smart, energy efficient hardware devices
- Bioinformatics
 - Use computers to figure out microorganisms, genetics, and understand diseases
- Databases, Computational Finance, Control, and much more



Admission Arrangements (First Year Entry)

 Students will first be admitted into the Computer Science and Engineering (BCSE) programme for a common 1st year of study

 They will then be allocated into either Computer Engineering (CENG) or Computer Science (CSCI) according to their CGPA after finishing their 1st year of study

Admission Requirements (For JUPAS Applicants)

HKDSE Subject	Minimum Level	Subject Weighting					
HKDSE Core Subjects							
English Language	3	1					
Chinese Language	3	1					
Mathematics (Compulsory Part)	4	1.5					
Citizenship and Social Development	A (Attained)	-					
HKDSE Elective Subjects							
One specific science subject ^	3	1.5 – 1.75					
Any one other subject #	3	1 – 1.75					

[^] Specific science subjects and subject weighting include 1.75 for Math M1/M2, 1.5 for Biology, Chemistry, and Physics, and Information and Communication Technology.

Selection is based on the Best 5 HKDSE subjects with subject weighting applied. Bonus points will be awarded to the 6^{th} and 7^{th} subjects, if any.

[#] Preferred subjects include 1.75 for Math M1/M2, 1.5 for Biology, Chemistry, Physics, Design and Applied Technology and Information and Communication Technology, and 1 for other subjects.

BCSE Admission Grades (2023 Entry)

Percentile	СНІ	ENG	MATHS	LS	M1/M2	1 st Elective	2 nd Elective	3 rd Elective	2023 Programme Weighted Total^
Upper Quartile	5*	3	5*	3	5	5*	5	4	45.875
Median	5	4	5*	3	5*	5	4		42.5
Lower Quartile	3	5	5	2	5	5	5		39.875

[^] Category A subjects score conversion scale: $5^{**} = 8.5 \mid 5^* = 7 \mid 5 = 5.5 \mid 4 = 4 \mid 3 = 3 \mid 2 = 2 \mid 1 = 1$; Category C subjects score conversion scale: $A = 5 \mid B = 4 \mid C = 3 \mid D = 2 \mid E = 1$;

2023 Subject Weighting: Math (x 1.5); M1 or M2 (x 1.75); Bio, Chem, Comb. Sci, DAT, ICT, Phy (x 1.5); LS (x 0.5)

- BCSE was one of the 15 CUHK programmes that admitted top students with a score of 33 or above in their best five HKDSE subjects in 2023 entry.

Admission Requirements (for Non-JUPAS & International Applicants)

- Applicants seeking admission on the strength of qualifications other than HKDSE examination results (e.g., IB, GCE-AL, overseas qualifications) can apply through Non-JUPAS channels
- Will be considered on the basis of their education background and academic achievements
- Can apply for "Admission with Advanced Standing" (for particular qualifications only)

Check out details on the website of CUHK's Office of Admissions and Financial Aid: Non-JUPAS Applications: http://admission.cuhk.edu.hk/non-jupas-yr-1/requirements.html International Applications: http://admission.cuhk.edu.hk/international/requirements.html



Admission Arrangements (Senior Year Entry)

- To meet the minimum entrance requirements for direct entry to year 3 of CENG / CSCI, you need to have:
 - » successfully completed a <u>LOCAL</u> course of study leading to the qualification of associate degree (AD) / higher diploma (HD) AND
 - » Met the minimum required scores or grades in English and Chinese languages (e.g. HKDSE level 3 or above / IELTS 6.0 or above, etc.)
- To make your application more competitive, you need to demonstrate outstanding capabilities in mathematics, programming and English

Admission Arrangements (Senior Year Entry)

