

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

Cohort AY2026/2027

Course Requirements	Units
Common Curriculum	
GEA1000 Quantitative Reasoning with Data ¹	4
CS1010E Programming Methodology (or other variants) ²	4
CDE2501 Sustainable Systems for Liveable Cities ²	4
ES2631 Critique and Communication of Thinking and Design ²	4
GE: Cultures and Connections ²	4
GE: Communities and Engagement ²	4
DTK1234 Design Thinking	4
EE2211 Introduction to Machine Learning or EE2213 Introduction to Artificial Intelligence	4
EG1311 Design and Make or EG1311BE Design and Make	4
PF1101A Project Management and Finance	4
Sub-total for Common Curriculum	40
Engineering Core	
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 or CFG2101 NUS Vacation Internship Programme ³ and EG3612 Vacation Industrial Attachment	10
Sub-total for Engineering Core	20
Engineering Programme Requirements	
BN1112 Introduction to Biomedical Design and Manufacturing	4
BN2112 Molecular Cell Biology for Biomedical Engineers	4
BN2104 Quantitative Approaches to Public and Global Health	4
BN2105 Medical Device Life Cycle Management	4
BN2201 Quantitative Physiology for Bioengineers	4
BN2204 Fundamentals of Biomechanics	4
BN2301 Biochemistry and Biomaterials for Bioengineers	4
BN2404 Biomedical Circuits and Signal Processing	4
BN3405 Biomedical Instrumentation	4
BN3406 Bioimaging and AI Applications	4
Technical electives	8
CDE3301 Ideas to Proof-of-Concept (over 2 consecutive semesters) ^{4, 5}	4
BN4101 B.Eng. Dissertation (over 2 consecutive semesters) ⁶	8
Sub-total for Engineering Programme Requirements	60
Unrestricted Electives	
CDE3301 Ideas to Proof-of-Concept (over 2 consecutive semesters) ⁴	8
Electives for Minor ⁵	8
Other unrestricted electives ⁶	24
Sub-total for Unrestricted Electives	40
Total	160

NUS Innovation & Design Programme
College of Design and Engineering

Notes:

- ¹ Students may read other approved courses for Data Literacy in lieu of GEA1000.
- ² Students may read equivalent courses in NUS College (NUSC), University Town College Programme (UTCP), and Ridge View Residential Programme (RVRC). CDE2501 fulfils GE: Singapore Studies while ES2631 fulfils GE: Critique and Expression.
- ³ May be replaced by CDE2605 Undergraduate Research Opportunities Programme or CDE2605R Undergraduate Research Experience (UREx).
- ⁴ The 12 units for CDE3301 are counted towards 4 units for BN3101A Biomedical Engineering Design / BN3101B Clinical Immersion and HealthTech Innovation while 8 units are counted as unrestricted elective.
- ⁵ Students should clear at least one elective course prior to CDE3301.
- ⁶ Students may take CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up in lieu of BN4101 and 4 units of unrestricted electives.

Sample study plan – JC-intake students or equivalent
(for students who opt for vacation internships)

Semester 1	Units	Semester 2	Units
BN1112 Introduction to Biomedical Design and Manufacturing	4	BN2112 Molecular Cell Biology for Biomedical Engineers	4
GEA1000 Quantitative Reasoning with Data	4	CS1010E Programming Methodology	4
DTK1234 Design Thinking	4	EG1311 Design and Make <u>or</u> EG1311BE Design and 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
PF1101A Project Management and Finance	4	Elective 1 for Minor	4
Sub-total	20	Sub-total	20

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

Semester 3	Units	Semester 4	Units
BN2104 Quantitative Approaches to Public and Global Health	4	BN2204 Fundamentals of Biomechanics	4
BN2105 Medical Device Life Cycle Management	4	BN3405 Biomedical Instrumentation	4
BN2301 Biochemistry & Biomaterials for Bioengineers	4	BN3406 Bioimaging and AI Applications	4
BN2404 Biomedical Circuits and Signal Processing	4	ES2631 Critique and Communication of Thinking and Design	4
EE2211 Introduction to Machine Learning <u>or</u> EE2213 Introduction to Artificial Intelligence	4	CDE3301 Ideas to Proof-of-Concept (replaces BN3101A/BN3101B)	6
EG2401A Engineering Professionalism	2		
Sub-total	22	Sub-total	22

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

Semester 5	Units	Semester 6 – can be used for SEP	Units
BN2201 Quantitative Physiology for Bioengineers	4	GE	4
CDE2501 Sustainable Systems for Liveable Cities	4	GE	4
Elective 2 for Minor	4	UE	4
CDE3301 Ideas to Proof-of-Concept (replaces BN3101A/BN3101B)	6	UE	4
		UE	4
Sub-total	18	Sub-total	20

