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

Academic Counselling Session for New Students

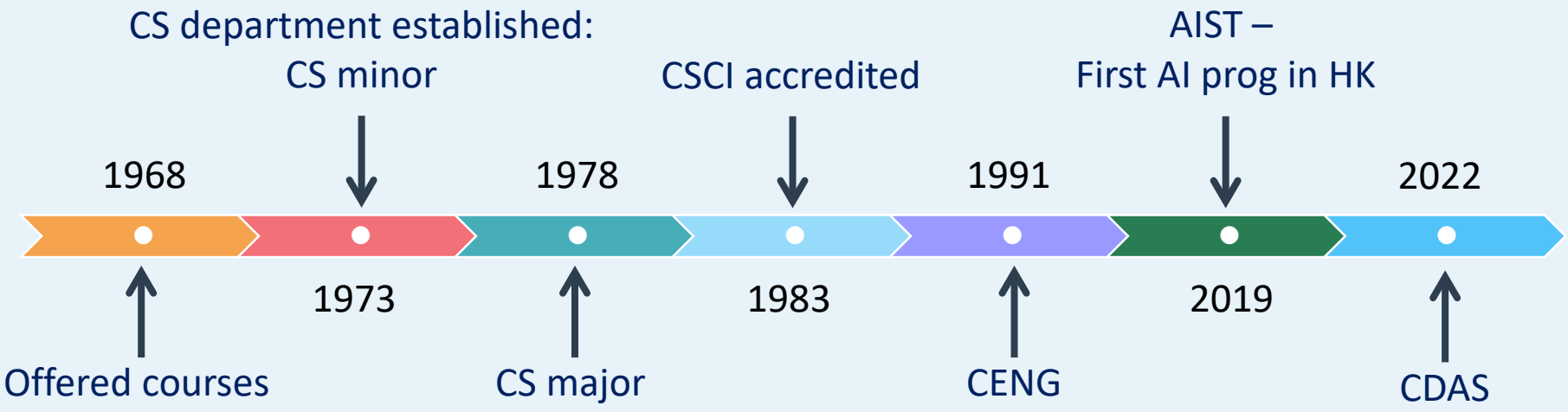
Artificial Intelligence: Systems & Technologies (AIST)

Agenda

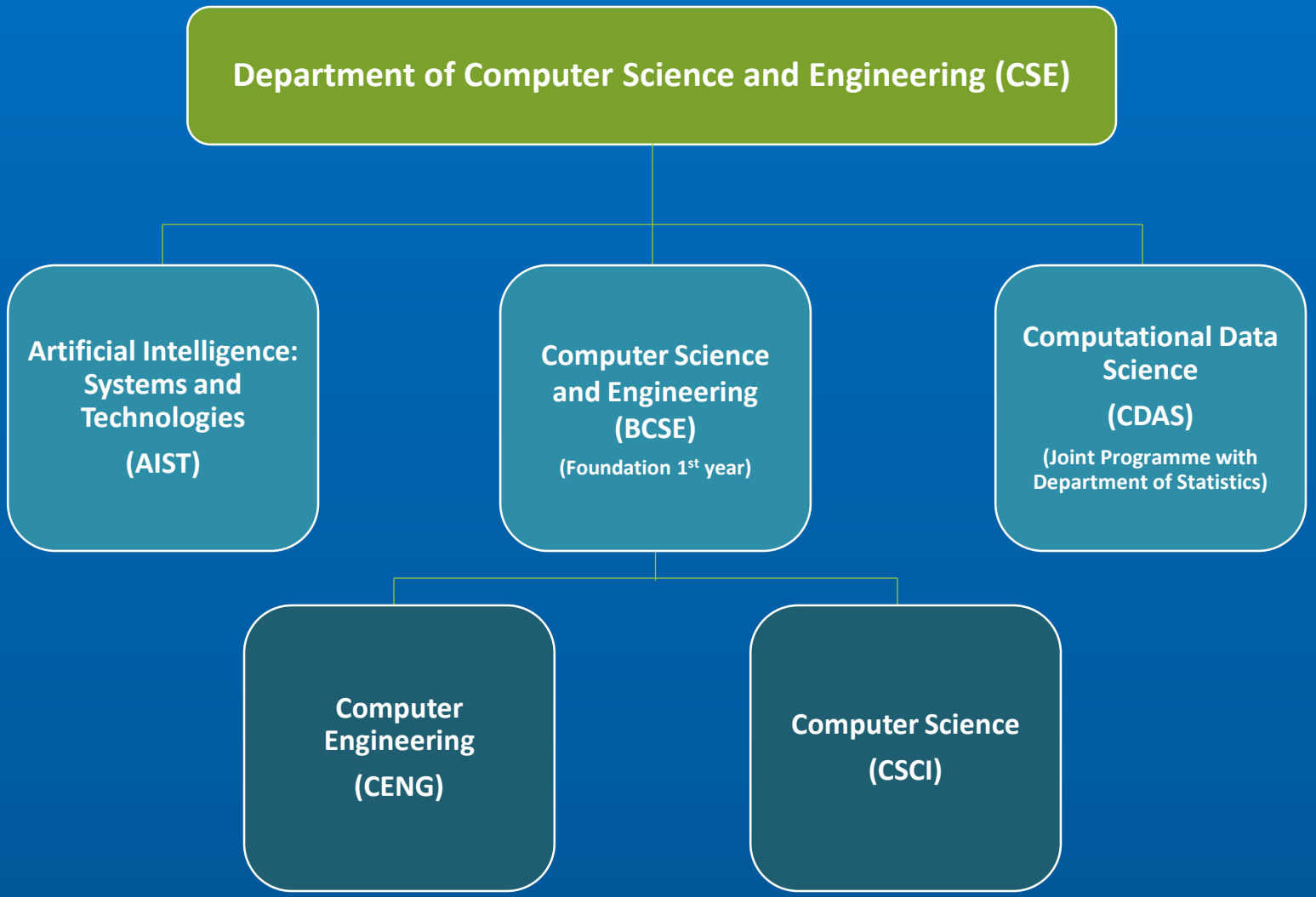
1. Brief introduction of our Department
2. Graduation Requirements & Curriculum Structure
3. Diverse Learning Experience at CSE
4. Other Learning Options
5. Important Reminders
6. Q&A
7. Academic Advising

