Academic Counselling Session for New Students

Computer Science and Engineering (BCSE)

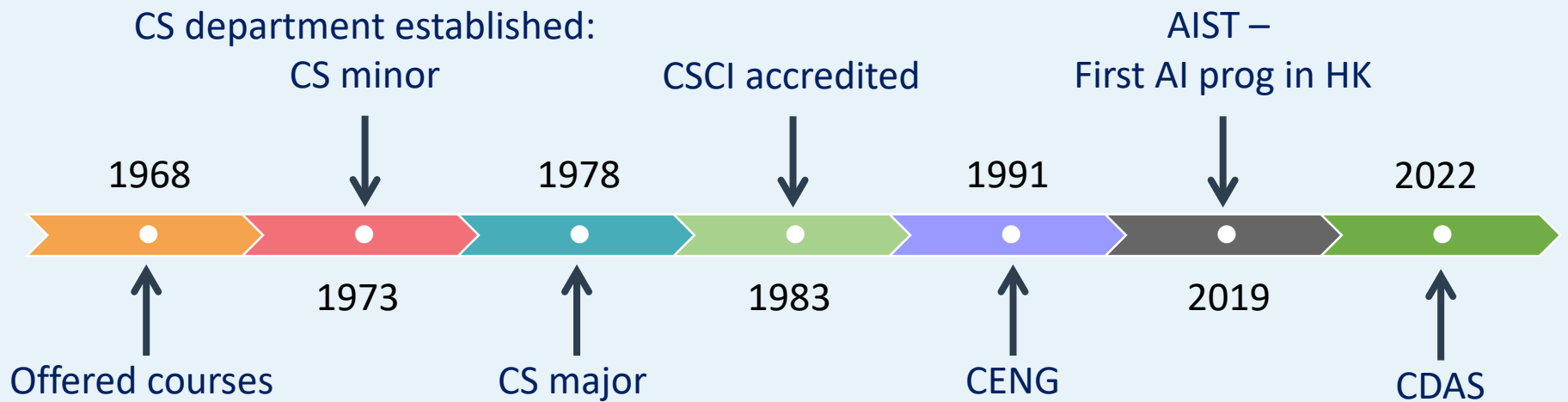Computer Engineering (CENG)

Computer Science (CSCI)

Agenda

1. Brief introduction of our Department
2. Graduation Requirements & Curriculum Structure (4 year curriculum)
3. Graduation Requirements & Curriculum Structure (2 year curriculum)
4. Declaration of Major for BCSE students
5. Diverse Learning Experience
6. Other Learning Options
7. Important Reminders
8. Q&A
9. Academic Advising

A Long History

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

CS department established:
CS minor

CSCI accredited

AIST –
First AI prog in HK

1968

1978

1991

2022

1973

1983

2019

Offered courses

CS major

CENG

CDAS

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. 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

Graduation Requirements
For BCSE
(4-year Curriculum)

Graduation Requirements

Major Requirements (75 units)

University Core Requirements (39units)

Free Electives *(9 Units)*

Min. 123 Units for Graduation

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**

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 Structure

Curriculum – Major Requirements

Curriculum – Faculty Package and Foundation

4	Final Year Project	Major Electives
3	Major Core	Major Electives
2	Major Foundation	Major Core
1	Faculty Package	Faculty Foundation (Maths + Science)

Faculty Package and Foundation (15 units)

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

Curriculum – Major Foundation *(for CE)*

4	Final Year Project	Major Electives
3	Major Core	Major Electives
2	Major Foundation	Major Core
1	Faculty Package	Faculty Foundation (Maths + Science)

Major Foundation (11 units)

- » C++ (CSCI1120)
- » Complex Variables (ENGG2720)
- » Differential Equations (ENGG2740)
- » Probability (ENGG2760)
- » Statistics (ENGG2780)

Curriculum – Major Core *(for CE)*

4	Final Year Project	Major Electives
3	Major Core	Major Electives
2	Major Foundation	Major Core
1	Faculty Package	Faculty Foundation (Maths + Science)

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 CE)*

4	Final Year Project	Major Electives
3	Major Core	Major Electives
2	Major Foundation	Major Core
1	Faculty Package	Faculty Foundation (Maths + Science)

Major Core (31 units)

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

Curriculum – Major Core *(for CE)*

4	Final Year Project	Major Electives
3	Major Core	Major Electives
2	Major Foundation	Major Core
1	Faculty Package	Faculty Foundation (Maths + Science)

Major Core (31 units)

» Fundamental of Electric Circuits (ELEG2202)

» Digital Logic and Systems (ENGG2020)
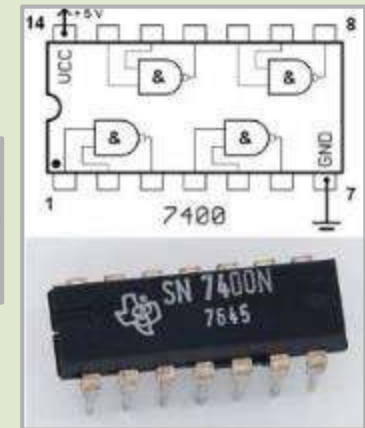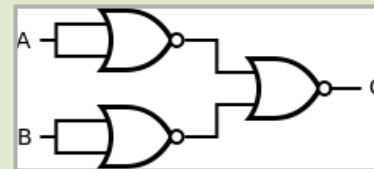
Curriculum – Major Electives *(for CE)*

4	Final Year Project	Major Electives
3	Major Core	Major Electives
2	Major Foundation	Major Core
1	Faculty Package	Faculty Foundation (Maths + Science)

Major Electives (12 units)

Streams

1. **Embedded Systems**
2. **VLSI Design and EDA**

Non-Stream

3. General Computer Engineering
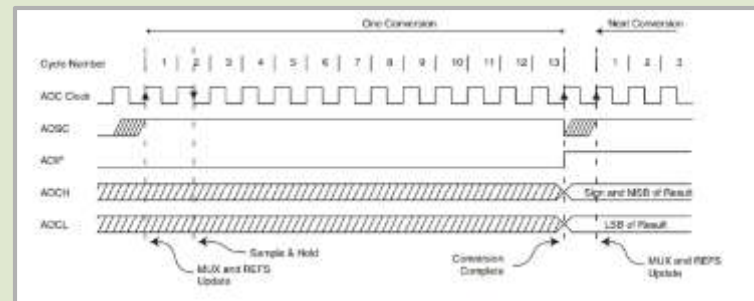
Curriculum – Major Foundation *(for CS)*

4	Final Year Project	Major Electives
3	Major Core	Major Electives
2	Major Foundation	Major Core
1	Faculty Package	Faculty Foundation (Maths + Science)

Major Foundation (10 units)

- » Java (CSCI1130)
- » Discrete Maths (ENGG2440)
- » Probability (ENGG2760)
- » Statistics (ENGG2780)

Curriculum – Major Core *(for CS)*

4	Final Year Project	Major Electives
3	Major Core	Major Electives
2	Major Foundation	Major Core
1	Faculty Package	Faculty Foundation (Maths + Science)

Major Core (27 units)

» Computer Organization and Design (CENG3420)

» Data Structure (CSCI2100)
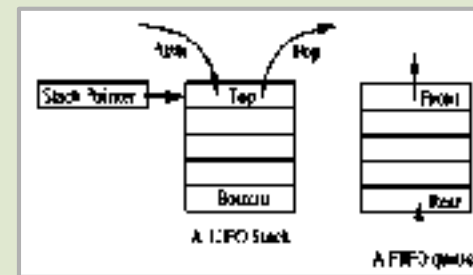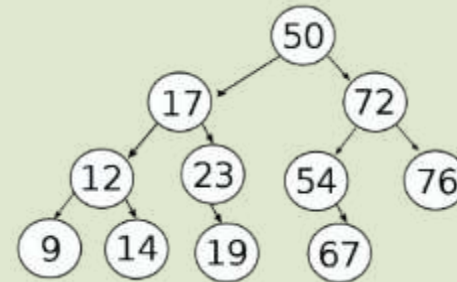
Curriculum – Major Core *(for CS)*

4	Final Year Project	Major Electives
3	Major Core	Major Electives
2	Major Foundation	Major Core
1	Faculty Package	Faculty Foundation (Maths + Science)

Major Core (27 units)

» Software Engineering (CSCI3100)

» Formal Languages and Automata Theory (CSCI3130)

» Intro to Operating Systems (CSCI3150)

» Design and Analysis of Algorithms (CSCI3160)

