# 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 fulltime 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 recognize 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:

- Depth in fundamental knowledge of core civil engineering disciplines;
- Breadth in integrative skills to apply the knowledge gained;
- Appreciation of interactions between engineering, business and technology in modern society;
- Drive for life-long learning and continuous self-development; and
- Understanding of their role as civil engineers in the development of society at the national and global context.

In addition, the programme ensures that 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:

- Apply knowledge of mathematics, science and engineering;
- Design and conduct experiments, analyze, interpret data and synthesize valid conclusions;
- Design a system, component, or process, and synthesize solutions to achieve desired needs;
- Identify, formulate, research through relevant literature review, and solve engineering problems reaching 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; (listening, writing and speaking skills);
- Recognize 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 project management; and
- Understand professional, ethical and moral responsibility in the workplace

## Degree Requirements

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

- Complete a minimum of **120 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 Faculty of Engineering, or the University.

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

a) All modules are 4MCs, except when otherwise stated.

b) 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 the Dean of SCALE and the Department of Civil & Environmental Engineering, a student may select a full-time equivalent module in place of any TCExxxx module.

### University Level Requirements (20MCs)

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

### Programme Requirements (100MCs), comprising

1. Faculty Requirements (8MCs)
   - TTG2415 Ethics in Engineering
   - TCE2331 Communicating Engineering or equivalent module

2. Major Requirements – Essential Modules (80MCs)

   TCE1109 Statics and Mechanics of Materials
   TTG1401 Engineering Mathematics I
   TME2401 Engineering Mathematics II
   TCE2112 Soil Mechanics
   TCE2134 Hydraulics
   TCE2155 Structural Mechanics and Materials
   TCE2183 Construction Project Management
   TCE2184 Infrastructure & the Environment
   TCE2407 Engineering & Uncertainty Analyses
   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
TCE3001 Water Quality Engineering
TCE4104 BTech Dissertation (8MCs)

3. Major Requirements – Elective Modules (12MCs, select 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. Subject to the approval of the Dean of SCALE, 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) |
| | TCE2134 Hydraulics (4) |
| | TTG1401 Engineering Mathematics I (4) |
| Sem 2 | TCE2155 Structural Mechanics and Materials (4) |
| | TCE2184 Infrastructure & the Environment (4) |
| | TME2401 Engineering Mathematics II (4) |
| Sp Term | General Education Module 1 – Quantitative Reasoning (4) |
| | General Education Module 2 – Asking Questions (4) |
| **2nd year of studies** | |
| Sem 1 | TCE2331 Communicating Engineering or equivalent module (4) |
| | TCE2407 Engineering & Uncertainty Analyses (4) |
| | TCE3155 Structural Analysis (4) |
| Sem 2 | TCE2112 Soil Mechanics (4) |
| | TCE2183 Construction Project Management (4) |
| | TCE3001 Water Quality Engineering (4) |
| Sp Term | General Education Module 3 – Thinking & Expression (4) |
| | General Education Module 4 – Human Cultures or Singapore Studies (4) |
| **3rd year of studies** | |
| Sem 1 | TCE3115 Geotechnical Engineering (4) |
| | TCE3132 Water Resources Engineering (4) |
| | TCE3166 Structural Steel Design and System (4) |
| Sem 2 | TCE3116 Foundation Engineering (4) |
| | TCE3121 Transportation Engineering(4) |
| | TCE3165 Structural Concrete Design (4) |
| Sp Term | General Education Module 5 – Human Cultures or Singapore Studies (4) |
| | TTG2415 Ethics in Engineering (4) |
| **4th year of studies** | |
| Sem 1 | TCE4103 Design Project (4) |
| | *TCE4104 BTech Dissertation |
| | Technical Elective 1 (4) |
| Sem 2 | *TCE4104 BTech Dissertation (8) |
| | Technical Elective 2 (4) |
| | Technical Elective 3 (4) |