A Long History

- The first computer science department in HK
- A strong alumni network



Our Undergraduate Programmes

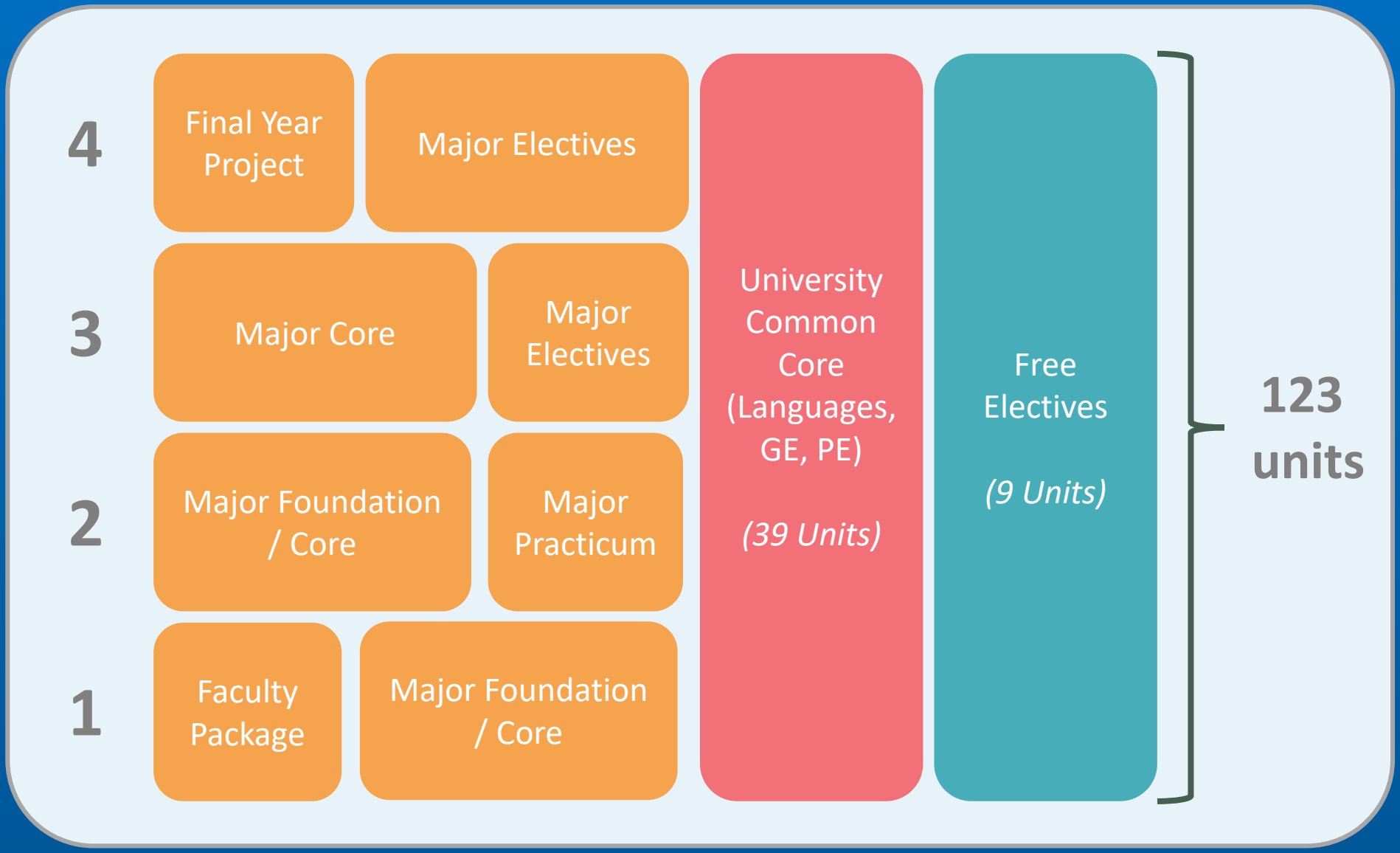


Excellent Teaching and Research Team

- **2021 Kyoto Prize Laureate and Turing Award Recipient**
  Prof. Andrew Yao
- **7 ACM Fellows**
  Prof. Martin Wong, 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

Curriculum Structure

Curriculum – Overview



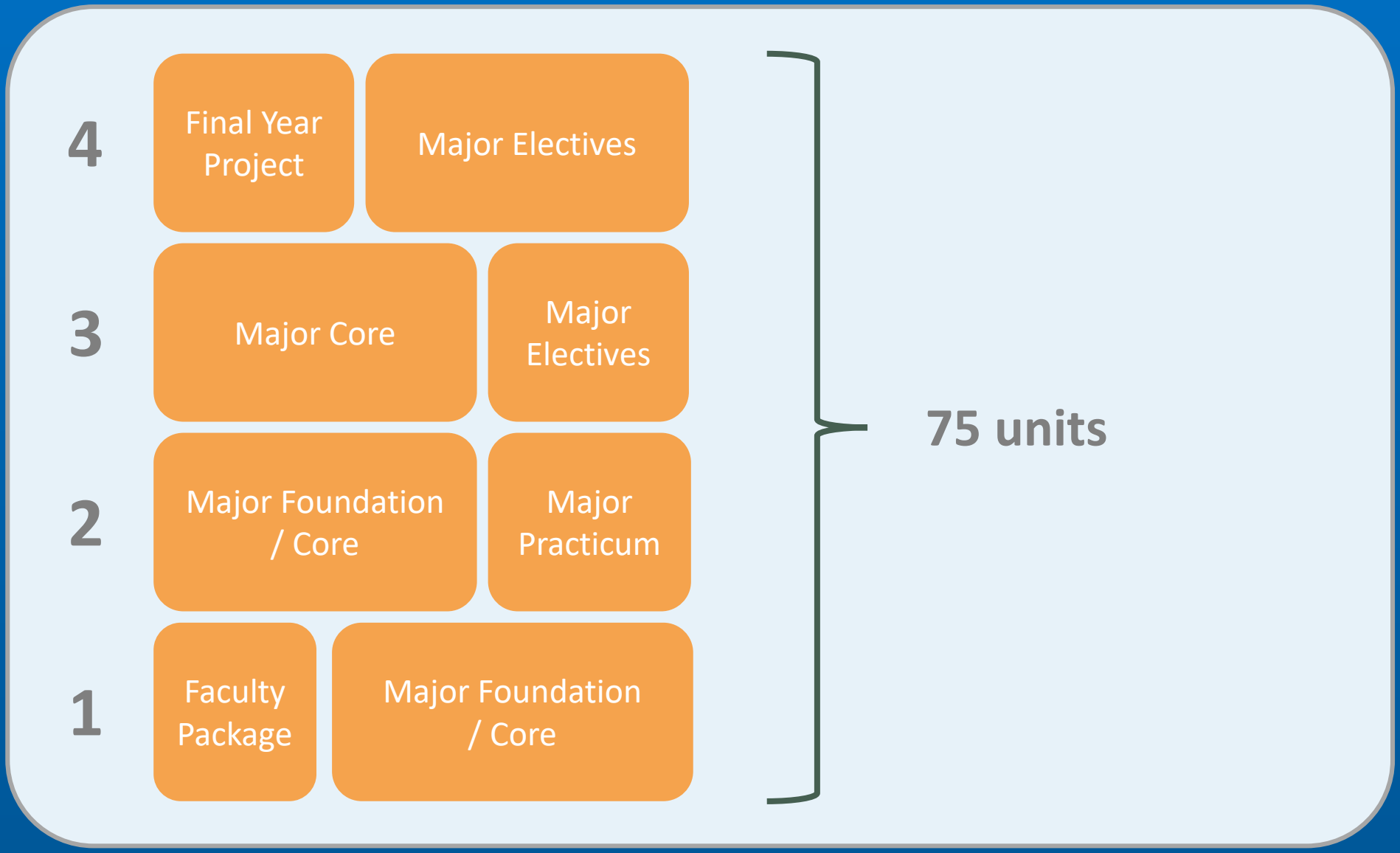
University Core Requirements

University Core Courses		Units Requirements
Language	English	8
	Chinese	5
General Education	University Foundation	6
	University GE	7 (At least 2 units in each Area A, C & D)
	College GE	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**

