

**Bachelor of Engineering (Biomedical Engineering)  
with Second Major in Innovation & Design**

**Cohort 2019/2020**

Modular Requirements	Modular Credits (MCs)
<b>University Level Requirements</b>	
<b>General education modules:</b>	
• Quantitative Reasoning (GER1000)	4
• Thinking & Expression (GET)	4
• Human Cultures (GEH)	4
• Singapore Studies (GES)	4
• Asking Questions (GEQ1000)	4
<b>Sub-total for University Level Requirements</b>	<b>20</b>
<b>Programme Requirements</b>	
<b>Faculty requirements:</b>	
• ES2531 Critical Thinking & Writing <sup>1</sup>	4
• EG2401A Engineering Professionalism	2
• ES1xxxx English <sup>2</sup>	-
<b>Foundation requirements (common core):</b>	
• BN1111 Biomedical Engineering Principles & Practice I	4
• BN2111 Biomedical Engineering Principles & Practice II	4
• MA1511 Engineering Calculus	2
• MA1512 Differential Equations for Engineering	2
• MA1513 Linear Algebra with Differential Equations	2
• CS1010E Programming Methodology	4
• EE2211 Introduction to Machine Learning	4
• EG1311 Design & Make	4
• IE2141 Systems Thinking & Dynamics	4
• MLE1010 Materials Engineering Principles & Practice	4
<b>BME core modules:</b>	
• CM1501 Organic Chemistry for Engineers	4
• PC1432 Physics IIE	4
• BN2102 Bioengineering Data Analysis	4
• BN2201 Quantitative Physiology for Bioengineers	4
• BN2204 Fundamentals of Biomechanics	4
• BN2301 Biochemistry and Biomaterials for Bioengineers	4
• BN2403 Fundamentals of Biosignals Processing & Bioinstrumentation	4
<b>BME technical electives</b> <sup>3,4</sup>	22
<b>BME design and project modules:</b>	
• EG3301R DCP Project <sup>3</sup> (over 2 consecutive semesters) <i>(Double-counted for Second Major in Innovation &amp; Design and replaces BN3101 Biomedical Engineering Design)</i>	12
<b>EG3612 Vacation Internship Programme (VIP)</b> <sup>3,5</sup>	6
<b>Sub-total for Programme Requirements</b>	<b>108</b>
<b>Unrestricted Elective Modules (UEM)</b>	
• Group A module for Second Major	4
• Group B module for Second Major	4
• Group C modules for Second Major – Innovation & Enterprise electives	8
• EG4301 DCP Dissertation <u>or</u> EG4301A Ideas to Start-up <sup>3</sup> (over 2 consecutive semesters)	12
Other unrestricted electives	4
<b>Sub-total for Unrestricted Elective Modules</b>	<b>32</b>
<b>Total</b>	<b>160</b>

**Innovation & Design Programme  
Faculty of Engineering**

Notes:

- <sup>1</sup> Students in USP, UTCP, and RVRC may read an equivalent module (e.g. UWC2101%, UTW1001%, ES1601, ES1501%) in lieu of ES2531.
- <sup>2</sup> 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.
- <sup>3</sup> Students in this Second Major are allowed to complete EG3612 (6 MCs) in lieu of EG3611A (10 MCs).  
  
The 12 MCs for EG3301R are mapped by 6 MCs from BN3101, 4 MCs from the replacement of EG3611A (10 MCs) with EG3612 (6 MCs), and 2 MCs from technical electives.  
  
Students may also opt to do EG3611A (10 MCs) in lieu of EG3612 (6 MCs) and 4 MCs of technical electives.
- <sup>4</sup> Students in this Second Major are allowed to complete additional technical electives (8 MCs) in lieu of BN4101 B.Eng. Dissertation (8 MCs) if they complete EG4301/EG4301A.
- <sup>5</sup> EG3612 (VIP) 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 E-Scholars. The 6 MCs for EG3612 may be replaced by other modules

**Recommended semester schedule for Cohort 2019/2020 – JC-intake students or equivalent**  
(for students with A-Level Physics)

