# School of Continuing and Lifelong Education

# 1 Faculty’s Commitment

The NUS School of Continuing and Lifelong Education (NUS SCALE) was launched in June 2016 to drive the expansion of NUS’ lifelong learning offerings in a concerted and strategic way that furthers our mission to be a leading global university, as well as fulfil our role as a public university of Singapore, shaping the future.

NUS SCALE aims to provide youths, executives and corporations access to NUS’ suite of innovative, world-class Continuing and Lifelong Education offerings, to stay relevant and ahead of competition.

Drawing on unparalleled access to the multi-disciplinary expertise of 16 other NUS Faculties/Schools, NUS SCALE offers youth, executive and professional development/training programmes, part-time degree programmes, as well as modular courses that meet the lifelong learning needs of individuals. All programmes are designed and developed in consultation with the industry to ensure relevance and currency.

# Contact Us

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| **Master's, Bachelor of Technology Programmes & Certificate Courses** | scale.admissions@nus.edu.sg<br>Block AS8, 10 Kent Ridge Crescent, #03-01 Singapore 119260<br><br>Walk-in Counter Operating Hours:<br>Mondays to Fridays: 8.30 am to 5.30 pm<br>Closed on Saturdays, Sundays and Public Holidays<br><br>*For enquiries on MSc in Forensic Science and MSc in Data Science and Machine Learning, please contact: pgc@nus.edu.sg* |
| **Executive & Professional Development Courses** | ask.scale@nus.edu.sg |
| **NUS CET500**<br>**NUS Lifelong Learners (NUS L3)** | lifelonglearning@nus.edu.sg<br><br>Block AS8, 10 Kent Ridge Crescent, #03-01 Singapore 119260<br><br>Walk-in Counter Operating Hours:<br>Mondays to Fridays: 8.30 am to 5.30 pm<br>Closed on Saturdays, Sundays and Public Holidays |
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Last updated: 28 May 2020

# 3 Undergraduate Education

## 3.1 Degrees Offered

### *Bachelor of Technology (BTech) Computing*

SCALE offers the following BTech programmes in Computing disciplines in partnership with the NUS School of Computing, one of the leading computing schools in the world with faculty members who are both internationally recognised researchers and inspiring teachers:

- Bachelor of Technology (Business Analytics)
- Bachelor of Technology (Cybersecurity)
- Bachelor of Technology (Software Engineering)

### *Bachelor of Technology (BTech) Engineering*

SCALE in partnership with the Faculty of Engineering offers the following BTech programmes in Engineering disciplines:

- Bachelor of Technology (Chemical Engineering)
- Bachelor of Technology (Civil Engineering)
- Bachelor of Technology (Electronics Engineering)
- Bachelor of Technology (Industrial & Management Engineering)
- Bachelor of Technology (Mechanical Engineering)
- Bachelor of Technology (Supply Chain Management)

These programmes are accredited by the relevant engineering bodies, and taught by highly qualified Engineering faculty members using first-class laboratory facilities in NUS.

## 3.2 Curriculum Structure and General Academic Matters

Unlike full-time degree programmes which cater primarily to students admitted with GCE 'A' Level qualifications, BTech part-time degree programmes are specially tailored to suit the needs and background of polytechnic graduates holding relevant full-time jobs in industry. The BTech curriculum gives recognition to the fact that Polytechnic upgraders have all attained a certain level of training in addition to acquiring some actual work experience. As such, although almost all the upper-year modules are identical to those of the equivalent full-time degree programmes, the modules in the earlier years are somewhat different and are specially designed to cater to the unique needs of BTech students.

***Periods of Study in each AY***: In addition to the two normal semesters of study in each Academic Year (Semesters 1 and 2), the BTech Programme also runs a 10-week Special Term during the period from May to July.

***Minimum and Maximum Candidature***: SCALE recognises the need to equip potential adult learners with the necessary skills within a reasonable amount of time so that they stay relevant in the industry upon graduation. As such, the minimum and maximum candidature periods are two-and-a-half and six years respectively, inclusive of approved periods of leave of absence. Nonetheless, records show that if work, family and other commitments permit, students typically attend classes three evenings a week and should typically be able to complete their degree requirements in four years. The curriculum structure is completely modular and flexible and students should study at their own comfortable pace. Students are strongly advised not to rush through their programmes; instead, they should attempt to arrange their other commitments allow them sufficient time and peace of mind to focus on, and gain the most out of, their studies. If taking an extra semester to complete their degree requirements results in greater benefit from their studies and perhaps a better class of honours for the degree, it might be worthwhile to do so as the benefits are lifelong.

***Workload***: In general, unless otherwise approved by the Dean of SCALE, a student may register for up to 14 MCs of modules during a normal semester and 2 modules in a Special Term, excluding Industrial Practice module.

***General***: Students are advised to read carefully other relevant information presented in this document as well as published by the Registrar's Office (www.nus.edu.sg/registrar). Of particular importance are information relating to: the Modular System, Undergraduate Education Continuation and Graduation Requirements, Academic Calendar, Responsibility for Notices/Circulars, Update of Personal Particulars, Acceptance Record, Leave of Absence, Grading Policy and Exam Process, Graduation, Discipline, Module Enrolment, S/U Option Declaration, and Commencement amongst others. Academic and administrative rules and regulations set out by the University will apply to every NUS student.

## 3.3 Bachelor of Technology (BTech) Computing

***Admission Intake:*** The BTech Computing programmes have one intake in each Academic Year for Semester 1 in August.

All diploma holders admitted into the BTech Computing programmes will generally be granted a set of Advanced Placement Credits (APCs) automatically. Further credits will be considered for holders of certain ICT-related diplomas which have been accredited for admission.  Additional credits can also be granted for the completion of relevant Advanced Diplomas and by opting to select and register to sit for Module Advanced Placement Credit Tests.

The structure and design of each of the BTech programmes in Computing are based on those of the corresponding four-year full-time Bachelor of Computing (BComp) programmes offered by the School of Computing. To qualify for a BTech degree in Computing, a student must take and pass a minimum of 160 MCs of modules, as tabulated below, and achieve a CAP of at least 2.00.

**Table: 160-MC BTech Computing curriculum structure**

| | **Minimum MCs required** |
|---|---|
| **University Level Requirements** | |
| General Education (GE) Modules [1] | 20 |
| **Sub-total** | **20** |
| **Programme Requirements** | |
| Foundation & Major Requirements | 104 |
| **Sub-total** | **104** |
| **Unrestricted Elective Modules [2]** | **36** |
| **Grand-total** | **160** |

Notes:

[1] A limited selection of GE modules (from the wide range available in the University) which can best meet the interests and professional needs of BTech students, will be offered specially in the evenings. The list of modules will be available in the SCALE website in due course.

[2] 20 MCs of UEMs will normally be given as Advanced Placement Credits to holders of diploma or higher qualifications. UEMs enable students to pursue their interests without any restrictions. Students may select any module at any level from among Technical or GE modules to meet this requirement.

***Stage Promotion***: Students will be deemed to have progressed to the next stage of study if they have obtained at least the number of MCs, including exemptions, as stated below:

To move to Stage 2 (Year 2): 32 MCs
To move to Stage 3 (Year 3): 64 MCs
To move to Stage 4 (Year 4): 108 MCs

***Degree Requirements & Recommended Study Schedule***

3.3.1 Bachelor of Technology (Business Analytics)

3.3.2 Bachelor of Technology (Cybersecurity)

3.3.3 Bachelor of Technology (Software Engineering)

## 3.3.1 Bachelor of Technology (Business Analytics)

The BTech (Business Analytics) programme is offered in partnership with the School of Computing. The BTech (Business Analytics) programme enables students to attain the following learning outcomes by the time of graduation:

1. Strong knowledge of data analytics foundations and fundamentals, including:
    a. familiarity with data analytics and programming principles, and
    b. high and broad understanding of the application of analytics in various industrial domains.
2. An ability to function effectively in teams to accomplish a common goal.
3. An understanding of professional, ethical, legal, security, and social issues and responsibilities of analytics professionals.
4. An ability to analyse the local and global impact of data analytics on individuals, organisations and society.
5. Clear recognition of the need for and an ability to engage in continuing professional development.

### *Degree Requirements*

Candidates must satisfy the following requirements to be conferred the degree of BTech (Business Analytics):

- Complete a minimum of **160 MCs** with a minimum CAP of 2.0 by taking modules as listed below;
- Comply with the requirement that the limit on the number of Level-1000 modules to be counted towards fulfillment of graduation requirements being 60 MCs (including exemption of 20 MCs for polytechnic diploma holders); and
- Satisfy any other additional requirements that may be prescribed by SCALE, the School of Computing, or the University.

**List of modules – BTech (Business Analytics), comprise:**

All modules are 4MCs, except when otherwise stated.

A. **University Level Requirements (20MCs)**

- Human Cultures (module with prefix GEH)
- Asking Questions (module with prefix GEQ)
- Quantitative Reasoning (module with prefix GER)
- Singapore Studies (module with prefix GES)
- Thinking and Expression (module with prefix GET)

B. **Programme Requirements (104MCs), comprising**

1. Major Requirements – Essential Modules (84MCs)

*Computing Foundations*

- TBA2103 Data Visualisation
- TBA2105 Web Mining
- TIC1001 Introduction to Computing and Programming I
- TIC1002 Introduction to Computing and Programming II
- TIC1101 Professional, Ethical and Social Issues in Computing

- TIC2001 Data Structures and Algorithms
- TIC2601 Database and Web Applications
- TIC2901 Communication for Computing Professionals
- TIC3901 Industrial Practice (12 MCs)

*Business Analytics Requirements*

- TBA2101 Building an Analytics Organisation
- TBA2102 Introduction to Business Analytics
- TBA2104 Predictive Analytics
- TBA3102 Text Analytics
- TBA3103 Application Systems Development for Business Analytics
- TBA3204 Web Analytics
- TBA4212 Search Engine Optimisation and Analytics

*Mathematics Requirements*

- TMA1001 Introductory Mathematics
- TMA2101 Calculus for Computing
- TMA2103 Probability and Statistics

2. Major Requirements – Elective Modules (20 MCs, selected from the list below)

– At least 3 out of 5 modules must be at level 4000.

– Not all electives modules may be offered in any semester/year. An elective module may not be offered if there is insufficient number of students opting for that module at any particular time.

- TBA3150 Mobile App and Game Analytics
- TBA3222 Marketing Analytics
- TBA3241 Social Media Analytics
- TBA4204 Financial Analytics
- TBA4215 Workforce Analytics
- TBA4230 Audit Analytics
- TBA4250 Healthcare Analytics

C. **Unrestricted Elective Modules (36MCs)**

Note: 20 MCs will normally be given as Advanced Placement Credits to holders of diploma or higher qualifications. They will need to complete 16MCs.

## *Study Schedule*

There is only one intake per academic year in Semester 1 (i.e. August). One sample study schedule for a four-year candidature is shown below. This assumes the students' work and other commitments allow them sufficient time to properly cope with their studies. Students are strongly advised to slow down if necessary so that they progress at their own comfortable pace.

