**Innovation & Design Programme**
**Faculty of Engineering**

# Bachelor of Engineering (Computer Engineering) with Second Major in Innovation & Design

## Cohorts 2017/2018 and 2018/2019

| Modular Requirements | Modular Credits (MCs) |
|---|---|
| **University Level Requirements** | |
| **General education modules:** | |
| • Quantitative Reasoning (GER1000) | 4 |
| • Thinking & Expression (GET) | 4 |
| • Human Cultures (GEH) | 4 |
| • Singapore Studies (GES) | 4 |
| • Asking Questions (GEQ1000) | 4 |
| **Sub-total for University Level Requirements** | **20** |
| **Programme Requirements** | |
| **Faculty requirements:** | |
| • CS2101 Effective Communication for Computing Professionals [1] *(Double-counted for Second Major in Innovation & Design)* | 4 |
| • EG2401A Engineering Professionalism | 2 |
| • ES1xxxx English [2] | - |
| **Year 1 and core modules:** | |
| • CG1111 Engineering Principles & Practice I | 6 |
| • CG1112 Engineering Principles & Practice II | 6 |
| • CS1010 Programming Methodology | 4 |
| • CS1231 Discrete Structures | 4 |
| • MA1511 Engineering Calculus | 2 |
| • MA1512 Differential Equations for Engineering | 2 |
| • MA1508E Linear Algebra for Engineering | 4 |
| • CG2023 Signals & Systems | 4 |
| • CG2027 Transistor-Level Digital Circuits | 2 |
| • CG2028 Computer Organization | 2 |
| • CG2271 Real-Time Operating Systems | 4 |
| • CS2040C Data Structures & Algorithms | 4 |
| • CS2113T Software Engineering & Object-Oriented Programming [1] | 4 |
| • EE2026 Digital Design | 4 |
| • ST2334 Probability & Statistics | 4 |
| • CG3207 Computer Architecture *or* CS3230 Design & Analysis of Algorithms | 4 |
| • EE4204 Computer Networks | 4 |
| **CEG technical electives (at least 12 MCs of depth modules)** [3] | 20 |
| **CEG design and project modules:** | |
| • EG3301R DCP Project [3] (over 2 consecutive semesters) *(Double-counted for Second Major in Innovation & Design and replaces CG4002 Computer Engineering Capstone Project)* | 12 |
| **EG3612 Vacation Internship Programme (VIP)** [3, 4] ***or*** **CP3200 Student Internship Programme (SIP)** | 6 |
| **Sub-total for Programme Requirements** | **108** |
| **Unrestricted Elective Modules (UEM)** | |
| • Group A module for Second Major | 4 |
| • Group B module for Second Major | 4 |
| • Group C modules for Second Major – Innovation & Enterprise electives | 12 |
| • EG4301 DCP Dissertation or EG4301A Ideas to Start-up (over 2 consecutive semesters) | 12 |
| **Sub-total for Unrestricted Elective Modules** | **32** |
| **Total** | **160** |

*(updated 2 October 2018)*

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Notes:

[1] Students should read CS2101 and CS2113T in the same semester as both modules are twinned. Students in USP, UTRP, and RVRC may read an equivalent module (e.g. ES1501X Academic Expository Writing) in lieu of CS2101. These students should then read CS2113 in lieu of CS2113T.

[2] Students who have not passed or been exempted from the Qualifying English Test at the point of admission will have to read ES1000 and/or ES1103. ES1103 carries 4 MCs which may be counted as UEM.

[3] Students in this Second Major are allowed to complete EG3612 (6 MCs) or CP3200 (6 MCs) in lieu of EG3611A (10 MCs) or CP3880 (12 MCs).

The 12 MCs for EG3301R are mapped by 8 MCs from CG4002 and 4 MCs from the replacement of EG3611A (10 MCs) with EG3612 (6 MCs) or CP3200 (6 MCs).

Students may also opt to do EG3611A (10 MCs) in lieu of EG3612 (6 MCs) and 4 MCs of technical electives, or CP3880 (12 MCs) in lieu of CP3200 (6 MCs) and 6 MCs of technical electives.

[4] EG3612 or CP3200 is optional for poly-intake students and those in the following special programmes: double degree programmes (DDP), concurrent degree programmes (CDP), Chemical Sciences Programme (CSP), and Global Engineering Programme (GEP).