Semester 1	MCs	Semester 2	MCs
BN1111 Biomedical Engineering Principles & Practice I	4	BN2111 Biomedical Engineering Principles & Practice II	4
MA1511 Engineering Calculus	2	MA1513 Linear Algebra with Differential Equations	2
MA1512 Differential Equations for Engineering	2	CS1010E Programming Methodology	4
EG1311 Design & Make	4	GER1000 Quantitative Reasoning	4
MLE1010 Materials Engineering Principles & Practice	4	PC1432 Physics IIE	4
GET	4	ES2531 Critical Thinking & Writing	4
		<b>Group A module for Second Major (UEM)</b>	<b>4</b>
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>26</b>

Semester 3	MCs	Semester 4	MCs
EE2211 Introduction to Machine Learning	4	IE2141 Systems Thinking & Dynamics	4
CM1501 Organic Chemistry for Engineers	4	BN2102 Bioengineering Data Analysis	4
BN2201 Quantitative Physiology for Bioengineers	4	BN2204 Fundamentals of Biomechanics	4
BN2403 Fundamentals of Biosignals Processing & Bioinstrumentation	4	BN2301 Biochemistry & Biomaterials for Bioengineers	4
GEQ1000 Asking Questions	4	EG2401A Engineering Professionalism	2
<b>Group B module for Second Major (UEM)</b>	<b>4</b>	<b>EG3301R DCP Project (replaces BN3101)</b>	<b>6</b>
<b>Sub-total</b>	<b>24</b>	<b>Sub-total</b>	<b>24</b>

Summer vacation between Semesters 4 and 5	MCs
EG3612 Vacation Internship Programme	6
<b>Sub-total</b>	<b>6</b>

Semester 5	MCs	Semester 6	MCs
<b>EG3301R DCP Project (replaces BN3101)</b>	<b>6</b>	<b>Innovation &amp; Enterprise Elective 1 (UEM)</b>	<b>4</b>
Technical Elective 1	4	Technical Elective 3	4
Technical Elective 2	4	Technical Elective 4	4
GEH	4	Technical Elective 5	4
		GES	4
<b>Sub-total</b>	<b>18</b>	<b>Sub-total</b>	<b>20</b>

Semester 7	MCs	Semester 8	MCs
<b>EG4301 DCP Dissertation (UEM)</b>	<b>6</b>	<b>EG4301 DCP Dissertation (UEM)</b>	<b>6</b>
<b>Innovation &amp; Enterprise Elective 2 (UEM)</b>	<b>4</b>	UEM	4
Technical Elective 6	2		
<b>Sub-total</b>	<b>12</b>	<b>Sub-total</b>	<b>10</b>

Note:

The Group A module for Second Major may be completed in the summer vacation between Semesters 2 and 3 or a subsequent semester if students do not wish to overload in Semester 2.

**Recommended semester schedule for Cohort 2019/2020 – JC-intake students or equivalent**  
(for students without A-Level Physics)

Semester 1	MCs	Semester 2	MCs
BN1111 Biomedical Engineering Principles & Practice I	4	BN2111 Biomedical Engineering Principles & Practice II	4
MA1511 Engineering Calculus	2	MA1513 Linear Algebra with Differential Equations	2
MA1512 Differential Equations for Engineering	2	CS1010E Programming Methodology	4
EG1311 Design & Make	4	PC1222 Fundamentals of Physics II	4
MLE1010 Materials Engineering Principles & Practice	4	GER1000 Quantitative Reasoning	4
PC1221 Fundamentals of Physics I	4	ES2531 Critical Thinking & Writing	4
		<b>Group A module for Second Major (UEM)</b>	<b>4</b>
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>26</b>

Semester 3	MCs	Semester 4	MCs
EE2211 Introduction to Machine Learning	4	IE2141 Systems Thinking & Dynamics	4
CM1501 Organic Chemistry for Engineers	4	BN2102 Bioengineering Data Analysis	4
BN2201 Quantitative Physiology for Bioengineers	4	BN2204 Fundamentals of Biomechanics	4
PC1432 Physics IIE	4	BN2301 Biochemistry & Biomaterials for Bioengineers	4
GEQ1000 Asking Questions	4	EG2401A Engineering Professionalism	2
<b>Group B module for Second Major (UEM)</b>	<b>4</b>	<b>EG3301R DCP Project (replaces BN3101)</b>	<b>6</b>
<b>Sub-total</b>	<b>24</b>	<b>Sub-total</b>	<b>24</b>