**A. Sample Study Schedule (4-year candidature beginning in Semester 1 of an AY):**

1. The number of Modular Credits (MC) of a module is denoted by the number in the bracket.
2. Modules marked with an asterisk (*) are modules stretching over more than one semester and the total number of MCs will only be given upon completion of the module.

| **1st Year of studies** |
|---|

| | |
|---|---|
| Sem 1: | TIC1001 Introduction to Computing and Programming I (4)<br>TIC1101 Professional, Ethical and Social Issues in Computing (4)<br>TMA1001 Introductory Mathematics (4) |
| Sem 2: | TBA2102 Introduction to Business Analytics (4)<br>TIC1002 Introduction to Computing and Programming II (4)<br>TMA2101 Calculus for Computing (4) |
| SpTerm: | General Education Module 1 (4)<br>TBA2101 Building An Analytics Organisation (4) |
| **2nd Year of studies** | |
| Sem 1: | TIC2001 Data Structures and Algorithms (4)<br>TIC2601 Database and Web Applications (4)<br>TMA2103 Probability and Statistics (4) |
| Sem 2: | TBA2103 Data Visualisation (4)<br>TBA2104 Predictive Analytics (4)<br>TBA3204 Web Analytics (4) |
| SpTerm: | General Education Module 2 (4)<br>General Education Module 3 (4) |
| **3rd Year of studies** | |
| Sem 1: | TBA2105 Web Mining (4)<br>TBA4212 Search Engine Optimisation and Analytics (4)<br>TIC2901 Communications for Computing Professionals (4)<br>*TIC3901 Industrial Practice |
| Sem 2: | TBA3102 Text Analytics (4)<br>*TIC3901 Industrial Practice (12)<br>Elective Module 1 (4)<br>Elective Module 2 (4) |
| SpTerm: | General Education Module 4 (4)<br>General Education Module 5 (4) |
| **4th Year of studies** | |

| | |
|---|---|
| Sem 1: | TBA3103 Application Systems Development for Business Analytics (4)<br>Elective Module 3 (4)<br>Unrestricted Elective Module 1 (4) |
| Sem 2: | Elective Module 4 (4)<br>Elective Module 5 (4)<br>Unrestricted Elective Module 2 (4) |
| SpTerm: | Unrestricted Elective Module 3 (4)<br>Unrestricted Elective Module 4 (4) |

## 3.3.2 Bachelor of Technology (Cybersecurity)

The BTech (Cybersecurity) programme is offered in partnership with the School of Computing. The BTech (Cybersecurity) programme enables students to attain the following learning outcomes by the time of graduation:

1. Strong knowledge of computer science foundations and fundamentals, including:
    a. familiarity with common computer science themes and principles,
    b. high-level understanding of systems as a whole, and
    c. understanding of the theoretical underpinnings of computer science and their influences in practice.

2. An ability to function effectively in teams to accomplish a common goal.
3. An understanding of professional, ethical, legal, security, and social issues and responsibilities.
4. An ability to analyse the local and global impact of computing on individuals, organisations, and society.
5. Clear recognition of the need for and an ability to engage in continuing professional development.
6. An ability to design, implement, and evaluate a computer-based system, process, components, or programme to meet the security needs.
7. An understanding of the processes and challenges that support the delivery and management of information security in an organisation.
8. An ability to use the current techniques, skills, and tools necessary for information security practice.

### *Degree Requirements*

Candidates must satisfy the following requirements to be conferred the degree of BTech (Cybersecurity):

- Complete a minimum of **160 MCs** with a minimum CAP of 2.0 by taking modules as listed below;
- Comply with the requirement that the limit on the number of Level-1000 modules to be counted towards fulfillment of graduation requirements being 60 MCs (including exemption of 20 MCs for polytechnic diploma holders); and
- Satisfy any other additional requirements that may be prescribed by SCALE, the School of Computing, or the University.

**List of modules – BTech (Cybersecurity), comprise:**

All modules are 4MCs, except when otherwise stated.

A. **University Level Requirements (20MCs)**
- Human Cultures (module with prefix GEH)
- Asking Questions (module with prefix GEQ)
- Quantitative Reasoning (module with prefix GER)
- Singapore Studies (module with prefix GES)
- Thinking and Expression (module with prefix GET)

B. **Programme Requirements (104MCs), comprising**
1. Major Requirements – Essential Modules (92MCs)

*Computing Foundations*

- TIC1001 Introduction to Computing and Programming I
- TIC1002 Introduction to Computing and Programming II
- TIC1101 Professional, Ethical, and Social Issues in Computing
- TIC1201 Discrete Structures
- TIC2001 Data Structures and Algorithms
- TIC2002 Introduction to Software Engineering
- TIC2301 Introduction to Information Security
- TIC2401 Introduction to Computer Systems
- TIC2501 Computer Networks and Applications
- TIC2601 Database and Web Applications
- TIC2901 Communication for Computing Professionals
- TIC3901 Industrial Practice (12 MCs)

*Cybersecurity Requirements*

- TIC2101 Information Systems and Organisations
- TIC3301 Information Security Management
- TIC3302 Computer Systems Security
- TIC4301 Information Security Practicum I
- TIC4302 Information Security Practicum II

*Mathematics Requirements*

- TMA1001 Introductory Mathematics
- TMA2101 Calculus for Computing
- TMA2102 Linear Algebra
- TMA2103 Probability and Statistics

2. Major Requirements – Elective Modules (12MCs, selected from the list below)

Not all electives modules may be offered in any semester/year. An elective module may not be offered if there is insufficient number of students opting for that module at any particular time.

- TIC4303 Software Security
- TIC4304 Web Security
- TIC4305 Network Security
- TIC4306 Information Security Governance and Audit

C. **Unrestricted Elective Modules (36MCs)**

Note: 20 MCs will normally be given as Advanced Placement Credits to holders of diploma or higher qualifications.

## *Study Schedule*

There is only one intake per academic year in Semester 1 (i.e. August). One sample study schedule for a four-year candidature is shown below. This assumes the students' work and other commitments allow them sufficient time to properly cope with their studies. Students are strongly advised to slow down if necessary so that they progress at their own comfortable pace.

**A. Sample Study Schedule (4-year candidature beginning in Semester 1 of an AY):**

1. The number of Modular Credits (MC) of a module is denoted by the number in the bracket.

2. Modules marked with an asterisk (*) are modules stretching over more than one semester and the total number of MCs will only be given upon completion of the module.

| | |
|---|---|
| **1st Year of studies** | |
| Sem 1: | TIC1001 Introduction to Computing and Programming I (4)<br>TIC1101 Professional, Ethical, and Social Issues in Computing (4)<br>TMA1001 Introductory Mathematics (4) |
| Sem 2: | TIC1002 Introduction to Computing and Programming II (4)<br>TIC1201 Discrete Structures (4)<br>TMA2101 Calculus for Computing (4) |
| SpTerm: | General Education Module 1 (4)<br>TMA2102 Linear Algebra (4) |
| **2nd Year of studies** | |
| Sem 1: | TIC2001 Data Structures and Algorithms (4)<br>TIC2301 Introduction to Information Security (4)<br>TIC2601 Database and Web Applications (4) |
| Sem 2: | TIC2101 Information Systems and Organisations (4)<br>TIC2401 Introduction to Computer Systems (4)<br>TIC2501 Computer Networks and Applications (4) |
| SpTerm: | General Education Module 2 (4)<br>General Education Module 3 (4) |
| **3rd Year of studies** | |
| Sem 1: | TIC2002 Introduction to Software Engineering (4)<br>TIC2901 Communication for Computing Professionals (4)<br>TMA2103 Probability and Statistics (4)<br>*TIC3901 Industrial Practice |
| Sem 2: | TIC3301 Information Security Management (4)<br>TIC3302 Computer Systems Security (4)<br>*TIC3901 Industrial Practice (12)<br>Unrestricted Elective Module 1 (4) |
| SpTerm: | General Education Module 4 (4)<br>General Education Module 5 (4) |

| **4th Year of studies** | |
|---|---|
| Sem 1: | TIC4301 Information Security Practicum I (4)<br>Elective Module 1 (4)<br>Unrestricted Elective Module 2 (4) |
| Sem 2: | TIC4302 Information Security Practicum II (4)<br>Elective Module 2 (4)<br>Elective Module 3 (4) |
| SpTerm: | Unrestricted Elective Module 3 (4)<br>Unrestricted Elective Module 4 (4) |

## 3.3.3 Bachelor of Technology (Software Engineering)

The BTech (Software Engineering) programme is offered in partnership with the School of Computing. The BTech (Software Engineering) programme enables students to attain the following learning outcomes by the time of graduation:

1. Strong knowledge of computer science foundations and fundamentals, including:
    a. familiarity with common computer science themes and principles,
    b. high-level understanding of systems as a whole, and
    c. understanding of the theoretical underpinnings of computer science and their influences in practice.

2. An ability to function effectively in teams to accomplish a common goal.
3. An understanding of professional, ethical, legal, security, and social issues and responsibilities.
4. An ability to analyse the local and global impact of computing on individuals, organisations, and society.
5. Clear recognition of the need for and an ability to engage in continuing professional development.
6. Individual competence in applying sound principles and rigorous thinking to:
    a. analyse an application problem,
    b. understand user's requirement,
    c. formulate the problem in terms of computation requirements,
    d. conceive novel solution ideas,
    e. design appropriate solutions that meet the requirements,
    f. implement the solution, and
    g. evaluate the effectiveness of the solution.

### *Degree Requirements*

Candidates must satisfy the following requirements to be conferred the degree of BTech (Software Engineering):

- Complete a minimum of **160 MCs** with a minimum CAP of 2.0 by taking modules as listed below;
- Comply with the requirement that the limit on the number of Level-1000 modules to be counted towards fulfillment of graduation requirements being 60 MCs (including exemption of 20 MCs for polytechnic diploma holders); and
- Satisfy any other additional requirements that may be prescribed by SCALE, the School of Computing, or the University.

**List of modules – BTech (Software Engineering), comprise:**

All modules are 4MCs, except when otherwise stated.

A. **<u>University Level Requirements (20MCs)</u>**

- Human Cultures (module with prefix GEH)
- Asking Questions (module with prefix GEQ)
- Quantitative Reasoning (module with prefix GER)
- Singapore Studies (module with prefix GES)
- Thinking and Expression (module with prefix GET)

B. **Programme Requirements (104MCs), comprising**

1. Major Requirements – Essential Modules (92MCs)

*Computing Foundations*

- TIC1001 Introduction to Computing and Programming I
- TIC1002 Introduction to Computing and Programming II
- TIC2001 Data Structures and Algorithms
- TIC1201 Discrete Structures
- TIC1101 Professional, Ethical, and Social Issues in Computing
- TIC2301 Introduction to Information Security
- TIC2401 Introduction to Computer Systems
- TIC2501 Computer Networks and Applications
- TIC2601 Database and Web Applications
- TIC2002 Introduction to Software Engineering
- TIC2901 Communication for Computing Professionals
- TIC3901 Industrial Practice (12 MCs)

*Software Engineering Requirements*

- TIC2701 Principles of Programming Languages
- TIC3001 Software Requirements Analysis and Design
- TIC3002 User Interface Design and Implementation
- TIC4001 Software Engineering Practicum I
- TIC4002 Software Engineering Practicum II

*Mathematics Requirements*

- TMA1001 Introductory Mathematics
- TMA2101 Calculus for Computing
- TMA2102 Linear Algebra
- TMA2103 Probability and Statistics

2. Major Requirements – Elective Modules (12MCs, selected from the list below)

Not all electives modules may be offered in any semester/year. An elective module may not be offered if there is insufficient number of students opting for that module at any particular time.

- TIC4003 Software Project Management
- TIC4004 Software Quality Control
- TIC4005 Parallel and Distributed Software Engineering
- TIC4303 Software Security

C. **Unrestricted Elective Modules (36MCs)**

Note: 20 MCs will normally be given as Advanced Placement Credits to holders of diploma or higher qualifications.

## *Study Schedule*

There is only one intake per academic year in Semester 1 (i.e. August). One sample study schedule for a four-year candidature is shown below. This assumes the students' work and other commitments allow them sufficient time to properly cope with their studies. Students are strongly advised to slow down if necessary so that they progress at their own comfortable pace.