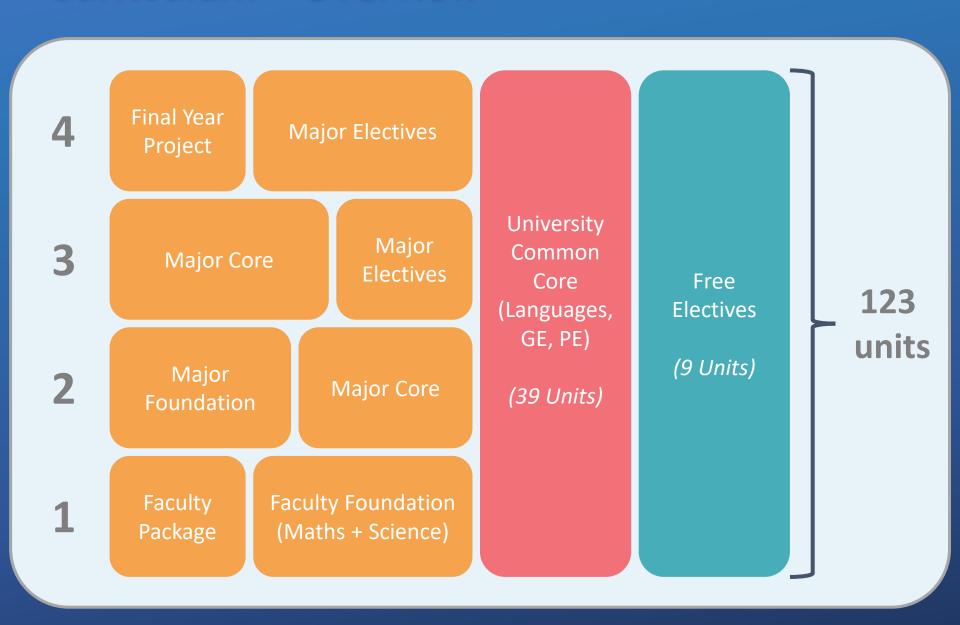
- If you are unsuccessful for Senior Year Entry, you will be considered for First Year Entry with Advanced Standing to the Computer Science and Engineering (BCSE) programme. If admitted:
 - You will be exempted from up to 23 units. Most would be able to finish their studies in 3 years.
 - ➤ You will study a <u>common 1st year</u> and be allocated to either CENG or CSCI <u>according to your CGPA</u> after you finish your 1st year.
- For reference, students admitted to senior year in the past had a CGPA of 3.5 or above

Check out more details on *Senior Year Applications:*http://admission.cuhk.edu.hk/non-jupas-senior/requirements.html