Summer vacation between Semesters 4 and 5	MCs
EG3612 Vacation Internship Programme	6
<b>Sub-total</b>	<b>6</b>

Semester 5	MCs	Semester 6	MCs
<b>EG3301R DCP Project (replaces BN3101)</b>	<b>6</b>	<b>Innovation &amp; Enterprise Elective 1 (UEM)</b>	<b>4</b>
BN2403 Fundamentals of Biosignals Processing & Bioinstrumentation	4	Technical Elective 1	4
GEH	4	Technical Elective 2	4
GET	4	Technical Elective 3	4
		GES	4
<b>Sub-total</b>	<b>18</b>	<b>Sub-total</b>	<b>20</b>

Semester 7	MCs	Semester 8	MCs
<b>EG4301 DCP Dissertation (UEM)</b>	<b>6</b>	<b>EG4301 DCP Dissertation (UEM)</b>	<b>6</b>
<b>Innovation &amp; Enterprise Elective 2 (UEM)</b>	<b>4</b>	Technical Elective 5	4
Technical Elective 4	4	Technical Elective 6	2
<b>Sub-total</b>	<b>14</b>	<b>Sub-total</b>	<b>12</b>

Note:

The Group A module for Second Major may be completed in the summer vacation between Semesters 2 and 3 or a subsequent semester if students do not wish to overload in Semester 2.

**Recommended semester schedule for Cohort 2019/2020 – JC-intake students or equivalent**  
(for students who opt for vacation internship **plus a specialisation**)

Semester 1	MCs	Semester 2	MCs
BN1111 Biomedical Engineering Principles & Practice I	4	BN2111 Biomedical Engineering Principles & Practice II	4
MA1511 Engineering Calculus	2	MA1513 Linear Algebra with Differential Equations	2
MA1512 Differential Equations for Engineering	2	CS1010E Programming Methodology	4
EG1311 Design & Make	4	GER1000 Quantitative Reasoning	4
MLE1010 Materials Engineering Principles & Practice	4	PC1432 Physics IIE	4
GET	4	ES2531 Critical Thinking & Writing	4
		<b>Group A module for Second Major (UEM)</b>	<b>4</b>
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>26</b>

Semester 3	MCs	Semester 4	MCs
EE2211 Introduction to Machine Learning	4	IE2141 Systems Thinking & Dynamics	4
CM1501 Organic Chemistry for Engineers	4	BN2102 Bioengineering Data Analysis	4
BN2201 Quantitative Physiology for Bioengineers	4	BN2204 Fundamentals of Biomechanics	4
BN2403 Fundamentals of Biosignals Processing & Bioinstrumentation	4	BN2301 Biochemistry & Biomaterials for Bioengineers	4
GEQ1000 Asking Questions	4	EG2401A Engineering Professionalism	2
<b>Group B module for Second Major (UEM)</b>	<b>4</b>	<b>EG3301R DCP Project (replaces BN3101)</b>	<b>6</b>
<b>Sub-total</b>	<b>24</b>	<b>Sub-total</b>	<b>24</b>

Summer vacation between Semesters 4 and 5	MCs
EG3612 Vacation Internship Programme	6
<b>Sub-total</b>	<b>6</b>

Semester 5	MCs	Semester 6	MCs
<b>EG3301R DCP Project (replaces BN3101)</b>	<b>6</b>	<b>Innovation &amp; Enterprise Elective 1 (UEM)</b>	<b>4</b>
Specialisation module 1	4	Specialisation module 3	4
Specialisation module 2	4	Specialisation module 4	4
GEH	4	Specialisation module 5	4
		GES	4
<b>Sub-total</b>	<b>18</b>	<b>Sub-total</b>	<b>20</b>

Semester 7	MCs	Semester 8	MCs
<b>EG4301 DCP Dissertation (UEM)</b>	<b>6</b>	<b>EG4301 DCP Dissertation (UEM)</b>	<b>6</b>
<b>Innovation &amp; Enterprise Elective 2 (UEM)</b>	<b>4</b>	UEM	4
Technical Elective 6	2		
<b>Sub-total</b>	<b>12</b>	<b>Sub-total</b>	<b>10</b>

Note:

The Group A module for Second Major may be completed in the summer vacation between Semesters 2 and 3 or a subsequent semester if students do not wish to overload in Semester 2.