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## Recommended semester schedule for Cohorts 2017/2018 and 2018/2019 – JC-intake students or equivalent

| Semester 1 | MCs | Semester 2 | MCs |
|---|---|---|---|
| CG1111 Engineering Principles & Practice I | 6 | CG1112 Engineering Principles & Practice II | 6 |
| MA1511 Engineering Calculus | 2 | MA1508E Linear Algebra for Engineering | 4 |
| MA1512 Differential Equations for Engineering | 2 | CS2040C Data Structures & Algorithms | 4 |
| CS1010 Programming Methodology | 4 | EE2026 Digital Design | 4 |
| CS1231 Discrete Structures | 4 | GEQ1000 Asking Questions | 4 |
| GER1000 Quantitative Reasoning | 4 | Group A module for Second Major (UEM) | 4 |
| **Sub-total** | **22** | **Sub-total** | **26** |

| Semester 3 | MCs | Semester 4 | MCs |
|---|---|---|---|
| CS2101 Effective Communication for Computing Professionals (double-counted) | 4 | EG3301R DCP Project (double-counted) | 6 |
| CS2113T Software Engineering & Object-Oriented Programming | 4 | CG2023 Signals & Systems | 4 |
| CG2027 Transistor-Level Digital Circuits | 2 | ST2334 Probability & Statistics | 4 |
| CG2028 Computer Organization | 2 | CG2271 Real-Time Operating Systems | 4 |
| GET | 4 | | |
| Group B module for Second Major (UEM) | 4 | | |
| **Sub-total** | **20** | **Sub-total** | **18** |

| Summer vacation between Semesters 4 and 5 | MCs |
|---|---|
| EG3612 Vacation Internship Programme *or* CP3200 Student Internship Programme | 6 |
| **Sub-total** | **6** |

| Semester 5 | MCs | Semester 6 | MCs |
|---|---|---|---|
| EG3301R DCP Project (double-counted) | 6 | Innovation & Enterprise Elective 1 (UEM) | 4 |
| EE4204 Computer Networks | 4 | EG2401A Engineering Professionalism | 2 |
| CG3207 Computer Architecture *or* CS3230 Design & Analysis of Algorithms | 4 | Technical Elective 1 | 4 |
| GEH | 4 | Technical Elective 2 | 4 |
| | | GES | 4 |
| **Sub-total** | **18** | **Sub-total** | **18** |

| Semester 7 | MCs | Semester 8 | MCs |
|---|---|---|---|
| EG4301 DCP BEng Dissertation (UEM) | 6 | EG4301 DCP BEng Dissertation (UEM) | 6 |
| Innovation & Enterprise Elective 2 (UEM) | 4 | Innovation & Enterprise Elective 3 (UEM) | 4 |
| Technical Elective 3 | 4 | Technical Elective 5 | 4 |
| Technical Elective 4 | 4 | | |
| **Sub-total** | **18** | **Sub-total** | **14** |

Note:

The Group A module for Second Major may be completed in Semester 4 if students do not wish to overload in Semester 2.

*(updated 2 October 2018)*

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## Recommended semester schedule for Cohorts 2017/2018 and 2018/2019 – poly-intake students

(for students who are exempted from CG1111 and Group A module for Second Major)

| Semester 3 | MCs | Semester 4 | MCs |
|---|---|---|---|
| MA1301 Introductory Mathematics (in lieu of EG3612) | 4 | EG3301R DCP Project (double-counted) | 6 |
| PC1222 Fundamentals of Physics II (in lieu of EG3612) | 4 | CG1112 Engineering Principles & Practice II | 6 |
| CS1010 Programming Methodology | 4 | MA1511 Engineering Calculus | 2 |
| EE2026 Digital Design | 4 | MA1512 Differential Equations for Engineering | 2 |
| GER1000 Quantitative Reasoning | 4 | CS1231 Discrete Structures | 4 |
| | | CS2040C Data Structures & Algorithms | 4 |
| **Sub-total** | **20** | **Sub-total** | **24** |

| Semester 5 | MCs | Semester 6 | MCs |
|---|---|---|---|
| EG3301R DCP Project (double-counted) | 6 | CG2023 Signals & Systems | 4 |
| MA1508E Linear Algebra for Engineering | 4 | CG2271 Real-Time Operating Systems | 4 |
| CS2113 Software Engineering & Object-Oriented Programming | 4 | ST2334 Probability & Statistics | 4 |
| CG2027 Transistor-Level Digital Circuits | 2 | GEQ1000 Asking Questions | 4 |
| CG2028 Computer Organization | 2 | GET | 4 |
| Group B module for Second Major (UEM) | 4 | | |
| **Sub-total** | **22** | **Sub-total** | **20** |

| Semester 7 | MCs | Semester 8 | MCs |
|---|---|---|---|
| EG4301 DCP BEng Dissertation (UEM) | 6 | EG4301 DCP BEng Dissertation (UEM) | 6 |
| Innovation & Enterprise Elective 1 (UEM) | 4 | Innovation & Enterprise Elective 2 (UEM) | 4 |
| CG3207 Computer Architecture *or* CS3230 Design & Analysis of Algorithms | 4 | Technical Elective 1 | 4 |
| EE4204 Computer Networks | 4 | Technical Elective 2 | 4 |
| GEH | 4 | GES | 4 |
| **Sub-total** | **22** | **Sub-total** | **22** |

| Semester 9 | MCs |
|---|---|
| Innovation & Enterprise Elective 3 (UEM) | 4 |
| Technical Elective 3 | 4 |
| Technical Elective 4 | 4 |
| Technical Elective 5 | 4 |
| EG2401A Engineering Professionalism | 2 |
| **Sub-total** | **18** |