» Principles of Programming Languages (CSCI3180)

Curriculum – Major Core *(for CS)*

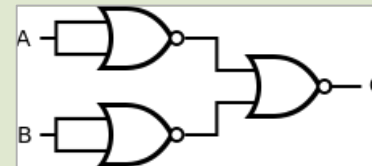|		
4	Final Year Project	Major Electives
3	Major Core	Major Electives
2	Major Foundation	Major Core
1	Faculty Package	Faculty Foundation (Maths + Science)

Major Core (27 units)

» Computers and Society (CSCI3250)

» Engineering Practicum (CSCI3251)

» Digital Logic and Systems (ENGG2020)
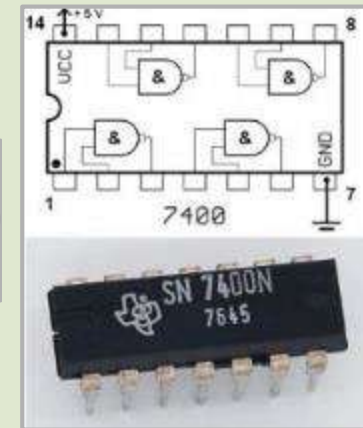
Curriculum – Major Electives *(for CS)*

|		
4	Final Year Project	Major Electives
3	Major Core	Major Electives
2	Major Foundation	Major Core
1	Faculty Package	Faculty Foundation (Maths + Science)

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)

4	Final Year Project	Major Electives
3	Major Core	Major Electives
2	Major Foundation	Major Core
1	Faculty Package	Faculty Foundation (Maths + Science)
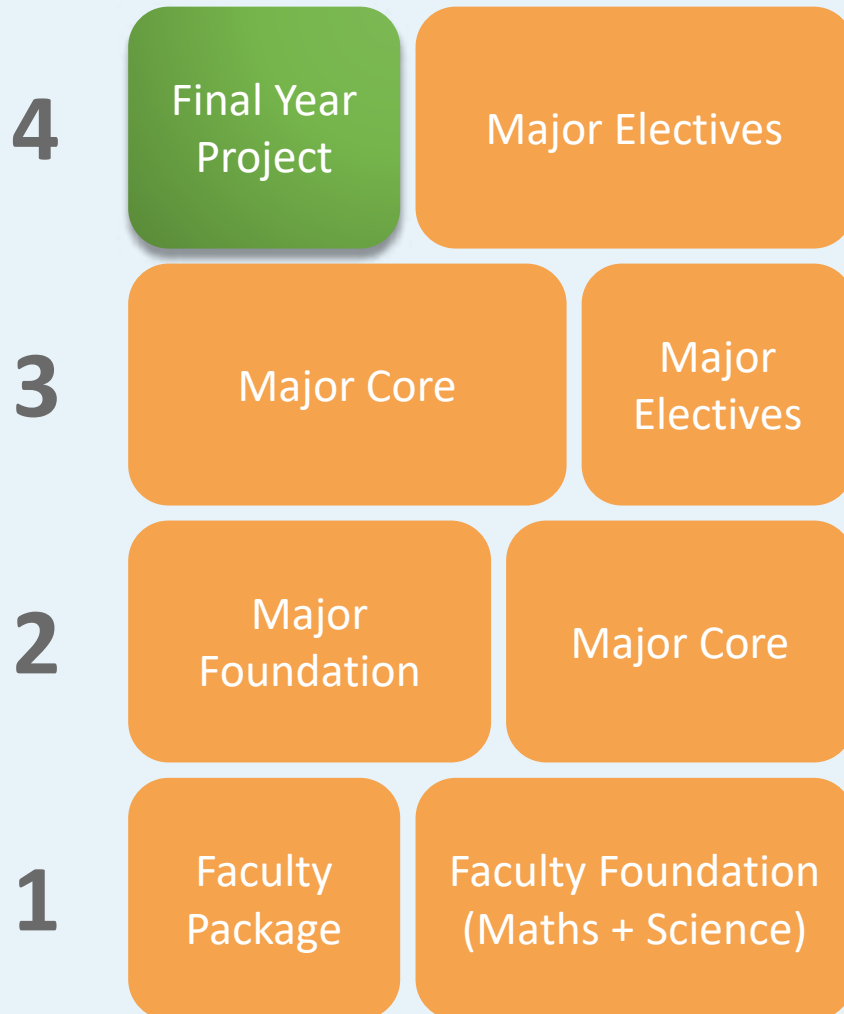
Final Year Project (6 units)

- » 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

Graduation Requirements
For CENG & CSCI
(2-year Curriculum)

Graduation Requirements

Major Requirements (52 units)

University Core Requirements (12 – 16 units)

Free Electives *(Remaining Units if any)*

Min. 69 Units for Graduation

University Core Requirements

University Core Requirements	Associate Degree Holders	Higher Diploma Holders
English Language	2-unit (ELTU3014)	5 units (ELTU2014 & ELTU3014)
University General Education	3 units (GE Foundation); 2 units (Area A GE course)	
College General Education	2 to 3 units depending on College affiliation	
Understanding China	1-unit *(online course - complete before graduation in any one term, including summer term)*	
Hong Kong in the Wider Constitutional Order	1-unit *(online course - complete before graduation in any one term, including summer term)*	
Physical Education	1-unit	
Total of units required	**12-13**	**15-16**

Major Requirements

Major Requirements	Computer Engineering	Computer Science
Faculty Package	3-unit (ENGG1120)	
Foundation Courses	3-unit	7-unit
Major Required Courses	28-unit	21-unit
Research Components	6-unit	
Stream Requirements	12-unit	15-unit
Total of units required	**52**	

Curriculum Structure

Curriculum – Major Requirements *(for CE)*

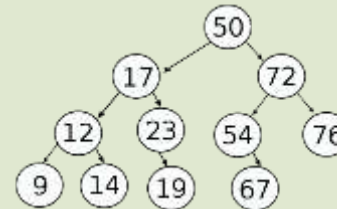|		
T4	Final Year Project (3)	Major Required (6) + Stream Courses (3)
T3	Final Year Project (3)	Major Required (3) + Stream Courses (9)
T2	Faculty Package (3)	Major Required (9)
T1	Major Required (10)	Faculty Foundation (3)

Year 1 Term 1 (13 units)

» Calculus for Engineers (MATH1510)
» Digital Logic Design Laboratory (CENG2010)
» Embedded System Design (CENG2400)
» Discrete Mathematics and Algorithms (CSCI3190)
» Digital Logic and Systems (ENGG2020)

Curriculum – Major Requirements *(for CE)*

T4	Final Year Project (3)	Major Required (6) + Stream Courses (3)
T3	Final Year Project (3)	Major Required (3) + Stream Courses (9)
T2	Faculty Package (3)	Major Required (9)
T1	Major Required (10)	Faculty Foundation (3)

Year 1 Term 2 (12 units)

» Linear Algebra (ENGG1120)
» Fundamentals of Embedded Systems (CENG2030)
» Computer Organization and Design (CENG3420)
» Data Structures (CSCI2100)
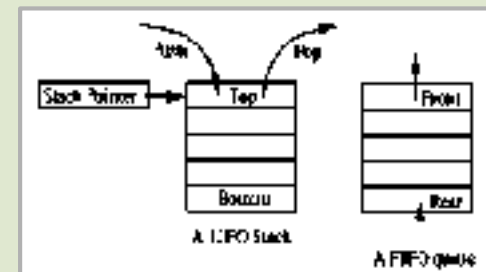
Curriculum – Major Requirements *(for CE)*

T4	Final Year Project (3)	Major Required (6) + Stream Courses (3)
T3	Final Year Project (3)	Major Required (3) + Stream Courses (9)
T2	Faculty Package (3)	Major Required (9)
T1	Major Required (10)	Faculty Foundation (3)

Year 2 Term 1 (15 units)

» FYP (CENG4998)

» Intro to Operating Systems (CSCI3150)

» Stream courses (9 units)

Curriculum – Major Requirements *(for CE)*

T4	Final Year Project (3)	Major Required (6) + Stream Courses (3)
T3	Final Year Project (3)	Major Required (3) + Stream Courses (9)
T2	Faculty Package (3)	Major Required (9)
T1	Major Required (10)	Faculty Foundation (3)

Year 2 Term 2 (12 units)

» FYP (CENG4999)

» Software Engineering (CSCI3100)

» Computers and Society (CSCI3250)

» Engineering Practicum (CSCI3251)

» Stream courses (3 units)

