

## **CIVIL ENGINEERING (Environmental Engineering)**

### **SYLLABUS**

The syllabus applies to students admitted in the academic year 2014-15 under the four-year curriculum.

#### Definition and Terminology

Each course offered by the Department of Civil Engineering shall be classified as either introductory level course or advanced level course.

A Discipline Core course is a compulsory course which a candidate must pass in the manner provided for in the Regulations.

A Discipline Elective course refers to any technical course offered by the Department of Civil Engineering for the fulfillment of the curriculum requirements of the degree of BEng in Civil Engineering-Environmental Engineering that are not classified as discipline core course.

### **Curriculum**

The Curriculum comprises 240 credits of courses as follows:

#### General Engineering Courses

Students are required to complete at least 36 credits of General Engineering Course.

#### Discipline Core Courses

Students are required to complete ALL discipline core courses (84 credits), comprising 24 credits of introductory core courses and 60 credits of advanced core courses.

#### Discipline Elective Courses

Students are required to complete at least 36 credits of advanced discipline elective courses offered by the Department of Civil Engineering.

#### Elective Courses

Students are required to complete 12 credits of elective course(s) offered by either the Department of Civil Engineering, or other departments within or outside of the Faculty of Engineering.

#### University Requirements

Students are required to complete:

- a) 12 credits in English language enhancement, including 6 credits in “CAES1000 Core University English” and 6 credits in “CAES9540 Technical English for Civil Engineering”;
- b) 6 credits in Chinese language enhancement course “CENG9001 Practical Chinese for Engineering Students”; and
- c) 36 credits of courses in the Common Core Curriculum, selecting not more than one course from the same Area of Inquiry within one academic year and at least one and no more than two courses from each Area of Inquiry during the whole period of study.

#### Capstone Experience

Students are required to complete the 12-credit “CIVL4102 Project” to fulfill the capstone experience requirement for the degree of BEng in Civil Engineering-Environmental Engineering.

#### Internship

Students are required to complete the 6-credit internship “CIVL2109 Internship”, which normally takes place after their third year of study.

## Degree Classification

The degree of Bachelor of Engineering shall be awarded in five divisions in accordance with EN16 of the Regulations for the Degree of Bachelor of Engineering and UG9 of the Regulations for the First Degree Curricula.

**The details of the distribution of the above course categories are as follows:**

The curriculum of BEng (Civil Engineering-Environmental Engineering) comprises 240 credits of courses with the following structure:

### UG 5 Requirements (54 credits)

Course Code	Course	No. of credits
CAES1000	Core University English	6
CAES9540	Technical English for Civil Engineering	6
CENG9001	Practical Chinese for Engineering Students	6
CC##XXXX	University Common Core Course (6 courses)*	36
<b>Total for UG5 Requirements</b>		<b>54</b>

\* Students can select not more than one course from each Area of Inquiry within one academic year and at least one and no more than two courses from each Area of Inquiry during the whole period of study.

### General Engineering Courses (36 credits)

Course Code	Course	No. of credits
MATH1851	Calculus and ordinary differential equations	6
MATH1853	Linear algebra, probability & statistics	6
ENGG1111/ ENGG1112	Computer programming and applications/ Computer programming and applications I	6
PHYS1050	Physics for engineering students	6
ENGG1201	Engineering for sustainable development	6
ENGG120X	Any one of the General Engineering Courses offered by other Departments of the Faculty of Engineering*	6
<b>Total for General Engineering Courses</b>		<b>36</b>

\*Choose one General Engineering Course from the following list:

ENGG1202	Introduction of computer science
ENGG1203	Introduction to electrical and electronic engineering
ENGG1204	Industrial management and logistics
ENGG1205	Introduction to mechanical engineering
ENGG1206	Introduction to biomedical engineering
ENGG1207	Introduction to biochemistry for medical engineering

### Discipline Core Courses (84 credits)

#### Introductory Courses (24 credits)

Course Code	Course	No. of credits
CIVL1105	Environmental engineering	6
CIVL1113	Engineering mechanics & materials	6
CIVL1114	Surveying & drawing	6
MECH2407	Multivariable calculus & partial differential equations	6

