BEng (Data Science & Engineering)

THE UNIVERSITY OF HONG KONG

DEPARTMENT OF COMPUTER SCIENCE

Data Science & Engineering

Data science and data engineering has evolved as a new discipline and profession

Not simply for data analysis, but a new paradigm for problem solving (=> new products)

Go beyond traditional CS, statistics, engineering courses (e.g. visualization, privacy, legal)

Problem-solving in all sorts of data-intensive application domains

E.g., banking, healthcare, media and entertainment, weather forecasting, transportation, marketing, and supply chain management

High demand and high impact

Job roles: data engineers (develops, constructs, tests and maintains architectures, e.g., data models, databases and large-scale processing systems), data scientists (clean, organize, analyze & interpret big data)

Shortage of professional data analysts worldwide, also for HK and GBA, e.g., shortage of 250,000 data scientists by 2024 in US

The BEng(Data Science & Engineering) programme

- A multidisciplinary programme offered by Department of Computer Science, with support from the Department of Statistics and Actuarial Science, Department of Mathematics, and Faculty of Law
- To equip students with the fundamental knowledge and practical skills in data science and engineering plus a focus on a data-intensive domain, thus creating an additional competitive edge for our graduates in the job market
- To provide a solid foundation for students pursuing career and research in the data science discipline

Programme Highlights

Comprehensive Foundations
Computer Science, Statistics, Engineering, Law

Advanced Studies

- Data mining
- Machine learning & Artificial intelligence
- Big data systems
- Advanced statistics
- Visual analytics & visualization
- Cyber security
- Data-driven technologies & applications

Capstone Experience

- Data science in practice
- Domain-specific application project / Technology project

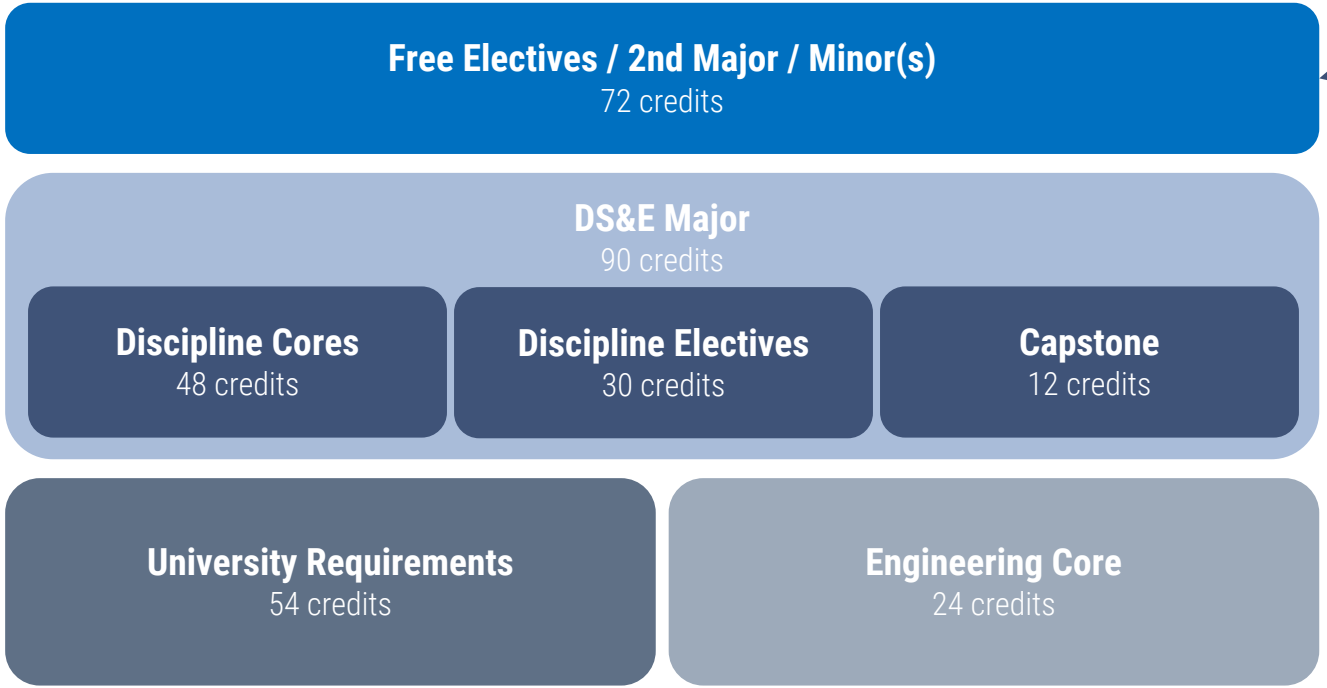
DS&E Application Domain

An option to pursue a minor in a specific domain for the application of data science and engineering;
e.g., business, engineering, science, social science, architecture, urban planning and education