Curriculum Structure



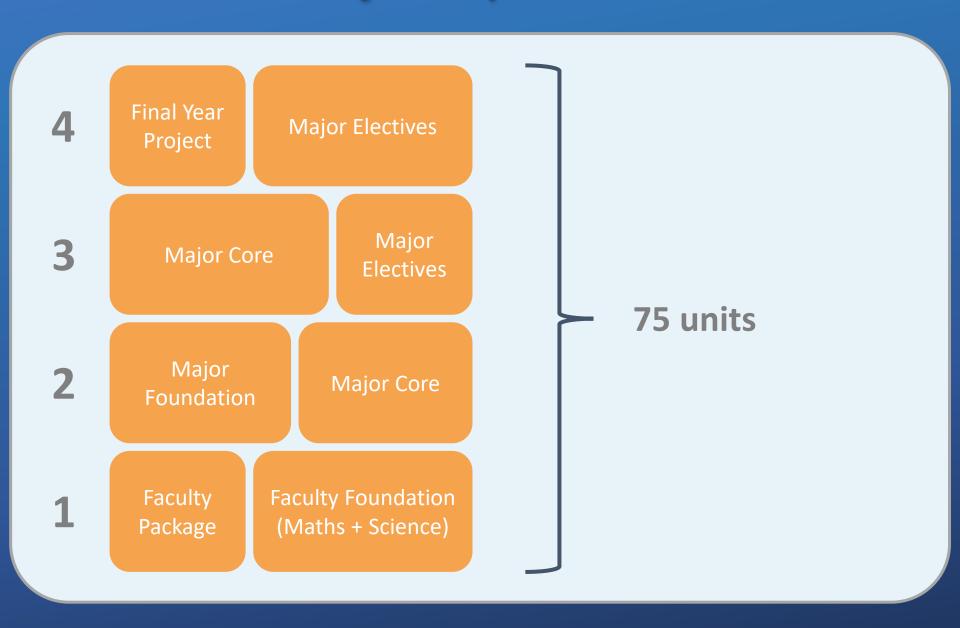
Curriculum – Overview



University Core Requirements

University Core Courses	Units Requirements
English Language	8
Chinese Language	5
University General Foundation	6
University General Education	7 (At least 2 units in Area A, C, D)
College General Education	6
Understanding China (UGCP1001) (online course - complete before graduation in any one term, including summer term)	1
Hong Kong in the Wider Constitutional Order (UGCP1002) (online course - complete before graduation in any one term, including summer term)	1
Digital Literacy and Computational Thinking (ENGG1003 or ENGG1004)	3
Physical Education	2
Total of units required	39

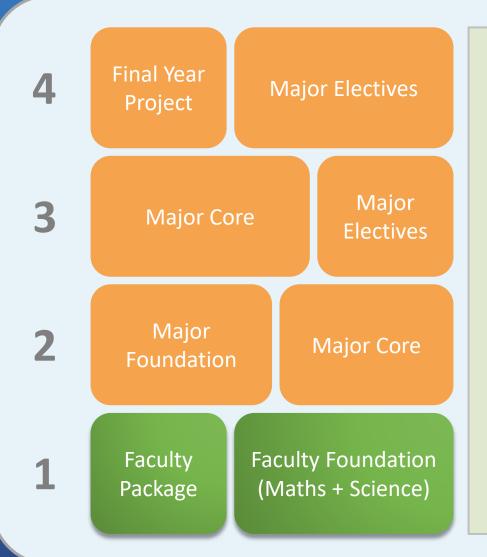
Curriculum – Major Requirements



Major Requirements

Major Requirements	Computer Engineering	Computer Science			
Faculty Package	9				
Foundation Courses	17	16			
Major Required Courses	31	27			
Research Components	6				
Stream Requirements	12	17			
Total of units required	75				

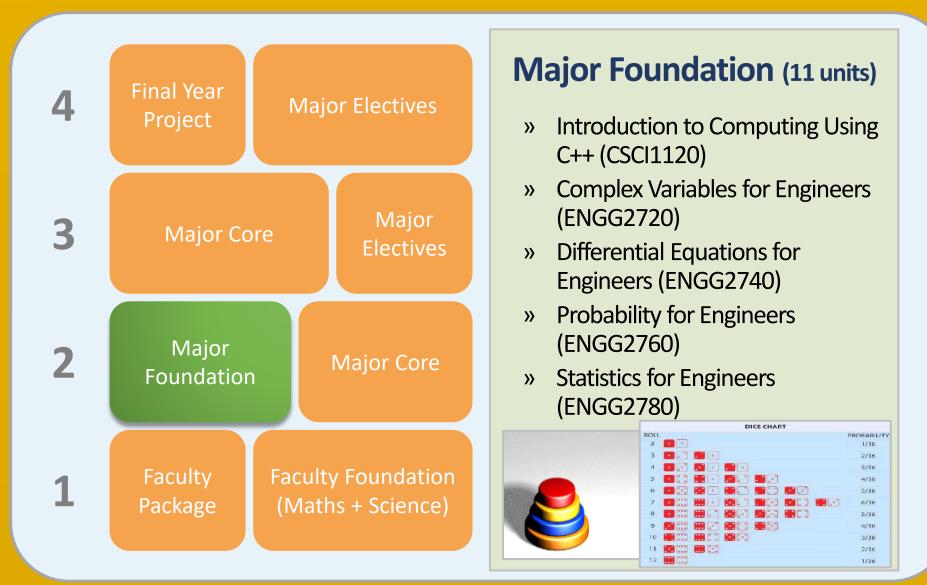
Curriculum – Faculty Package and Foundation



Faculty Package and Foundation (15 units)

- » Problem Solving By Programming (ENGG1110)
- » Linear Algebra for Engineers (ENGG1120)
- » Multivariable Calculus for Engineers (ENGG1130)
- Calculus for Engineers (MATH1510)
- » Foundation Science