Notes:

1. Poly-intake students may receive the following exemptions depending on their Diploma qualification:
   - CG1111 Engineering Principles & Practice I (6 MCs)
   - CS2101 Effective Communication for Computing Professionals (4 MCs)
   - Unrestricted elective modules (20 MCs)

2. Poly-intake students may be exempted from Group A module for Second Major (4 MCs) and/or one Innovation & Enterprise elective (4 MCs) depending on their Diploma qualification. These would be included as part of the 20 MCs of exemptions for unrestricted elective modules.

*(updated 2 October 2018)*

3. EG3612 (VIP) is not compulsory for poly-intake students. The 6 MCs for VIP may be fulfilled by MA1301 (4 MCs) and PC1222 (4 MCs) and/or other technical elective modules.

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## Recommended semester schedule for Cohorts 2017/2018 and 2018/2019 – poly-intake students

(for students who are NOT exempted from CG1111 and Group A module for Second Major)

| Semester 3 | MCs | Semester 4 | MCs |
|---|---|---|---|
| CG1111 Engineering Principles & Practice I | 6 | CG1112 Engineering Principles & Practice II | 6 |
| MA1301 Introductory Mathematics (in lieu of EG3612) | 4 | MA1511 Engineering Calculus | 2 |
| PC1222 Fundamentals of Physics II (in lieu of EG3612) | 4 | MA1512 Differential Equations for Engineering | 2 |
| CS1010 Programming Methodology | 4 | CS1231 Discrete Structures | 4 |
| GER1000 Quantitative Reasoning | 4 | CS2040C Data Structures & Algorithms | 4 |
| | | EE2026 Digital Design | 4 |
| | | Group A module for Second Major (UEM) | 4 |
| **Sub-total** | **22** | **Sub-total** | **26** |

| Semester 5 | MCs | Semester 6 | MCs |
|---|---|---|---|
| MA1508E Linear Algebra for Engineering | 4 | EG3301R DCP Project (double-counted) | 6 |
| CS2113 Software Engineering & Object-Oriented Programming | 4 | CG2023 Signals & Systems | 4 |
| CG2271 Real-Time Operating Systems | 4 | CG2027 Transistor-Level Digital Circuits | 2 |
| GET | 4 | CG2028 Computer Organization | 2 |
| Group B module for Second Major (UEM) | 4 | ST2334 Probability & Statistics | 4 |
| | | GEQ1000 Asking Questions | 4 |
| **Sub-total** | **20** | **Sub-total** | **22** |

| Semester 7 | MCs | Semester 8 | MCs |
|---|---|---|---|
| EG3301R DCP Project (double-counted) | 6 | EG4301 DCP BEng Dissertation (UEM) | 6 |
| Innovation & Enterprise Elective 1 (UEM) | 4 | Innovation & Enterprise Elective 2 (UEM) | 4 |
| CG3207 Computer Architecture *or* CS3230 Design & Analysis of Algorithms | 4 | Technical Elective 1 | 4 |
| EE4204 Computer Networks | 4 | Technical Elective 2 | 4 |
| GES | 4 | GEH | 4 |
| | | EG2401A Engineering Professionalism | 2 |
| **Sub-total** | **22** | **Sub-total** | **24** |

| Semester 9 | MCs |
|---|---|
| EG4301 DCP BEng Dissertation (UEM) | 6 |
| Innovation & Enterprise Elective 3 (UEM) | 4 |
| Technical Elective 3 | 4 |
| Technical Elective 4 | 4 |
| Technical Elective 5 | 4 |
| **Sub-total** | **22** |

Notes:

1. Poly-intake students may receive the following exemptions depending on their Diploma qualification:
   - CG1111 Engineering Principles & Practice I (6 MCs)
   - CS2101 Effective Communication for Computing Professionals (4 MCs)
   - Unrestricted elective modules (20 MCs)

*(updated 2 October 2018)*

2. Poly-intake students may be exempted from Group A module for Second Major (4 MCs) and/or one Innovation & Enterprise elective (4 MCs) depending on their Diploma qualification. These would be included as part of the 20 MCs of exemptions for unrestricted elective modules.

3. EG3612 (VIP) is not compulsory for poly-intake students. The 6 MCs for VIP may be fulfilled by MA1301 (4 MCs) and PC1222 (4 MCs) and/or other technical elective modules.