Programme Learning Outcomes

Upon successful completion of the curriculum, students should be able to:	
PLO(a)	apply knowledge of data science and engineering technologies to data science applications appropriate to the programme outcomes and to the discipline
PLO(b)	apply knowledge of data science and engineering technologies to the abstraction and conceptualization of data science applications
PLO(c)	analyze a data-centric problem, and identify and define the data science and engineering methodologies and technologies appropriate to its solution
PLO(d)	design, implement, and evaluate a data science solution, process, component, or programme to meet desired needs with appropriate consideration for public health and safety, social and environmental considerations
PLO(e)	function effectively on teams to accomplish a common goal
PLO(f)	demonstrate an understanding of professional, ethical, legal, security and social issues and responsibilities
PLO(g)	communicate effectively with a range of audiences
PLO(h)	analyze the local and global impact of data science technology on individuals, organizations, and society
PLO(i)	recognize the need for and an ability to engage in continuing professional development
PLO(j)	use current techniques, skills, and tools necessary for data science and engineering practice with an understanding of the limitations

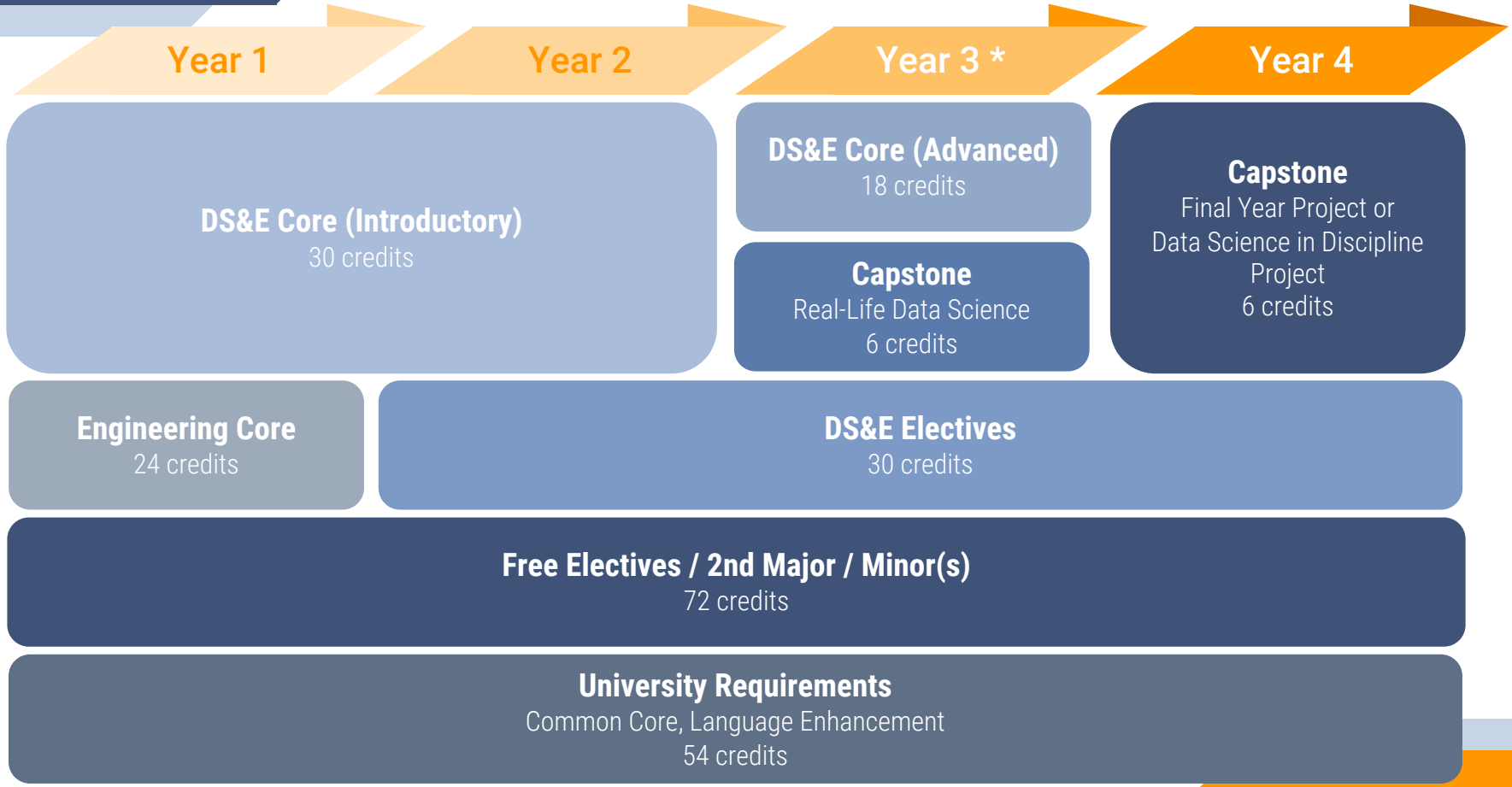
BEng(DS&E) Programme Structure (Total 240 credits)



Students are strongly recommended to do a Minor (or even a Second Major) programme to develop an application area to better equip themselves with sound knowledge in data-intensive domains and support their pursuit in data science & engineering.