Curriculum – Major Foundation (for CENG)



Curriculum – Major Core (for CENG)



Major Core (31 units)

- » Digital Logic Design Laboratory (CENG2010)
- » Fundamentals of Embedded Systems (CENG2030)
- » Embedded System Design (CENG2400)
- » Computer Organization and Design (CENG3420)



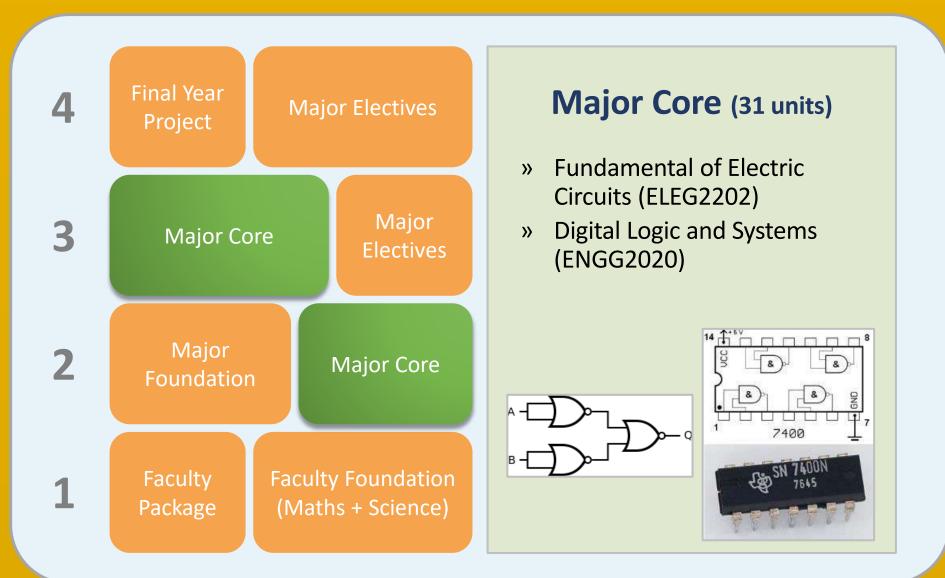
Curriculum – Major Core (for CENG)



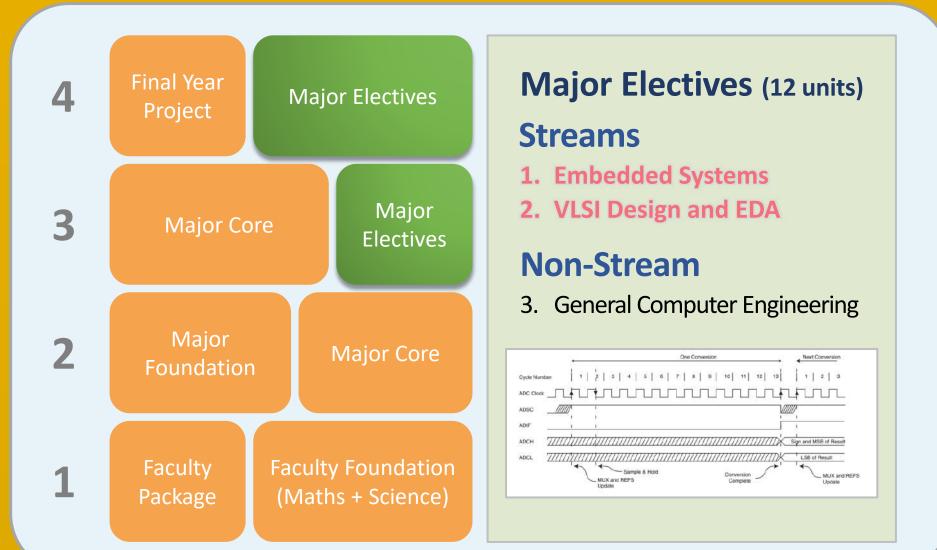
Major Core (31 units)