Curriculum – Major Requirements *(for CE)*

T4	Final Year Project (3)	Major Required (6) + Stream Courses (3)
T3	Final Year Project (3)	Major Required (3) + Stream Courses (9)
T2	Faculty Package (3)	Major Required (9)
T1	Major Required (10)	Faculty Foundation (3)

Major Electives (12 units)

Streams

1. **Embedded Systems**
2. **VLSI Design and EDA**

Non-Stream

General Computer Engineering
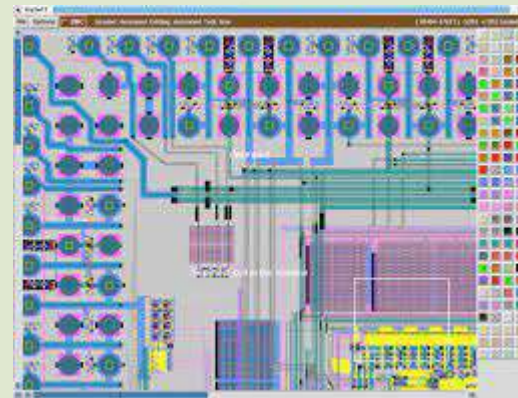
Curriculum – Major Requirements *(for CS)*

T4	Final Year Project (3)	Major Required (3) + Stream Courses (6)
T3	Final Year Project (3)	Major Required (3) + Stream Courses (6)
T2	Faculty Package (3)	Foundation (2) + Major Required (9)
T1	Stream Courses (3)	Foundation (5) + Major Required (6)

Year 1 Term 1 (14 units)

» Discrete Maths (ENGG2440)
» Probability (ENGG2760) (2)
» Formal Languages and Automata Theory (CSCI3130)
» Design and Analysis of Algorithms (CSCI3160)
» Stream courses (3 units)

Curriculum – Major Requirements *(for CS)*

T4	Final Year Project (3)	Major Required (3) + Stream Courses (6)
T3	Final Year Project (3)	Major Required (3) + Stream Courses (6)
T2	Faculty Package (3)	Foundation (2) + Major Required (9)
T1	Stream Courses (3)	Foundation (5) + Major Required (6)

Year 1 Term 2 (14 units)

» Linear Algebra (ENGG1120)

» Statistics (ENGG2780)

» Computer Organization and Design (CENG3420)

» Software Engineering (CSCI3100)

» Principles of Programming Languages (CSCI3180)

Curriculum – Major Requirements *(for CS)*

T4
- Final Year Project (3)
- Major Required (3) + Stream Courses (6)

T3
- Final Year Project (3)
- Major Required (3) + Stream Courses (6)

T2
- Faculty Package (3)
- Foundation (2) + Major Required (9)

T1
- Stream Courses (3)
- Foundation (5) + Major Required (6)

Year 2 Term 1 (12 units)

» FYP (CSCI 4998)

» Intro to Operating Systems (CSCI3150)

» Stream courses (6 units)

Curriculum – Major Requirements *(for CS)*

T4	Final Year Project (3)	Major Required (3) + Stream Courses (6)
T3	Final Year Project (3)	Major Required (3) + Stream Courses (6)
T2	Faculty Package (3)	Foundation (2) + Major Required (9)
T1	Stream Courses (3)	Foundation (5) + Major Required (6)

Year 2 Term 2 (12 units)

» FYP (CSCI 4999)
» Computers and Society (CSCI3250)
» Engineering Practicum (CSCI3251)
» Stream courses (6 units)

Computer Ethics

Curriculum – Major Requirements *(for CS)*

T4	Final Year Project (3)	Major Required (3) + Stream Courses (6)
T3	Final Year Project (3)	Major Required (3) + Stream Courses (6)
T2	Faculty Package (3)	Foundation (2) + Major Required (9)
T1	Stream Courses (3)	Foundation (5) + Major Required (6)

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

For both 4 year and 2 year curriculum – Distinct Topics

- Computer-aided Design for Very Large Scale Integrated Circuits (CENG4120/CENG5030/CENG5270)
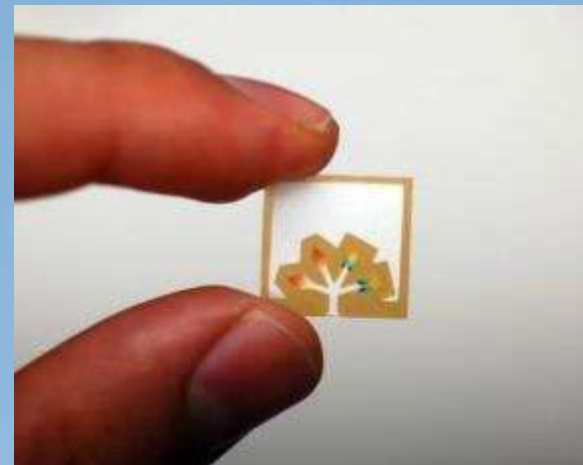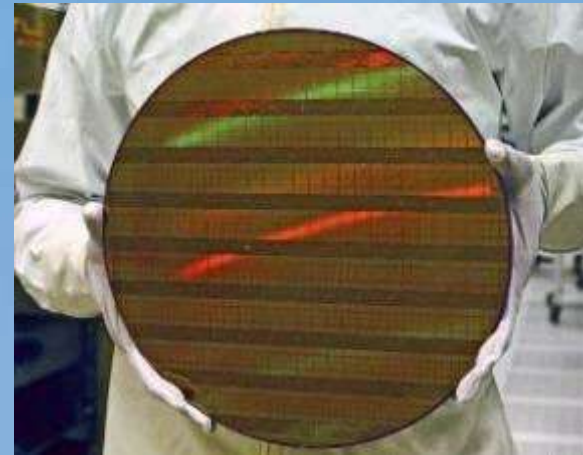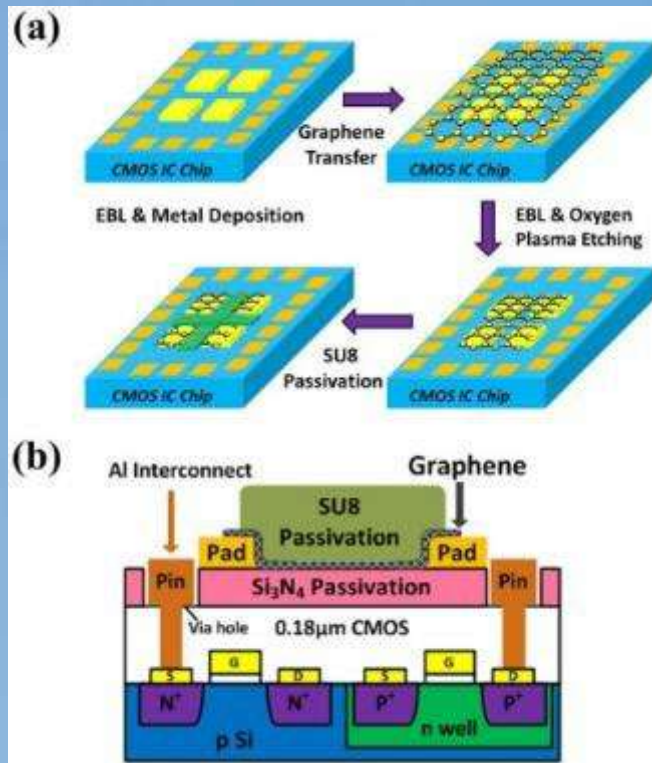
For both 4 year and 2 year curriculum – Distinct Topics

- Embedded System Development and Applications (CENG4480)