**A. Sample Study Schedule (4-year candidature beginning in Semester 1 of an AY):**

1. The number of Modular Credits (MC) of a module is denoted by the number in the bracket.
2. Modules marked with an asterisk (*) are modules stretching over more than one semester and the total number of MCs will only be given upon completion of the module.

| | |
|---|---|
| **1st Year of studies** | |
| Sem 1: | TIC1001 Introduction to Computing and Programming I (4)<br>TIC1101 Professional, Ethical, and Social Issues in Computing (4)<br>TMA1001 Introductory Mathematics (4) |
| Sem 2: | TIC1002 Introduction to Computing and Programming II (4)<br>TIC1201 Discrete Structures (4)<br>TMA2101 Calculus for Computing (4) |
| SpTerm: | General Education Module 1 (4)<br>TMA2102 Linear Algebra (4) |
| **2nd Year of studies** | |
| Sem 1: | TIC2001 Data Structures and Algorithms (4)<br>TIC2301 Introduction to Information Security (4)<br>TIC2601 Database and Web Applications (4) |
| Sem 2: | TIC2002 Introduction to Software Engineering (4)<br>TIC2401 Introduction to Computer Systems (4)<br>TIC2501 Computer Networks and Applications (4) |
| SpTerm: | General Education Module 2 (4)<br>General Education Module 3 (4) |
| **3rd Year of studies** | |
| Sem 1: | TIC2701 Principles of Programming Languages (4)<br>TIC2901 Communication for Computing Professionals (4)<br>*TIC3901 Industrial Practice<br>TMA2103 Probability and Statistics (4) |

| | |
|---|---|
| Sem 2: | TIC3001 Software Requirements Analysis and Design (4)<br>TIC3002 User Interface Design and Implementation (4)<br>*TIC3901 Industrial Practice (12)<br>Unrestricted Elective Module 1 (4) |
| SpTerm: | General Education Module 4 (4)<br>General Education Module 5 (4) |
| **4th Year of studies** | |
| Sem 1: | TIC4001 Software Engineering Practicum I (4)<br>Elective Module 1 (4)<br>Unrestricted Elective Module 2 (4) |
| Sem 2: | TIC4002 Software Engineering Practicum II (4)<br>Elective Module 2 (4)<br>Elective Module 3 (4) |
| SpTerm: | Unrestricted Elective Module 3 (4)<br>Unrestricted Elective Module 4 (4) |

## 3.4 Bachelor of Technology (BTech) Engineering

***Admission Intakes:*** Each of the BTech Engineering programmes has two intakes in each Academic Year, one for Semester 1 in August and the other for Semester 2 in January of the following year except for the following:

- BTech (Chemical Engineering) offers only one intake in Semester 2 in January.
- BTech (Civil Engineering) and BTech (Supply Chain Management) offer only one intake in Semester 1 in August.

As all students admitted into BTech programmes in Engineering must have the minimum of a recognised polytechnic diploma, all students are granted, upon admission, advanced placement credits of 40 MCs which is equivalent to one year of the four-year full-time degree requirements. As such, all BTech Engineering students are admitted directly as Stage 2 (Year 2) students. Students with additional post-diploma academic qualifications may, on a case-by-case basis, apply and be considered for additional advanced placement credits. The granting of such additional credits will be entirely at the discretion of the University.

The structure and design of each of the BTech programmes in Engineering are based on those of the corresponding four-year full-time Bachelor of Engineering (BEng) programmes offered by the Faculty of Engineering. To qualify for a BTech degree in Engineering, a student must take and pass a minimum of 160 MCs of modules, as tabulated below, and achieve a CAP of at least 2.00.

**Table: 160-MC BTech Engineering curriculum structure**

| | **Minimum MCs required** |
|---|---|
| **University Level Requirements** | |
| General Education (GE) Modules [1] | 20 |
| **Sub-total** | **20** |
| **Programme Requirements** [2] | |
| Ethics in Engineering | 4 |
| Foundation & Major Requirements [3] | 105 – 116 |

| | Minimum MCs required |
|---|---|
| **Sub-total** | **109 – 120** |
| **Unrestricted Elective Modules** [4] | 20 – 32 |
| **Grand-total** | **160 – 161** |

Notes:

[1] A limited selection of GE modules (from the wide range available in the University) which can best meet the interests and professional needs of BTech students, will be offered specially in the evenings. The list of modules will be available in the SCALE website in due course.

[2] These are specific to the individual BTech programme and reference should be made to the relevant sections.

[3, 4] 20 MCs of programme requirements and 20 MCs of unrestricted elective requirements will normally be given as Advanced Placement Credits to holders of relevant diploma or higher qualifications.

[4] UEMs enable students to pursue their interests without any restrictions. Students may select any module at any level from among Technical or GE modules to meet this requirement.

***Stage Promotion***: Students will be deemed to have progressed to the next stage of study if they have obtained at least the number of MCs, including exemptions, as stated below:

To move to Stage 2 (Year 2): 36 MCs
To move to Stage 3 (Year 3): 76 MCs
To move to Stage 4 (Year 4): 112 MC

***Degree Requirements & Recommended Study Schedule***

3.4.1 Bachelor of Technology (Chemical Engineering)

3.4.2 Bachelor of Technology (Civil Engineering)

3.4.3 Bachelor of Technology (Electronics Engineering)

3.4.4 Bachelor of Technology (Industrial & Management Engineering)

3.4.5 Bachelor of Technology (Mechanical Engineering)

3.4.6 Bachelor of Technology (Supply Chain Management)

## 3.4.1 Bachelor of Technology (Chemical Engineering)

The BTech (Chemical Engineering) programme is offered in partnership with the Department of Chemical and Biomolecular Engineering. The programme is accredited by the Engineering Accreditation Board (EAB) of the Institution of Engineers Singapore (IES). Via this accreditation, all signatories in the Washington Accord recognise the substantial equivalence of this programme in satisfying the academic requirements for the practice of engineering at the professional level in many countries including Canada, United States of America, United Kingdom, Hong Kong, New Zealand, Australia and others.

The ***educational objectives*** of the BTech (Chemical Engineering) programme are to:

- develop knowledge and skills required for immediate employment as a professional engineer in Chemical Engineering;
- develop an understanding of and an ability to apply basic mathematics, chemical, physical and information sciences to the practice of Chemical Engineering;
- prepare students for future career paths and life-long learning; and
- enable students to better contribute to national development in the context of globalisation.

The programme aims to achieve the following ***learning outcomes***:

- *Core*: Understanding of and ability to apply the science, mathematics and engineering knowledge fundamental to the discipline.
- *Breadth*: Basic competence in a range of technical areas relevant to Chemical Engineering.
- *Depth*: Be able to understand and apply in-depth knowledge of one or more specialisations within Chemical Engineering.
- *Design*: An enhanced ability to perform engineering design by the process of creative thinking, synthesis and integration of interdisciplinary knowledge.

### *Degree Requirements*

Candidates must satisfy the following requirements to be conferred the degree of BTech (Chemical Engineering):

- Complete a minimum of **161 MCs** with a minimum CAP of 2.00;
(Note: 20 MCs of programme requirements and 20 MCs of unrestricted elective requirements will normally be given as Advanced Placement Credits (APCs) to holders of relevant diploma or higher qualifications. Students will be required to complete a minimum of **121 MCs** of modules as listed below);
- Comply with the requirement that the limit on the number of Level-1000 modules to be counted towards fulfilment of graduation requirements being 60 MCs (including the 20 MCs of APCs); and
- Satisfy any other additional requirements that may be prescribed by SCALE, the Faculty of Engineering, or the University.

**List of modules – BTech (Chemical Engineering), comprise:**

1. All modules are 4MCs, except when otherwise stated.
2. A module with module code TCNxxxx is equivalent to the module CNxxxx/CNxxxxR offered to full-

time students. Subject to the approval from SCALE and the Department of Chemical and Biomolecular Engineering, a student may select a full-time equivalent module in place of any TCNxxxx module.

A. **University Level Requirements (20MCs)**

- Human Cultures (module with prefix GEH)
- Asking Questions (module with prefix GEQ)
- Quantitative Reasoning (module with prefix GER)
- Singapore Studies (module with prefix GES)
- Thinking and Expression (module with prefix GET)

B. **Programme Requirements (89MCs), comprising**

1. Faculty Requirements (4MCs)
    - TTG2415 Ethics in Engineering

2. Major Requirements – Essential Modules (65MCs)
    - TCN1005 MatLab Programming for Chemical Engineers
    - TCN1111 Chemical Engineering Principles
    - TTG1401 Engineering Mathematics 1
    - TCN1422 Materials for Chemical Engineers
    - TCN2116 Chemical Kinetics and Reactor Design
    - TCN2121 Chemical Engineering Thermodynamics
    - TCN2122 Fluid Mechanics
    - TCN2125 Heat and Mass Transfer
    - TCN2411 Mathematics for Chemical Engineers 2
    - TCN3121 Process Dynamics and Control
    - TCN3124 Particle Technology
    - TCN3132 Separation Processes (5MCs)
    - TCN3135 Process Safety, Health and Environment (3MCs)
    - TCN3421 Process Modelling & Numerical Simulation
    - TCN4122 Process Synthesis and Simulation (3MCs)
    - TCN4124 Design Project (6MCs)

3. Major Requirements – Elective Modules (20MCs, selected from the list below)

    Not all elective modules may be offered in any semester/year. An elective module may not be offered if there is insufficient number of students opting for that module at any particular time. Subject to the approval from SCALE and the Department of Chemical and Biomolecular Engineering, a student may select one Level-3000 or higher module from other programmes within the Faculty of Engineering.

    - TCN4119 BTech Dissertation (8MCs)
    - TCN4203 Polymer Engineering
    - TCN4205 Pinch Analysis and Process Integration
    - TCN4208 Biochemical Engineering
    - TCN4210 Membrane Science and Engineering
    - TCN4211 Petrochemicals & Processing Technology
    - TCN4215 Food Technology and Engineering
    - TCN4216 Electronic Materials Science

- TCN4217 Processing of Microelectronic Materials
- TCN4227 Advanced Process Control
- TCN4229 Computer Aided Chemical Engineering
- TCN4231 Downstream Processing of Biochemical and Pharmaceutical Products
- TCN4233 Good Manufacturing Practices in Pharmaceutical Industry
- TCN4238 Chemical & Biochemical Process Modeling
- TCN4240 Unit Operations and Processes for Effluent Treatment
- TCN4242 Optimization of Chemical Processes
- TCN4246 Chemical and Bio-Catalysis

C. **Unrestricted Elective Modules (12MCs)**

## *Study Schedule*

There are two intakes per academic year, in Semester 1 (i.e. August) and in Semester 2 (i.e. January). The respective sample study schedules for a four-year candidature are presented below. These assume the students' work and other commitments allow them sufficient time to properly cope with their studies. Students are strongly advised to slow down if necessary so that they progress at their own comfortable pace.

**A. Sample Study Schedule (4-year candidature beginning in Semester 1 of an AY):**

1. The number of Modular Credits (MC) of a module is denoted by the number in the bracket.
2. Modules marked with an asterisk (*) are modules stretching over more than one semester and the total number of MCs will only be given upon completion of the module.

| **1st Year of studies** | |
|---|---|
| Sem 1: | TTG1401 Engineering Mathematics 1 (4)<br>TCN1005 MATLAB Programming for Chemical Engineers (4)<br>GE Requirements 1 (4) |
| Sem 2: | TCN1422 Materials for Chemical Engineers (4)<br>TCN1111 Chemical Engineering Principles (4)<br>GE Requirements 2 (4) |
| SpTerm: | TCN2411 Mathematics for Chemical Engineers 2 (4)<br>GE Requirements 3 (4) |
| **2nd Year of studies** | |

| | |
|---|---|
| Sem 1: | GE Requirements 4 (4)<br>TCN2121 Chemical Engineering Thermodynamics (4)<br>TCN2122 Fluid Mechanics (4) |
| Sem 2: | TCN2116 Chemical Kinetics & Reactor Design (4)<br>TCN2125 Heat and Mass Transfer (4)<br>TCN3124 Particle Technology (4) |
| SpTerm: | TCN3135 Process Safety, Health and Environment (3)<br>GE Requirements 5 (4) |
| **3rd Year of studies** | |
| Sem 1: | TCN3121 Process Dynamics & Control (4)<br>TCN3132 Separation Processes (5)<br>TCN3421 Process Modeling & Numerical Simulation (4) |
| Sem 2: | *TCN4119 BTech Dissertation /Technical Elective Module (4)<br>Technical Elective Module 1 (4)<br>Technical Elective Module 2 (4) |
| SpTerm: | TTG2415 Ethics in Engineering (4)<br>*TCN4119 BTech Dissertation |
| **4th Year of studies** | |
| Sem 1: | *TCN4119 BTech Dissertation (8) /Technical Elective Module (4)<br>TCN4122 Process Synthesis and Simulation (3)<br>*TTG3001 Industrial Practice /Unrestricted Elective Module (4) |
| Sem 2: | *TCN4124 Final Year Design Project<br>*TTG3001 Industrial Practice (12) /Unrestricted Elective Module (4)<br>Technical Elective Module 3 (4) |
| SpTerm:: | *TCN4124 Final Year Design Project (6)<br>*Unrestricted Elective Module (4) |

**B. Sample Study Schedule (4-year candidature beginning in Semester 2 of an AY):**

1. The number of Modular Credits (MC) of a module is denoted by the number in the bracket.

2. Modules marked with an asterisk (*) are modules stretching over more than one semester and the total number of MCs will only be given upon completion of the module.

