

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. 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
- 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 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.

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

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