- » Data Structures (CSCI2100)
- » Software Engineering (CSCI3100)
- » Introduction to Operating Systems (CSCI3150)
- » Introduction to Discrete Mathematics and Algorithms (CSCI3190)
- » Computers and Society (CSCI3250)
- » Engineering Practicum (CSCI3251)

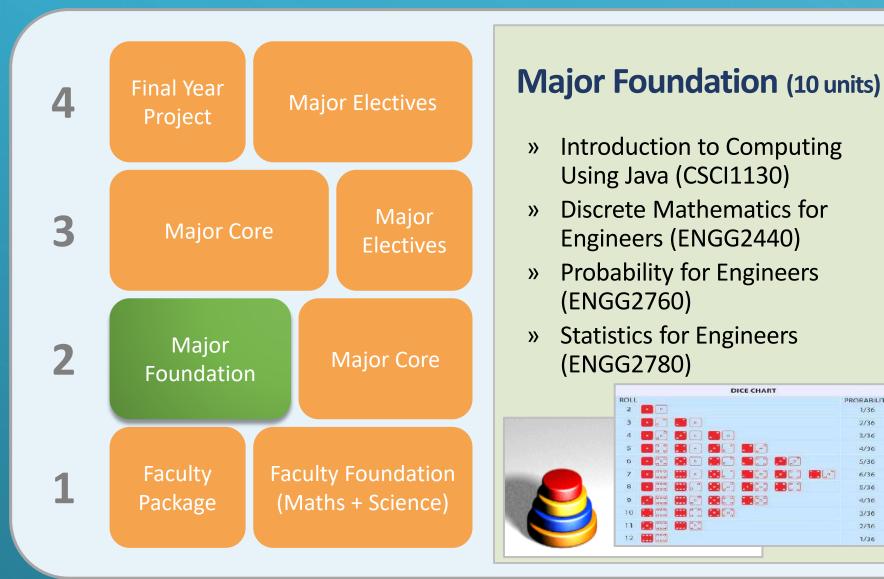
Curriculum – Major Core (for CENG)



Curriculum – Major Electives (for CENG)



Curriculum – Major Foundation (for CSCI)

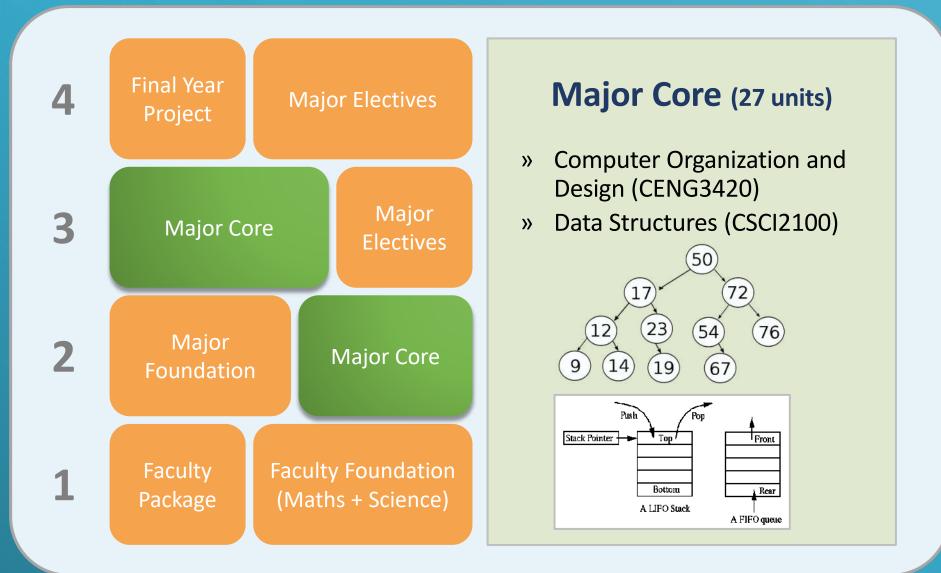


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Curriculum – Major Core (for CSCI)