For both 4 year and 2 year curriculum – Distinct Topics

- Artificial Intelligence (CSCI3230/ESTR3108)
  - » Create computer software that are capable of intelligent behavior
    - ✓ Searching
    - ✓ Pattern recognition
    - ✓ Genetics algorithms
    - ✓ Artificial neural networks
    - ✓ Deep learning
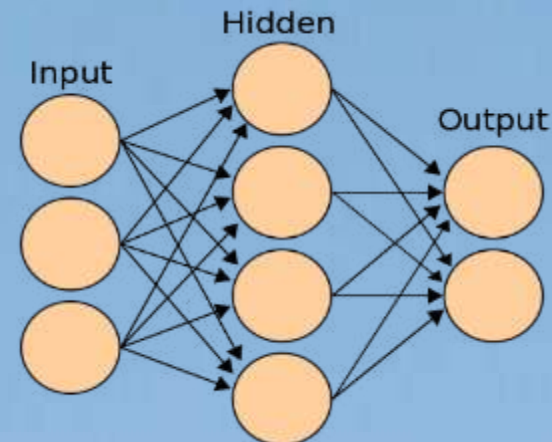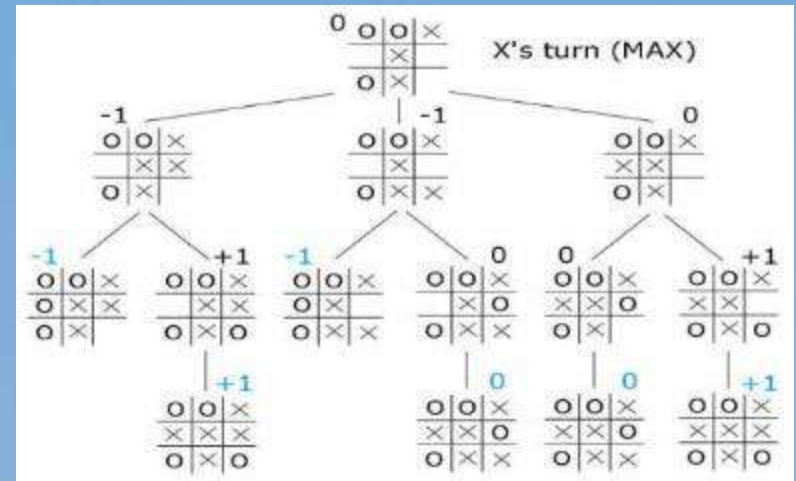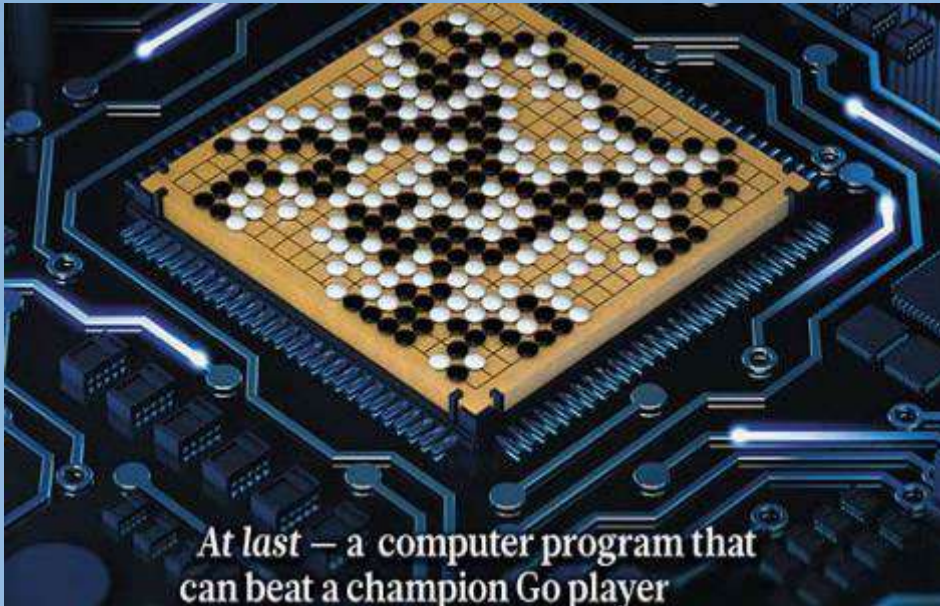
At last – a computer program that can beat a champion Go player

For both 4 year and 2 year curriculum – Distinct Topics

- Computer Graphics and Multi-media (CSCI3260/CSCI3280/CSCI3290)
  - » Use graphics cards to create photorealistic images and movies
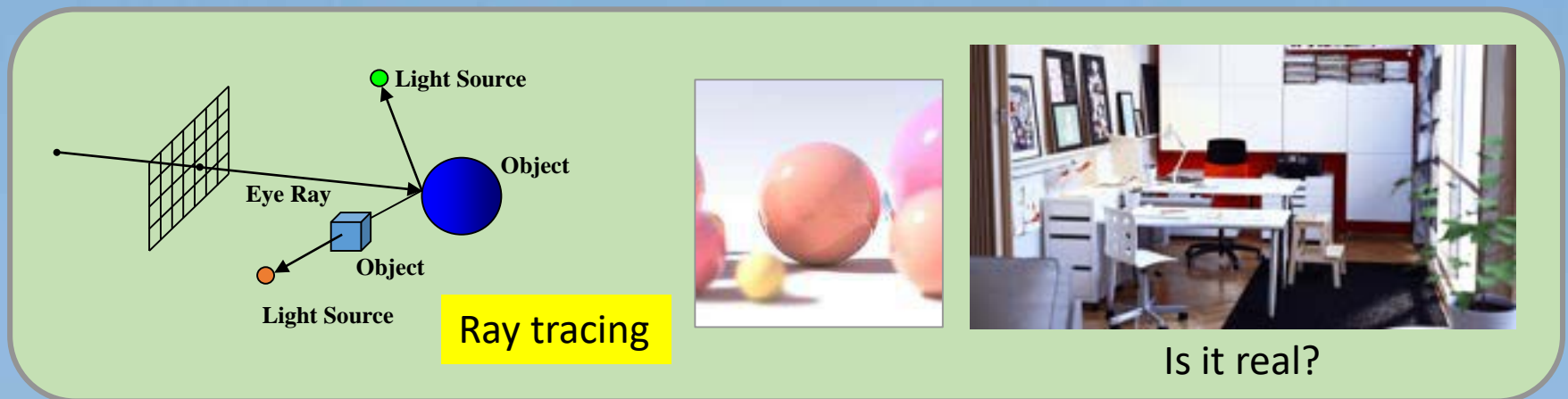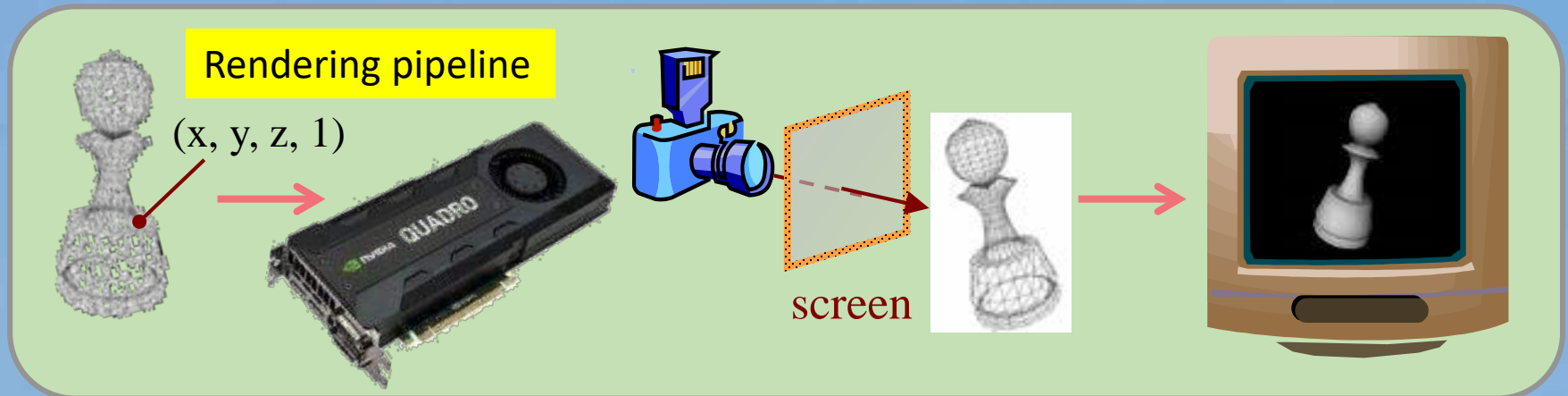
Rendering pipeline

$(x, y, z, 1)$

screen

Light Source

Eye Ray

Object

Object

Light Source

Ray tracing

Is it real?