Check the DS&E syllabus for a list of recommended minor programmes

Curriculum Map



** Internship during summer*

University Requirements

English course

- CAES1000 Core University English
  - 1st or 2nd semester at Year 1
  - Students with HKDSE Level 5 or above (or equivalent) in English Language are exempted from taking this course
    - For the list of equivalent qualifications, please refer to Faculty's Handbook for First Year Students.
    - For non-local students from places with qualifications not listed in the equivalent list, you can apply the exemption by taking the Academic Speaking and Writing test.
      - Please contact the Engineering Faculty Office for the details on taking the test.
- CAES9542 Technical English for computer science
  - 1st semester at Year 4 (together with the capstone project)

University Requirements

Chinese course

Local students: take CENG9001 Practical Chinese for Engineering Student in Year 3

Putonghua-speaking students: take either CUND9002 or CUND9003 (recommend at Year 1)

International students: can apply for exemption for CENG9001; either take

- a 6-credit Cantonese or Putonghua language course for international students; OR
- an elective course in lieu

(Please refer to Faculty's Handbook for First Year Students.)

University Requirements

Common Core courses

Complete a total of 6 courses

At least one and not more than two courses from each of the four Area of Inquiries (AoIs)

- Science, Technology and Big Data (course code: CCSTxxxx)
- Arts and Humanities (course code: CCHUxxxx)
- Global Issues (course code: CCGLxxxx)
- China: Culture, State and Society (course code: CCCHxxxx)

UG5E1001 Introduction to the Constitution, the Basic Law and the National Security Law

A non-credit bearing course

An online course that will adopt a self-directed learning approach

Students can take this course in any semester throughout their period of study

Check the following link for further details about the course:
ttps://www.cedars.hku.hk/ge/ug5e1001.html

Engineering Cores

Total 4 courses		To be taken in
ENGG1320	Engineers in the modern world	Year 1 Sem 1/2
ENGG1330	Computer programming I	Year 1 Sem 1
ENGG1340	Computer programming II	Year 1 Sem 2
MATH1013	University mathematics II	Year 1 Sem 1

1st Year Enrolment

Semester 1

University requirements

- CAES1000 Core University English
  (*only for students who do not have DSE English level 5 or above or equivalent*)
- 2 common core courses

Engineering cores

- ENGG1330 Computer programming I
- MATH1013 University mathematics II

Semester 2

University requirements

- 1 common core course

Engineering cores

- ENGG1340 Computer programming II
- ENGG1320 Engineers in the modern world

DS&E cores

- COMP2501 Introduction to data science and engineering (*COMP2501B is specifically for DS&E students)
- MATH2014 Multivariable calculus and linear algebra

prerequisite

prerequisite

prerequisite

Majors / Minors

- Check the DS&E syllabus for a list of recommended Minor programmes which are related applications of data science. Examples: Finance, Economics, Marketing, Neuroscience, Genetics and Genomics, Urban Infrastructure Informatics, Environmental Science
- A lot of choices: https://aao.hku.hk/list-of-major/, https://aao.hku.hk/list-of-minor/
- May have admission prerequisite/study restriction
- Download and study the syllabus of the Major or Minor programme
  - Understand the syllabus: How many core courses? When are they being offered?
  - Observe the pre-requisite requirements and restrictions
  - Beware of the timetable issue
- Recommend to consult the corresponding Temporary Advisor(s) of the offering department/faculty before making your course selection

Sample Study Plans

BEng(DS&E) Academic Advising Page

https://www.cs.hku.hk/programmes/beng-datasc/academic-advising

- BEng(DS&E)
- BEng(DS&E) with Second Major in Finance
- BEng(DS&E) with Minor in Finance
- BEng(DS&E) with Minor in Neuroscience

The samples serve as illustrative purposes only. Beware of the pre-requisite and time-tabling issues. Students who opt for a 2nd Major or Minor are responsible for planning for their own course of studies.

Information

Regulations and Syllabus for the degree of BEng(Data Science & Engineering)

- https://engg.hku.hk/Teaching-Learning/BEng-BASc/Academic-Programmes/Regulations-Syllabuses

BEng(Data Science & Engineering) web site

- https://www.cs.hku.hk/datasce

First Year Experience Website

- https://www.fye.hku.hk/

General regulations & Regulations for first degree curricula

- http://aao.hku.hk/sy3/plan-of-study/reg-and-syl/

CS Courses offered in latest year

- https://www.cs.hku.hk/programmes/course-offered

Further Enquiries

BEng(Data Science & Engineering) programme

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