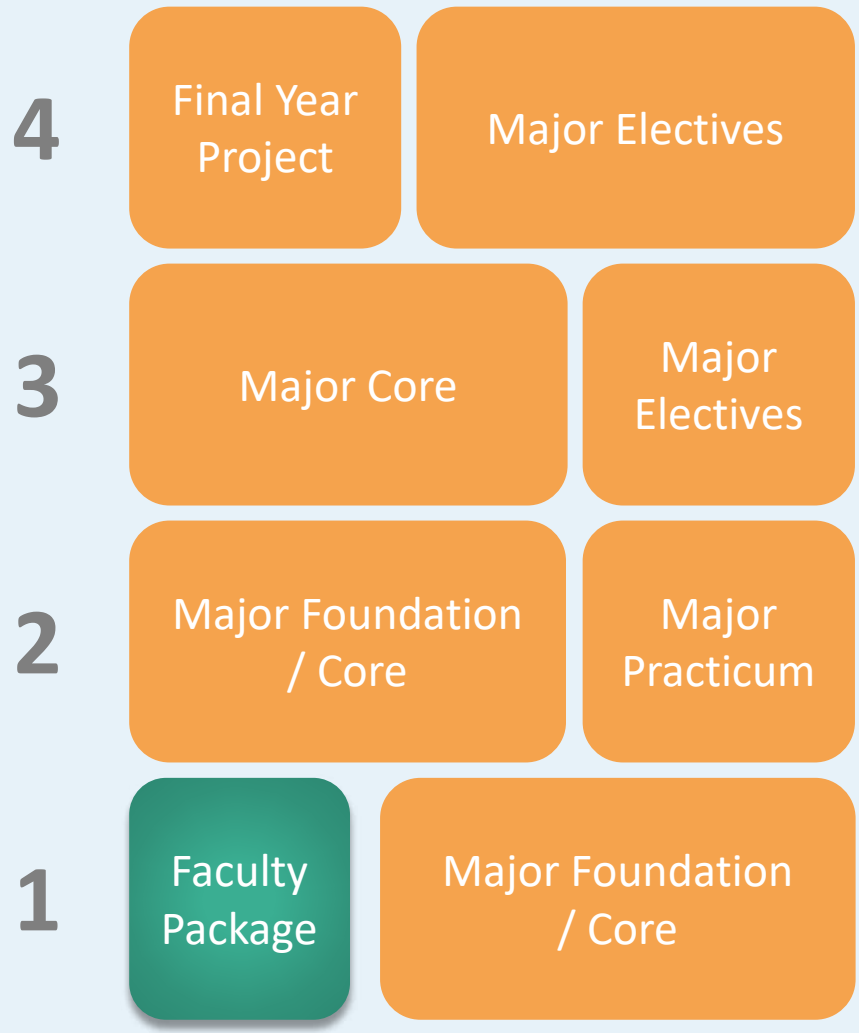
Major Requirements

Major Requirements	
Faculty Package	9
Foundation Courses	16
Major Required Courses	22
Research Components	6
Stream Requirements	22
Total of units required	**75**

Curriculum – Major Requirements



Curriculum – Faculty Package and Foundation



Faculty Package (9 units)

- Programming (ENGG1110)
- Linear Algebra (ENGG1120)
- Multivariable Calculus (ENGG1130)

Curriculum – Major Practicum

4	Final Year Project	Major Electives
3	Major Core	Major Electives
2	Major Foundation / Core	Major Practicum
1	Faculty Package	Major Foundation / Core

Major Foundation / Core (10 units)

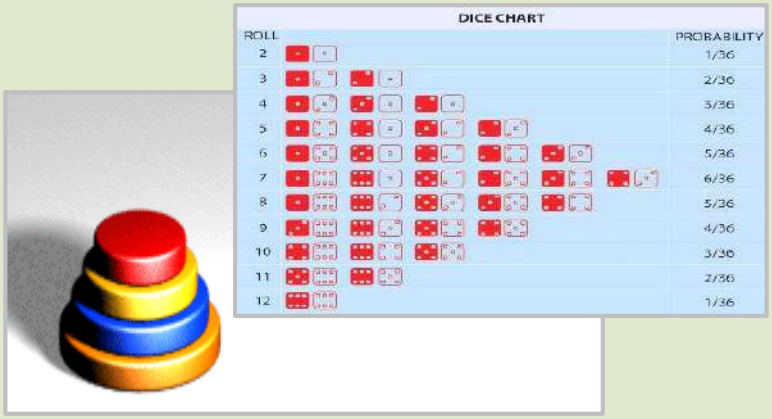
- Calculus for Engineers (MATH1510)
- Physics (PHYS1003/1110)
- Intro to AI & ML (AIST1000)
- Intro to Computing Using Python (AIST1110)

Curriculum – Major Foundation

4	Final Year Project	Major Electives
3	Major Core	Major Electives
2	Major Foundation / Core	Major Practicum
1	Faculty Package	Major Foundation / Core

Major Foundation / Core (13 units)

- Discrete Maths (ENGG2440)
- Probability (ENGG2760)
- Statistics (ENGG2780)
- Data Structures (CSCI2100)
- Intro to Computer Systems (AIST3020)



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Curriculum – Major Practicum

4	Final Year Project	Major Electives
3	Major Core	Major Electives
2	Major Foundation / Core	Major Practicum
1	Faculty Package	Major Foundation / Core

Major Practicum (3 units)

- Technology, Society and Engineering Practice (AIST2601)
- Engineering Practicum (AIST2602)