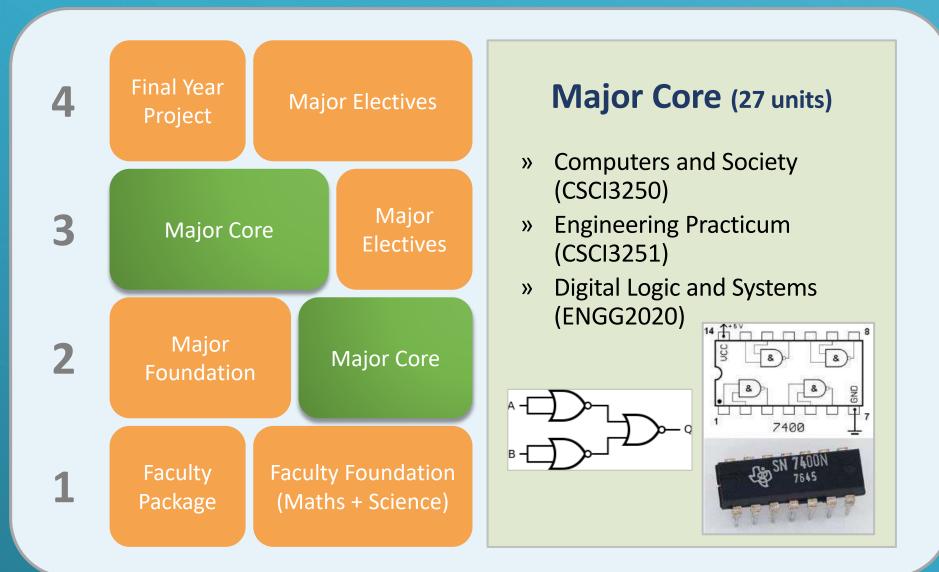
Curriculum – Major Core (for CSCI)



Major Core (27 units)

- » Software Engineering (CSCI3100)
- » Formal Languages and Automata Theory (CSCI3130)
- » Introduction to Operating Systems (CSCI3150)
- » Design and Analysis of Algorithms (CSCI3160)
- » Principles of Programming Languages (CSCI3180)

Curriculum – Major Core (for CSCI)



Curriculum – Major Electives (for CSCI)



Major Electives (17 units)

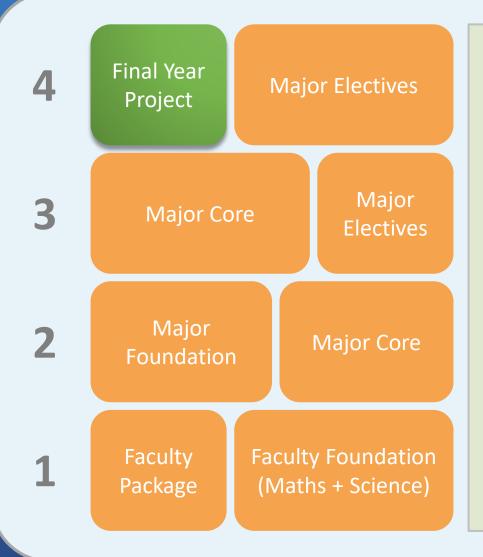
Streams

- 1. Intelligence Science
- 2. Database and Information Systems
- 3. Rich Media
- 4. Distributed Systems, Networks and Security
- 5. Algorithms and Complexity
- 6. Data Analytics

Non-Stream

7. General Computer Science

Curriculum – Final Year Project (FYP)



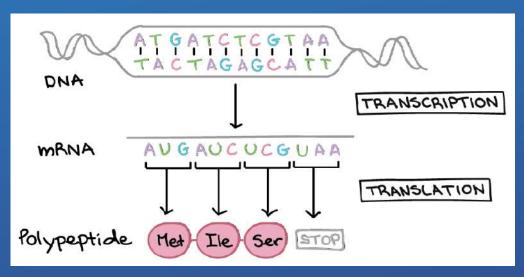
Final Year Project (6 units)

- » 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

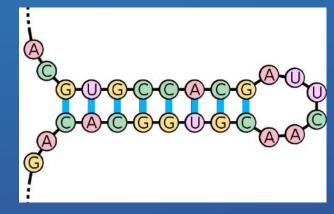
Open topic FYP – you may also propose a project to a professor