| | |
|---|---|
| **1st Year of studies** | |
| Sem 2: | TCN1111 Chemical Engineering Principles (4)<br>TTG1401 Engineering Mathematics 1 (4)<br>TCN1422 Materials for Chemical Engineers (4) |
| SpTerm: | General Education Module 1 (4)<br>TCN2411 Mathematics for Chemical Engineers 2 (4) |
| Sem 1: | TCN1005 MatLab Programming for Chemical Engineers (4)<br>TCN2121 Chemical Engineering Thermodynamics (4)<br>TCN2122 Fluid Mechanics (4) |
| **2nd Year of studies** | |
| Sem 2: | TCN2116 Chemical Kinetics & Reactor Design (4)<br>TCN2125 Heat and Mass Transfer (4)<br>TCN3124 Particle Technology (4) |
| SpTerm: | General Education Module 2 (4)<br>TCN3135 Process Safety, Health and Environment (3) |
| Sem 1: | TCN3121 Process Dynamics & Control (4)<br>TCN3132 Separation Processes (5)<br>TCN3421 Process Modelling & Numerical Simulation (4) |
| **3rd Year of studies** | |
| Sem 2: | General Education Module 3 (4)<br>*TCN4119 BTech Dissertation / Technical Elective Module (4)<br>Technical Elective Module 1 (4) |
| SpTerm: | General Education Module 4 (4)<br>TTG2415 Ethics in Engineering (4)<br>*TCN4119 BTech Dissertation |
| Sem 1: | *TTG3001 Industrial Practice / Unrestricted Elective Module (4)<br>*TCN4119 BTech Dissertation (8) / Technical Elective Module (4)<br>TCN4122 Process Synthesis and Simulation (3) |
| **4th Year of studies** | |

| | |
|---|---|
| Sem 2: | General Education Module 5 (4)<br>*TTG3001 Industrial Practice (12) / Unrestricted Elective Module (4)<br>*TCN4124 Final Year Design Project |
| SpTerm: | *TCN4124 Final Year Design Project (6)<br>Unrestricted Elective Module (4) |
| Sem 1: | Technical Elective Module 2 (4)<br>Technical Elective Module 3 (4) |

## 3.4.2 Bachelor of Technology (Civil Engineering)

The BTech (Civil Engineering) programme is offered in partnership with the Department of Civil and Environmental Engineering beginning in August 2017. The curriculum for the part-time BTech Programme is formulated based on the current broad based full-time B.Eng. programme but with stronger emphasis on practice.

As this is a new programme, we are seeking accreditation from the Engineering Accreditation Board (EAB) of the Institution of Engineers Singapore (IES). We expect to be provisionally accredited for the first 2 years after the launch of the programme and full accreditation will be expected in about 3 years thereafter. With successful accreditation, all signatories in the Washington Accord will recognise the substantial equivalence of this programme in satisfying the academic requirements for the practice of engineering at the professional level in many countries including Canada, United States of America, United Kingdom, Hong Kong, New Zealand, Australia and others.

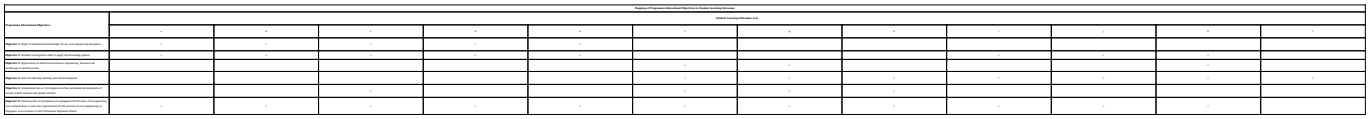
The ***educational objectives*** of the programme are as follows:

**Objective 1:** Depth in fundamental knowledge of core civil engineering disciplines
**Objective 2:** Breadth in integrative skills to apply the knowledge gained
**Objective 3:** Appreciation of interactions between engineering, business and technology in modern society
**Objective 4:** Drive for life-long learning and self-development
**Objective 5:** Understand role as civil engineers in the sustainable developments of society in both national and global contexts.
**Objective 6:** Ensuring that our graduates are equipped with the basic civil engineering core competencies to meet the requirements for the practice of civil engineering in Singapore in accordance to the Professional Engineers Board.

The ***student learning outcomes*** are aligned to those required by the Engineering Accreditation Board on outcomes for civil engineering graduates and these are as follows:

a. **Engineering Knowledge**: An ability to apply scientific and engineering principles as well as contemporary technology to the civil engineering discipline.
b. **Problem Analysis**: An ability to identify, formulate and solve civil engineering problems.
c. **Design of Solutions**: An ability to design a system, component, or process in civil engineering to meet desired needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
d. I**nvestigation**: An ability to conduct complex experiments using research-based knowledge, as well as to analyse and interpret data in civil engineering to make meaningful conclusions.
e. **Modern Tool Usage**: An ability to use the appropriate techniques, skills, and modern engineering tools to understand complex civil engineering activities necessary for engineering practice with an appreciation of the limitations of the tools employed.

f. **Engineer and Society**: An ability to work as a civil engineer effectively with an integrated understanding of societal, health, safety, legal, and cultural issues relevant to the professional practice as well as professional, and societal responsibilities.
g. **Environment and Sustainability**: An ability to assess the impact of the professional civil engineering solutions in societal and environmental contexts within the sustainable development framework.
h. **Ethics:** An ability to understand the importance of professional ethics and engage in the civil engineering practice with a strong commitment to ethical responsibilities.
i. **Individual and Team Work**: An ability to understand the importance of working effectively as an individual as well as a member of multidisciplinary teams in professional practice.
j. **Communication:** An ability to convey technical materials effectively through oral presentations and written communications, and give and receive clear instructions.
k. **Project Management and Finance:** An ability to manage civil engineering projects using engineering and management principles and economic decision-making, and work in multidisciplinary environments.
l. **Life-long Learning**: An ability to gain knowledge of contemporary and emerging environmental issues and to engage in, life-long learning in the broadest context of technological change.



## *Degree Requirements*

Candidates must satisfy the following requirements to be conferred the degree of BTech (Civil Engineering):

- Complete a minimum of **160 MCs** with a minimum CAP of 2.00;
(Note: 20 MCs of programme requirements and 20 MCs of unrestricted elective requirements will normally be given as Advanced Placement Credits (APCs) to holders of relevant diploma or higher qualifications. Students will be required to complete a minimum of **120 MCs** of modules as listed below);
- Comply with the requirement that the limit on the number of Level-1000 modules to be counted towards fulfilment of graduation requirements being 60 MCs (including the 20 MCs of APCs); and
- Satisfy any other additional requirements that may be prescribed by SCALE, the Faculty of Engineering, or the University.

**List of modules – BTech (Civil Engineering), comprise:**

1. All modules are 4MCs, except when otherwise stated.

2. A module with module code TCExxxx is equivalent to the module CExxxx, OTxxxx, ESExxxx and TPxxxx offered to the full-time students. Subject to the approval from SCALE and the Department of Civil & Environmental Engineering, a student may select a full-time equivalent module in place of any TCExxxx module.

A. **University Level Requirements (20MCs)**
- Human Cultures (module with prefix GEH)
- Asking Questions (module with prefix GEQ)
- Quantitative Reasoning (module with prefix GER)

- Singapore Studies (module with prefix GES)
- Thinking and Expression (module with prefix GET)

B. **Programme Requirements (100MCs), comprising**

1. Faculty Requirements (8MCs)
    - TTG2415 Ethics in Engineering
    - TTG2901 Communications for Engineering Professionals
2. Major Requirements – Essential Modules (80MCs)
    - TCE1109 Statics and Mechanics of Materials
    - TTG1401 Engineering Mathematics I
    - TCE2112 Soil Mechanics
    - TCE2134 Hydraulics
    - TCE2155 Structural Mechanics and Materials
    - TCE2183 Construction Project Management
    - TCE2184 Infrastructure & the Environment
    - TME2401 Engineering Mathematics II
    - TCE2407 Engineering & Uncertainty Analyses
    - TCE3001 Water Quality Engineering
    - TCE3115 Geotechnical Engineering
    - TCE3116 Foundation Engineering
    - TCE3121 Transportation Engineering
    - TCE3132 Water Resources Engineering
    - TCE3155 Structural Analysis
    - TCE3165 Structural Concrete Design
    - TCE3166 Structural Steel Design and System
    - TCE4103 Design Project
    - TCE4104 BTech Dissertation (8MCs)
3. Major Requirements – Elective Modules (12MCs, selected from the list below)

    Not all elective modules may be offered in any semester/year. An elective module may not be offered if there is insufficient number of students opting for that module at any particular time. Subject to the approval from SCALE and the Department of Civil and Environmental Engineering, a student may select one Level-3000 or higher module from other programmes within the Faculty of Engineering.

*Construction*

- TCE4282 Building Information Modeling for Project Management
- TCE5604 Advanced Concrete Technology
- TCE5611 Precast Concrete Technology
- TCE5805 Construction Equipment and Methods

*Environmental Engineering and Hydraulics*

- TCE4247 Treatment Plant Hydraulics
- TCE4401 Water & Wastewater Engineering 2
- TCE4408 Environmental Impact Assessment

*Geotechnical Engineering*

- TCE5106 Ground Improvement
- TCE5107 Pile Foundations
- TCE5108 Earth Retaining Structures
- TCE5113 Geotechnical Investigation & Monitoring

*Offshore Engineering*

- TCE5202 Analysis & Design of Offshore Structures
- TCE5206 Offshore Foundations

*Structural Engineering*

- TCE4257 Linear Finite Element Analysis
- TCE4258 Structural Stability & Dynamics
- TCE5509 Advanced Structural Steel Design
- TCE5510 Advanced Structural Concrete Design

*Transportation Engineering*

- TCE4221 Design of Land Transport Infrastructures
- TCE5025 Intelligent Transportation Systems
- TCE5026 Transportation Management & Policy

***Study Schedule***

There is only one intake per academic year in Semester 1 (i.e. August). One sample study schedule for a four-year candidature is shown below. This assumes the students' work and other commitments allow them sufficient time to properly cope with their studies. Students are strongly advised to slow down if necessary so that they progress at their own comfortable pace.

**Sample Study Schedule (4-year candidature beginning in Semester 1 of an AY):**

1. The number of Modular Credits (MC) of a module is denoted by the number in the bracket.
2. Modules marked with an asterisk (*) are modules stretching over more than one semester and the total number of MCs will only be given upon completion of the module.

| **1st Year of studies** | |
|---|---|
| Sem 1: | TCE1109 Statics and Mechanics of Materials (4)<br>TCE2112 Soil Mechanics (4)<br>TCE2155 Structural Mechanics and Materials (4) |
| Sem 2: | TCE2134 Hydraulics (4)<br>TCE3115 Geotechnical Engineering (4)<br>TTG1401 Engineering Mathematics I (4) |
| SpTerm: | General Education Module 1 (4)<br>General Education Module 2 (4) |
| **2nd Year of studies** | |
| Sem 1: | TCE2183 Construction Project Management (4)<br>TCE2184 Infrastructure & the Environment (4)<br>TME2401 Engineering Mathematics II (4) |
| Sem 2: | TCE3116 Foundation Engineering (4)<br>TCE3165 Structural Concrete Design (4)<br>TCE3166 Structural Steel Design and System (4) |

| | |
|---|---|
| SpTerm: | General Education Module 3 (4)<br>TCE2407 Engineering & Uncertainty Analyses (4) |
| **3rd Year of studies** | |
| Sem 1: | TCE3001 Water Quality Engineering (4)<br>TCE3132 Water Resources Engineering (4)<br>TCE3155 Structural Analysis (4) |
| Sem 2: | TTG2901 Communications for Engineering Professionals (4)<br>TCE3121 Transportation Engineering (4)<br>General Education Module 4 (4) (module with prefix GET) |
| SpTerm: | General Education Module 5 (4)<br>TTG2415 Ethics in Engineering (4) |
| **4th Year of studies** | |
| Sem 1: | TCE4103 Design Project (4)<br>*TCE4104 BTech Dissertation<br>Elective Module 1 (4) |
| Sem 2: | *TCE4104 BTech Dissertation (8)<br>Elective Module 2 (4)<br>Elective Module 3 (4) |

## 3.4.3 Bachelor of Technology (Electronics Engineering)

The BTech (Electronics Engineering) is offered in partnership with the Department of Electrical & Computer Engineering. The programme aims to graduate professional electronics engineers who have a strong foundation in the relevant sciences and technology and who are able to contribute to society through innovation, enterprise and leadership. The programme provides students with an education that enhances and complements their knowledge and experiences, offers the requisite balance of breadth and depth for a professional electrical engineering education, and seeks to establish a solid foundation for lifelong learning throughout an electronics engineer's career.