**Recommended semester schedule for Cohort 2019/2020 – JC-intake students or equivalent**  
(for students from Common Engineering)

Semester 1	MCs	Semester 2	MCs
Engineering Principles & Practice I	4	Engineering Principles & Practice II	4
MA1505 Mathematics I	4	MA1512 Differential Equations for Engineering	2
CS1010E Programming Methodology	4	MA1513 Linear Algebra with Differential Equations	2
EG1311 Design & Make	4	MLE1010 Materials Engineering Principles & Practice	4
GET	4	GER1000 Quantitative Reasoning	4
		PC1432 Physics IIE	4
		<b>Group A module for Second Major (UEM)</b>	<b>4</b>
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>24</b>

Semester 3	MCs	Semester 4	MCs
EE2211 Introduction to Machine Learning	4	IE2141 Systems Thinking & Dynamics	4
CM1501 Organic Chemistry for Engineers	4	BN2102 Bioengineering Data Analysis	4
BN2201 Quantitative Physiology for Bioengineers	4	BN2204 Fundamentals of Biomechanics	4
BN2403 Fundamentals of Biosignals Processing & Bioinstrumentation	4	BN2301 Biochemistry & Biomaterials for Bioengineers	4
GEQ1000 Asking Questions	4	ES2531 Critical Thinking & Writing	4
<b>Group B module for Second Major (UEM)</b>	<b>4</b>	<b>EG3301R DCP Project (replaces BN3101)</b>	<b>6</b>
<b>Sub-total</b>	<b>24</b>	<b>Sub-total</b>	<b>26</b>

Summer vacation between Semesters 4 and 5	MCs
EG3612 Vacation Internship Programme	6
<b>Sub-total</b>	<b>6</b>

Semester 5	MCs	Semester 6	MCs
<b>EG3301R DCP Project (replaces BN3101)</b>	<b>6</b>	<b>Innovation &amp; Enterprise Elective 1 (UEM)</b>	<b>4</b>
Technical Elective 1	4	Technical Elective 3	4
Technical Elective 2	4	Technical Elective 4	4
GEH	4	Technical Elective 5	4
EG2401A Engineering Professionalism	2	GES	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

Semester 7	MCs	Semester 8	MCs
<b>EG4301 DCP Dissertation (UEM)</b>	<b>6</b>	<b>EG4301 DCP Dissertation (UEM)</b>	<b>6</b>
<b>Innovation &amp; Enterprise Elective 2 (UEM)</b>	<b>4</b>	UEM	2
Technical Elective 6	2		
<b>Sub-total</b>	<b>12</b>	<b>Sub-total</b>	<b>8</b>

Note:

The Group A module for Second Major may be completed in the summer vacation between Semesters 2 and 3 or a subsequent semester if students do not wish to overload in Semester 2.

**Recommended semester schedule for Cohort 2019/2020 – JC-intake students or equivalent**  
(for students who opt for industrial attachment in lieu of vacation internship)

Semester 1	MCs	Semester 2	MCs
BN1111 Biomedical Engineering Principles & Practice I	4	BN2111 Biomedical Engineering Principles & Practice II	4
MA1511 Engineering Calculus	2	MA1513 Linear Algebra with Differential Equations	2
MA1512 Differential Equations for Engineering	2	CS1010E Programming Methodology	4
EG1311 Design & Make	4	PC1432 Physics IIE	4
MLE1010 Materials Engineering Principles & Practice	4	GER1000 Quantitative Reasoning	4
GET	4	ES2531 Critical Thinking & Writing	4
		<b>Group A module for Second Major (UEM)</b>	<b>4</b>
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>26</b>

