**ADMISSION CRITERIA**

**Computer Engineering Programme**

GCE ‘A’ Level
Pass in H2 Level Mathematics, and
Pass in H2 Level Biology/Chemistry/Computer Science/Physics, and
Pass in H1 Level/’O’ Level Physics* or equivalent.

International Baccalaureate
Pass in HL Mathematics, and
Pass in HL Biology/Chemistry/Computer Science/Physics, and
Pass in SL Physics** or equivalent.

NUS High School Diploma
Major CAP of 2.0 in Mathematics, and
Major CAP of 2.0 in Biology/Chemistry/Physics, and
Overall CAP of 2.0 in Physics* or equivalent.

International & Other Qualifications
Pass in Senior High School Level Mathematics, and
Pass in Senior High School Level Biology/Chemistry/Physics, and
Pass in Junior High School Level Physics^^

Diploma Holders
Applicants should have a relevant diploma from one of the local polytechnics and those with a Certificate of Merit, Diploma with Merit or Diploma with Distinction may apply for any programme in NTU.

For the list of acceptable local diplomas and exempted courses, please visit ntu.edu.sg/url/localdiploma.html

**Computer Science Programme**

GCE ‘A’ Level
Pass in H2 Level Mathematics, and
Pass in H2 Level Biology/Chemistry/Computer Science/Physics.

International Baccalaureate
Pass in HL Mathematics, and
Pass in HL Biology/Chemistry/Computer Science/Physics.

NUS High School Diploma
Major CAP of 2.0 in Mathematics, and
Major CAP of 2.0 in Biology/Chemistry/Physics.

International & Other Qualifications
Pass in Senior High School Level Mathematics, and
Pass in Senior High School Level Biology/Chemistry/Physics.

Diploma Holders
Applicants should have a relevant diploma from one of the local polytechnics. Those with a Certificate of Merit, Diploma with Merit or Diploma with Distinction may apply for any programme in NTU.

For the list of acceptable local diplomas and exempted courses, please visit ntu.edu.sg/url/localdiploma.html

**Data Science & Artificial Intelligence Programme**

Refer to the Computer Science Programme. For details, refer to scse.ntu.edu.sg

**Double Major Bachelor of Science (Honours) in Mathematical and Computer Sciences (MACS)**

Refer to the Computer Science Programme. For details, visit scse.ntu.edu.sg

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**UNDERGRADUATE PROGRAMMES**

**Full-Time Programmes**

- Bachelor of Engineering (Computer Engineering)
- Bachelor of Engineering (Computer Science)*

**Double Degree in Computer Engineering/Computer Science & Business**

- Bachelor of Business** awarded by Nanyang Business School and
- Bachelor of Engineering (Computer Engineering or Computer Science)

**Full-Time Programmes (Honours Based on Merit)**

- Bachelor of Science (Data Science & Artificial Intelligence)
- Bachelor of Science (Economics & Data Science)NEW

More details available at scse.ntu.edu.sg

**Double Degree in Computer Engineering/Computer Science and Economics**

- Bachelor of Social Sciences in Economics awarded by School of Humanities and Social Sciences and
- Bachelor of Engineering (Computer Engineering or Computer Science)

**Computer Engineering/Computer Science with a Second Major in Business**

**Computer Engineering/Computer Science with a Second Major in Entrepreneurship**

**Double Major Bachelor of Science (Honours) in Mathematical and Computer Sciences (MACS)**

* SCSE B.Eng programmes are accredited by the Engineering Accreditation Board (EAB) of Institution of Engineers Singapore (IES).
* Part-Time Course Available - Refer to scse.ntu.edu.sg for more details.
** With Specialisation in Business Analytics.
* 4-year Programme.
* 4.5-year Programme.
* 5-year Programme.
SINGLE DEGREE
COMPUTER ENGINEERING

Interdisciplinary Collaborative Core (32 AUs)
- Common Core (17AU)
- Foundational Core (15AUs*)

Broadening and Deepening Electives (21AU)
- Engineering and Science Fundamentals (4 AUs)
- University of Science (2 AUs)

Common Core (17AU)
- Foundational Core (15AUs*)

