**3.2.3.2 Degree Requirements**

In order to graduate with the BEng (Civil Engineering) degree, students are required to:

- Complete a minimum of 160 MCs with a CAP ≥ 2.0.
- Pass the modules in accordance with Table 3.2.3a.
- Satisfy all other requirements as prescribed by the Faculty or the University.

Subject to the approval of the Department, students may opt to take a relevant module in another department as one of the three technical electives. The module must be of at least Level-3000 standard and must be taken on a graded basis.

For students aspiring for a First Class Honours Degree, they must obtain at least an ‘A’ grade for CE4104 BEng Dissertation.

Students may apply to specialise in Offshore Engineering at start of Stage 3. They must take a Group Design Project and a BEng Dissertation that is related to offshore engineering, OT5202 Analysis & Design of Offshore Structures and CE5307 Wave Hydrodynamics and Physical Oceanography, and complete at least a 12-week stint (equivalent to at least 6 MCs) in an offshore or marine-related company under the 6-month industrial attachment (or EG3612 Vacation Internship Programme).

<table>
<thead>
<tr>
<th>MODULAR REQUIREMENTS</th>
<th>MCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundational/Common Requirements</td>
<td>32</td>
</tr>
<tr>
<td>MA1505 Mathematics I</td>
<td>4</td>
</tr>
<tr>
<td>*MLE1010 Materials Engineering Principles and Practice</td>
<td>4</td>
</tr>
<tr>
<td>*CS10101E Programming Methodology</td>
<td>4</td>
</tr>
<tr>
<td>CE1101A Civil Engineering Principles &amp; Practice</td>
<td>4</td>
</tr>
<tr>
<td>CE2101 Principles &amp; Practice in Infrastructure and Environment</td>
<td>4</td>
</tr>
<tr>
<td>*EG2211 Introduction to Machine Learning</td>
<td>4</td>
</tr>
<tr>
<td>*IE2141 Systems Thinking and Dynamics</td>
<td>4</td>
</tr>
<tr>
<td>*CE2410 Virtual Design and Modelling</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 3.2.3a: Summary of Modular Requirements and Credits (for A-level or equivalent students matriculated in AY2015/2016)
# MODULAR REQUIREMENTS

<table>
<thead>
<tr>
<th>Faculty Requirements</th>
<th>MCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG2401A Engineering Professionalism</td>
<td>2</td>
</tr>
<tr>
<td>ES1531 Critical Thinking and Writing</td>
<td>4</td>
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</tbody>
</table>

## CE Core Modules

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>MCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE2112</td>
<td>Soil Mechanics (G)</td>
<td>4</td>
</tr>
<tr>
<td>CE2134</td>
<td>Hydraulics (H)</td>
<td>4</td>
</tr>
<tr>
<td>CE2155</td>
<td>Structural Mechanics and Materials (S)</td>
<td>4</td>
</tr>
<tr>
<td>CE2183</td>
<td>Construction Project Management (C)</td>
<td>4</td>
</tr>
<tr>
<td>CE2407</td>
<td>Engineering and Uncertainty Analyses</td>
<td>4</td>
</tr>
<tr>
<td>ESE3001</td>
<td>Water Quality Engineering (E)</td>
<td>4</td>
</tr>
<tr>
<td>CE3115</td>
<td>Geotechnical Engineering (G)</td>
<td>4</td>
</tr>
<tr>
<td>CE3116</td>
<td>Foundation Engineering (G)</td>
<td>4</td>
</tr>
<tr>
<td>CE3121</td>
<td>Transportation Engineering (T)</td>
<td>4</td>
</tr>
<tr>
<td>CE3132</td>
<td>Water Resources Engineering (H)</td>
<td>4</td>
</tr>
<tr>
<td>CE3155</td>
<td>Structural Analysis (S)</td>
<td>4</td>
</tr>
<tr>
<td>CE3165</td>
<td>Structural Concrete Design (S)</td>
<td>4</td>
</tr>
<tr>
<td>CE3166</td>
<td>Structural Steel Design and System (S)</td>
<td>4</td>
</tr>
</tbody>
</table>

## CE Project & Internship Modules

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>MCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE4103</td>
<td>Design Project</td>
<td>4</td>
</tr>
<tr>
<td>CE4104</td>
<td>BEng Dissertation</td>
<td>8</td>
</tr>
<tr>
<td>EG3611A</td>
<td>Industrial Attachment</td>
<td>10</td>
</tr>
</tbody>
</table>

## Unrestricted Elective Modules

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>MCS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>28</td>
</tr>
</tbody>
</table>
BEng students are required to read a Critical Thinking & Writing module (ES1531 Critical Thinking & Writing which also satisfies the General Education (Thinking & Expression) requirement) and a Communications module (ES2331 Communicating Engineering). Alternatively, students can read ES1501X Academic Expository Writing in place of both ES1531 and ES2331. USP/UTRP/RVRC students should refer to their respective programmes for USP/UTRP/RVRC modules to be read in place of ES1531 and/or ES2331.