<b>Total for Introductory Discipline Core Courses</b>	24
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*Advanced Courses (60 credits)*

<b>Course Code</b>	<b>Course</b>	<b>No. of credits</b>
CIME2101	Water and air quality: concepts and measurement	6
CIVL2102	Engineering geology and rock mechanics	6
CIVL2103	Fluid mechanics	6
CIVL2104	Hydraulics and hydrology	6
CIVL2105	Theory and design of structures I	6
CIVL2106	Soil mechanics	6
CIVL2107	Theory and design of structures II	6
CIVL2108	Principles of civil engineering management	6
CIVL2111	Transportation engineering	6
CIVL4101	Capstone design project	6
<b>Total for Advanced Discipline Core Courses</b>		<b>60</b>

**Capstone Experience and Internship (18 credits)**

<b>Course Code</b>	<b>Course</b>	<b>No. of credits</b>
CIVL2109	Internship*	6
CIVL4102	Final Year Project <sup>+</sup>	12
<b>Total for Capstone Experience and Internship</b>		<b>18</b>

+Capstone Experience

\*Internship

**Discipline Elective Courses (36 credits)**

<b>Course Code</b>	<b>Course</b>	<b>No. of credits</b>
CIVL2110	Experiential learning	6
CIVL3103	Construction project management	6
CIVL3106	Engineering hydraulics	6
CIVL3107	Environmental impact assessment of civil engineering projects	6
CIVL3108	Foundation engineering	6
CIVL3111	Wastewater treatment	6
CIVL3115	Solid and hazardous waste management	6
CIVL3118	Theory and design of structures III	6
CIVL3121	Water resources engineering	6
CIVL3122	Wind engineering	6
<b>Complete six discipline elective courses for a total of 36 credits</b>		<b>36</b>

**Elective Courses (12 credits)**

At least 12 credits of courses offered by either the Department of Civil Engineering, or other departments within or outside of the Faculty of Engineering.

<b>Course Code</b>	<b>Course</b>	<b>No. of credits</b>
CIVL3101	Advanced engineering mechanics	6
CIVL3112	Prestressed concrete structures	6
CIVL3114	Slope engineering	6
CIVL3116	Steel structures	6

CIVL3119	Traffic engineering	6
CIVL3120	Transportation infrastructure engineering	6
CIVL3125	Law for civil engineers	6
CIVL3126	Engineering practice in Mainland China	6
CIVL3127	Building practice in the built environment	6
CIVL3128	Structural dynamics and earthquake engineering	6
CIVL3129	Numerical analysis in geotechnical engineering	6
CIVL3130	Structural fire engineering	6
CIVL3131	Earth retaining systems	6
CIVL3132	Geotechnical testing instrumentation and monitoring	6
CIVL3133	Ground improvement	6
CIVL3134	Environmental geotechnology	6

### Summary of curriculum structure of BEng (Civil Engineering-Environmental Engineering)

Course Categories	No. of credits
UG5 Requirements	54
General Engineering Courses	36
Discipline Core Courses (Introductory)	24
Discipline Core Courses (Advanced)	60
Capstone Experience and Internship	18
Discipline Elective Courses	36
Elective Courses	12
<b>Total</b>	<b>240</b>

A suggested study plan is as follows:

#### FIRST YEAR

##### General Engineering Courses (36 credits)

MATH1851	Calculus and ordinary differential equations
MATH1853	Linear algebra, probability & statistics
ENGG1111/	Computer programming and applications/
ENGG1112	Computer programming and applications I
PHYS1050	Physics for engineering students
ENGG1201	Engineering for sustainable development
ENGG120X	Any one of the General Engineering Courses offered by other Departments of the Faculty of Engineering

##### University Requirements (UG5) (24 credits)

CAES1000	Core University English
CC##XXXX	Three Common Core Courses

#### SECOND AND THIRD YEARS

##### Introductory Discipline Core Courses (24 credits)

CIVL1105	Environmental engineering
CIVL1113	Engineering mechanics & materials
CIVL1114	Surveying & drawing
MECH2407	Multivariable calculus & partial differential equations