Broadening and Deepening Electives (21AU)
- Engineering and Science Fundamentals (4 AUs)
- University of Science (2 AUs)

CE Cores & Majors (78 AUs)

Computer Engineering Fundamentals
- Mathematics: Calculus, Linear Algebra, Probability
- Programming & Algorithms: Introduction to Computational Thinking, Programming, Data Structure and Algorithm

CE Foundations (18 AUs):

CS Cores & Majors (78 AUs)

Computer Science Fundamentals
- Mathematics: Calculus, Linear Algebra, Probability
- Programming & Algorithms: Introduction to Computational Thinking, Programming, Data Structure and Algorithm

CS Foundations (18 AUs):

CE Major, Prescribed Elective & Elective Focus (36 AUs)

CE Majors
- Artificial Intelligence
- Data Science & Analytics
- Cyber Security
- Other new focus

CS Major, Prescribed Electives & Specialisations (36 AUs)

CS Majors
- Artificial Intelligence
- Data Science & Analytics
- Cyber Security
- Other new focus

Projects
- Multidisciplinary Project (MDP), Final Year Project (FYP)

Professional Internship (10 AUs*)

Note: The curriculum is correct at the time of printing. For updates/changes in modules for programme, please refer to scse.ntu.edu.sg

YEAR 1 & 2
YEAR 3 & 4
Common Year CE and CS
**COMMON YEAR**

### YEAR 1
- Mathematics I
- Discrete Mathematics
- Introduction to Computational Thinking & Programming
- Linear Algebra for Computing
- Digital Logic
- Computer Organisation & Architecture
- Physics for Computing
- Data Structures & Algorithms
- Engineers in Society
- Introduction to Data Science & Artificial Intelligence

### YEAR 2
- Probability & Statistics for Computing
- Algorithm Design & Analysis
- Object Oriented Design & Programming
- Operating Systems
- Digital Systems Design
- Sensors, Interfacing & Digital Control
- Microprocessor System Design & Development
- Software Engineering
- Computer Network
- Career & Entrepreneurial Development for the Future World
- Algorithm Design & Analysis
- Object Oriented Design & Programming
- Operating Systems
- Software Engineering
- Computer Network
- Broadening & Deepening Elective 1

### YEAR 3
- Embedded Programming
- Signal, System and Transform
- Multidisciplinary Design Project
- Effective Communication II
- Broadening & Deepening Elective 2
- Broadening & Deepening Elective 3
- Professional Internship
- Computer Security
- Major Prescribed Elective I 1
- Major Prescribed Elective I 2
- Major Prescribed Elective I 3
- Multidisciplinary Design Project

### YEAR 4
- Final Year Project
- Major Prescribed Elective 1
- Major Prescribed Elective 2
- Major Prescribed Elective 3
- Major Prescribed Elective 4
- Broadening & Deepening Elective 4
- Broadening & Deepening Elective 5
- Broadening & Deepening Elective 6
- Broadening & Deepening Elective 7
- Final Year Project
- Major Prescribed Elective II 1
- Major Prescribed Elective II 2
- Major Prescribed Elective II 3
- Major Prescribed Elective II 4
- Broadening & Deepening Elective 4
- Broadening & Deepening Elective 5
- Broadening & Deepening Elective 6
- Broadening & Deepening Elective 7

**Elective Focus (3 MPEs)**
- Artificial Intelligence
- Security
- Data Science

**Specialization (5 MPEs)**
- Artificial Intelligence
- Security
- Data Science
- Interdisciplinary and Collaborative Core
- Core
- Major Prescribed Electives
- Broadening and Deepening Electives
**DOUBLE DEGREE**

**COMPUTER ENGINEERING OR COMPUTER SCIENCE WITH BUSINESS**

The School of Computer Science and Engineering and the Nanyang Business School have come together to design two hybrid undergraduate Double Degree programmes to meet the challenges of a changing economic landscape. A specialisation in business analytics will equip students to monitor target markets, analyse information and forecast future trends across various industries while formulating ways to improve business strategies, operations and business decisions.

The double degree programme is a comprehensive and well-rounded curriculum to be completed in 4 years while integrating two disciplines, thereby broadening the scope of the students and enabling them to leverage on a kaleidoscope of opportunities.