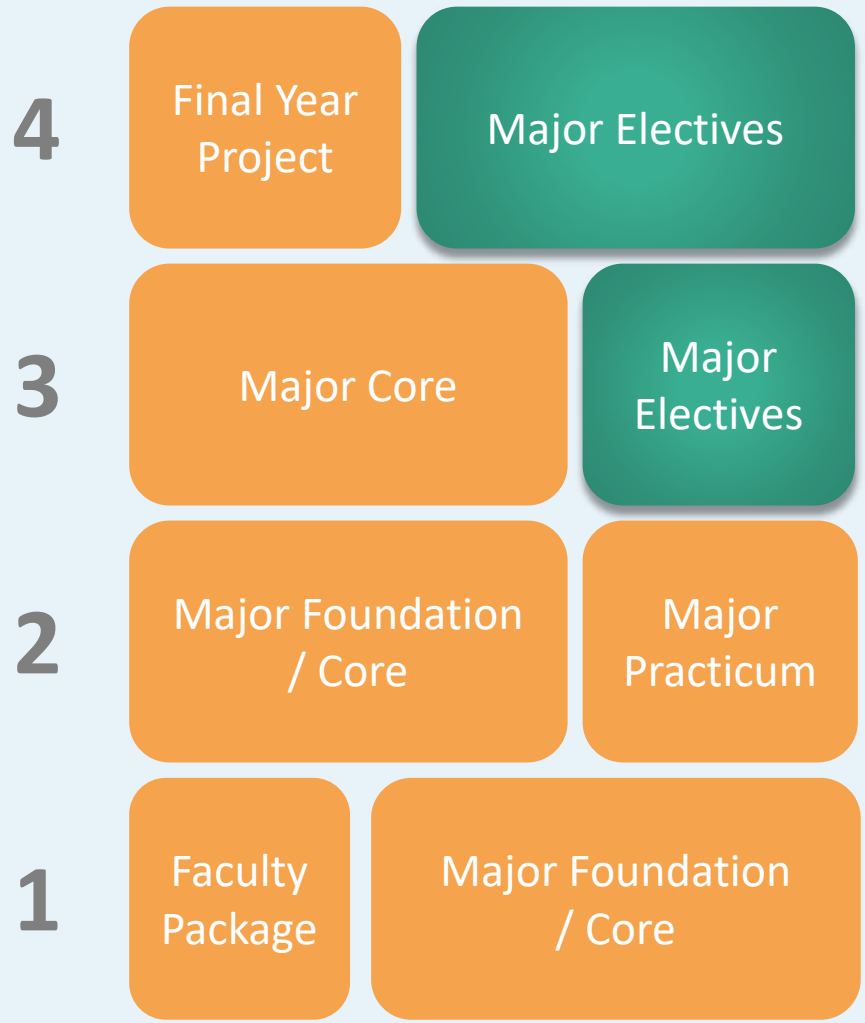
Curriculum – Major Core

4	Final Year Project	Major Electives
3	Major Core	Major Electives
2	Major Foundation / Core	Major Practicum
1	Faculty Package	Major Foundation / Core

Major Core (12 units)

- Numerical Optimization (AIST3030)
- Design and Analysis of Algorithms (CSCI3160)
- Fundamentals of Artificial Intelligence (CSCI3230)
- Fundamentals of Machine Learning (CSCI3320)

Curriculum – Major Electives



Major Electives (22 units)

Streams

1. Biomedical Intelligence
2. Intelligent Multimedia Processing
3. Large-scale Artificial Intelligence – Theory and Systems
4. Intelligent Manufacturing and Robotics

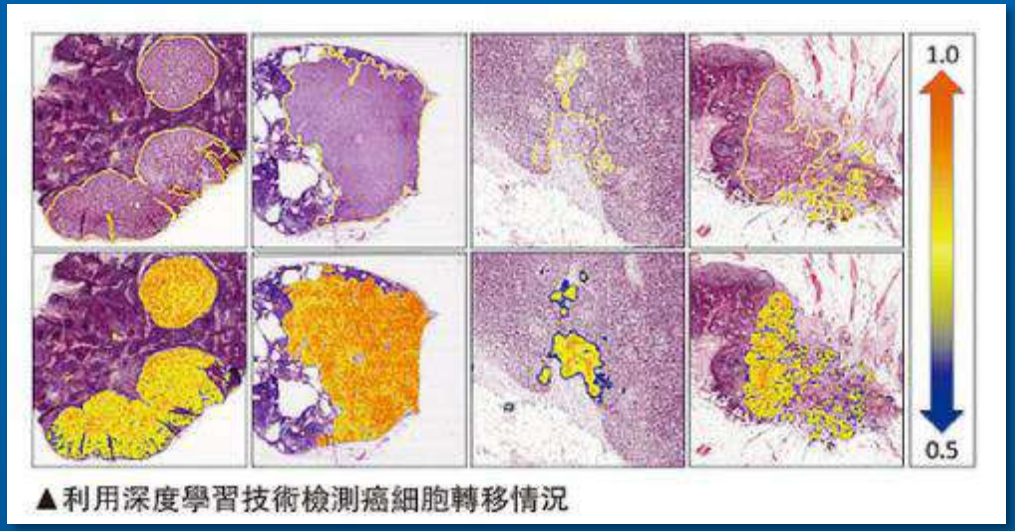
Non-Stream

5. General Artificial Intelligence: Systems and Technologies

Stream 1: Biomedical Intelligence

- Study how to build intelligent biomedicine and healthcare applications

- Two emerging markets:
  - » Personalized genomics and precision medicine (*e.g.* disease prevention, prediction, early diagnosis and treatment)
  - » Clinical record systems (*e.g.* electronic medical records and pharmacy prescription information and insurance records)



▲利用深度學習技術檢測癌細胞轉移情況

Stream 2: Intelligent Multimedia Processing

- Study how to bridge AI and human brain functions and design models, algorithms, and systems for multimedia processing with high performance and high accuracy.