The programme comprises of three components – a strong core in mathematics, computing and engineering; technical competence through a minimum of breadth and depth modules; and general education. The core – which includes group projects, a product design and innovations project, and individual research and design projects – provides knowledge and skills considered essential for electronics engineers. A minimum number of breadth modules ensures that each student is exposed to many aspects of the state-of-the-art areas; in addition, students can achieve depth in one or two areas of their choice. General education modules complement the technical education through a wide array of modules in humanities, social sciences and professionalism to make our graduates educated members of the global community.

The programme is accredited by the Engineering Accreditation Board (EAB) of the Institution of Engineers Singapore (IES). Via this accreditation, all signatories in the Washington Accord recognise the substantial equivalence of this programme in satisfying the academic requirements for the practice of engineering at the professional level in many countries including Canada, United States of America, United Kingdom, Hong Kong, New Zealand, Australia and others.

The structure of the BTech (Electronics Engineering) programme is designed to achieve the following ***educational objectives*** to prepare engineers who will have the following attributes:

- **Technical Skills**: are technically competent to solve complex problems in electronics engineering and can adapt effectively in a fast changing environment.
- **Critical Thinking**: are able to critically think, analyse and make decisions that give due consideration to global issues in business, ethics, society and the environment.
- **Leadership & Team Building**: are able to communicate effectively, act with integrity, and have the inter-personal skills needed to engage in, lead, and nurture diverse teams.
- **Attitude**: are committed to lifelong learning, resourceful, resilient and embrace global challenges and opportunities to make a positive impact in society.

The above objectives are achieved by a curriculum designed to graduate students who have attained the following ***learning outcomes***:

a. **Engineering knowledge:** Apply the knowledge of mathematics, natural science, engineering fundamentals, and an engineering specialisation to the solution of complex engineering problems.
b. **Problem Analysis:** Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
c. **Design/development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
d. **Investigation:** Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
e. **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
f. **The engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
g. **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for the sustainable development.
h. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
i. **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
j. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
k. **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and economic decision-making, and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
l. **Life-long Learning:** Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
m. **EE Specific Programme Criteria:** Have the knowledge to analyse and design complex electronic devices, software, and systems containing hardware and software components; and understand the principles and applications of the basic sciences, engineering science and advanced mathematics, including probability and statistics, differential and integral calculus, linear algebra and complex variables.

## *Degree Requirements*

Candidates must satisfy the following requirements to be conferred the degree of BTech (Electronics Engineering):

- Complete a minimum of **160 MCs** with a minimum CAP of 2.00;

(Note: 20 MCs of programme requirements and 20 MCs of unrestricted elective requirements will normally be given as Advanced Placement Credits (APCs) to holders of relevant diploma or higher qualifications. Students will be required to complete a minimum of **120 MCs** of modules as listed below.)

- Comply with the requirement that the limit on the number of Level-1000 modules to be counted towards fulfilment of graduation requirements being 60 MCs (including the 20 MCs of APCs); and
- Satisfy any other additional requirements that may be prescribed by SCALE, the Faculty of

Engineering, or the University.

**List of modules – BTech (Electronics Engineering), comprise:**

1. All modules are 4MCs, except when otherwise stated.

2. A module with module code TEExxxx is equivalent to the module EExxxx offered to the full-time students. Subject to the approval from SCALE and the Department of Electrical and Computer Engineering, a student may select a full-time equivalent module in place of any TEExxxx module.

A. **University Level Requirements (20MCs)**
- Human Cultures (module with prefix GEH)
- Asking Questions (module with prefix GEQ)
- Quantitative Reasoning (module with prefix GER)
- Singapore Studies (module with prefix GES)
- Thinking and Expression (module with prefix GET)

B. **Programme Requirements (84MCs), comprising**

1. Faculty Requirements (4MCs)
   - TTG2415 Ethics in Engineering

2. Major Requirements – Essential Modules (60MCs)
   - TTG1401 Engineering Mathematics I
   - TEE2002 Engineering Mathematics II
   - TEE2003 Advanced Mathematics for Engineers
   - TEE2011 Engineering Electromagnetics
   - TEE2023 Signals & Systems
   - TEE2026 Digital Design
   - TEE2027 Electronic Circuits
   - TEE2028 Microcontroller Programming and Interfacing
   - TEE2033 Integrated System Lab
   - TEE2101 Programming Methodology
   - TEE3031 Innovation & Enterprise I
   - TEE3506 Electrical Energy Systems
   - TEE4001 BTech Dissertation (12MCs)

3. Major Requirements – Elective Modules (20MCs, selected from the list below)

   Not all elective modules may be offered in any semester/year. An elective module may not be offered if there is insufficient number of students opting for that module at any particular time. Unless approval for exemption is obtained from SCALE and the Department of Electrical and Computer Engineering, a student must read at least two Level-4000 electives and three other electives selected from the list below.

   *Communications*

- TEE3131 Communication Systems
- TEE4101 RF Communications

*Computer Engineering*

- TEE3201 Software Engineering
- TEE4204 Computer Networks
- TEE4210 Network Protocols and Applications

*Microelectronics*

- TEE4407 Analog Electronics
- TEE4436 Fabrication Process Technology

*General*

- TIE2130 Quality Engineering I
- TEE3331 Feedback Control Systems
- TEE3501 Power Electronics
- TEE4305 Introduction to Fuzzy/Neural Systems
- TEE4211 Data Science for the Internet of Things
- TME4245 Robot Mechanics and Control

C. **Unrestricted Elective Modules (16MCs)**

## *Study Schedules*

There are two intakes per academic year, in Semester 1 (i.e. August) and in Semester 2 (i.e. January). The respective sample study schedules for a four-year candidature are presented below. These assume the students' work and other commitments allow them sufficient time to properly cope with their studies. Students are strongly advised to slow down if necessary so that they progress at their own comfortable pace.

**A. Sample Study Schedule (4-year candidature beginning in Semester 1 of an AY):**

1. The number of Modular Credits (MC) of a module is denoted by the number in the bracket.
2. Modules marked with an asterisk (*) are modules stretching over more than one semester and the total number of MCs will only be given upon completion of the module.

| **1st Year of studies** | |
|---|---|
| Sem 1: | General Education Module 1 (4)<br>TTG1401 Engineering Mathematics I (4)<br>TEE2027 Electronic Circuits (4) |
| Sem 2: | TEE2002 Engineering Mathematics II (4)<br>TEE2026 Digital Design (4)<br>TEE2101 Programming Methodology (4) |

| | |
|---|---|
| SpTerm: | General Education Module 2 (4)<br>General Education Module 3 (4) |
| **2nd Year of studies** | |
| Sem 1: | TEE2003 Advanced Mathematics for Engineers (4)<br>TEE2028 Microcontroller Programming and Interfacing (4)<br>TEE3506 Electrical Energy Systems (4) |
| Sem 2: | TEE2011 Engineering Electromagnetics (4)<br>TEE2023 Signals & Systems (4)<br>Unrestricted Elective Module (4) |
| SpTerm: | General Education Module 4 (4) |
| **3rd Year of studies** | |
| Sem 1: | *TTG3002 Industrial Practice<br>Elective Module 1 (4)<br>Elective Module 2 (4)<br>General Education Module 5 (4) |
| Sem 2: | *TTG3002 Industrial Practice (8)<br>TEE2033 Integrated System Lab (4)<br>TEE3031 Innovation & Enterprise I (4)<br>Elective Module 3 (4) |
| SpTerm: | TTG2415 Ethics in Engineering (4) |
| **4th Year of studies** | |
| Sem 1: | *TEE4001 BTech Dissertation<br>Elective Module 4 (4)<br>Elective Module 5 (4) |
| Sem 2: | *TEE4001 BTech Dissertation (12)<br>Unrestricted Elective Module (4) |

**B. Sample Study Schedule (4-year candidature beginning in Semester 2 of an AY):**

1. The number of Modular Credits (MC) of a module is denoted by the number in the bracket.

2. Modules marked with an asterisk (*) are modules stretching over more than one semester and the total number of MCs will only be given upon completion of the module.

| | |
|---|---|
| **1st Year of studies** | |
| Sem 2: | TEE2026 Digital Design (4)<br>TEE2101 Programming Methodology (4)<br>TTG1401 Engineering Mathematics I (4) |
| SpTerm: | General Education Module 1 (4)<br>General Education Module 2 (4) |
| Sem 1: | General Education Module 3 (4)<br>TEE2002 Engineering Mathematics II (4)<br>TEE2027 Electronic Circuits (4) |
| **2nd Year of studies** | |
| Sem 2: | TEE2003 Advanced Mathematics for Engineers (4)<br>TEE2011 Engineering Electromagnetics (4)<br>TEE2023 Signals and Systems (4) |
| SpTerm: | General Education Module 4 (4) |
| Sem 1: | General Education Module 5 (4)<br>TEE2028 Microcontroller Programming and Interfacing (4)<br>*TTG3002 Industrial Practice<br>TEE3506 Electrical Energy Systems (4) |
| **3rd Year of studies** | |
| Sem 2: | TEE2033 Integrated System Lab (4)<br>TEE3031 Innovation & Enterprise I (4)<br>*TTG3002 Industrial Practice (8)<br>Elective Module 1 (4) |
| SpTerm: | TTG2415 Ethics in Engineering (4) |
| Sem 1: | Elective Module 2 (4)<br>Elective Module 3 (4)<br>Unrestricted Elective Module (4) |
| **4th Year of studies** | |

| | |
|---|---|
| Sem 2: | *TEE4001 BTech Dissertation<br>Elective Module 4 (4)<br>Elective Module 5 (4) |
| SpTerm: | *TEE4001 BTech Dissertation |
| Sem 1: | *TEE4001 BTech Dissertation (12)<br>Unrestricted Elective Module (4) |

## 3.4.4 Bachelor of Technology (Industrial & Management Engineering)

The BTech (Industrial & Management Engineering) is offered in partnership with the Department of Industrial Systems Engineering and Management. The programme aims to graduate professional industrial and management engineers who have a strong foundation in the relevant modelling and methodological expertise together with a systems mindset, who can contribute to society through innovation, enterprise and leadership. The programme provides students with an education that enhances and complements their knowledge and experiences.

In order to prepare graduates for the rapidly evolving landscape of Industrial and Management Engineering (IME) and to upgrade polytechnic graduates into learning engineers, the programme is specially designed to comprise essential modules, elective modules (both technical and non technical), enrichment modules, and projects. The essential modules seek to equip students with a strong foundation in mathematics, probability and statistics in engineering fundamentals. The technical electives provide the breadth and depth in different areas of IME.

Design, which is the heart of engineering, is integrated through various project activities. Non-technical modules introduce students to methodologies of business and management. By providing graduates with a combination of broad-based fundamentals and specialised knowledge, the programme strives to graduate versatile engineers who would be best positioned to lead in a rapidly changing and increasingly knowledge-based economy.

The programme is accredited by the Engineering Accreditation Board (EAB) of the Institution of Engineers Singapore (IES). Via this accreditation, all signatories in the Washington Accord recognise the substantial equivalence of this programme in satisfying the academic requirements for the practice of engineering at the professional level in many countries including Canada, United States of America, United Kingdom, Hong Kong, New Zealand, Australia and others.

The ***educational objectives*** of the BTech (Industrial & Management Engineering) curriculum strive to equip graduates with the abilities to:

- Apply fundamental knowledge and skill sets required in the Industrial and Management Engineering profession.
- Adopt a systems approach to design, develop, implement, manage and innovate integrated systems that include people, technology, information, energy and resources taking into account global, societal, environmental and economic contexts.
- Work and communicate effectively with multi-disciplinary team members and different types of stakeholders.
- Recognise the need and continue to develop skills and knowledge to embrace changes in society and the profession.

