

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

**Cohort AY2023/2024**

Course Requirements	Units
<b>Common Curriculum</b>	
GEA1000 Quantitative Reasoning with Data	4
CS1010E Programming Methodology	4
ES2631 Critique and Communication of Thinking and Design <sup>1</sup>	4
GE: Cultures and Connections <sup>1</sup>	4
GE: Singapore Studies <sup>1</sup>	4
GE: Communities and Engagement <sup>1</sup>	4
CDE2000 Creating Narratives	4
CDE2501 Liveable Cities	4
DTK1234 Design Thinking	4
EE2211 Introduction to Machine Learning	4
EG1311 Design and Make	4
IE2141 Systems Thinking and Dynamics	4
PF1101 Fundamentals of Project Management	4
BN4101 B.Eng. Dissertation (over 2 consecutive semesters) <sup>2</sup>	8
<b>Sub-total for Common Curriculum</b>	<b>60</b>
<b>Engineering Core</b>	
MA1511 Engineering Calculus	2
MA1513 Linear Algebra with Differential Equations	2
CE2407A Uncertainty Analysis for Engineers	2
CE2407B Introduction to Numerical Methods for Engineers	2
EG2401A Engineering Professionalism	2
EG3611A Industrial Attachment <u>or</u> CFG2101 NUS Vacation Internship Programme <sup>3</sup> <u>and</u> EG3612 Vacation Industrial Attachment	10
<b>Sub-total for Engineering Core</b>	<b>20</b>
<b>Engineering Programme Requirements</b>	
BN1111 Biomedical Engineering Principles and Practice I	4
BN2111 Biomedical Engineering Principles and Practice II	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
CDE3301/EG3301R Ideas to Proof-of-Concept (over 2 consecutive semesters) <sup>4</sup>	4
Technical electives	8
<b>Sub-total for Engineering Programme Requirements</b>	<b>40</b>
<b>Unrestricted Electives</b>	
Group A course for Minor	4
Group B course for Minor	4
CDE3301/EG3301R Ideas to Proof-of-Concept (over 2 consecutive semesters) <sup>4</sup>	8
Other unrestricted electives <sup>2</sup>	24
<b>Sub-total for Unrestricted Electives</b>	<b>40</b>
<b>Total</b>	<b>160</b>

**Innovation & Design Programme**  
**NUS College of Design and Engineering**

Notes:

- <sup>1</sup> Students may read equivalent courses in NUS College (NUSC), University Town College Programme (UTCP), and Ridge View Residential Programme (RVRC).
- <sup>2</sup> Students may take CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up in lieu of BN4101 and 4 units of unrestricted electives.
- <sup>3</sup> May be replaced by CDE2605 Undergraduate Research Opportunities Programme or CDE2605R Undergraduate Research Experience (UREx).
- <sup>4</sup> The 12 units for CDE3301/EG3301R are counted towards 4 units for BN3101A Biomedical Engineering Design while 8 units are counted as unrestricted elective.

**Recommended semester schedule – JC-intake students or equivalent**  
(for students who opt for vacation internships)

Semester 1	Units	Semester 2	Units
BN1111 Biomedical Engineering Principles and Practice I	4	BN2111 Biomedical Engineering Principles and Practice II	4
GEA1000 Quantitative Reasoning with Data	4	CS1010E Programming Methodology	4
DTK1234 Design Thinking	4	EG1311 Design & Make	4
MA1513 Linear Algebra with Differential Equations	2	MA1511 Engineering Calculus	2
CE2407A Uncertainty Analysis for Engineers	2	CE2407B Introduction to Numerical Methods for Engineers	2
PF1101 Fundamentals of Project Management	4	Group A/B course for Minor	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

Summer vacation between Semesters 2 and 3	Units
CFG2101 NUS Vacation Internship Programme	4
<b>Sub-total</b>	<b>4</b>

Semester 3	Units	Semester 4	Units
CDE2501 Liveable Cities	4	BN2102 Bioengineering Data Analysis	4
BN2301 Biochemistry & Biomaterials for Bioengineers	4	BN2204 Fundamentals of Biomechanics	4
BN2403 Fundamentals of Biosignals Processing & Bioinstrumentation	4	ES2631 Critique and Communication of Thinking and Design	4
EE2211 Introduction to Machine Learning	4	IE2141 Systems Thinking & Dynamics	4
EG2401A Engineering Professionalism	2	CDE3301/EG3301R Ideas to Proof-of-Concept (replaces BN3101A)	6
Group A/B course for Minor	4		
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>22</b>

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

Semester 5	Units	Semester 6 – can be used for SEP	Units
CDE3301/EG3301R Ideas to Proof-of-Concept (replaces BN3101A)	6	GE	4
BN2201 Quantitative Physiology for Bioengineers	4	GE	4
CDE2000 Creating Narratives	4	UE	4
GE	4	UE	4
		UE	4
<b>Sub-total</b>	<b>18</b>	<b>Sub-total</b>	<b>20</b>