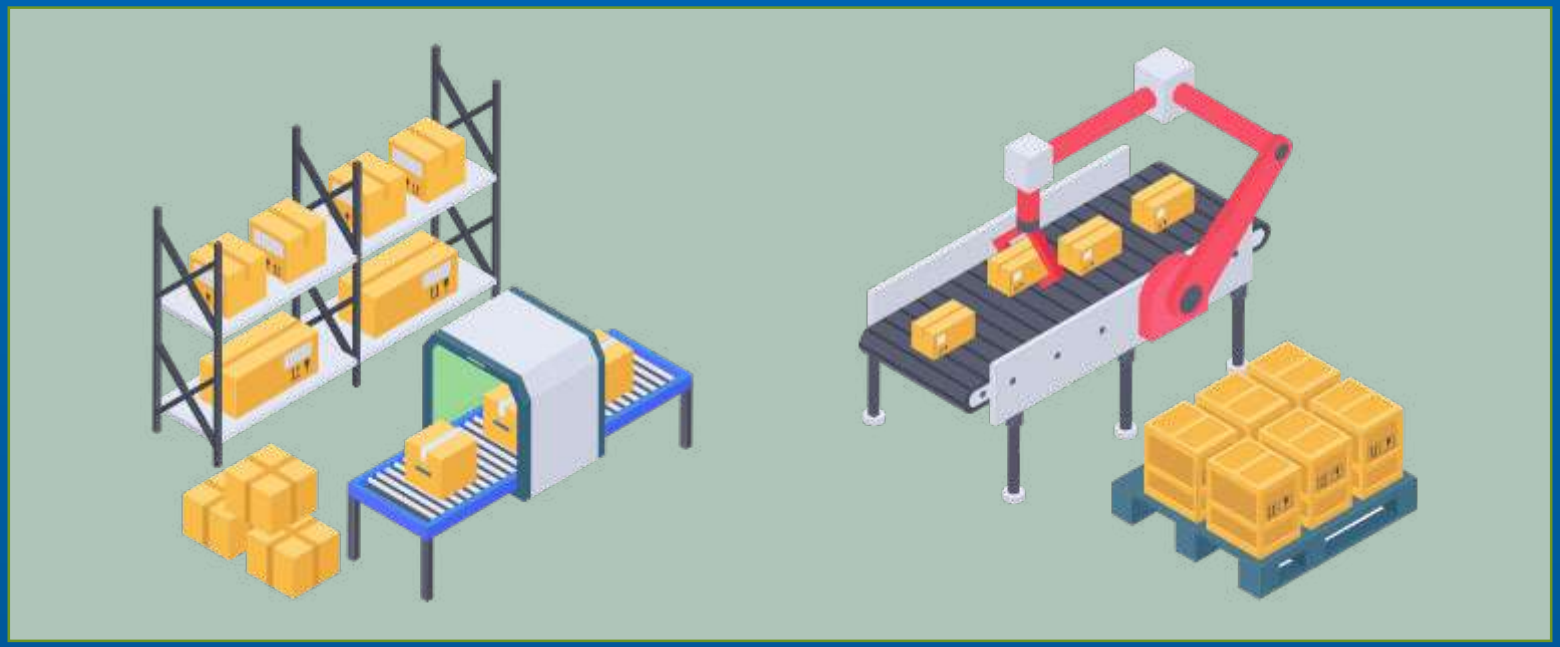
- Areas: digital image processing, face recognition, computer animation, human-computer interactions, speech and audio processing, computer linguistics

Stream 3: Large-scale AI – Theory and Systems

- Study the advanced techniques of realizing large-scale artificial intelligence from both theory and system perspectives
  - » **Theory**: machine learning theory, statistical inference, online algorithms, *etc.*
  - » **Systems**: high performance computing, distributed storage, big data management, *etc.*

Stream 4: Intelligent Manufacturing & Robotics

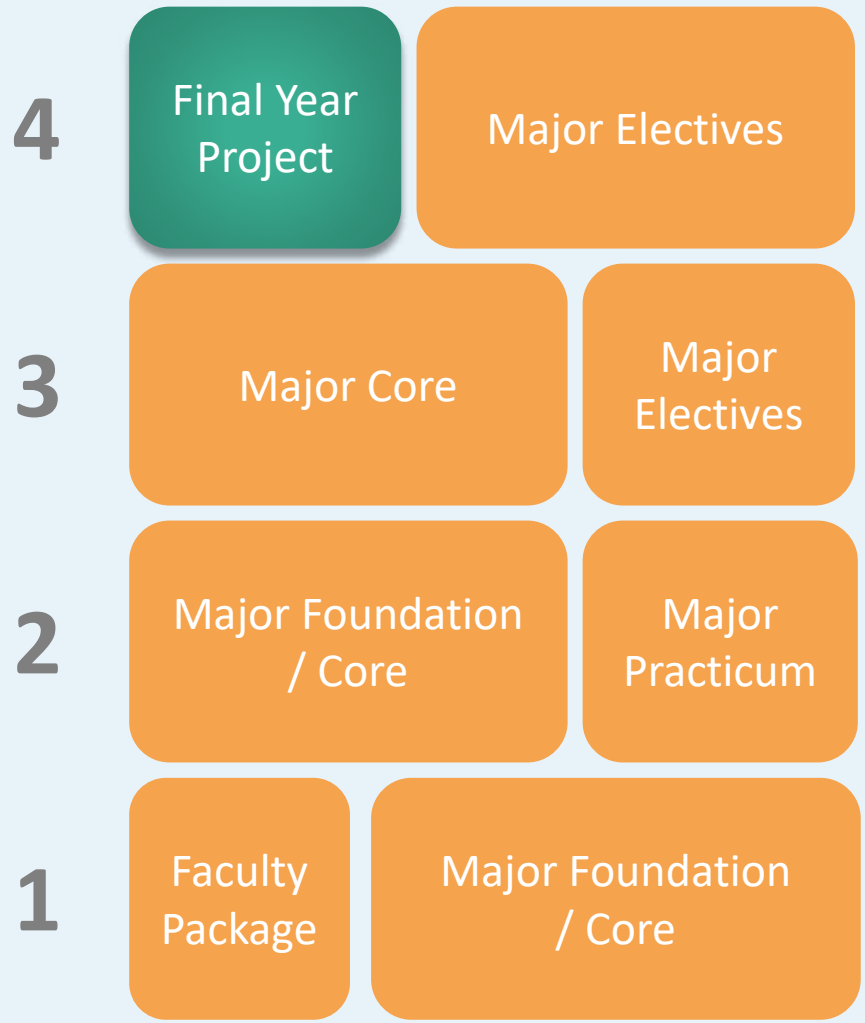
- Study how to integrate manufacturing and robotics with AI for different aspects of human activities.
- Focus on the topics of mechanics, sensing and control, design & manufacturing, human-robot interactions, *etc.*



Distinct Topics

- Many other practical and interesting courses in AI:
  - » Machine Learning
  - » Deep Learning
  - » Large Scale Distributed Computing
  - » Intelligent Embedded Systems
  - » Knowledge Representation/Inference
  - » Human-Computer Interactions
  - » Natural Language Processing
  - » Big Data Analytics
  - … …

Curriculum – Final Year Project (FYP)