For both 4 year and 2 year curriculum – Distinct Topics

- Computer Graphics and Multi-media (CSCI3260/CSCI3280/CSCI3290)
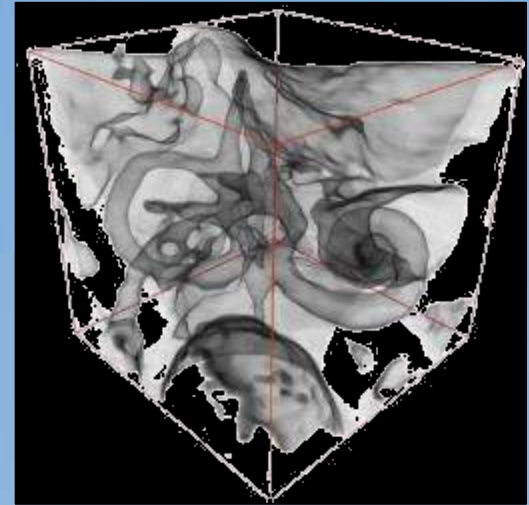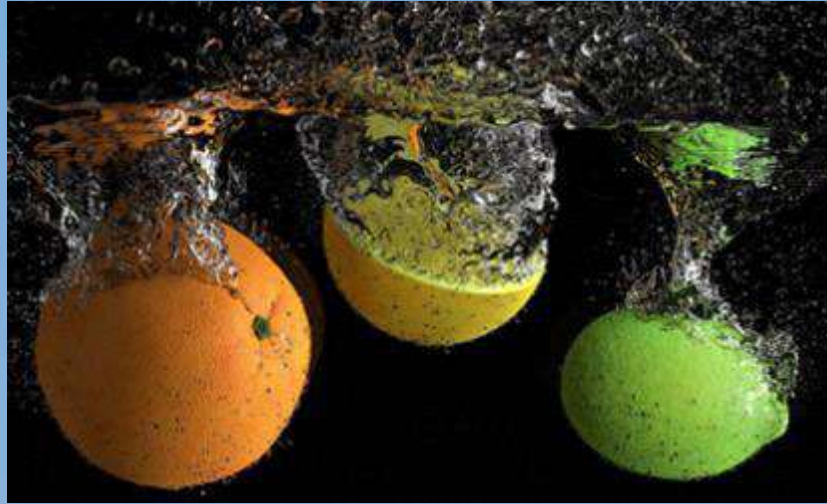
Film & visual effects & data visualization

For both 4 year and 2 year curriculum – Distinct Topics

- Computer Graphics and Multi-media (CSCI3260/CSCI3280/CSCI3290)
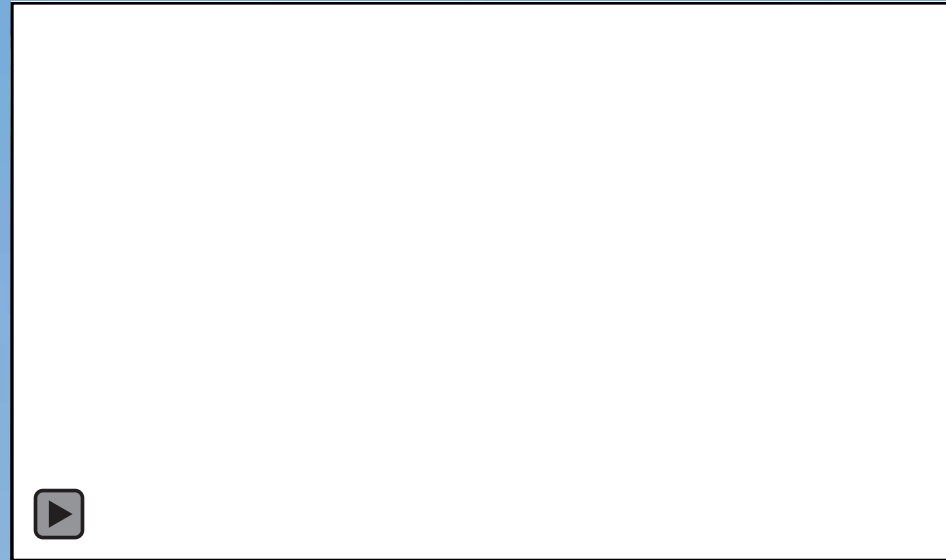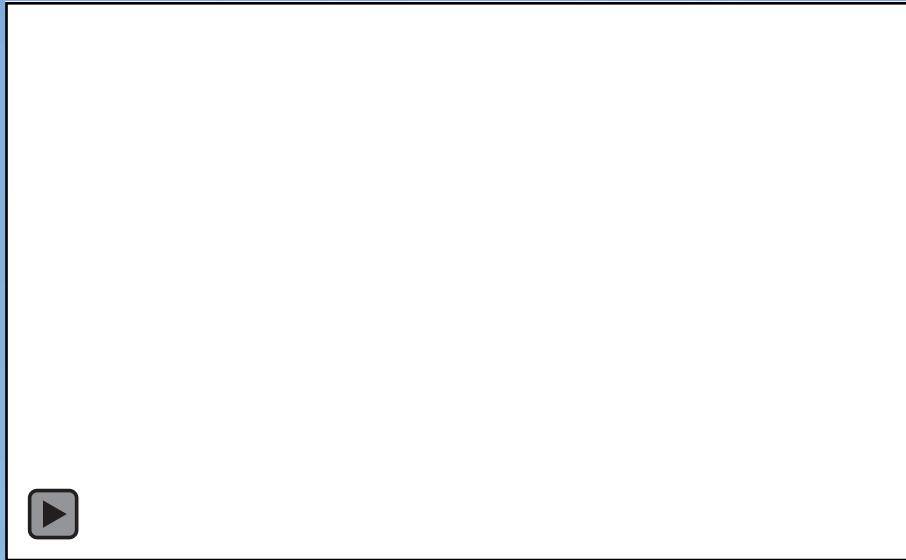
Students' course projects

For both 4 year and 2 year curriculum – Distinct Topics

- Computer Game Software (CSCI4120)
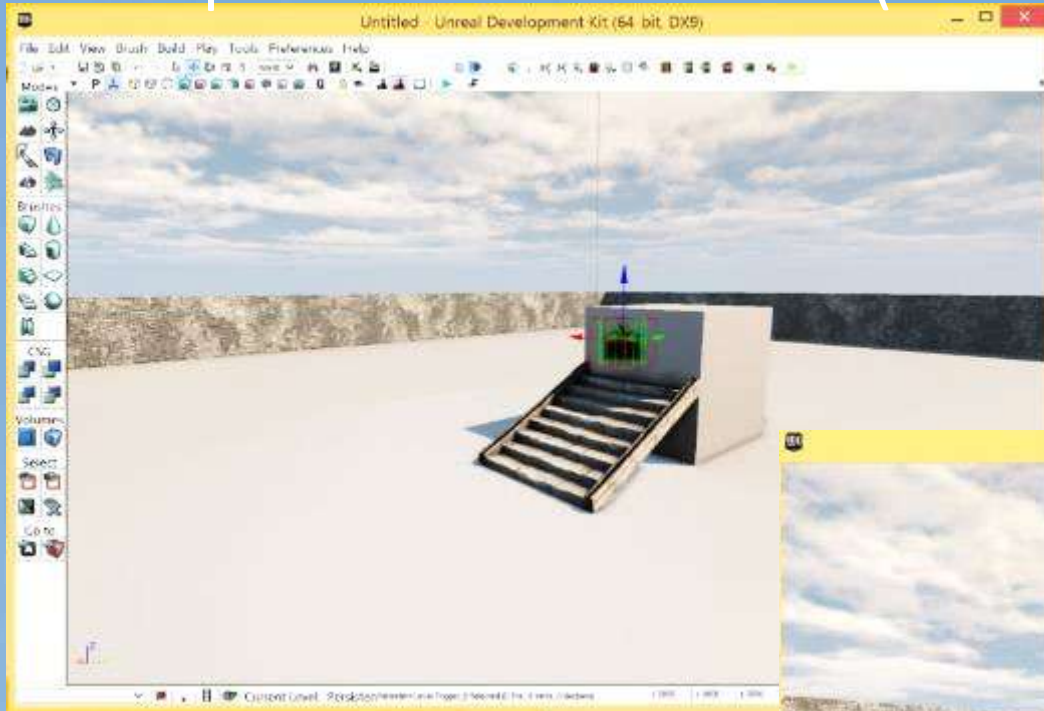
Learn how to develop a game