Semester 3	MCs	Semester 4	MCs
EE2211 Introduction to Machine Learning	4	IE2141 Systems Thinking & Dynamics	4
CM1501 Organic Chemistry for Engineers	4	BN2102 Bioengineering Data Analysis	4
BN2201 Quantitative Physiology for Bioengineers	4	BN2204 Fundamentals of Biomechanics	4
BN2403 Fundamentals of Biosignals Processing & Bioinstrumentation	4	BN2301 Biochemistry & Biomaterials for Bioengineers	4
GEQ1000 Asking Questions	4	EG2401A Engineering Professionalism	2
<b>Group B module for Second Major (UEM)</b>	<b>4</b>	<b>EG3301R DCP Project (replaces BN3101)</b>	<b>6</b>
<b>Sub-total</b>	<b>24</b>	<b>Sub-total</b>	<b>24</b>

Semester 5	MCs	Semester 6	MCs
<b>EG3301R DCP Project (replaces BN3101)</b>	<b>6</b>	EG3611A Industrial Attachment	10
<b>Innovation &amp; Enterprise Elective 1 (UEM)</b>	<b>4</b>		
Technical Elective 1	4		
GEH	4		
GES	4		
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>10</b>

Semester 7	MCs	Semester 8	MCs
<b>EG4301 DCP Dissertation (UEM)</b>	<b>6</b>	<b>EG4301 DCP Dissertation (UEM)</b>	<b>6</b>
<b>Innovation &amp; Enterprise Elective 2 (UEM)</b>	<b>4</b>	Technical Elective 4	4
Technical Elective 2	4	Technical Elective 5	2
Technical Elective 3	4	UEM	4
<b>Sub-total</b>	<b>18</b>	<b>Sub-total</b>	<b>16</b>

Note:

The Group A module for Second Major may be completed in the summer vacation between Semesters 2 and 3 or a subsequent semester if students do not wish to overload in Semester 2.

**Recommended semester schedule for Cohort 2019/2020 – JC-intake students or equivalent**  
(for students who opt for industrial attachment **plus a specialisation**)

Semester 1	MCs	Semester 2	MCs
BN1111 Biomedical Engineering Principles & Practice I	4	BN2111 Biomedical Engineering Principles & Practice II	4
MA1511 Engineering Calculus	2	MA1513 Linear Algebra with Differential Equations	2
MA1512 Differential Equations for Engineering	2	CS1010E Programming Methodology	4
EG1311 Design & Make	4	PC1432 Physics IIE	4
MLE1010 Materials Engineering Principles & Practice	4	GER1000 Quantitative Reasoning	4
GET	4	ES2531 Critical Thinking & Writing	4
		<b>Group A module for Second Major (UEM)</b>	<b>4</b>
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>26</b>

Semester 3	MCs	Semester 4	MCs
EE2211 Introduction to Machine Learning	4	IE2141 Systems Thinking & Dynamics	4
CM1501 Organic Chemistry for Engineers	4	BN2102 Bioengineering Data Analysis	4
BN2201 Quantitative Physiology for Bioengineers	4	BN2204 Fundamentals of Biomechanics	4
BN2403 Fundamentals of Biosignals Processing & Bioinstrumentation	4	BN2301 Biochemistry & Biomaterials for Bioengineers	4
GEQ1000 Asking Questions	4	EG2401A Engineering Professionalism	2
<b>Group B module for Second Major (UEM)</b>	<b>4</b>	<b>EG3301R DCP Project (replaces BN3101)</b>	<b>6</b>
<b>Sub-total</b>	<b>24</b>	<b>Sub-total</b>	<b>24</b>

Semester 5	MCs	Semester 6	MCs
<b>EG3301R DCP Project (replaces BN3101)</b>	<b>6</b>	EG3611A Industrial Attachment	10
<b>Innovation &amp; Enterprise Elective 1 (UEM)</b>	<b>4</b>		
Specialisation module 1	4		
GEH	4		
GES	4		
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>10</b>

Semester 7	MCs	Semester 8	MCs
<b>EG4301 DCP Dissertation (UEM)</b>	<b>6</b>	<b>EG4301 DCP Dissertation (UEM)</b>	<b>6</b>
<b>Innovation &amp; Enterprise Elective 2 (UEM)</b>	<b>4</b>	Specialisation module 4	4
Specialisation module 2	4	Specialisation module 5	4
Specialisation module 3	4	UEM	2
<b>Sub-total</b>	<b>18</b>	<b>Sub-total</b>	<b>16</b>

Note:

The Group A module for Second Major may be completed in the summer vacation between Semesters 2 and 3 or a subsequent semester if students do not wish to overload in Semester 2.