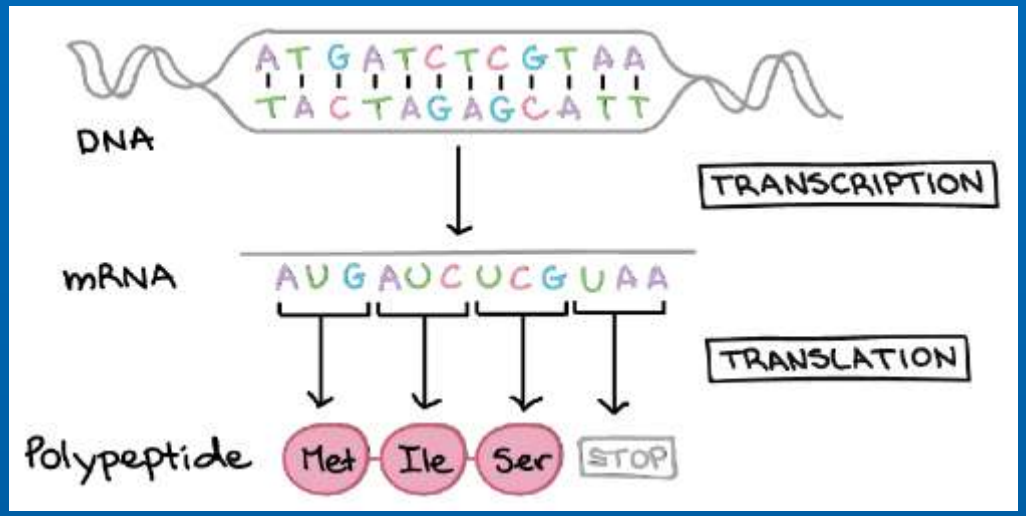


Final Year Project (6 units)

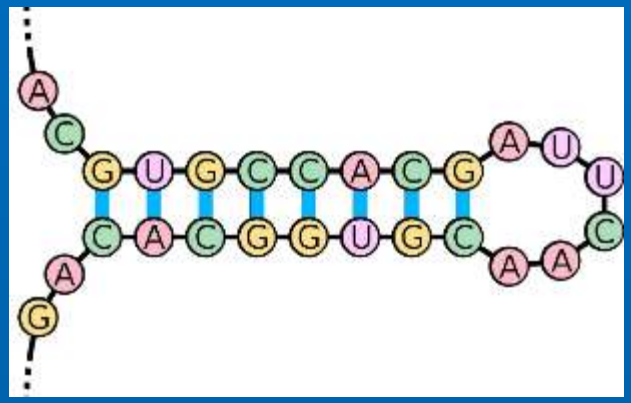
- Pick an interesting topic
- Interdisciplinary nature
- Apply the knowledge learnt in the previous courses
- Many open topics. Your creativity and discussion with the supervisor
- Complete a project under the supervision of an advisor

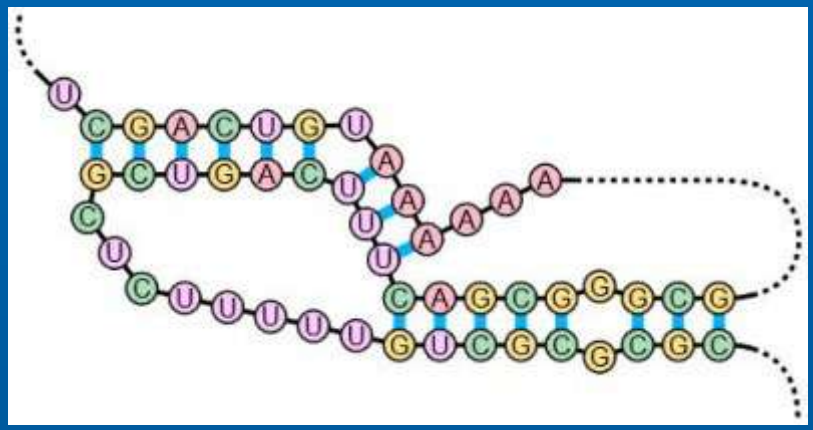
FYP Example (AI + Bioinformatics)

- Apply machine learning to predict RNA-protein interaction



RNA-binding protein (RBP)



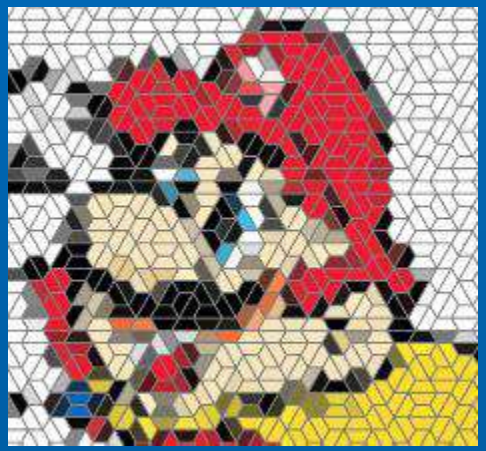


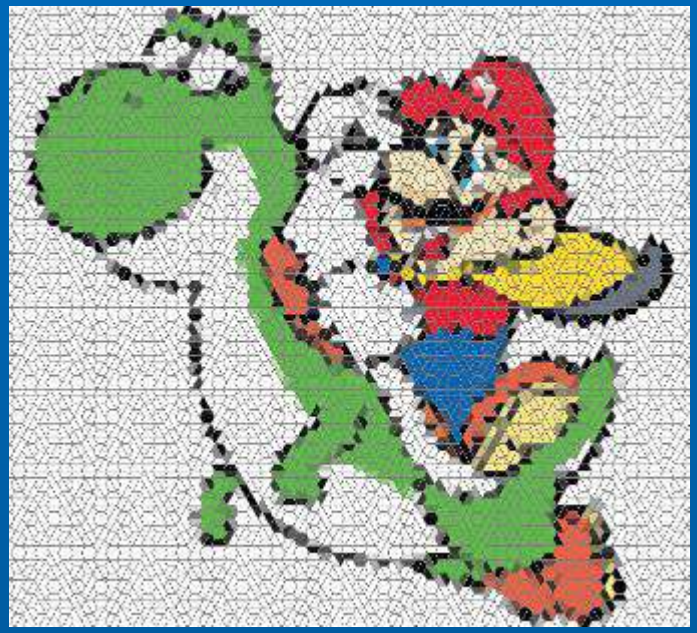
RNA folds to a specific structure to fit into the protein binding site

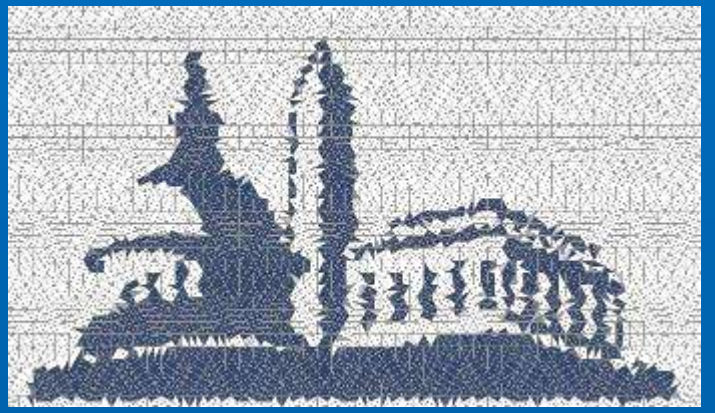
Sample from current CE/CS students (FYP KY1804)

