COMPUTER SCIENCE AND ENGINEERING

What is Computer Science (CSE)?

It is a very dynamic field, which entails the development and maintenance of computer programs, software, and applications, which help people to have better access to useful information. It is well-known today how leading computer science enterprises, like Microsoft, Apple, Google, IBM, Facebook, Twitter, WhatsApp, Tencent and Baidu, use creative ideas and technologies to integrate computing technologies into many walks of life.

The CSE Department consists of world-renowned educators and researchers with state-of-the-art knowledge in big data, cybersecurity, artificial intelligence, cloud computing, networking, graphics, social media, software development and computation theory.

What do CSE students study?

Thanks to our distinguished faculty with a broad number of areas of expertise, our students study topics that prepare them for a good career. In addition to traditional course work, numerous opportunities exist for overseas exchanges, international competitions, scientific research, and internships.

Overview of CSE Curriculum

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| COMPULSORY |
| Final Year Project / Final Year Thesis |

CHOICES OF 5 ELECTIVES FROM 4 OTHER AREAS

| Software / Database : Search Engines, Data Mining, Big Data Management, Database Design, Mobile App Development, Programming Languages |
| AI / Theory : Artificial Intelligence, Advanced Algorithms, Theory of Computation, Machine Learning, Image Processing, Natural Language Processing |

COMPULSORY


Highlights

a. Care and advising: We care about our students and assign an academic adviser to each of them each year. Faculty members have an open-door policy, welcoming students to pop in and chat.

b. Enrichment opportunities: Students have numerous chances to take special honors computer science courses and participate in overseas exchanges, competitions, internships, industry-sponsored projects and scientific research.

c. Flexible curriculum: Students can enroll in additional minors or majors in other disciplines in order to pursue their own interests and strengthen their competitiveness.

What are the career prospects for CSE graduates?

Computer Science is a growing and rewarding field. CSE graduates are usually in high demand and have good job opportunities. Some join computer software or hardware companies, while others take up information technology (IT) positions in various fields. Employers of our graduates include:

- Google, IBM, HP, Compaq, Intel, Baldia, Microsoft, Yahoo, and Oracle
- Morgan Stanley, Goldman Sachs, PricewaterhouseCoopers, HSBC, Hing Seng Bank, and Bank of China

Career Choices

- Entrepreneur
- Systems programmer
- Mobile app developer
- Database administrator
- Management/IT consultant
- Researcher
- Bioinformatics specialist
- System consultant
- Data analyst
- Web and content developer
- Systems administrator
- Network administrator
- Game designer/programmer
- Medical imaging specialist
- Software engineer
- Systems analyst
- EDP auditor
- Network engineer
- Data miner
- Systems integrator
- Business analyst
Data Science & Technology (DSCT)

The program is jointly offered by CSE and MATH, and will equip students to use a wide spectrum of mathematical tools and IT technologies and to develop data analysis skills that will allow them to understand and analyze actual phenomena of massive datasets obtained from rich information sources. In this program, students will undergo rigorous training in relevant mathematical and computational disciplines, like machine learning, classification, cluster analysis, uncertainty quantification, computational science, data mining, databases, and visualization. Students will also receive hands-on experience and expert guidance to acquire practical data analysis skills that will give them a solid foundation for their future careers.

dsc.tust.hk

Cybersecurity

The Department of Computer Science and Engineering has recently established the HKUST Cybersecurity Lab to conduct world-leading research in security, privacy, and cryptography. Since many aspects of our lives are now dependent on computer processing, the HKUST Cybersecurity Lab strives to develop and promote cyber safety through innovation, education, collaboration, and technology transfer.

What is Cybersecurity?

Cybersecurity defends computer systems against malicious attacks, such as identity forgery, disabling or compromising of trusted computation devices and the theft of personal or organizational data. Cybersecurity researchers develop algorithms, tools, and systems to detect security flaws of computer systems, to safeguard data through cryptography, and to protect people’s privacy on the internet.

What are the major applications?

SECURITY
- Defense against Buffer Overflow attacks

CRYPTOGRAPHY
- Secure Sockets Layer (SSL) Communication

PRIVACY
- Anonymity networks

APPLICATIONS
- Online Shopping
- Smart Cities
- Health
- Finance & Risk Management
- Genetic Farming
- Education

DATA MINING & VISUALIZATION
- Feature Selection
- Sentiment Analysis
- Clustering
- Classification
- Data Visualization

BIG DATA COMPUTING & DATA MANAGEMENT
- Scaled-out Storage
- NoSQL Database
- Adaptive Online Tuning
- Distributed Learning
- Repartition & Distribution

DATA INTEGRATION
- Data Cleaning
- Entity Resolution
- Schema Matching
- Transfer Learning

DATA EXTRACTION
- Web Data
- City Data
- Financial Data
- Logistics Data
- Agricultural Data
- Sensor Data

Application Examples
- Online Shopping: Visual Advertising
- Smart Cities: Crowd-sourcing System
- Smart Cities: Indoor Positioning
- Funded Project: Genetic Farming
- Education: Student Behavior Analysis
- Health: Automatic Negative Thought Detection