**Recommended semester schedule for Cohort 2019/2020 – JC-intake students or equivalent**  
(for students in year-long NOC programmes)

Semester 1	MCs	Semester 2	MCs
BN1111 Biomedical Engineering Principles & Practice I	4	BN2111 Biomedical Engineering Principles & Practice II	4
MA1511 Engineering Calculus	2	MA1513 Linear Algebra with Differential Equations	2
MA1512 Differential Equations for Engineering	2	CS1010E Programming Methodology	4
EG1311 Design & Make	4	PC1432 Physics IIE	4
MLE1010 Materials Engineering Principles & Practice	4	GER1000 Quantitative Reasoning	4
GET	4	ES2531 Critical Thinking & Writing	4
		<b>Group A module for Second Major (UEM)</b>	<b>4</b>
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>26</b>

Semester 3	MCs	Semester 4	MCs
EE2211 Introduction to Machine Learning	4	IE2141 Systems Thinking & Dynamics	4
CM1501 Organic Chemistry for Engineers	4	BN2102 Bioengineering Data Analysis	4
BN2201 Quantitative Physiology for Bioengineers	4	BN2204 Fundamentals of Biomechanics	4
BN2403 Fundamentals of Biosignals Processing & Bioinstrumentation	4	BN2301 Biochemistry & Biomaterials for Bioengineers	4
GEQ1000 Asking Questions	4	EG3301R DCP Project (replaces BN3101)	6
<b>Group B module for Second Major (UEM)</b>	<b>4</b>		
<b>Sub-total</b>	<b>24</b>	<b>Sub-total</b>	<b>22</b>

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project (replaces BN3101)	6	NOC	
Technical Elective 1	4		
GEH	4		
GES	4		
<b>Sub-total</b>	<b>18</b>	<b>Sub-total</b>	

Semester 7	MCs	Semester 8	MCs
NOC		Technical Elective 2	4
		Technical Elective 3	4
		Technical Elective 4	4
		Technical Elective 5	2
<b>Sub-total</b>		<b>Sub-total</b>	<b>14</b>

Mapping of year-long NOC programmes:

NOC modules	iDP / Engineering modules
TR3201 Entrepreneurship Practicum (8 MCs)	EG2401A Engineering Professionalism (2 MCs) + BN4109 (4 MCs – TE)
TR3202 Start-up Internship Programme (12 MCs)	EG3612 Vacation Internship Programme (6 MCs) + EG4301 DCP Dissertation (4 MCs out of 12 MCs)
TR3203N Start-up Case Study & Analysis (8 MCs)	EG4301 DCP Dissertation (8 MCs out of 12 MCs)
Entrepreneurship courses (up to 12 MCs)	Innovation & Enterprise electives (8 MCs – UEM)

**Recommended semester schedule for Cohort 2019/2020 – poly-intake students**  
(for students who are exempted from Group A module for Second Major)

Semester 3	MCs	Semester 4	MCs
MA1301 Introductory Mathematics (in lieu of EG3612)	4	EG3301R DCP Project (replaces BN3101)	6
PC1221 Fundamentals of Physics I (In lieu of EG3612)	4	MA1511 Engineering Calculus	2
CM1417 Fundamentals of Chemistry	4	MA1512 Differential Equations for Engineering	2
EG1311 Design & Make <i>or</i> MLE1010 Materials Engineering Principles & Practice	4	PC1222 Fundamentals of Physics II	4
Group B module for Second Major (UEM)	4	PC1432 Physics IIE	4
		GER1000 Quantitative Reasoning	4
		ES2531 Critical Thinking & Writing	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>26</b>

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project (replaces BN3101)	6	IE2141 Systems Thinking & Dynamics	4
MA1513 Linear Algebra with Differential Equations	2	BN2102 Bioengineering Data Analysis	4
EE2211 Introduction to Machine Learning	4	BN2204 Fundamentals of Biomechanics	4
CM1501 Organic Chemistry for Engineers	4	BN2301 Biochemistry & Biomaterials for Bioengineers	4
BN2201 Quantitative Physiology for Bioengineers	4	GET	4
GEQ1000 Asking Questions	4	EG2401A Engineering Professionalism	2
<b>Sub-total</b>	<b>24</b>	<b>Sub-total</b>	<b>22</b>