The programmes are planned to enable graduates to hone their business management and computer science and engineering skills, helping to discover and maximise their capabilities which will enable them to develop relevant skills that are much sought after in today’s job market.

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### COMPUTER ENGINEERING

<table>
<thead>
<tr>
<th>Core and Prescribed</th>
<th>Engineering Fundamentals</th>
<th>Computer Science Fundamentals</th>
</tr>
</thead>
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<tr>
<td><strong>Business CE Integration Cores &amp; Majors</strong></td>
<td><strong>Business CS Integration Cores &amp; Majors</strong></td>
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</tr>
<tr>
<td>• Financial Accounting</td>
<td>• Organisation Behaviour and Design</td>
<td>Business Cores</td>
</tr>
<tr>
<td>• Management Accounting</td>
<td>• Strategic Management</td>
<td>Mathematics</td>
</tr>
<tr>
<td>• Financial Management</td>
<td>• Career Readiness</td>
<td>Calculus, Linear Algebra, Probability and Statistics</td>
</tr>
<tr>
<td><strong>Business</strong></td>
<td><strong>Computer Science Fundamentals</strong></td>
<td>Humanities</td>
</tr>
<tr>
<td>• Financial Accounting</td>
<td>• Organisation Behaviour and Design</td>
<td><strong>Projects:</strong> Multidisciplinary Project (MDP), Final Year Project (FYP)</td>
</tr>
<tr>
<td>• Management Accounting</td>
<td>• Strategic Management</td>
<td><strong>CE Foundations:</strong> Logic Design, Signals and Systems, Computer Architecture and Organisation, Microprocessor Programming, Software Engineering, Introduction to Database, Computer Networks, Operating Systems</td>
</tr>
<tr>
<td><strong>Computer Engineering Fundamentals</strong></td>
<td><strong>Business Analytics</strong></td>
<td><strong>Business CS Integration Modules</strong></td>
</tr>
<tr>
<td>• Statistical and Quantitative Methods</td>
<td>• Business Analytics</td>
<td><strong>CS Majors and Specialisations</strong></td>
</tr>
<tr>
<td>• Business Law</td>
<td>• Designing &amp; Developing Databases</td>
<td><strong>Professional Attachment</strong></td>
</tr>
<tr>
<td>• Marketing</td>
<td>• Analytics I: Visual and Predictive Analytics</td>
<td><strong>Business/Computing Integration Electives 1-3</strong></td>
</tr>
</tbody>
</table>

### COMPUTER SCIENCE

<table>
<thead>
<tr>
<th>Unrestricted Electives</th>
<th>Fundamentals</th>
<th>Engineering and Science Fundamentals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business CE Integration Cores &amp; Majors</strong></td>
<td><strong>Business CS Integration Cores &amp; Majors</strong></td>
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<tr>
<td><strong>Business</strong></td>
<td>Business CS Integration Modules</td>
<td></td>
</tr>
<tr>
<td>• Statistical and Quantitative Methods</td>
<td>• Analytics II: Advanced Predictive Analytics</td>
<td></td>
</tr>
<tr>
<td>• Business Law</td>
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</tr>
<tr>
<td>• Marketing</td>
<td><strong>Professional Attachment</strong></td>
<td></td>
</tr>
</tbody>
</table>

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**Note:** The curriculum is correct at the time of printing. For updates/changes in modules for programme, please refer to scse.ntu.edu.sg.
DATA SCIENCE & ARTIFICIAL INTELLIGENCE

This is a full time four-year direct honours Bachelor of Science degree programme, jointly offered by SCSE and the School of Physical and Mathematical Sciences (SPMS). The programme targets visionary students who aspire to master the demands of integrating the synergistic disciplines of computer science and statistics for the study of data science (DS) and artificial intelligence (AI).

This programme will provide students with opportunities to solve real-life problems in different application domains such as science and technology, healthcare and clinical medicine, business and finance, environmental sustainability, and others – using their knowledge in DS and AI. As such, there will be rich opportunities for graduating students to work across multiple domains of the digital economy and participate in enhancing Singapore’s global competitiveness.