For students who have not passed or been exempted from the Qualifying English Test at the time of admissions to the Faculty, they have to read ES1000 and/or ES1102. This will be decided by CELC.

For BEng students in the following special programmes: DDPs, CDPs, GEP & CSP, internship / industrial-attachment is optional and the modular credits for the internship/industrial-attachment will be become ‘Free Electives’ i.e., Unrestricted Electives (UE).

+ Letter in the parenthesis indicates the major civil engineering discipline each module belongs to.

Note: Limit on Level-1000 Modules
Students should not read more than 60 MCs of Level-1000 modules towards their degree requirements (minimum of 162 MCs for graduation).

Table 3.2.3b: Technical Elective Modules

Geotechnical Engineering Modules (G)
CE4216 Geotech. Investigation & Applied Geology
CE5101 Seepage and Consolidation of Soils
CE5104 Underground Space
CE5105 Anal. & Num. Meth. in Foundation Eng.rg
CE5106 Ground Improvement
CE5107 Pile Foundations
CE5108 Earth Retaining Structures
CE5881 Topics in Geotechnical Engineering †

Environmental Engineering Modules (E)
ESE3101  Solid and Hazardous Waste Management
ESE4401  Water & Wastewater Engineering 2
ESE4405  Urban Water Engineering & Management
ESE5205  Sludge & Solid Waste Management
ESE5402  Industrial Water Control

**Structural Engineering Modules (S)**
CE4257  Linear Finite Element Analysis
CE4258  Structural Stability and Dynamics
CE5509  Advanced Structural Steel Design
CE5510  Advanced Structural Concrete Design
CE5514  Plate and Shell Structures
CE5513  Plastic Analysis of Structures
CE5604  Advanced Concrete Technology
CE5610  Assessment and Retrofit of Concrete Structures
CE5611  Precast Concrete Technology
CE5885  Topics in Structural Engineering †
CE5886  Topics in Concrete Engineering †

**Infrastructure Systems Modules (C and T)**
CE4221  Design of Land Transport Infrastructure
CE4282  Building Information Modelling for Project Management
CE5204  Pavement Design and Rehabilitation
CE5205  Transportation Planning
CE5207  Pavement Network Management Systems
CE5603  Engineering Economics and Project Evaluation
CE5804  Global Infrastructure Project Management
CE5805  Construction Equipment and Methods
CE5806  Construction Project and Site Control
CE5880  Topics in Project Management Engineering †
CE5882  Topics in Transportation Engineering †
TP5025  Intelligent Transportation Systems
TP5026  Transport Management & Policy
TP5027  Transport & Freight Terminal Management
TP5028  Intermodal Transportation Operations

**Coastal & Offshore Engineering Modules (H)**
CE4231  Earth’s Climate: Science & Modelling
CE4247  Treatment Plant Hydraulic
CE5307  Wave Hydrodynamics and Physical Oceanography
CE5308  Coastal Processes & Sediment Transport
CE5312  River Mechanics
CE5313  Groundwater Hydrology
CE5883  Topics in Hydraulic & Water Resources
OT5101  Exploration and Production of Petroleum
OT5201  Marine Statics and Dynamics
OT5202  Analysis & Design of Offshore Structures
OT5203  Design of Floating Structures
OT5204  Moorings & Risers
OT5205  Offshore Pipelines
OT5206  Offshore Foundations
OT5207  Arctic Engineering
OT5208  Fatigue and Fracture for Offshore Structures
OT5881  Topics in Offshore Engineering †
OT5882  Topics in Subsea Engineering †

Other Technical Modules
CE3101  Integrated Infrastructure Project†
CE3102  Engineering of Socio-Technical Systems
GE2215  Introduction to GIS
GE3238  GIS Design and Practice
CE4291  Special Topics in Civil Engineering†
CE5701  Special Topics in Civil Engineering†
CE5702  CE Reliability Analysis and Design†

†depending on the topics covered