For both 4 year and 2 year curriculum – Distinct Topics
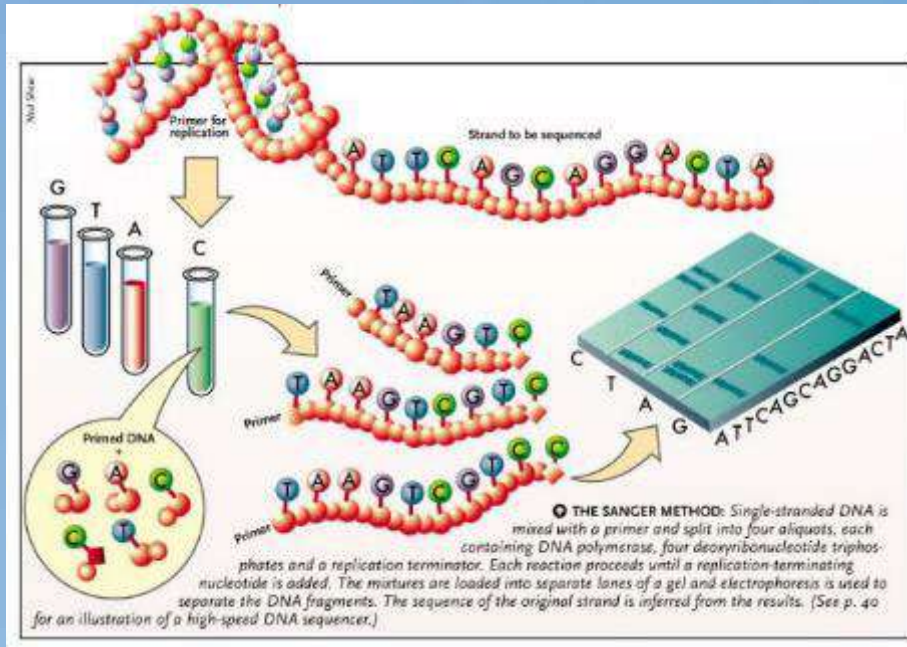
- Computer Game Software (CSCI4120)

Students' course projects

For both 4 year and 2 year curriculum – Distinct Topics

- Algorithms for Bioinformatics (CSCI3220)
  - » Use computer to model and interpret biological data
  - » DNA mutation ⟷ diseases
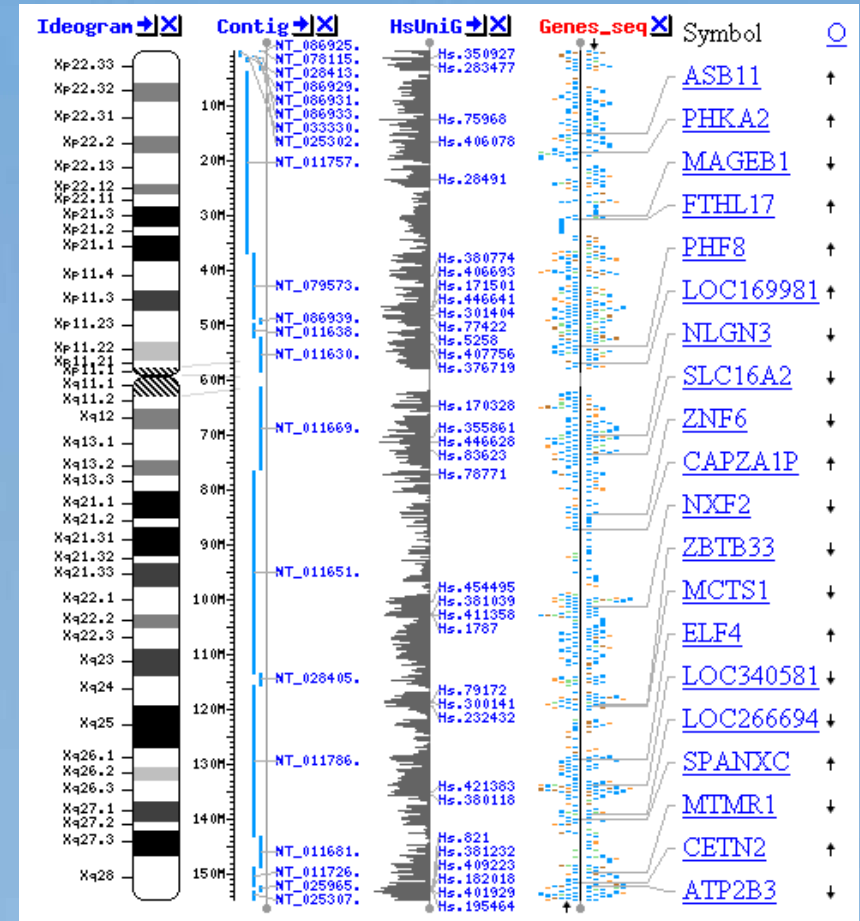
For both 4 year and 2 year curriculum – Distinct Topics

- Big Data Analytics and Machine Learning (CSCI3170/CSCI3320/CSCI4180/CSCI5510)

ATCGAATTCCATAATC
ATTATCGAACTTACGA
AATTTACAATCAATCG

Data

ATCGAATTCCATAATC
ATTATCGAACTTACGA
AATTTACAATCAATCG

Patterns

Fast and Efficient

Knowledge

Information

For both 4 year and 2 year curriculum – Distinct Topics

- Many other practical and interesting courses:
  - » Algorithms
  - » Cloud Computing
  - » Computational Finance
  - » Computer and Network Security
  - » Databases
  - » Energy Efficient Computing
  - » Networks
  - » Operating Systems
  - » Rapid Prototyping of Digital Systems
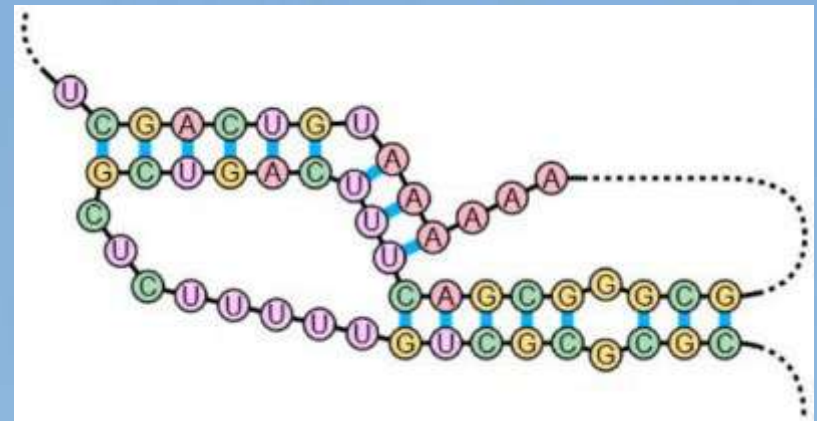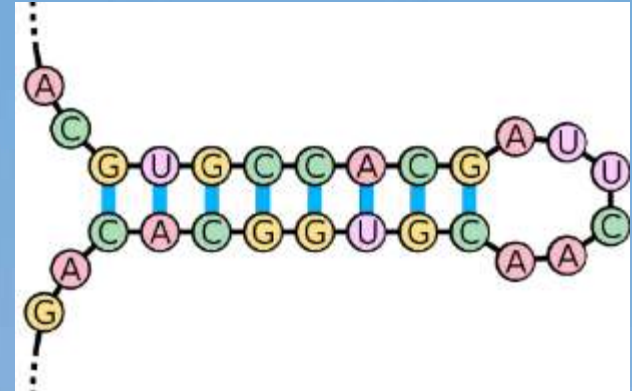 - » Smart Hardware Design
  - » ……

FYP Example (AI + Bioinformatics)