**Advanced Discipline Core Courses (54 credits)**

CIME2101	Water and air quality: concepts and measurement
CIVL2102	Engineering geology and rock mechanics
CIVL2103	Fluid mechanics
CIVL2104	Hydraulics and hydrology (pre-requisite: CIVL2103)
CIVL2105	Theory and design of structures I (pre-requisite: CIVL2113)
CIVL2106	Soil mechanics
CIVL2107	Theory and design of structures II (pre-requisite: CIVL2105)
CIVL2108	Principles of civil engineering management
CIVL2111	Transportation engineering

**Discipline Elective Courses (12 credits)**

(Note that pre-requisite is required for some courses. Please refer to the course description for individual courses)

**University Requirements (UG5) (24 credits)**

CC##XXXX	Three Common Core Courses
CENG9001	Practical Chinese for Engineering Students

**Internship (6 credits)**

CIVL2109	Internship (This course must be enrolled in the Summer semester of the third year)
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**FOURTH YEAR****Advanced Discipline Core Courses (6 credits)**

CIVL4101	Capstone design project (This course must be enrolled in the fourth year)
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**Discipline Elective Courses (24 credits)**

(Note that pre-requisite is required for some courses. Please refer to the course descriptions for individual courses)

**Capstone Experience (12 credits)**

CIVL4102	Project (This course must be enrolled in the fourth year)
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**University Requirements (UG5) (6 credits)**

CAES9540	Technical English for Civil Engineering (This course should be enrolled in the fourth year)
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**Elective Courses (12 credits)**

(Note that pre-requisite is required for some courses. Please refer to the course descriptions for individual courses)

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## **COURSE DESCRIPTIONS**

Candidates will be required to do the coursework in the respective courses selected. Not all courses are offered every semester.

### **General Engineering Courses**

ENGG1111	Computer programming (6 credits)
ENGG1112	Computer programming I (6 credits)
MATH1851	Calculus and ordinary differential equations (6 credits)
MATH1853	Linear algebra, probability & statistics (6 credits)
PHYS1050	Physics for engineering students (6 credits)
ENGG1201	Engineering for sustainable development (6 credits)
ENGG1202	Foundation of computer science (6 credits)
ENGG1203	Introduction to electrical and electronic engineering (6 credits)
ENGG1204	Industrial management and logistics (6 credits)
ENGG1205	Introduction to mechanical engineering (6 credits)
ENGG1206	Introduction to biomedical engineering (6 credits)
ENGG1207	Foundation of biochemistry for medical engineering (6 credits)

Please refer to the General Engineering Courses in the syllabus for the degree of BEng for details.

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### **University Requirements on Language Enhancement Courses**

<b>CAES1000.</b>	<b>Core University English (6 credits)</b>
<b>CENG9001.</b>	<b>Practical Chinese for Engineering Students (6 credits)</b>

Please refer to the University Language Enhancement Courses in the syllabus for the degree of BEng for details.

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### **CAES9540. Technical English for Civil Engineering (6 credits)**

For course descriptions, please refer to the syllabuses of the Civil Engineering programme.

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### **University Common Core Curriculum**

36 credits of courses in the University Common Core Curriculum, in which students can select not more than one course from the same Area of Inquiry within one academic year and at least one and no more than two courses from each Area of Inquiry during the whole period of study:

- Scientific and Technology Literacy
  - Humanities
  - Global Issues
  - China: Culture, State and Society
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### **Introductory Discipline Core Courses**

<b>CIVL1105.</b>	<b>Environmental engineering (6 credits)</b>
<b>CIVL1113.</b>	<b>Engineering mechanics and materials (6 credits)</b>
<b>CIVL1114.</b>	<b>Surveying and drawing (6 credits)</b>

**MECH2407. Multivariable calculus & partial differential equations (6 credits)**

For course descriptions, please refer to the syllabuses of the Civil Engineering programme.

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**Advanced Discipline Core Courses**

- CIVL2102. Engineering geology and rock mechanics (6 credits)**
- CIVL2103. Fluid mechanics (6 credits)**
- CIVL2104. Hydraulics and hydrology (6 credits)**
- CIVL2105. Theory and design of structures I (6 credits)**
- CIVL2106. Soil mechanics (6 credits)**
- CIVL2107. Theory and design of structures II (6 credits)**
- CIVL2108. Principles of civil engineering management (6 credits)**
- CIVL2111. Transportation engineering (6 credits)**
- CIVL4101. Capstone Design Project (6 credits)**

For course descriptions, please refer to the syllabuses of the Civil Engineering programme.