DSAI Graduates can expect to be employed as a

- Machine Learning Engineer
- Data Scientist
- Research Scientist
- R&D Engineer
- Business Intelligence Developer
- Computer Vision Research Engineer
- Data Analyst
- Data Architect
- AI Engineer
- AI Scientist

Semester 1
- Calculus
- Discrete Mathematics
- Introduction to Computational Thinking & Programming
- Navigating the Digital World
- Inquiry & Communication in an Interdisciplinary World
- Broadening & Deepening Elective

Semester 2
- Linear Algebra for Scientists
- Introduction to Data Science & AI
- Data Structures & Algorithms
- Object Oriented Design & Programming
- Ethics & Civics in a Multi-Cultural World
- Healthy Living & Mental Wellbeing

Semester 1
- Machine Learning
- Data Analytics and Mining Major
- Prescribed Elective
- Major Prescribed Elective
- Effective Communication 2
- Broadening & Deepening Elective

Semester 1
- Calculus III
- Probability and Introduction to Statistics
- Algorithm Design and Analysis
- Software Engineering
- Career & Entrepreneurial Development for the Future World
- Sustainability: Human, Social, Economic & Environment

Semester 2
- Statistics
- Data Analysis with Computer
- Introduction to Databases
- Artificial Intelligence
- Science & Technology for Humanity
- Broadening & Deepening Elective

Semester 2
- Final Year Project
- Major Prescribed Elective
- Major Prescribed Elective
- Broadening & Deepening Elective
- Broadening & Deepening Elective

Semester 2
- Final Year Project
- Major Prescribed Elective
- Major Prescribed Elective
- Broadening & Deepening Elective
- Broadening & Deepening Elective

Note: The curriculum is correct at the time of printing. For updates/changes in modules for programme, please refer to scse.ntu.edu.sg
BACHELOR OF SCIENCE (HONOURS) IN MATHEMATICAL AND COMPUTER SCIENCES

This four-year double major degree programme is in partnership with the School of Physical and Mathematical Sciences. It aims to attract top students who can master the technically demanding disciplines from both schools.

The programme provides students with strong foundations in their two majors with core courses and in-depth specialised training in one of four areas at the interface of Mathematical Sciences and Computer Science.

The areas of specialisation include Theoretical Computer Science, Cryptography and Cybersecurity, Financial Modelling, and Data Science.

Double Major Programme
Bachelor of Science in Mathematical and Computer Sciences

Minimum Subject Requirements

<table>
<thead>
<tr>
<th>Singapore-Cambridge GCE ‘A’ Level</th>
<th>International Baccalaureate Diploma</th>
<th>NUS High School Diploma</th>
<th>International &amp; Other Qualifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2 Level pass in Mathematics and Physics/Chemistry/Biology/Computer</td>
<td>Mathematics at Higher Level</td>
<td>Major CAP of 2.0 in Mathematics and Physics/Chemistry/Biology</td>
<td>Mathematics at Senior High School Level</td>
</tr>
<tr>
<td>H2 Level pass in Physics/Chemistry/Biology/Computer</td>
<td>Mathematics at Higher Level</td>
<td>Major CAP of 2.0 in Mathematics and Computer Science at Higher Level</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mathematics at Senior High School Level</td>
</tr>
</tbody>
</table>

Graduates from the programme are expected to either be ICT leaders and entrepreneurs in fast developing areas such as Financial Technology, Cybersecurity, and Data Analytics, or pursue postgraduate degrees in Mathematics and Computer Science-related disciplines.

Note: This information is correct at the time of printing. For updates/detailed programme modules, please refer to scse.ntu.edu.sg
CAREER PROSPECTS

Our industry-ready graduates are equipped with a strong foundation in the disciplines of computer engineering and computer science. As a result, they are well-prepared to use their skills to harness technology and continually work towards making breakthroughs that enable people to communicate more seamlessly, manage their environments more effectively and lead more comfortable lives.

No matter which industry they are in, graduates of SCSE are able to provide innovative solutions.