Semester 7	Units	Semester 8	Units
BN4101 B.Eng. Dissertation	4	BN4101 B.Eng. Dissertation	4
Technical Elective 1	4	Technical Elective 2	4
UE	4	UE	4
UE	4		
<b>Sub-total</b>	<b>16</b>	<b>Sub-total</b>	<b>12</b>

**Recommended semester schedule – JC-intake students or equivalent**  
(for students who opt for industrial attachment)

Semester 1	Units	Semester 2	Units
BN1111 Biomedical Engineering Principles and Practice I	4	BN2111 Biomedical Engineering Principles and Practice II	4
GEA1000 Quantitative Reasoning with Data	4	CS1010E Programming Methodology	4
DTK1234 Design Thinking	4	EG1311 Design & Make	4
MA1513 Linear Algebra with Differential Equations	2	MA1511 Engineering Calculus	2
CE2407A Uncertainty Analysis for Engineers	2	CE2407B Introduction to Numerical Methods for Engineers	2
PF1101 Fundamentals of Project Management	4	Group A/B course for Minor	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

Semester 3	Units	Semester 4	Units
CDE2501 Liveable Cities	4	BN2102 Bioengineering Data Analysis	4
BN2301 Biochemistry & Biomaterials for Bioengineers	4	BN2204 Fundamentals of Biomechanics	4
BN2403 Fundamentals of Biosignals Processing & Bioinstrumentation	4	ES2631 Critique and Communication of Thinking and Design	4
EE2211 Introduction to Machine Learning	4	IE2141 Systems Thinking & Dynamics	4
EG2401A Engineering Professionalism	2	CDE3301/EG3301R Ideas to Proof-of-Concept (replaces BN3101A)	6
Group A/B course for Minor	4		
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>22</b>

Semester 5	Units	Semester 6	Units
CDE3301/EG3301R Ideas to Proof-of-Concept (replaces BN3101A)	6	EG3611A Industrial Attachment	10
BN2201 Quantitative Physiology for Bioengineers	4		
CDE2000 Creating Narratives	4		
GE *	4		
GE *	4		
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>10</b>

Semester 7	Units	Semester 8	Units
BN4101 B.Eng. Dissertation	4	BN4101 B.Eng. Dissertation	4
Technical Elective 1	4	Technical Elective 2	4
GE *	4	UE	4
UE	4	UE	4
UE	4	UE	4
UE	4		
<b>Sub-total</b>	<b>24</b>	<b>Sub-total</b>	<b>20</b>

\* Students in UTCP and RVRC will need to overload in Semesters 2 to 4 in order to clear these courses earlier.

**Recommended semester schedule – JC-intake students or equivalent**  
(for students in Engineering Scholars Programme)

Semester 1	Units	Semester 2	Units
BN1111 Biomedical Engineering Principles and Practice I	4	BN2111 Biomedical Engineering Principles and Practice II	4
GEA1000 Quantitative Reasoning with Data	4	BN2102 Bioengineering Data Analysis	4
DTK1234 Design Thinking	4	BN2204 Fundamentals of Biomechanics	4
CE2407A Uncertainty Analysis for Engineers	2	CE2407B Introduction to Numerical Methods for Engineers	2
MA1513 Linear Algebra with Differential Equations	2	UTCP course 2 (replaces GE)	4
PF1101 Fundamentals of Project Management	4	CDE3301/EG3301R Ideas to Proof-of-Concept (replaces BN3101A)	6
UTCP course 1 (replaces GE)	4	Group A/B course for Minor	4
<b>Sub-total</b>	<b>24</b>	<b>Sub-total</b>	<b>28</b>

Semester 3	Units	Semester 4 – NOC	Units
BN2201 Quantitative Physiology for Bioengineers	4	NOC	
BN2301 Biochemistry & Biomaterials for Bioengineers	4		
BN2403 Fundamentals of Biosignals Processing & Bioinstrumentation	4		
CDE2501 Liveable Cities	4		
UTCP course 3 (replaces GE)	4		
CDE3301/EG3301R Ideas to Proof-of-Concept (replaces BN3101A)	6		
<b>Sub-total</b>	<b>26</b>	<b>Sub-total</b>	<b>22</b>

Semester 5	MCs	Semester 6	MCs
BN4101 B.Eng. Dissertation	4	BN4101 B.Eng. Dissertation	4
Group A/B course for Minor	4	Technical Elective 1	4
UTCP course 4 (replaces ES2631 Critique and Communication of Thinking and Design)	4	Technical Elective 2	4
CDE2000 Creating Narratives	4	UE	4
EE2211 Introduction to Machine Learning	4	UE	4
UE (or IE2141 Systems Thinking & Dynamics if not in RC4)	4	UE	4
<b>Sub-total</b>	<b>24</b>	<b>Sub-total</b>	<b>24</b>

Students must complete the following courses before Semester 1 through advanced placement credits:

- CS1010E Programming Methodology (4 units)
- EG1311 Design & Make (4 units)
- MA1505 Mathematics I (4 units) – replaces MA511 Engineering Calculus (2 units) and counted as UE (2 units)

**Innovation & Design Programme**  
**NUS College of Design and Engineering**

A one-semester NOC programme comprises the following courses:

- ETP3201L Innovation & Enterprise Internship (12 units) – replaces EG3611A (10 units) and EG2401A (2 units)
- ETP3204S Innovation & Enterprise Internship Practicum (4 units) – counted as UE (4 units)
- Entrepreneurship course (4 units) – counted as UE (4 units)
- ETP2271 Discovering Resilience and Purpose (2 units) – counted as UE (2 units)

**Recommended semester schedule – poly-intake students**  
(for students who may want to upgrade to a Second Major)

Semester 1	Units	Semester 2	Units
BN1111 Biomedical Engineering Principles and Practice I	4	BN2111 Biomedical Engineering Principles and Practice II	4
GEA1000 Quantitative Reasoning with Data	4	CS1010E Programming Methodology	4
PF1101 Fundamentals of Project Management	4	MA1511 Engineering Calculus	2
MA1301 Introductory Mathematics * (UE)	4	CE2407B Introduction to Numerical Methods for Engineers	2
Group A/B course for Minor	4	PC1201 Fundamentals of Physics (UE)	4
		CDE3301/EG3301R Ideas to Proof-of-Concept (replaces BN3101A)	6
		Group A/B course for Minor	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>26</b>

Semester 3	Units	Semester 4	Units
CDE2501 Liveable Cities	4	BN2102 Bioengineering Data Analysis	4
BN2301 Biochemistry & Biomaterials for Bioengineers	4	BN2204 Fundamentals of Biomechanics	4
BN2403 Fundamentals of Biosignals Processing & Bioinstrumentation	4	ES2631 Critique and Communication of Thinking and Design	4
MA1513 Linear Algebra with Differential Equations *	2	IE2141 Systems Thinking & Dynamics	4
CE2407A Uncertainty Analysis for Engineers *	2	GE	4
EG2401A Engineering Professionalism	2	GE	4
CDE3301/EG3301R Ideas to Proof-of-Concept (replaces BN3101A)	6		
<b>Sub-total</b>	<b>24</b>	<b>Sub-total</b>	<b>24</b>

Semester 5	Units	Semester 6	Units
BN4101 B.Eng. Dissertation	4	BN4101 B.Eng. Dissertation	4
BN2201 Quantitative Physiology for Bioengineers	4	Technical Elective 1	4
CDE2000 Creating Narratives	4	Technical Elective 2	4
EE2211 Introduction to Machine Learning *	4		
GE	4		
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>12</b>

\* Students who are exempted from MA1301 can take MA1513 and CE2407A in Semester 1 and EE2211 in Semester 3.

Poly-intake students with accredited diplomas will receive the following exemptions:

- DTK1234 Design Thinking (4 units)
- EG1311 Design & Make (4 units)
- EG3611A Industrial Attachment (10 units)
- Unrestricted electives (20 units)

**Recommended semester schedule – poly-intake students**

(for students who are not planning to upgrade to a Second Major)

Semester 1	Units	Semester 2	Units
BN1111 Biomedical Engineering Principles and Practice I	4	BN2111 Biomedical Engineering Principles and Practice II	4
GEA1000 Quantitative Reasoning with Data	4	CS1010E Programming Methodology	4
PF1101 Fundamentals of Project Management	4	MA1511 Engineering Calculus	2
MA1301 Introductory Mathematics * (UE)	4	CE2407B Introduction to Numerical Methods for Engineers	2
GE	4	PC1201 Fundamentals of Physics (UE)	4
		Group A/B course for Minor	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

Semester 3	Units	Semester 4	Units
CDE2501 Liveable Cities	4	BN2102 Bioengineering Data Analysis	4
BN2301 Biochemistry & Biomaterials for Bioengineers	4	BN2204 Fundamentals of Biomechanics	4
BN2403 Fundamentals of Biosignals Processing & Bioinstrumentation	4	ES2631 Critique and Communication of Thinking and Design	4
MA1513 Linear Algebra with Differential Equations *	2	IE2141 Systems Thinking & Dynamics	4
CE2407A Uncertainty Analysis for Engineers *	2	CDE3301/EG3301R Ideas to Proof-of-Concept (replaces BN3101A)	6
EG2401A Engineering Professionalism	2		
Group A/B course for Minor	4		
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>22</b>

Semester 5	Units	Semester 6	Units
BN4101 B.Eng. Dissertation	4	BN4101 B.Eng. Dissertation	4
BN2201 Quantitative Physiology for Bioengineers	4	Technical Elective 1	4
CDE2000 Creating Narratives	4	Technical Elective 2	4
EE2211 Introduction to Machine Learning *	4	GE	4
CDE3301/EG3301R Ideas to Proof-of-Concept (replaces BN3101A)	6	GE	4
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>20</b>

\* Students who are exempted from MA1301 can take MA1513 and CE2407A in Semester 1 and EE2211 in Semester 3.

Poly-intake students with accredited diplomas will receive the following exemptions:

- DTK1234 Design Thinking (4 units)
- EG1311 Design & Make (4 units)
- EG3611A Industrial Attachment (10 units)
- Unrestricted electives (20 units)