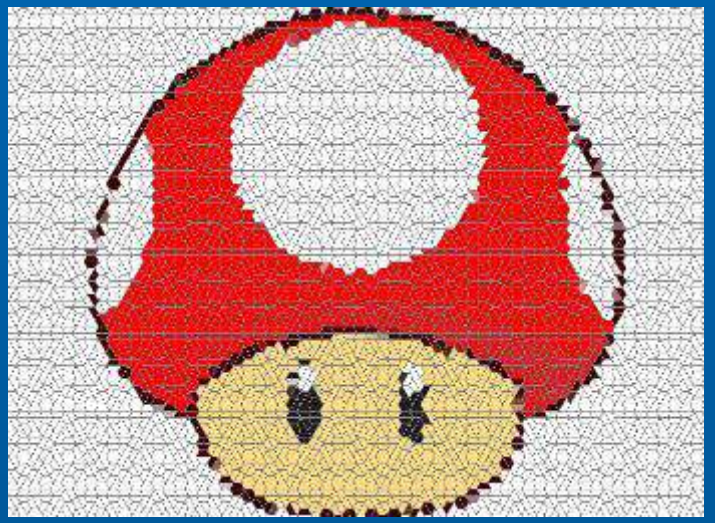
FYP Example (AI + Multimedia)

- Design a neural network that learns to produce a tiling





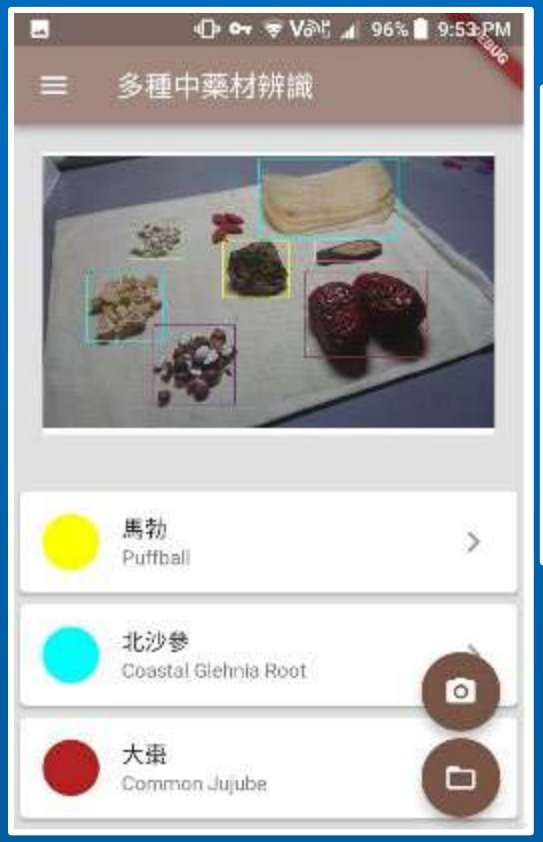


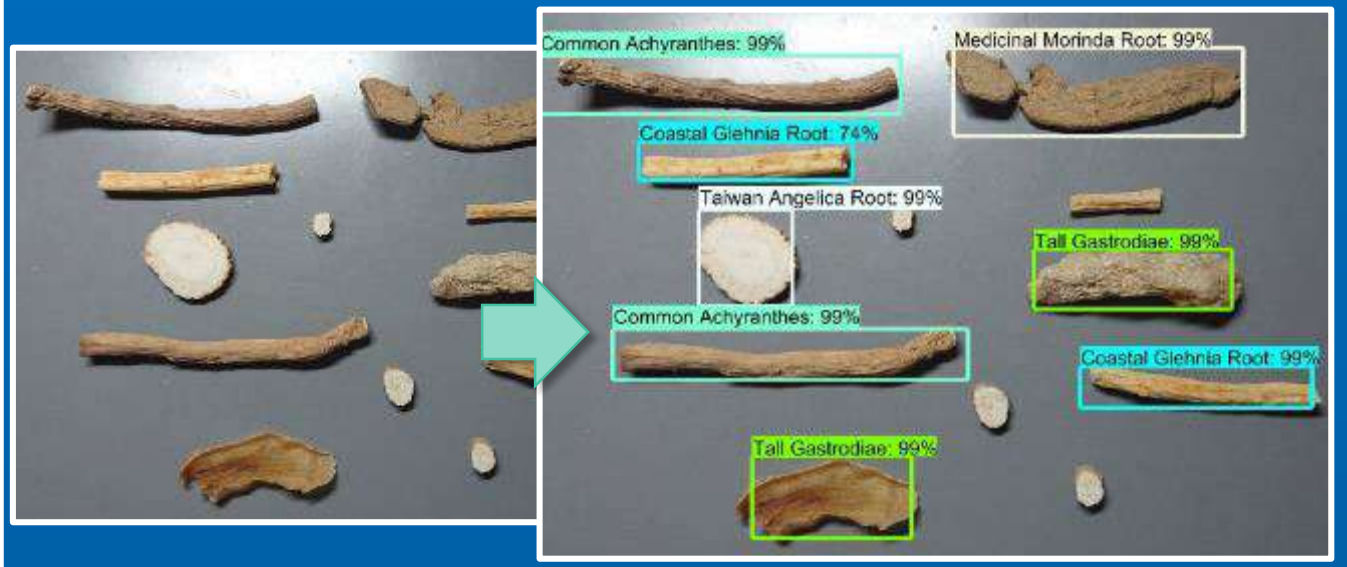


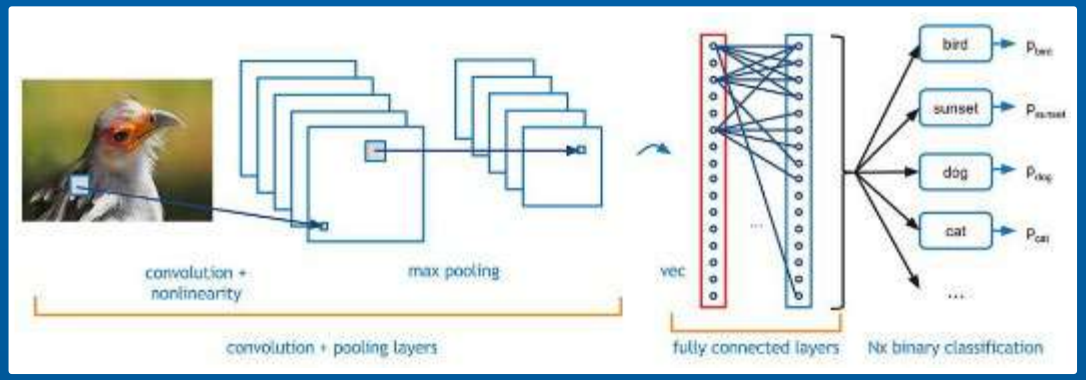
Sample from current CE/CS students (FYP CWF1902)

FYP Example (AI + Computer Vision)

- Chinese Medicinal Herb Recognizer







Sample from current CE/CS students (FYP MHW1804)