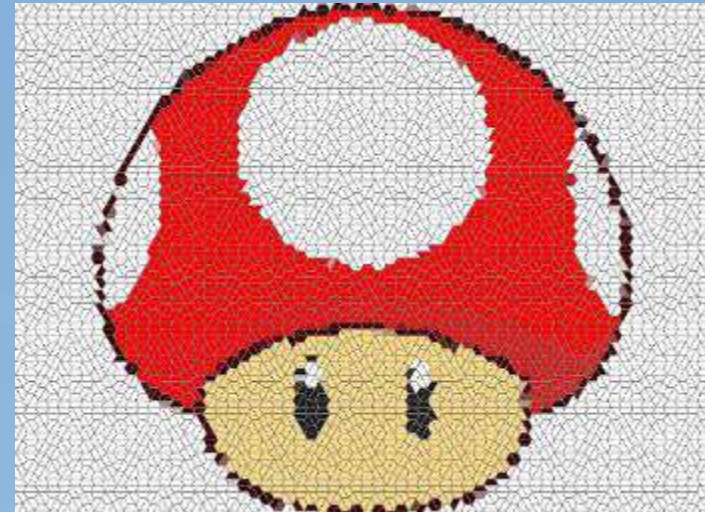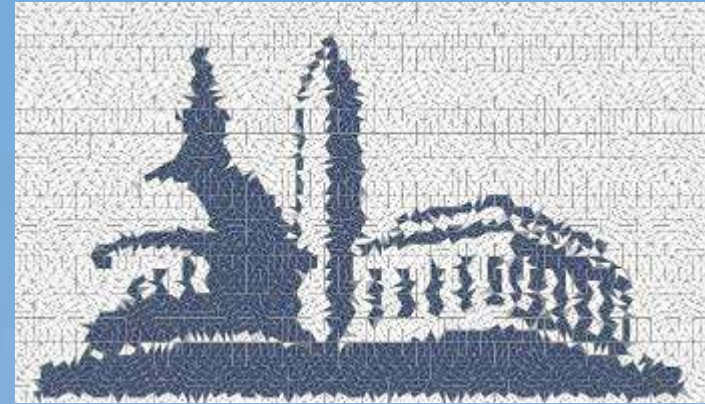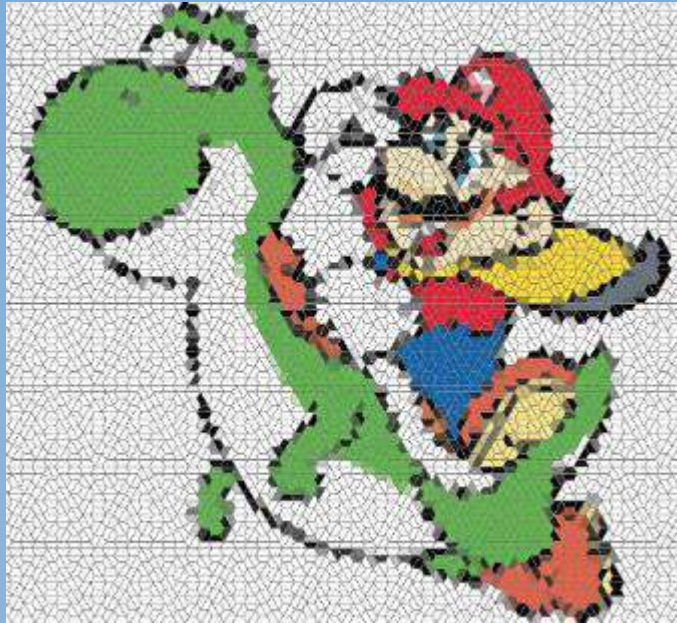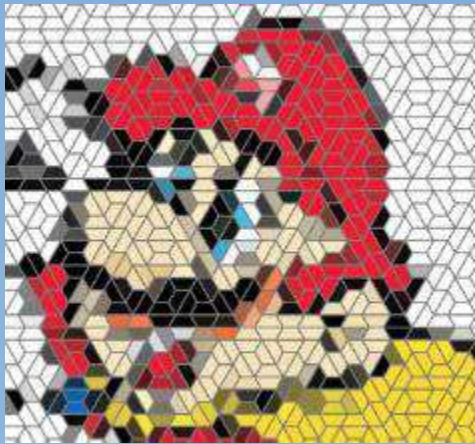- Apply machine learning to predict RNA-protein interaction
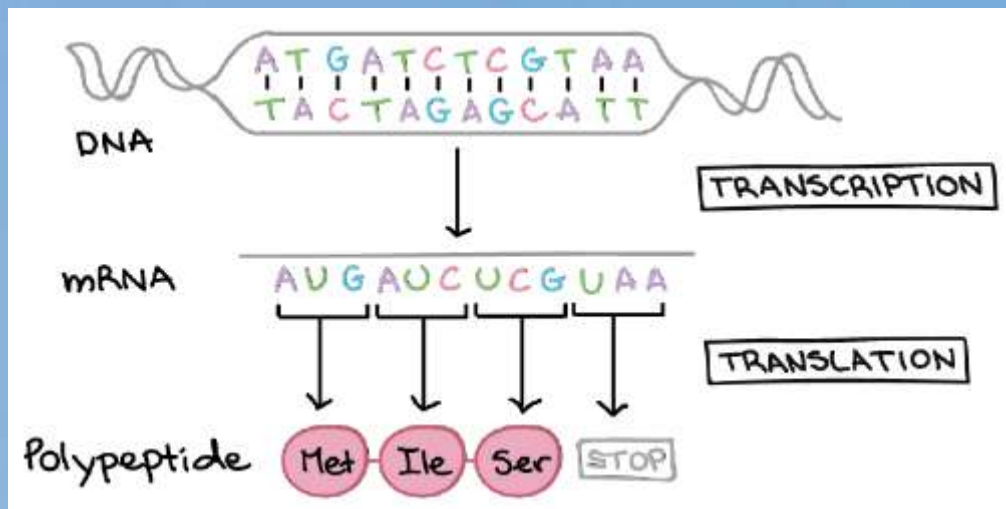
RNA-binding protein (RBP)

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

From FYP KY1804

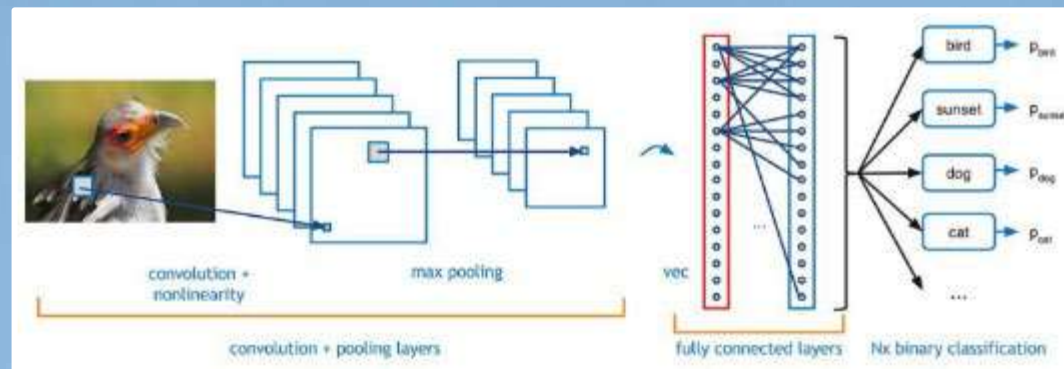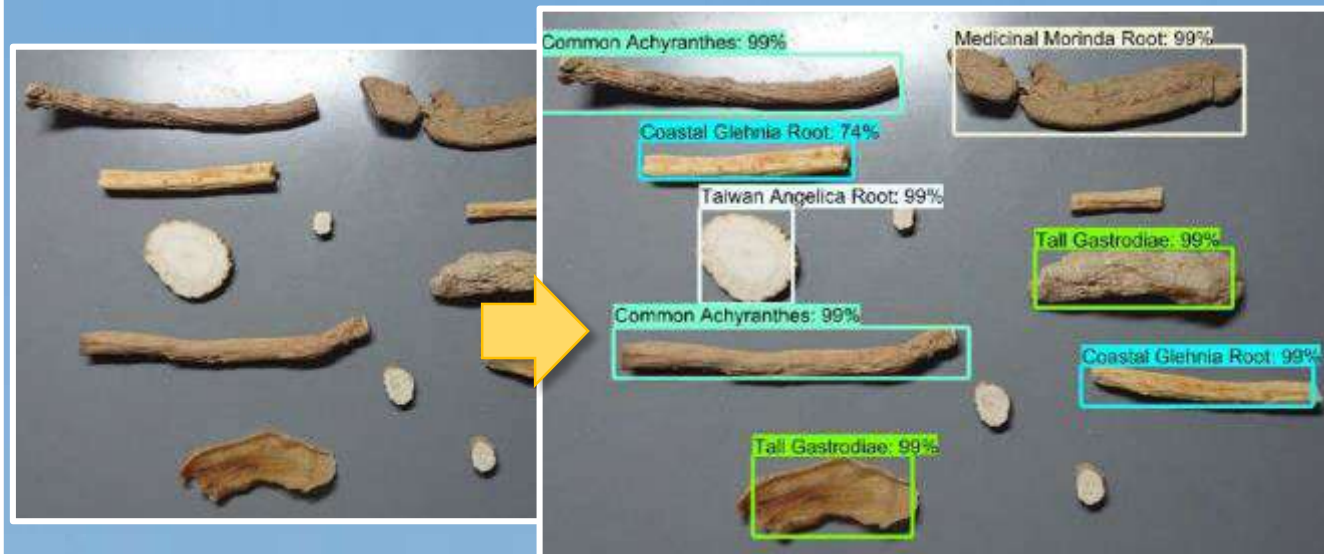# FYP Example (AI + Multimedia)