NUS Innovation & Design Programme
College of Design and Engineering

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		
Sub-total	14	Sub-total	14

Sample study plan – JC-intake students or equivalent
(for students who opt for industrial attachment)

Semester 1	Units	Semester 2	Units
BN1112 Introduction to Biomedical Design and Manufacturing	4	BN2112 Molecular Cell Biology for Biomedical Engineers	4
GEA1000 Quantitative Reasoning with Data	4	CS1010E Programming Methodology	4
DTK1234 Design Thinking	4	EG1311 Design and Make <u>or</u> EG1311BE Design and 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
PF1101A Project Management and Finance	4	Elective 1 for Minor	4
Sub-total	20	Sub-total	20

Semester 3	Units	Semester 4	Units
BN2104 Quantitative Approaches to Public and Global Health	4	BN2204 Fundamentals of Biomechanics	4
BN2105 Medical Device Life Cycle Management	4	BN3405 Biomedical Instrumentation	4
BN2301 Biochemistry & Biomaterials for Bioengineers	4	BN3406 Bioimaging and AI Applications	4
BN2404 Biomedical Circuits and Signal Processing	4	ES2631 Critique and Communication of Thinking and Design	4
EE2211 Introduction to Machine Learning <u>or</u> EE2213 Introduction to Artificial Intelligence	4	CDE3301 Ideas to Proof-of-Concept (replaces BN3101A/BN3101B)	6
EG2401A Engineering Professionalism	2		
Sub-total	22	Sub-total	22

Semester 5	Units	Semester 6	Units
BN2201 Quantitative Physiology for Bioengineers	4	EG3611A Industrial Attachment	10
CDE2501 Sustainable Systems for Liveable Cities	4		
GE	4		
Elective 2 for Minor	4		
CDE3301 Ideas to Proof-of-Concept (replaces BN3101A/BN3101B)	6		
Sub-total	22	Sub-total	10

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		
Sub-total	24	Sub-total	20

Sample study plan – JC-intake students or equivalent
(for students in Engineering Scholars Programme)

Semester 1	Units	Semester 2	Units
BN1112 Introduction to Biomedical Design and Manufacturing	4	BN2112 Molecular Cell Biology for Biomedical Engineers	4
GEA1000 Quantitative Reasoning with Data	4	BN2204 Fundamentals of Biomechanics	4
DTK1234 Design Thinking	4	CE2407B Introduction to Numerical Methods for Engineers	2
MA1513 Linear Algebra with Differential Equations	2	RVRC/UTCP course 2 (replaces GE)	4
CE2407A Uncertainty Analysis for Engineers	2	Elective 1 for Minor	4
PF1101A Project Management and Finance	4	CDE3301 Ideas to Proof-of-Concept (replaces BN3101A/BN3101B)	6
RVRC/UTCP course 1 (replaces GE)	4		
Sub-total	24	Sub-total	24

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

Semester 3	Units	Semester 4 – can be used for SEP/NOC	Units
BN2104 Quantitative Approaches to Public and Global Health	4	BN3405 Biomedical Instrumentation	4
BN2105 Medical Device Life Cycle Management	4	BN3406 Bioimaging and AI Applications	4
BN2301 Biochemistry & Biomaterials for Bioengineers	4	UE	4
EG2401A Engineering Professionalism	2	UE	4
RVRC/UTCP course 3 (replaces CDE2501)	4	RVRC/UTCP course 4 (replaces ES2631)	4
Elective 2 for Minor	4		
CDE3301 Ideas to Proof-of-Concept (replaces BN3101A/BN3101B)	6		
Sub-total	28	Sub-total	20

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

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
BN2404 Biomedical Circuits and Signal Processing	4	Technical Elective 2	4
EE2211 Introduction to Machine Learning or EE2213 Introduction to Artificial Intelligence	4	UE	4
UE	4	UE	2
UE	4		
Sub-total	24	Sub-total	18

NUS Innovation & Design Programme
College of Design and Engineering

Students are highly encouraged to complete the following courses before Semester 1 through advanced placement credits:

- CS1010E Programming Methodology (4 units)
- EG1311 Design and Make (4 units)
- MA1505 Mathematics I (4 units) – replaces MA1511 Engineering Calculus (2 units) and counted as UE (2 units)

CFG2101 may be replaced by CDE2605 Undergraduate Research Opportunities Programme or CDE2605R Undergraduate Research Experience (UREx).