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation (UEM)	6	EG4301 DCP Dissertation (UEM)	6
BN2403 Fundamentals of Biosignals Processing & Bioinstrumentation	4	Innovation & Enterprise Elective 1 (UEM)	4
Technical Elective 1	4	Technical Elective 2	4
GEH	4	Technical Elective 3	4
GES	4		
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>18</b>

Semester 9	MCs
Innovation & Enterprise Elective 2 (UEM)	4
Technical Elective 4	4
Technical Elective 5	4
Technical Elective 6	2
<b>Sub-total</b>	<b>14</b>

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

Notes:

1. Poly-intake students may receive the following exemptions depending on their Diploma qualification:
  - BN1111 Biomedical Engineering Principles & Practice I (4 MCs)
  - BN2111 Biomedical Engineering Principles & Practice II (4 MCs)
  - CS1010E Programming Methodology (4 MCs)
  - EG1311 Design & Make (4 MCs) *or* MLE1010 Materials Engineering Principles & Practice (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.
  
3. EG3612 (VIP) is not compulsory for poly-intake students. The 6 MCs for VIP may be fulfilled by bridging modules such as MA1301 (4 MCs), PC1221 (4 MCs), PC1222 (4 MCs), CM1417 (4 MCs) and/or other modules.

**Recommended semester schedule for Cohort 2019/2020 – JC-intake students or equivalent**  
(for students in E-Scholars programme)

Semester 1	MCs	Semester 2	MCs
BN1111 Biomedical Engineering Principles & Practice I	4	BN2111 Biomedical Engineering Principles & Practice II	4
MA1511 Engineering Calculus	2	MA1513 Linear Algebra with Differential Equations	2
MA1512 Differential Equations for Engineering	2	GER1000 Quantitative Reasoning	4
MLE1010 Materials Engineering Principles & Practice	4	BN2102 Bioengineering Data Analysis	4
CM1501 Organic Chemistry for Engineers or PC1432 Physics IIE	4	RC4 module 2	4
RC4 module 1 (replaces ES2531 Critical Thinking & Writing)	4	EG3301R DCP Project (replaces BN3101)	6
Group B module for Second Major (UEM)	4	Group A module for Second Major (UEM)	4
<b>Sub-total</b>	<b>24</b>	<b>Sub-total</b>	<b>28</b>

Semester 3	MCs	Semester 4	MCs
EE2211 Introduction to Machine Learning	4	TR3202 Start-up Internship Programme	12
BN2201 Quantitative Physiology for Bioengineers	4	Entrepreneurship courses	8
BN2403 Fundamentals of Biosignals Processing & Bioinstrumentation	4		
RC4 module 3	4		
RC4 module 4	4		
EG2101 Pathways to Engineering Leadership (replaces EG2401A Engineering Professionalism)	2		
EG3301R DCP Project (replaces BN3101)	6		
<b>Sub-total</b>	<b>28</b>	<b>Sub-total</b>	<b>20</b>

Semester 5	MCs	Semester 6	MCs
EG4301 DCP Dissertation (UEM)	6	EG4301 DCP Dissertation (UEM)	6
UEM (in lieu of IE2141)	4	BN2204 Fundamentals of Biomechanics	4
Technical Elective 1	4	BN2301 Biochemistry & Biomaterials for Bioengineers	4
Technical Elective 2	4	Technical Elective 4	4
Technical Elective 3	4	Technical Elective 5	4
RC4 module 5	4	Technical Elective 6	2
<b>Sub-total</b>	<b>26</b>	<b>Sub-total</b>	<b>24</b>

Notes:

- Students must complete the following modules before Semester 1 through advanced placement credits:
  - CS1010E Programming Methodology (4 MCs)
  - CM1501 Organic Chemistry for Engineers (4 MCs) – using CM1121 Organic Chemistry
  - EG1311 Design & Make (4 MCs)
- TR3202 and the NOC entrepreneurship courses are mapped to EG3612 Vacation Internship Programme (6 MCS), 8 MCs of Innovation & Enterprise electives (i.e. Group C modules), and 6 MCs of UEM.