The ***student learning outcomes*** of the BTech (Industrial & Management Engineering) curriculum strive to equip graduates with the following attributes:

- **Engineering Knowledge:** Apply the knowledge of mathematics, science and engineering to the solution of complex engineering and management problems.
- **Problem Analysis**: Identify, formulate, research through relevant literature review, and analyse complex engineering and management problems to reach substantiated conclusions using mathematics and sciences.
- **Design/Development of Solutions:** Design and develop solutions for complex engineering and management problems including systems, components and/or processes that meet the specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
- **Investigation:** Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **Modern Tool Usage:** Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, to complex engineering and management activities including modelling and prediction with an understanding of the limitations.
- **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for, sustainable development.
- **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
- **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and economic decision-making, and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **Life-long Learning:** Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## *Degree Requirements*

Candidates must satisfy the following requirements to be conferred the degree of BTech (Industrial & Management Engineering):

1. Complete a minimum of **161 MCs** with a minimum CAP of 2.00;
   (Note: 20 MCs of programme requirements and 20 MCs of unrestricted elective requirements will normally be given as Advanced Placement Credits (APCs) to holders of relevant diploma or higher qualifications. Students will be required to complete a minimum of **121 MCs** of modules as listed below);
2. Comply with the requirement that the limit on the number of Level-1000 modules to be counted

towards fulfillment of graduation requirements being 60 MCs (including the 20 MCs of APCs); and
3. Satisfy any other additional requirements that may be prescribed by SCALE, the Faculty of Engineering, or the University.

**List of modules – BTech (Industrial & Management Engineering), comprise:**

*1. All modules are 4MCs, except when otherwise stated.*

*2. A module with module code TIExxxx is equivalent to the module IExxxx offered to the full-time students. Subject to the approval from SCALE and the Department of Industrial Systems Engineering and Management, a student may select a full-time equivalent module in place of any TIExxxx module.*

A. University Level Requirements (20MCs)
   - Human Cultures (module with prefix GEH)
   - Asking Questions (module with prefix GEQ)
   - Quantitative Reasoning (module with prefix GER)
   - Singapore Studies (module with prefix GES)
   - Thinking and Expression (module with prefix GET)

B. Programme Requirements (89MCs), comprising
   1. Faculty Requirements (4MCs)
      - TTG2415 Ethics in Engineering
   2. Major Requirements – Essential Modules (65MCs)
      - TTG1401 Engineering Mathematics I
      - TIE2010 Introduction to Industrial System
      - TIE2020 Probability and Statistics
      - TIE2030 Programming Methodology with Python
      - TIE2100 Probability Models with Applications
      - TIE2110 Operations Research I
      - TIE2130 Quality Engineering I
      - TIE2140 Engineering Economy
      - TIE3100 Systems Design Project (8MCs)
      - TIE3101 Statistics for Engineering Applications
      - TIE3110 Simulation (5MCs)
      - TIE4240 Project Management
      - TIE4101 BTech Dissertation (8MCs)
   3. Major Requirements – Elective Modules (20MCs, selected from the list below)

      Not all electives modules may be offered in any semester/year. An elective module may not be offered if there is insufficient number of students opting for that module at any particular time.

      - TIE2150 Human Factors Engineering
      - TIE4203 Decision Analysis in Industrial & Operations Management
      - TIE4212 Advanced Modelling in Operations Management
      - TIE4220 Supply Chain Modelling
      - TIE4230 Quality Engineering I
      - TIE4239 Selected Topics in Quality Engineering
      - TIE4242 Cost Analysis and Management
      - TIE4246 New Product Management and Innovation
      - TIE4249 Selected Topics in Engineering Management
      - TIE4252 Introduction to Systems Engineering
      - TIE4259 Selected Topics in Systems Engineering
      - TIE4299 Selected Topics in Industrial Engineering

- IE5108 Facility Layout and Location
- IE5121 Quality Planning and Management

In the rare event that a student is unable to secure sufficient number of electives from the above list to complete their requirements, permission may be granted by SCALE and the Department of Industrial Systems Engineering and Management for the student to select one Level-3000 or higher module from other programmes within the Faculty of Engineering.

C. Unrestricted Elective Modules (12MCs)

## *Study Schedules*

There are two intakes per academic year, in Semester 1 (i.e. August) and in Semester 2 (i.e. January). The respective sample study schedules for a four-year candidature are presented below. These assume the students' work and other commitments allow them sufficient time to properly cope with their studies. Students are strongly advised to slow down if necessary so that they progress at their own comfortable pace.

**A. Sample Study Schedule (4-year candidature beginning in Semester 1 of an AY):**

*1. The number of Modular Credits (MC) of a module is denoted by the number in the bracket.*

*2. Modules marked with an asterisk (*) are modules stretching over more than one semester and the total number of MCs will only be given upon completion of the module.*

| **1st Year of studies** | |
|---|---|
| Sem 1: | TEE2010 Introduction to Industrial System (4)<br>TIE2030 Programming Methodology with Python (4)<br>TTG1401 Engineering Mathematics I (4) |
| Sem 2: | TIE2020 Probability and Statistics (4)<br>TIE2130 Quality Engineering (4)<br>TIE2140 Engineering Economy (4) |
| SpTerm: | General Education Module 1 (4)<br>General Education Module 2 (4) |
| **2nd Year of studies** | |
| Sem 1: | TIE2110 Operations Research I (4)<br>TIE3101 Statistics for Engineering Applications (4)<br>TIE3110 Simulation (5) |

| | |
|---|---|
| Sem 2: | TIE2100 Probability Models with Applications (4)<br>TIE3010 Systems Thinking and Design (4)<br>General Education Module 3 (4) |
| SpTerm: | TTG2415 Ethnics in Engineering (4)<br>General Education Module 4 (4) |
| **3rd Year of studies** | |
| Sem 1: | *TIE3100 Systems Design Project<br>TIE4240 Project Management (4)<br>*TTG3001 Industrial Practice |
| Sem 2: | *TIE3100 Systems Design Project (8)<br>Elective Module 1 (4)<br>*TTG3001 Industrial Practice (12) |
| SpTerm: | Elective Module 2 (4)<br>General Education Module 5 (4) |
| **4th Year of studies** | |
| Sem 1: | *TIE4101 BTech Dissertation<br>Elective Module 3 (4)<br>Elective Module 4 (4) |
| Sem 2: | *TIE4101 BTech Dissertation (8)<br>Elective Module 5 (4) |

**B. Sample Study Schedule (4-year candidature beginning in Semester 2 of an AY):**

*1. The number of Modular Credits (MC) of a module is denoted by the number in the bracket.*

*2. Modules marked with an asterisk (*) are modules stretching over more than one semester and the total number of MCs will only be given upon completion of the module.*

| | |
|---|---|
| **1st Year of studies** | |
| Sem 2: | TIE2020 Probability and Statistics (4)<br>TIE2130 Quality Engineering I (4)<br>TIE2140 Engineering Economy (4) |

| | |
|---|---|
| SpTerm: | General Education Module 1 (4)<br>General Education Module 2 (4) |
| Sem 1: | TIE2010 Introduction to Industrial System (4)<br>TIE2030 Programming Methodology with Python(4)<br>TTG1401 Engineering Mathematics I (4) |
| **2nd Year of studies** | |
| Sem 2: | TIE2100 Probability Models with Applications (4)<br>TIE3010 Systems Thinking and Design (4)<br>General Education Module 3 (4) |
| SpTerm: | TTG2415 Ethics in Engineering (4)<br>General Education Module 4 (4) |
| Sem 1: | TIE2110 Operations Research 1 (4)<br>TIE3101 Statistics for Engineering Applications (4)<br>TIE3110 Simulation (5)<br>*TTG3001 Industrial Practice |
| **3rd Year of studies** | |
| Sem 2: | *TIE3100 Systems Design Project<br>Elective Module 1 (4)<br>Elective Module 2 (4)<br>*TTG3001 Industrial Practice (12) |
| SpTerm: | *TIE3100 Systems Design Project<br>General Education Module 5 (4) |
| Sem 1: | *TIE3100 Systems Design Project (8)<br>TIE4240 Project Management (4)<br>Elective Module 3 (4) |
| **4th Year of studies** | |
| Sem 2: | *TIE4101 BTech Dissertation<br>Elective Module 4 (4) |

| | |
|---|---|
| SpTerm: | *TIE4101 BTech Dissertation<br>Elective Module 5 (4) |
| Sem 1: | *TIE4101 BTech Dissertation (8) |

## 3.4.5 Bachelor of Technology (Mechanical Engineering)

The BTech (Mechanical Engineering) programme is offered in partnership with the Department of Mechanical Engineering. The academic curriculum follows closely that of the equivalent BEng programme.

The programme is accredited by the Engineering Accreditation Board (EAB) of the Institution of Engineers Singapore (IES). Via this accreditation, all signatories in the Washington Accord recognise the substantial equivalence of this programme in satisfying the academic requirements for the practice of engineering at the professional level in many countries including Canada, United States of America, United Kingdom, Hong Kong, New Zealand, Australia and others.

The ***educational objectives*** of the programme are as follows:

- To prepare graduates with the knowledge and competency for careers in, and related to, Mechanical Engineering
- To prepare graduates to become leaders in fields related to Mechanical Engineering
- To enable graduates to understand their role as engineers and their impact on society in both national and global contexts.

The ***learning outcomes*** for the programme are the abilities to:

- **Engineering knowledge**: Apply knowledge of mathematics, natural science, engineering fundamentals, and an engineering specialisation to the solution of complex engineering problems.
- **Problem Analysis**: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **Design/Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
- **Investigation:** Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for the sustainable development.
- **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **Individual and Team Work**: Function effectively as an individual, and as a member or leader in

diverse teams and in multidisciplinary settings.
- **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and economic decision-making, and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **Life-long Learning:** Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## *Degree Requirements*

Candidates must satisfy the following requirements to be conferred the degree of BTech (Mechanical Engineering):

- Complete a minimum of **161 MCs** with a minimum CAP of 2.00;
(Note: 20 MCs of programme requirements and 20 MCs of unrestricted elective requirements will normally be given as Advanced Placement Credits (APCs) to holders of relevant diploma or higher qualifications. Students will be required to complete a minimum of **121 MCs** of modules as listed below)
- Comply with the requirement that the limit on the number of Level-1000 modules to be counted towards fulfilment of graduation requirements being 60 MCs (including the 20 MCs of APCs); and
- Satisfy any other additional requirements that may be prescribed by SCALE, the Faculty of Engineering, or the University.

**List of modules – BTech (Mechanical Engineering), comprise:**

*1. All modules are 4MCs, except when otherwise stated.*

*2. A module with module code TMExxxx is equivalent to the module MExxxx offered to the full-time students. Subject to the approval from SCALE and the Department of Mechanical Engineering, a student may select a full-time equivalent module in place of any TMExxxx module.*

A. **<u>University Level Requirements (20MCs)</u>**
- Human Cultures (module with prefix GEH)
- Asking Questions (module with prefix GEQ)
- Quantitative Reasoning (module with prefix GER)
- Singapore Studies (module with prefix GES)
- Thinking and Expression (module with prefix GET)

B. **<u>Programme Requirements (93MCs), comprising</u>**

1. <u>Faculty Requirements (4MCs)</u>
   - TTG2415 Ethics in Engineering

2. <u>Major Requirements – Essential Modules (65MCs)</u>
   - TTG1401 Engineering Mathematics I

- TME2401 Engineering Mathematics II
- TME2114 Mechanics of Materials II (3MCs)
- TME2121 Engineering Thermodynamics
- TME2134 Fluid Mechanics I
- TME2135 Fluid Mechanics II
- TME2142 Feedback Control Systems
- TME2143 Sensors and Actuators
- TME2151 Principles of Mechanical Engineering Materials
- TME3112 Mechanics of Machines
- TME3122 Heat Transfer
- TME3162 Manufacturing Processes
- TME2101 Fundamentals of Mechanical Design
- TME3101 Mechanical Systems Design (6MCs)
- TME4102 BTech Dissertation (8MCs)

3. Major Requirements – Elective Modules (24MCs, selected from the list below)

*Not all elective modules may be offered in any semester/year. An elective module may not be offered if there is insufficient number of students opting for that module at any particular time. Subject to the approval from SCALE and the Department of Mechanical Engineering, a student may select one Level-3000 or higher module from other programmes within the Faculty of Engineering.*

- TME3211 Mechanics of Solids
- TME3233 Unsteady Flow in Fluid Systems
- TME3251 Materials for Engineers
- TME3241 Microprocessor Applications
- TME3242 Automation
- TME3261 Computer Aided Design and Manufacturing
- TME3263 Design for Manufacturing and Assembly
- TME3291 Numerical Methods in Engineering
- TME4213 Vibration Theory and Applications
- TME4223 Thermal Environmental Engineering
- TME4225 Applied Heat Transfer
- TME4234 Experimental Methods in Fluid Mechanics
- TME4245 Robot Mechanics and Control
- TME4254 Materials in Engineering Design
- TME4261 Tool Engineering
- TME4262 Automation in Manufacturing
- TME4283 Micro fabrication Processes
- TIE2010 Introduction to Industrial Systems
- TIE2130 Quality Engineering I
- TME4209 Management of New Product Development
- TME4256 Functional Materials and Devices
- TME4263 Manufacturing Simulation & Data Communication
- TME4264 Fundamentals of Automotive Engineering

C. **Unrestricted Elective Modules (8MCs)**

## *Study Schedules*

There are two intakes per academic year, in Semester 1 (i.e. August) and in Semester 2 (i.e. January). The respective sample study schedules for a four-year candidature are presented below. These assume the students' work and other commitments allow them sufficient time to properly cope with their studies. Students are strongly advised to slow down if necessary so that they progress at their own comfortable pace.