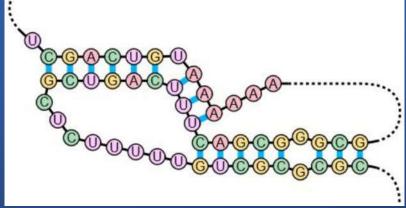
FYP (AI + Bioinformatics)

Apply machine learning to predict RNA-protein interaction



RNA-binding protein (RBP)

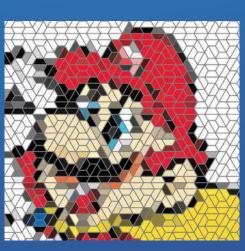


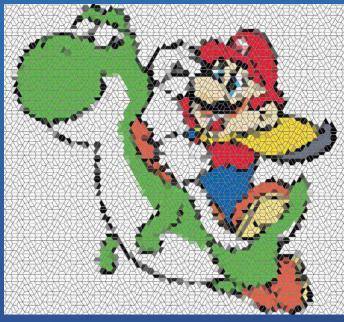


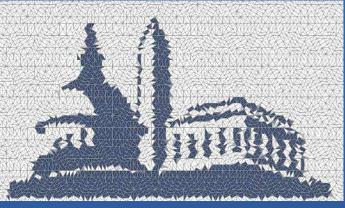
RNA folds to a specific structure to fit into the protein binding site

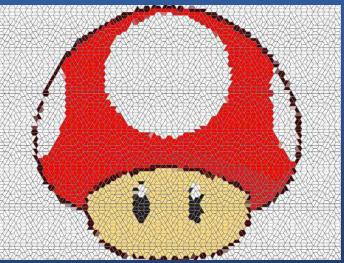
FYP (AI + Multimedia)

Design a neural network that learns to produce a tiling





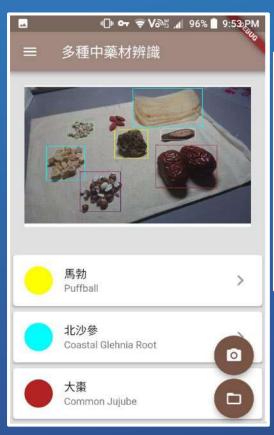




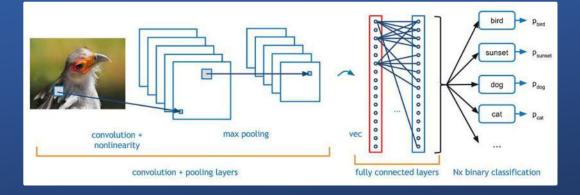
FYP (AI + Computer Vision)

• Chinese Medicinal Herb Recognizer









FYP (Self-driving Robots)

• Controls: Serial, Bluetooth, and Raspberry Pi, etc.



Arduino Mega 2560



Raspberry Pi 3b+



Camera module



From FYP MCY1801

FAQs



FAQ Content:

- Q: Will there be any interview?
- Q: How does the major allocation work?
- Q: Computer Engineering or Computer Science?
- Q: How many students will be admitted?
- Q: Will there be any exchange opportunity?
- Q: Will there be any scholarship or financial aid?
- Q: What are the career prospects of CENG/CSCI graduates?
- Q: Can I transfer to AIST or other majors in Year 2?
- Q: Can I declare AIST / CENG / CSCI as second major or minor?
- Q: I am still struggling to choose between AIST / CENG / CSCI.

What can I do?

Q: Will there be any interview?



Interview Arrangements (JUPAS)

- Interviews will be arranged in mid/late June every year.
- Not all applicants will be interviewed. We only consider Band A applications when shortlisting interviewees.
- Shortlisted applicants will receive an invitation email by early June for the details, e.g., date, time, format, etc.
- Stay tuned! Check your email regularly for the latest update!