Sample study plan – poly-intake students

(for students who may want to upgrade to a Second Major)

Semester 1	Units	Semester 2	Units
BN1112 Introduction to Biomedical Design and Manufacturing	4	BN2112 Molecular Cell Biology for Biomedical Engineers	4
GEA1000 Quantitative Reasoning with Data	4	CS1010E Programming Methodology	4
PF1101A Project Management and Finance	4	MA1511 Engineering Calculus	2
CE2407A Uncertainty Analysis for Engineers	2	CE2407B Introduction to Numerical Methods for Engineers	2
MA1301 Introductory Mathematics * (UE)	4	Elective 2 for Minor	4
Elective 1 for Minor	4	CDE3301 Ideas to Proof-of-Concept (replaces BN3101A/BN3101B)	6
		PC1201 Fundamentals of Physics (UE) – if required	4
Sub-total	22	Sub-total	26

Semester 3	Units	Semester 4	Units
BN2104 Quantitative Approaches to Public and Global Health	4	BN2204 Fundamentals of Biomechanics	4
BN2105 Medical Device Life Cycle Management	4	BN3405 Biomedical Instrumentation	4
BN2301 Biochemistry & Biomaterials for Bioengineers	4	CDE2501 Sustainable Systems for Liveable Cities	4
MA1513 Linear Algebra with Differential Equations *	2	ES2631 Critique and Communication of Thinking and Design	4
EG2401A Engineering Professionalism	2	GE	4
CDE3301 Ideas to Proof-of-Concept (replaces BN3101A/BN3101B)	6		
Sub-total	22	Sub-total	20

Semester 5	Units	Semester 6	Units
BN4101 B.Eng. Dissertation	4	BN4101 B.Eng. Dissertation	4
BN2201 Quantitative Physiology for Bioengineers	4	BN3406 Bioimaging and AI Applications	4
BN2404 Biomedical Circuits and Signal Processing *	4	Technical Elective 1	4
EE2211 Introduction to Machine Learning <u>or</u> EE2213 Introduction to Artificial Intelligence	4	Technical Elective 2	4
GE	4		
Sub-total	20	Sub-total	16

* Students who are exempted from MA1301 can take MA1513 in Semester 1 and BN2404 in Semester 3.

^ Students who are exempted from PC1201 can take a GE in Semester 2.

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

- DTK1234 Design Thinking (4 units)
- EG1311 Design and Make (4 units)
- EG3611P Industrial Attachment (10 units)
- Unrestricted electives (20 units)

Sample study plan – poly-intake students

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

Semester 1	Units	Semester 2	Units
BN1112 Introduction to Biomedical Design and Manufacturing	4	BN2112 Molecular Cell Biology for Biomedical Engineers	4
GEA1000 Quantitative Reasoning with Data	4	CS1010E Programming Methodology	4
PF1101A Project Management and Finance	4	MA1511 Engineering Calculus	2
CE2407A Uncertainty Analysis for Engineers	2	CE2407B Introduction to Numerical Methods for Engineers	2
MA1301 Introductory Mathematics * (UE)	4	Elective 1 for Minor	4
GE	4	PC1201 Fundamentals of Physics ^ (UE) – if required	4
Sub-total	22	Sub-total	20

Semester 3	Units	Semester 4	Units
BN2104 Quantitative Approaches to Public and Global Health	4	BN2204 Fundamentals of Biomechanics	4
BN2105 Medical Device Life Cycle Management	4	BN3405 Biomedical Instrumentation	4
BN2301 Biochemistry & Biomaterials for Bioengineers	4	CDE2501 Sustainable Systems for Liveable Cities	4
MA1513 Linear Algebra with Differential Equations *	2	ES2631 Critique and Communication of Thinking and Design	4
EG2401A Engineering Professionalism	2	CDE3301 Ideas to Proof-of-Concept (replaces BN3101A/BN3101B)	6
Elective 2 for Minor	4		
Sub-total	20	Sub-total	22

Semester 5	Units	Semester 6	Units
BN4101 B.Eng. Dissertation	4	BN4101 B.Eng. Dissertation	4
BN2201 Quantitative Physiology for Bioengineers	4	BN3406 Bioimaging and AI Applications	4
BN2404 Biomedical Circuits and Signal Processing *	4	Technical Elective 1	4
EE2211 Introduction to Machine Learning or EE2213 Introduction to Artificial Intelligence	4	Technical Elective 2	4
CDE3301 Ideas to Proof-of-Concept (replaces BN3101A/BN3101B)	6	GE ^	4
Sub-total	22	Sub-total	20

* Students who are exempted from MA1301 can take MA1513 in Semester 1 and BN2404 in Semester 3.

^ Students who are exempted from PC1201 can take a GE in Semester 1.

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

- DTK1234 Design Thinking (4 units)
- EG1311 Design and Make (4 units)
- EG3611P Industrial Attachment (10 units)
- Unrestricted electives (20 units)