**A. Sample Study Schedule (4-year candidature beginning in Semester 1 of an AY):**

*1. The number of Modular Credits (MC) of a module is denoted by the number in the bracket.*

*2. Modules marked with an asterisk (*) are modules stretching over more than one semester and the total number of MCs will only be given upon completion of the module.*

| | |
|---|---|
| **1st Year of studies** | |
| Sem 1: | TME2121 Engineering Thermodynamics (4)<br>TME2151 Principles of Mechanical Engineering Materials (4)<br>TTG1401 Engineering Mathematics I (4) |
| Sem 2: | TME2101 Fundamentals of Mechanical Design (4)<br>TME2114 Mechanics of Materials II (3)<br>TME2401 Engineering Mathematics II (4) |
| SpTerm: | General Education Module 1 (4)<br>General Education Module 2 (4) |
| **2nd Year of studies** | |
| Sem 1: | TME2134 Fluid Mechanics I (4)<br>TME3112 Mechanics of Machines (4)<br>TME3162 Manufacturing Processes (4) |
| Sem 2: | TME2135 Fluid Mechanics II (4)<br>TME2143 Sensors and Actuators (4)<br>General Education Module 3 (4) |
| SpTerm: | TTG2415 Ethics in Engineering (4) |
| **3rd Year of studies** | |

| | |
|---|---|
| Sem 1: | TME2142 Feedback Control Systems (4)<br>*TTG3002 Industrial Practice<br>Elective Module 1 (4)<br>Elective Module 2 (4) |
| Sem 2: | TME3101 Mechanical Systems Design (6)<br>TME3122 Heat Transfer (4)<br>*TTG3002 Industrial Practice (8)<br>Elective Module 3 (4) |
| SpTerm: | General Education Module 4 (4)<br>General Education Module 5 (4) |
| **4th Year of studies** | |
| Sem 1: | *TME4102 BTech Dissertation<br>Elective Module 4 (4)<br>Elective Module 5 (4) |
| Sem 2: | *TME4102 BTech Dissertation (8)<br>Elective Module 6 (4) |

**B. Sample Study Schedule (4-year candidature beginning in Semester 2 of an AY):**

*1. The number of Modular Credits (MC) of a module is denoted by the number in the bracket.*

*2. Modules marked with an asterisk (*) are modules stretching over more than one semester and the total number of MCs will only be given upon completion of the module.*

| | |
|---|---|
| **1st Year of studies** | |
| Sem 2: | TME2101 Fundamentals of Mechanical Design (4)<br>TME2114 Mechanics of Materials II (3)<br>TTG1401 Engineering Mathematics I (4) |
| SpTerm: | General Education Module 1 (4)<br>General Education Module 2 (4) |
| Sem 1: | TME2121 Engineering Thermodynamics (4)<br>TME2134 Fluid Mechanics I (4)<br>TME2401 Engineering Mathematics II (4) |

| | |
|---|---|
| **2nd Year of studies** | |
| Sem 2: | TME2135 Fluid Mechanics II (4)<br>TME2143 Sensors and Actuators (4)<br>TME3101 Mechanical Systems Design (6) |
| SpTerm: | General Education Module 3 (4) |
| Sem 1: | TME2151 Principles of Mechanical Engineering Materials (4)<br>TME3112 Mechanics of Machines (4)<br>TME3162 Manufacturing Processes (4)<br>*TTG3002 Industrial Practice |
| **3rd Year of studies** | |
| Sem 2: | General Education Module 4 (4)<br>TME3122 Heat Transfer (4)<br>*TTG3002 Industrial Practice (8)<br>Elective Module 1 (4) |
| SpTerm: | General Education Module 5 (4) |
| Sem 1: | TME2142 Feedback Control Systems (4)<br>Elective Module 2 (4)<br>Elective Module 3 (4) |
| **4th Year of studies** | |
| Sem 2: | *TME4102 BTech Dissertation<br>Elective Module 4 (4)<br>Elective Module 5 (4) |
| SpTerm: | *TME4102 BTech Dissertation<br>TTG2415 Ethics in Engineering (4) |
| Sem 1: | *TME4102 BTech Dissertation (8)<br>Elective Module 6 (4) |

## 3.4.6 Bachelor of Technology (Supply Chain Management)

The BTech (Supply Chain Management) programme is building on the suite of five existing BTech programmes (Electronics Engineering, Mechanical Engineering, Chemical Engineering, Industrial & Management Engineering and Civil Engineering) offered by the School of Continuing and Lifelong Education (SCALE) and the Faculty of Engineering in NUS. The programme will provide an avenue for suitably qualified polytechnic diploma holders who are currently employed to pursue a part-time degree at NUS, while allowing them to stay economically productive during the course. The part-time programme will marry key components from the broad-based full-time Bachelor of Engineering (BEng) (ISE) programme with essential elements of strong industry relevance that will be immediately useful in the workplace. In this way, it will fulfil the strong aspiration of the growing number of capable polytechnic graduates to obtain a degree without the need to go overseas or give up their jobs.

The BTech (Supply Chain Management) programme is aligned with the Faculty's educational philosophy which emphasises the learning of scientific fundamentals of engineering as a foundation for proficient and innovative practice. Interactive classroom lectures are augmented by hands-on laboratory sessions and design and research experience.

The ***educational objectives*** of the programme are as follows:

- A deep fundamental knowledge of core supply chain management, supply chain engineering and general business disciplines such as international trade law;
- Broad integrative skills to apply the knowledge gained;
- An appreciation of the interactions between modern logistics and supply chains, with engineering, business and technology in modern society;
- A drive for life-long learning and continuous self-development; and
- An understanding of their roles as supply chain analysts/ engineers in the development of Singapore society at the national and global levels.

In addition, the programme ensures that our graduates are equipped with the necessary logistics and supply chain management and engineering core competencies to meet the requirements for the practice of engineering in Singapore as stipulated by the Professional Engineers Board.

The ***student learning outcomes*** are aligned to those required by the Engineering Accreditation Board on outcomes for engineering graduates and these are as follows:

- Apply knowledge of mathematics, science and engineering to logistics and supply chain management;
- Design and conduct experiments, analyse, interpret data and synthesise valid conclusions;
- Design a system, component, or process, and synthesise solutions to achieve desired needs;
- Identify and formulate research through relevant literature review, and solve engineering problems with substantiated conclusions;

- Use the techniques, skills and modern engineering tools necessary for engineering practice with appropriate considerations for public health and safety, cultural, societal, and environmental constraints;
- Communicate effectively (including listening, writing and speaking skills);
- Recognise the need for, and have the ability to engage in life-long learning;
- Understand the impact of engineering solutions in a societal context and to be able to respond effectively to the needs for sustainable development;
- Function effectively within multidisciplinary teams and understand the fundamental precepts of effective logistical and supply chain related project management; and
- Understand professional, ethical and moral responsibilities in the workplace.

## *Degree Requirements*

Candidates must satisfy the following requirements to be conferred the degree of BTech (Supply Chain Management):

- Complete a minimum of **160 MCs** with a minimum CAP of 2.00;
(Note: 20 MCs of programme requirements and 20 MCs of unrestricted elective requirements will normally be given as Advanced Placement Credits (APCs) to holders of relevant diploma or higher qualifications. Students will be required to complete a minimum of **120 MCs** of modules as listed below);
- Comply with the requirement that the limit on the number of Level-1000 modules to be counted towards fulfillment of graduation requirements being 60 MCs (including the 20 MCs of APCs); and
- Satisfy any other additional requirements that may be prescribed by SCALE, the Faculty of Engineering, or the University.

**List of modules – BTech (Supply Chain Management), comprise:**

1. All modules are 4MCs, except when otherwise stated.

2. A module with module code TIExxxx is equivalent to the module IExxxx offered to full-time students. Subject to the approval from SCALE and the Department of Industrial Systems Engineering and Management, a student may select a full-time equivalent module in place of any TIExxxx module.

A. **University Level Requirements (20MCs)**
- Human Cultures (module with prefix GEH)
- Asking Questions (module with prefix GEQ)
- Quantitative Reasoning (module with prefix GER)
- Singapore Studies (module with prefix GES)
- Thinking and Expression (module with prefix GET)

B. **Programme Requirements (88MCs), comprising**

1. Faculty Requirements (4MCs)
- TTG2415 Ethics in Engineering

2. Major Requirements – Essential Modules (68MCs)
- TTG1401 Engineering Mathematics I
- TIE2020 Probability and Statistics

- TIE2030 Programming Methodology with Python
- TIE2100 Probability Models with Applications
- TIE2110 Operations Research I
- TIE2140 Engineering Economy
- TIE3101 Statistics for Engineering Applications
- TIE4220 Supply Chain Modelling
- TSC3100 Systems Chain Design (8MCs)
- TSC3222 Global Sourcing and Supply Management
- TSC3223 Supply Chain Financial Analysis and Management
- TSC3224 Distribution and Warehousing
- TSC3226 Transportation Management
- TSC4101 BTech Dissertation (8MCs)
- TSC4225 Port Logistics

3. Major Requirements – Elective Modules (16MCs or 17MCs, selected from the list below)

a) A student who reads 17 MCs under the Electives may have his/ her UEM requirements reduced to 11 MCs.
b) Not all electives modules may be offered in any semester/year. An elective module may not be offered if there is insufficient number of students opting for that module at any particular time. Subject to the approval from SCALE and the Department of Industrial Systems Engineering and Management, a student may select one Level-3000 or higher module from other programmes within the Faculty of Engineering.

- TIE3010 Systems Thinking and Design
- TIE3110 Simulation (5MCs)
- TIE4242 Cost Analysis and Management
- TIE4240 Project Management
- TIE4203 Decision Analysis in Industrial & Operations Management
- TIE4212 Advanced Modeling in Operations Management
- TIE4252 Introduction to Systems Engineering
- TIE4229 Selected Topics in Logistics
- TIE4249 Selected Topics in Engineering Management
- TIE4259 Selected Topics in Systems Engineering
- TIE4299 Selected Topics in Industrial Engineering

C. **Unrestricted Elective Modules (12MCs)**

## *Study Schedule*

There are two intakes per academic year, in Semester 1 (i.e. August) and Semester 2 (i.e January). The sample study schedule for a four-year candidature are presented below. These assume the students' work and other commitments allow them sufficient time to properly cope with their studies. Students are strongly advised to slow down if necessary so that they progress at their own comfortable pace.