Interview Arrangements (Non-JUPAS)

- Interviews will be conducted in batches from "Jan. every year.
- You are encouraged to attach adequate supporting documents, e.g., transcripts, predicted grade, certificates, etc., in your application for our holistic review.
- Shortlisted applicants will receive an invitation email for the details, e.g., date, time, format, etc.
- Stay tuned! Check your email regularly for the latest update!

Q: How does the major allocation work?



Major Allocation

- BCSE students will be allocated into either CENG or CSCI according to their CGPA after finishing their 1st year of study
- Students with outstanding entry grades / renewable scholarships and good academic performance in their first year of study are guaranteed their first choice of major
- It is expected that a relatively high percentage of students would be allocated to their preferred major.

More details:

https://www.cse.cuhk.edu.hk/admission/cengn/major-allocation-cengn/https://www.cse.cuhk.edu.hk/admission/cscin/major-allocation-cscin/

Q: Computer Engineering (CENG) or Computer Science (CSCI)?



Differences between CENG and CSCI

- Computer Engineering is more about building things
 - » To take care of design and hardware/software integration (e.g., lower cost, higher speed, more energy efficient)
- Computer Science is more about designing software solutions
 - » To take care of coding, software architecture, and the underlying theory



Q: How many students will be admitted to BCSE / CENG / CSCI?



Local Intake Quota

 First Year Entry to Computer Science and Engineering (BCSE) (JS4412):
 107

 Senior Year Entry to Computer Engineering (CENG) / Computer Science (CSCI):
 11



Note: There is no fixed quota for international students and Mainland students attempting Gao Kao.

Q: Will there be any exchange opportunity?



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)!

Q: Will there be any scholarship or financial aid?



Scholarships and Financial Aids

- The Government and the University offer various scholarships and financial aids depending on student's financial situation, or their outstanding performance in academic or other areas
- List of some scholarships and financial aids
 - » Admission Scholarships
 - » Scholarships for Overseas Studies
 - » Government or University Financial Aid
 - » Summer Subsistence and Travel Loan Scheme
 - » Student Residence Bursary Scheme

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Check out more details on the website of CUHK's Office of Admissions and Financial Aid: https://admission.cuhk.edu.hk/finance.html

Q: What are the career prospects of CENG/CSCI graduates?



Career Prospects

- Employers of our graduates include:
 - » Google
 - » Intel
 - » Microsoft
 - » IBM
 - » Apple
 - » Facebook
 - » Yahoo
 - » Deloitte
 - » Hong Kong Government

» Investment Banking Institutes



Career Choices

- ☑ Entrepreneur
- ☑ Systems programmer
- ☑ Mobile app developer
- ☑ Database administrator
- ☑ Management/IT consultant
- ☑ Researcher
- ☑ Bioinformatics specialist
- ☑ System consultant
- ☑ Data analyst
- ☑ Web and content developer ☑ Business analyst

- ☑ Network administrator
- ☑ Game designer/programmer
- ☑ Medical imaging specialist
- ☑ Software engineer
- ☑ System analyst
- ✓ Systems administrator
- ☑ Network engineer
- ☑ Data miner
- ☑ Systems integrator

Q: Can I transfer to AIST or other majors in Year 2?



If you look for AIST / other majors instead...

- You may submit application for change of major (to AIST or other majors), subject to prevailing regulations stipulated by RES and approval by relevant unit(s).
- If you are determined to go for AIST, you may choose JS4468 / AISTN as your first choice directly.



Q: Can I declare AIST / CENG / CSCI as second major or minor?



Declare Second Major / Minor

- You are not allowed to declare AIST / CENG / CSCI as your second major or minor if you are a CSE student.
- However, you are encouraged to broaden your horizons and declare second major / minor offered by other departments.







Q: I am still struggling to choose between AIST / CENG / CSCI. What can I do?



If you are still struggling to choose...

- You can go through our website and admission
 materials for a better understanding before applying,
 and write to us via email at ug-admiss@cse.cuhk.edu.hk
 if you have any further queries.
- You can join our outreach activities in the future and chat with our teachers and student ambassadors.



Contact Us





www.cse.cuhk.edu.hk



See you in Fall 2024!