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**CIME2101. Water and air quality: concepts and measurement (6 credits)**

This course will introduce concepts on water/air quality and pollution, the standard methods of water and wastewater examination, air pollution control principles, and measurement techniques for common air pollutants.

Pre-requisite: CIVL1105 Environmental engineering

Assessment: 10% practical work, 10% continuous assessment, 80% examination

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**Capstone Experience and Internship**

- CIVL2109. Internship (6 credits)**
- CIVL4102. Project (12 credits)**

For course descriptions, please refer to the syllabuses of the Civil Engineering programme.

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**Discipline Elective Courses**

- CIVL2110. Experiential learning (6 credits)**
- CIVL3103. Construction project management (6 credits)**
- CIVL3106. Engineering hydraulics (6 credits)**
- CIVL3107. Environmental impact assessment of civil engineering projects (6 credits)**
- CIVL3108. Foundation engineering (6 credits)**
- CIVL3111. Wastewater treatment (6 credits)**
- CIVL3115. Solid and hazardous waste management (6 credits)**
- CIVL3118. Theory and design of structures III (6 credits)**
- CIVL3121. Water resources engineering (6 credits)**
- CIVL3122. Wind engineering (6 credits)**

For course descriptions, please refer to the syllabuses of the Civil Engineering programme.

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## Minor in Environmental Engineering

Candidates are required to complete a total of 48 credits of courses comprising:

- (a) Introductory Courses (18 credits)

Course Code	Course	No. of credits
ENGG1201	Engineering for sustainable development*	6
CIVL1105	Environmental engineering	6
CIVL2103	Fluid mechanics <b>OR</b>	6
CIME2101	Water and air quality: concepts and measurement	6
Total for Introductory Discipline Core Courses		18

\* Students opting for the Minor cannot use the course ENGG1201 Engineering for sustainable development as satisfying the requirements of the General Engineering Course.

- (b) Discipline Elective Courses (30 credits)

Students must complete 30 credits of discipline elective courses to be chosen from the following list:

Course Code	Course	No. of credits
CIME2101	Water and air quality: concepts and measurement	6
CIVL2111	Transportation engineering	6
CIVL2104	Hydraulics and hydrology	6
CIVL3106	Engineering hydraulics	6
CIVL3107	Environmental impact assessment of civil engineering projects	6
CIVL3111	Wastewater treatment	6
CIVL3115	Solid and hazardous waste management	6
CIVL3121	Water resources engineering	6
CIVL3122	Wind engineering	6
CIVL3134	Environmental Geotechnology	6
MECH3420	Air pollution control	6
Total for Discipline Elective Courses		30

## COURSE DESCRIPTIONS

For course descriptions, please refer to the syllabuses of the Civil Engineering programme.

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## Minor in Geotechnical Engineering

Candidates are required to complete a total of 48 credits of courses comprising:

- (a) Introductory courses (18 credits)

Course Code	Course	No. of credits
MATH1851	Calculus and ordinary differential equations	6
MATH1853	Linear algebra, probability & statistics	6
CIVL2106	Soil mechanics	6
Total for Introductory Discipline Core Engineering Courses		18

- (b) Discipline Elective Courses (30 credits)

Students must complete 30 credits of discipline elective courses to be chosen from the following list:

Course Code	Course	No. of credits
CIVL2102	Engineering geology and rock mechanics	6
CIVL3108	Foundation engineering	6
CIVL3114	Slope engineering	6
CIVL3129	Numerical analysis in geotechnical engineering	6
CIVL3131	Earth retaining system	6
CIVL3132	Geotechnical testing, instrumentation and monitoring	6
CIVL3133	Ground improvement	6
CIVL3134	Environmental geotechnology	6
Total for Discipline Elective Courses		30

### COURSE DESCRIPTIONS

For course descriptions, please refer to the syllabuses of the Civil Engineering programme.