- Design a neural network that learns to produce a tiling

FYP Example (AI + Computer Vision)

- Chinese Medicinal Herb Recognizer
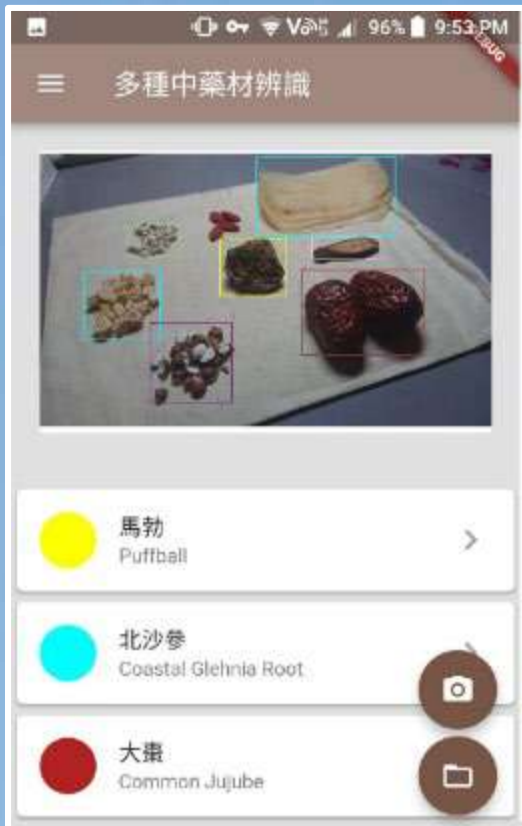
FYP Example (AI + Autonomous Driving)

- Design a deep framework for real-time detection of 3D objects (vehicles) in 3D point cloud data

From FYP CWF2002 (The UG student co-authored a paper in AAAI 2021 & another in CVPR 2021)
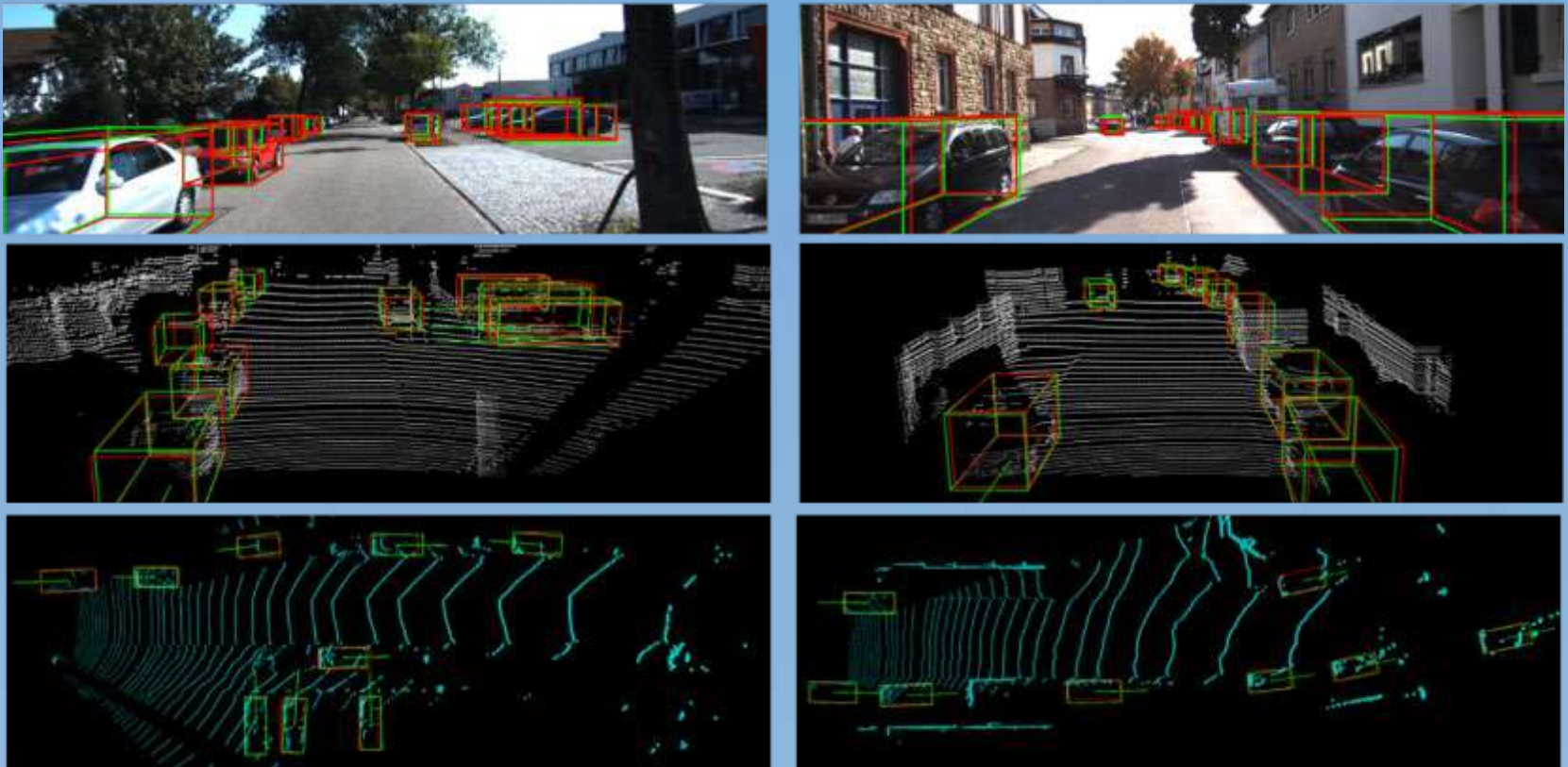
FYP example (Self-driving Robots)

- Controls: Serial, Bluetooth, and Raspberry Pi, *etc.*

Arduino Mega 2560

Raspberry Pi 3b+

Camera module

PiCamera & Raspberry Pi & Servo Motors

Motor Drivers & Stepper Motors

Arduino Mega 2560 & Power Supplies & Motor System

From FYP MCY1801

Declaration of Major for BCSE

Declaration of Major

-After BCSE students finished their 2nd semester, they will undergo the "major allocation" exercise and be allocated into either the CENG and CSCI programme

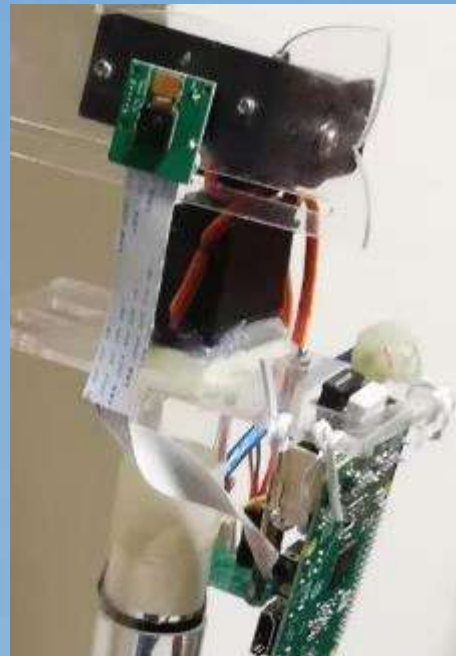-Allocation is primarily based on CGPA but students' preference will be accommodated as much as possible

Declaration procedure:

Tentative Dates	Details
Late March/Early April	The Department to announce the procedures via email; Students will then have a month to submit their preferences
Late May/Early June	Release of Term 2 results; Students will be given 3 days to modify their preferences after the results have been released
Late June	Release of major allocation results by email

Diverse Learning Experience

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

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

Other learning options

Double degree with IBBA

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

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/

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: Can I declare more than one stream?

No, you cannot.

CE

Major Electives (12 units)

Streams

1. **Embedded Systems**
2. **VLSI Design and EDA**

Non-Stream

3. General Computer Engineering

CS

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

Q4: Can I apply for course exemption using AD/HD courses?

Yes, you may apply, but they will be considered on a case by case basis.

Upon approval, you will be exempted from the approved course(s) only, but NOT the units.

You are required to take other major courses to fulfill the major requirements.

Q5: If I go for exchange, can I apply for credit transfer?

Yes, you may.

But PLEASE apply for credit transfer **IN ADVANCE** by providing the course details to the Department before enrolling the courses in the exchange university.

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 !