**Sample Study Schedule (4-year candidature beginning in Semester 1 of an AY):**

1. The number of Modular Credits (MC) of a module is denoted by the number in the bracket.
2. Modules marked with an asterisk (*) are modules stretching over more than one semester and the total number of MCs will only be given upon completion of the module.

| | |
|---|---|
| **1st Year of studies** | |
| Sem 1: | TTG1401 Engineering Mathematics (4)<br>TIE2030 Programming Methodology with Python (4)<br>TIE2110 Operations Research I (4) |
| Sem 2: | TIE2020 Probability & Statistics (4)<br>TIE2100 Probability Models with Applications (4)<br>TIE2140 Engineering Economy (4) |
| SpTerm: | General Education Module 1 (4)<br>General Education Module 2 (4) |
| **2nd Year of studies** | |
| Sem 1: | TIE3101 Statistics for Engineering Application (4)<br>TSC3223 Supply Chain Financial Analysis & Management (4)<br>Elective Module 1 (4) |
| Sem 2: | TIE4220 Supply Chain Modelling (4)<br>TSC3222 Global Sourcing & Supply Management (4)<br>Elective Module 2 (4) |
| SpTerm: | TTG2415 Ethics in Engineering (4)<br>General Education 3 Module (4) |
| **3rd Year of studies** | |
| Sem 1: | TSC3226 Transportation Management (4)<br>*TSC3100 Systems Chain Design<br>*TTG3001 Industrial Practice |
| Sem 2: | TSC3224 Distribution and Warehousing (4)<br>*TSC3100 Systems Chain Design (8)<br>*TTG3001 Industrial Practice (12) |
| SpTerm: | General Education Module 4 (4)<br>General Education Module 5 (4) |
| **4th Year of studies** | |

| | |
|---|---|
| Sem 1: | TSC4225 Port Logistics (4)<br>*TSC4101 BTech Dissertation<br>Elective Module 3 (4) |
| Sem 2: | *TSC4101 BTech Dissertation (8)<br>Elective Module 4 (4) |

**Sample Study Schedule (4-year candidature beginning in Semester 2 of an AY):**

1. The number of Modular Credits (MC) of a module is denoted by the number in the bracket.
2. Modules marked with an asterisk (*) are modules stretching over more than one semester and the total number of MCs will only be given upon completion of the module.

| **1st Year of studies** | |
|---|---|
| Sem 2: | TTG1401 Engineering Mathematics (4)<br>TIE2020 Probability & Statistics (4)<br>TIE2140 Engineering Economy (4) |
| SpTerm: | General Education Module 1 (4)<br>General Education Module 2 (4) |
| Sem 1: | TIE2030 Programming Methodology with Python (4)<br>TIE2110 Operations Research I (4)<br>TIE3101 Statistics for Engineering Application (4) |
| **2nd Year of studies** | |
| Sem 2: | TIE2100 Probability Models with Applications (4)<br>TSC3222 Global Sourcing & Supply Management (4)<br>TIE4220 Supply Chain Modelling (4) |
| SpTerm: | TTG2415 Ethics in Engineering (4)<br>General Education Module 3 (4) |
| Sem 1: | TSC3223 Supply Chain Financial Analysis & Management (4)<br>TSC3226 Transportation Management (4)<br>*TTG3001 Industrial Practice |

| | |
|---|---|
| **3rd Year of studies** | |
| Sem 2: | *TSC3100 Systems Chain Design<br>TSC3224 Distribution and Warehousing (4)<br>*TTG3001 Industrial Practice (12) |
| SpTerm: | General Education Module 4 (4)<br>General Education Module 5 (4)<br>*TSC3100 Systems Chain Design |
| Sem 1: | TSC4225 Port Logistics (4)<br>*TSC3100 Systems Chain Design (8)<br>Elective Module 1 (4) |
| **4th Year of studies** | |
| Sem 2: | *TSC4101 BTech Dissertation<br>Elective Module 2 (4) |
| SpTerm: | *TSC4101 BTech Dissertation<br>Elective Module 3 (4) |
| Sem 1: | *TSC4101 BTech Dissertation (8)<br>Elective Module 4 (4) |

## 3.5 Financial Assistance

### A. MOE Tuition Fee Subsidy

The Ministry of Education (MOE) provides eligible Singaporeans and Singapore Permanent Residents (SPR) taking part-time undergraduate degree programmes in the local universities with a substantial tuition fee subsidy.

In addition to fulfilling the nationality criteria, applicants must also satisfy the following subsidy eligibility criteria in order to be considered for admission:

- Must not have previously received a government subsidy/sponsorship for a completed first degree; these include first degrees from NUS/NTU/SMU/SUTD/SIT/SUSS, or from an overseas university funded by government scholarship/bursary;
- Be at least 21 years old; and
- Must fulfill one of the following work experience criteria:
  - 2 years of full-time work experience; OR
  - fully discharged the NS liability; OR
  - currently employed on a full-time basis.

It should be noted that part-time employment will not be considered as “full-time work experience”. A part-time employee is one who works for less than 35 hours a week under a contract of service with an employer.

Exemption from the Age and Work Experience Criteria

- Students may be exempted from the age and work experience eligibility criteria if they are:

  a. sponsored by their company for the part-time undergraduate degree programme; or
  b. currently employed in a job role/sector related to the part-time undergraduate degree programme.

- Notwithstanding these exemptions, NS-liable students must have fully discharged their full-time NS liability before they can be admitted.
- Supporting documents(s) must be submitted, together with the admission application, for assessment. NUS reserves the right to determine if exemption would be granted, and the University’s decision will be final and binding.

SkillsFuture Mid-Career Enhanced Subsidy

With this enhanced subsidy, Singaporean students aged 40 and above will pay tuition fees that are lower than the standard subsidised fees payable by other Singaporean students who are below 40 years old.

The availability of this enhanced subsidy is tied to the student’s eligibility for the tuition fee subsidy in the first instance. Hence, a Singaporean student must be eligible for the tuition fee subsidy in order to be

eligible for the enhanced subsidy.

**B. SkillsFuture Study Award for Infocomm Technology**

Eligible students who are enrolled in BTech (Business Analytics), BTech (Cybersecurity) and BTech (Software Engineering) programmes may apply. Please visit this link for more information and enquiries.

**C. BCA-Industry iBuiltSG Undergraduate Sponsorship Programme (Part-Time)**

For eligible students who are enrolled in the BTech (Civil Engineering) or BTech (Mechanical Engineering), this programme co-funds the undergraduate sponsorship offered by industry firms to upgrade and retain their high potential local employees, whom the firms wish to groom to take up higher management and professional roles within the built environment sector. For more information and enquiries, please visit this website: https://www.buildingcareers.gov.sg/Programmes-Initiatives/Scholarship-and-Sponsorship-Programmes/Part-Time-Sponsorships.

# 4 Graduate Education

## 4.1 Master of Science (Industry 4.0)

The MSc (Industry 4.0) is an inter-disciplinary programme offered in collaboration with the Faculty of Engineering, Faculty of Science, School of Computing and Institute of Systems Science.

The MSc (Industry 4.0) programme will enable student to attain, by the time of graduation:

- Breadth in ability to understand technology core concepts from a management viewpoint, including key emerging technology and business areas
- Understanding of key business and processes, including supply chain management, systems design and change management
- Ability to use both breadth and depth to be more effective functional specialists, or to move up management ranks
- Ability to drive change and transformation projects in a company, through technical understanding, understanding of business processes, and effective leadership

## Period of Candidature

Both full-time and part-time studies are offered. The period of candidature are as follows:

- Full-time studies can be completed in 12-18 months. The maximum candidature is 24 months.
- Part-time studies can be completed in 18-36 months. The maximum candidature is 36 months.

## Degree Requirements

Candidates must satisfy the following requirements to be conferred the degree of MSc (Industry 4.0):

- Complete a minimum of 40 MCs with 20 MCs in essential core modules and 20 MCs in graduate certificates and elective modules;
- Complete at least one Graduate Certificate listed under “List of Modules” below;
- Attain a minimum CAP of 3.00; and
- Satisfy any other additional requirements that may be prescribed by the Programme Management Committee for MSc (Industry 4.0), or the University.

## List of Modules

Modules are generally 4 MCs, except when otherwise stated.

i. ***Essential Core Modules (20MCs)***
   - *IND5001 Introduction to Industry 4.0 and Applications*
   - IND5002 Digital Physical Integration in Industry 4.0
   - IND5003 Data Analytics for Sense-making
   - IND5004 Digital Infrastructure and Transformation
   - IND5005 Industry Consulting and Application Project

ii. ***Graduate Certificates & Elective Modules:***
   All required electives must be completed for the award of the graduate certificate that will be issued by the respective faculties. In addition to the graduate certificate, candidates may select any elective

offered to meet the 40-MC graduation requirement.

| Faculty | Module Title | MCs |
|---|---|---|
| FoE | **Additive Manufacturing (Choose 6 modules)** | **12** |
| | ME5608A Principles and Processes of Additive Manufacturing | 2 |
| | ME5608B Hybrid Manufacturing | 2 |
| | ME5615A Design and Pre-processing for Additive Manufacturing | 2 |
| | ME5615B Post-processing for Additive Manufacturing | 2 |
| | ME5614A Special Project in Additive Manufacturing | 2 |
| | ME5513A Fatigue Analysis for Additive Manufacturing | 2 |
| | MLE5301 Metallic & Ceramic Materials in Additive Manufacturing | 2 |
| | MLE5302 Polymer Materials in Additive Manufacturing | 2 |
| | **Internet of Things (Choose 5 modules)** | **10** |
| | EE5020 Data Science for Internet of Things | 2 |
| | EE5021 Cloud Based Services for Internet of Things | 2 |
| | EE5022 Cyber Security for Internet of Things | 2 |
| | EE5023 Wireless Networks | 2 |
| | EE5024 Sensor Networks | 2 |
| | EE5060 Sensors and Instrumentation for Automation | 2 |
| | EE5061 Industrial Control and IEC Programming | 2 |
| | EE5027 Statistical Pattern Recognition | 2 |
| | EE5026 Machine Learning for Data Analytics | 2 |
| | EE5025 Intellectual Property: Innovations in IoT | 2 |

| | | |
|---|---|---|
| **FoS** | **Data Mining and Interpretation** | **8** |
| | ST5227 Applied Data Mining<br>DSA5203 Visual Data Processing and Interpretation | 4<br>4 |
| | **Deep Learning for Industry** | **8** |
| | DSA5102 Foundations of Machine Learning<br>DSA5204 Deep Learning and Applications | 4<br>4 |
| | **Quality Assurance and Yield Optimization** | **8** |
| | ST5203 Design of Experiments for Product Design and Process Improvements<br>ST5208 Analytics for Quality Control and Productivity Improvements | 4<br>4 |
| **SCALE** | **Digital Supply Chain** | **12** |
| | IND5021 Managing the Digital Supply Chain<br>IND5022 Data Analytics for Smart Manufacturing<br>DSC5221A Managing the Financial Supply Chain<br>IND5024 Strategic Procurement in a Digital World | 4<br>4<br>2<br>2 |
| **SoC** | **Principles and Practice of Secure Systems (Choose 3 modules)** | **12** |
| | CS5322 Database Security<br>CS5332 Biometric Authentication<br>CS5331 Web Security<br>CS5321 Network Security<br>CS5439 Software Security | 4<br>4<br>4<br>4<br>4 |
| | **Digital Business (Choose 3 modules)** | **12** |
| | IS5007 Strategising for Global IT-enabled Business Success<br>IS5116 Digital Entrepreneurship<br>IS5117 Digital Government<br>IS5151 Information System Security Policy and Management | 4<br>4<br>4<br>4 |

## Study Schedule

One intake is admitted every year to start in Semester 1 (i.e. August) of the academic year. The recommended study schedule for full-time and part-time studies are illustrated as below.

| | |
|---|---|
| **Full-time Study Schedule** | |
| 1st Year of studies, Sem 1: | Core Modules (12 MCs)<br>Preallocated three 4-MC modulesElective Modules (8 MCs)<br>Select from 2-MC and 4-MC modules |
| 1st Year of studies, Sem 2: | Core Modules (8 MCs)<br>Preallocated core and capstone modulesElective Modules (12 MCs)<br>Select from 2-MC and 4-MC modules |
| **Part-time Study Schedule** | |
| 1st Year of studies, Sem 1: | Core Modules (12 MCs)<br>Preallocated three 4-MC modules |
| 1st Year of studies, Sem 2: | Core Modules (4 MCs)<br>Preallocated moduleElective Modules (8 MCs)<br>Select from 2-MC and 4-MC modules |
| 2nd Year of studies, Sem 1: | Core Modules (4 MCs)<br>Preallocated capstone moduleElective Modules (4 MCs)<br>Select from 2-MC and 4-MC modules |
| 2nd Year of studies, Sem 2: | Elective Modules (8 MCs)<br>Select from 2-MC and 4-MC modules |