Recommended Course Pattern in Year 1

Term 1	Units	Term 2	Units
ENGG1110/ESTR1002 Problem Solving By Programming (Student is required to take this course in term 2 if he/she needs to take MATH1020)	3	ENGG1120/ESTR1005 Linear Algebra for Engineers	3
AIST1000 Introduction to Artificial Intelligence and Machine Learning	1	ENGG1130/ESTR1006 Multivariable Calculus for Engineers	3
MATH1510 * Calculus for Engineers	3	AIST1110 Introduction to Computing using Python	3
PHYS1003 / 1110 Physics course	3	UGFH / UGFN University Foundation GE	3
ENGG1003 Digital Literacy and Computational Thinking	3	ELTU1001 Foundation English for University Studies	3
CHLT1001 University Chinese I	3	College GE	0-2
College GE	0-3	PE	1
PE	1		
MATH1020 * General Mathematics *(only for students who could not pass the placement test of MATH1510)*	3		
	17-20		16-18

Recommended Course Pattern in Year 2

Term 1	Units	Term 2	Units
ENGG2440/ESTR2004 Discrete Mathematics for Engineers	3	AIST3020 Introduction to Computer Systems	3
ENGG2760/ESTR2018 Probability for Engineers	2	AIST2601 Technology, Society and Engineering Practice	2
CSCI2100/ESTR2102 Data Structures	3	AIST2602 Engineering Practicum	1
CHLT1002 University Chinese II	2	ENGG2780/ESTR2020 Statistics for Engineers	2
UGFH / UGFN University Foundation GE	3	ELTU2014 English for Engineering Students I	3
University GE	2-3	University GE	2-3
Minor / Free Electives	Remaining units	Minor / Free Electives	Remaining units
	15-18		13-18

Recommended Course Pattern in Year 3

Term 1	Units	Term 2	Units
AIST3030/ESTR3114 Numerical Optimization	3	CSCI3320 Fundamentals of Machine Learning	3
CSCI3160/ESTR3104 Design and Analysis of Algorithms	3	Stream electives	9-12
CSCI3230/ESTR3108 Fundamentals of Artificial Intelligence	3	ELTU3014 English for Engineering Students II	2
Stream electives	3-6	Minor / Free Electives	Remaining units
University GE	2-3		
Minor / Free Electives	Remaining units		
	15-18		14-18

Recommended Course Pattern in Year 4

Term 1	Units	Term 2	Units
AIST4998 Final Year Project I	3	AIST4999 Final Year Project II	3
Stream electives	6-9	Stream electives	4-8
Minor / Free Electives	Remaining units	Minor / Free Electives	Remaining units
	9-18		9-18

Diverse Learning Experience at CSE

Recent Achievements in Intl'/Local Competitions

Champion in
Robocon Hong Kong Contest
in 2021 and 2022

Hong Kong Computer Society
Student Sponsorship 2022

First Prize in the Cloud Track of the
Huawei ICT Competition (2023)

Industrial Visits

- Visit to companies to learn latest development in industry

Work-Study Scheme

2 or 3 years study + 1 year work-study

Google

Microsoft

hp

FUJITSU

HSBC

恒生銀行 HANG SENG BANK

新鴻基地產 Sun Hung Kai Properties

ASM Pacific Technology

HKSTP 香港科技園

Exchange

- Students often do overseas exchange in the 2nd or 3rd year

- Credit transfer
  - PLEASE apply for credit transfer **IN ADVANCE** by providing the course details to the Department before enrolling the courses in the exchange university.
  - Grade B is required for credit transfer

Exchange Opportunities

e.g.

- Macquarie University, Australia
- University of Toronto, Canada
- University of Waterloo, Canada
- Shanghai Jiao Tong University, China
- Soka University, Japan
- National University of Singapore, Singapore
- University of Sheffield, UK
- University of California, Davis, USA
- University of Massachusetts Amherst, USA

Life at CSE

- CSE Corner: https://i.cse.cuhk.edu.hk/
- Facebook pages:
  - Faculty of Engineering https://www.facebook.com/cuhkengg

Life at CUHK

- Living on Campus: http://www.cuhk.edu.hk/english/campus/accommodation.html
- Library: https://www.lib.cuhk.edu.hk/
  - Past papers
- Independent Learning Center (ILC) https://www.ilc.cuhk.edu.hk/
- Facebook pages:
  - 中大人資訊專頁 https://www.facebook.com/cuhkinfo

Other learning options

Double majors

Minor programme(s)

Important Reminders

- Treasure your time in University.
- Mange your time wisely:
  study, extra-curricular activities, part-time job, etc.
- Study scheme is updated every year.
  You SHOULD follow the study scheme of your entry year, i.e., **2023 entry**, and keep following it when you progress.
- Pay attention to course prerequisite!
- Declaration of stream:
  you should declare in September of your final year.

Important Reminders (cont)

- Our CSE Tech Team will provide each of you with a CSE account for our systems and PCs in our labs.

- Make good use of our intranet for UG students. The department will make announcements via emails and put the announcements in our intranet. https://i.cse.cuhk.edu.hk/undergraduate/ (access through Department website)

- Set up email forwarding to/from your CUHK email accounts

Study Scheme

- Personal advice
  - Take as many credits as possible in the 1st year
  - Maximum = 18 units per semester
  - Year 1 Term 1 Max. units: 19 (default)

Questions & Answers

Q1: Can I “NOT follow” the recommended study pattern?

Almost all courses are **pre-assigned in year 1.**

You need to obtain the Department’s consent to drop the required courses.

We advise against not following the study pattern. If you do so, you may face **time conflict** in the major required courses in your senior years.

Q2: Can I take more than 18 units per semester?

Yes, you may apply for **credit overload** in a semester, but we **do not recommend rushing to finish your study**.

Note:
Some students may be pre-assigned to take 19 units in year 1. It depends on your affiliated college; some colleges will pre-assign College General Education (GE) for students, while some will not.

Q3: Where can I find course information?

- CUSIS
  - **Teaching timetable by Subj/Dept**
    - Make sure to select “view all”
  - **Browse Course Catalog**: Course syllabus, learning outcomes
  - **Browse Program Information**: Study scheme

Useful Links

- **Student Handbook**

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

- **Registration and Examinations Section (RES)**

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/

Lastly, Academic Advising

-Every student is assigned an academic advisor

-You will meet at least once a year 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 monthly meeting with the academic advisor.

Department may, in providing Academic Advisory Service or in emergency, contact your parent(s)/ guardian(s), if necessary, and disclose to them my personal data held by the Department and in the Student Information System.

Please take a few minutes before you go to complete the consent form:

Contact Us

dept@cse.cuhk.edu.hk

http://www.cse.cuhk.edu.hk

Note:
Our department is responsible for AIST / CENG / CSCI courses only. If you have questions on other courses, please contact the concerned course offering department for assistance.

Thank you !