Graduates of CE, CS and DSAI are employed in companies such as:

- Adobe
- Agency for Science, Technology and Research
- Amazon
- Apple
- Bank of America
- Boeing
- DBS
- ExxonMobil
- Facebook
- Google
- HP
- Intel
- LinkedIn
- Microsoft
- Nokia
- PayPal
- Samsung
- Singapore Airlines
- Singtel

and many more!

OUR GRADUATES AND SUCCESS STORIES

Adrian Chye
Co-Founder, Mediafreaks Group of Companies. (Class of 2004)

Budhaditya Bhattacharya
Founder, WAYV Digital (Class of 2013)

Ngo Chee Yong
Co-Founder and CTO, Swag Soft LLP (Class of 2005)

Jolene Lim
RSA Technology Consultant (Class of 2014)

Pamela Lim Jiah Min
Senior Associate Technology Consultant PricewaterhouseCoopers Consulting (Singapore) (Class of 2015)

Loh Jia Wen, Doreen
Presales Specialist - Asia Pacific and Japan SAP ASIA (Class of 2014)

Russell Loh Weibin
J.P. Morgan Technology Analyst (Class of 2018)

Jonathan Samraj
Infocomm Development Authority of Singapore Telecom Cyber Security Cluster (Class of 2014)

Deepank Vora
PayPal Software Engineer (Class of 2014)
OVERSEAS ENTREPRENEURSHIP PROGRAMME (OEP)

Sing Swee Yang
UG Programme: Bachelor of Computer Science, Year 4
START, Beijing, China

"At START, I interned as a back-end software developer and though I lacked some knowledge and experience, my mentor was very understanding and helpful, guiding me along. I also participated in an exchange at Tsinghua University, studying alongside China’s best students. It was an honour to do so, and the experience taught me to treasure the abundance of academic resources and opportunities available to students at NTU."

INTERNSHIP

Alfie Farhana Binte Mohamed
Computer Science, Class of 2018
Hewlett Packard Enterprise

"The most rewarding part of my NTU journey has been successfully applying the theoretical and practical knowledge gained from the modules in Computer Science into my internship at Hewlett Packard Enterprise."

Prabhjot Vicky Grewal
Computer Science, Class of 2018
Merrill Lynch

"My internship experience with the Bank of America Merrill Lynch was enlightening, and I’m glad that we get to choose our professional internships from an exhaustive list of companies. I also appreciate how the faculty provides us with lecture recordings, giving us the flexibility to pursue our passions both in and out of the classroom."

RESIDENT AND OVERSEAS EXCHANGE

Laurensia Anjani
Computer Science, Year 4
University of Sydney

"My 6-week exchange programme at the University of Sydney (Australia) was the first time I set foot in New South Wales. I took a course called Designing Social Media, which gave me new insights into social media design and allowed me to develop a social media strategy for Osteoporosis Australia."

OUTSTANDING ACHIEVERS

Managing Director at age 23 by setting up a mobile and on-line food delivery portal

Chinmay Malaviya
Co-Founder and Advisor
Food Panda (Global)
(Class of 2012)

"SCSE challenged me in many ways to explore different options, which in turn, helped me find what I wanted to do in life. SCSE built the right foundation for the entrepreneur in me to develop – teaching me key lessons and skills that have helped me immensely in my journey after graduation. The school offered me a great platform to test my hypotheses and pave the way for my entrepreneurial journey."

The School has been very supportive of students’ research. We were always given a lot of leeway to experiment and discuss our ideas. That helped a lot when I went into Google as I was very comfortable sharing my ideas with my colleagues and we had no qualms about trying out new things, just like in school.

Tan Chade-Meng
Google’s Jolly Good Fellow
(Class of 1995)
Read more about Chade Meng at chademeng.com

1st Singaporean employed by Google Headquarters

"The School has been very supportive of students’ research. We were always given a lot of leeway to experiment and discuss our ideas. That helped a lot when I went into Google as I was very comfortable sharing my ideas with my colleagues and we had no qualms about trying out new things, just like in school."

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Managing Director at age 23 by setting up a mobile and on-line food delivery portal

Chinmay Malaviya
Co-Founder and Advisor
Food Panda (Global)
(Class of 2012)
NTU's Computer Science Ranks 1st in Asia and 2nd Globally
US News & World Report's Best Global Universities Rankings

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