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

## Cohort AY2025/2026

Course Requirements	Units
Common Curriculum	
GEA1000 Quantitative Reasoning with Data <sup>1</sup>	4
CS1010E Programming Methodology (or other variants)	4
CDE2501 Liveable Cities <sup>2</sup>	4
ES2631 Critique and Communication of Thinking and Design <sup>2</sup>	4
GE: Cultures and Connections <sup>2</sup>	4
GE: Communities and Engagement <sup>2</sup>	4
DTK1234 Design Thinking	4
EE2211 Introduction to Machine Learning	4
or EE2213 Introduction to Artificial Intelligence	
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 <u>or</u>	10
CFG2101 NUS Vacation Internship Programme <sup>3</sup> and EG3612 Vacation Industrial	
Attachment	
Sub-total for Engineering Core	20
Engineering Programme Requirements	
BN1112 Introduction to Biomedical Design and Manufacturing	4
BN2112 Cell Biology and Analytics for 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) <sup>4,5</sup>	4
BN4101 B.Eng. Dissertation (over 2 consecutive semesters) <sup>6</sup>	8
Sub-total for Engineering Programme Requirements	60
Unrestricted Electives	
CDE3301 Ideas to Proof-of-Concept (over 2 consecutive semesters) <sup>4</sup>	8
Electives for Minor <sup>3</sup>	8
Other unrestricted electives °	24
Sub-total for Unrestricted Electives	40
Total	160

#### Notes:

- <sup>1</sup> Students may read other approved courses for Data Literacy in lieu of GEA1000.
- <sup>2</sup> 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.
- <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 are counted towards 4 units for BN3101A Biomedical Engineering Design while 8 units are counted as unrestricted elective.
- <sup>5</sup> Students should clear at least one elective course from List I prior to CDE3301.
- <sup>6</sup> Students may take CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up in lieu of BN4101 and 4 units of unrestricted electives.

# Recommended semester schedule – JC-intake students or equivalent

(for students who opt for vacation internships)

Semester 1	Units	Semester 2	Units
BN1112 Introduction to Biomedical	4	BN2112 Cell Biology and Analytics for	4
Design and Manufacturing	4	Engineers	4
GEA1000 Quantitative Reasoning with	4	CS1010E Programming Mathodology	4
Data	4		4
DTK1224 Decign Thinking	4	EG1311 Design and Make	4
DIK1234 Design Thinking	4	or EG1311BE Design and Make	4
MA1513 Linear Algebra with Differential	2	MA1E11 Engineering Calculus	2
Equations	Z		2
CE2407A Uncertainty Analysis for	2	CE2407B Introduction to Numerical	2
Engineers	2	Methods for Engineers	2
PF1101A Project Management and	4	Floative 1 for Minor	4
Finance	4		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)	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	4	CE	Λ
Bioengineers	4	GE	4
CDE2501 Liveable Cities	4	GE	4
Elective 2 for Minor	4	UE	4
CDE3301 Ideas to Proof-of-Concept	C		Δ
(replaces BN3101A)	0	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

# Recommended semester schedule – JC-intake students or equivalent

(for students who opt for industrial attachment)

Semester 1	Units	Semester 2	Units
BN1112 Introduction to Biomedical	4	BN2112 Cell Biology and Analytics for	4
Design and Manufacturing	4	Engineers	4
GEA1000 Quantitative Reasoning with	4	CS1010E Programming Mathodology	4
Data	4	CSIDIDE Programming Methodology	4
DTK1224 Design Thinking	4	EG1311 Design and Make	4
DIK1234 Design Thinking	4	or EG1311BE Design and Make	4
MA1513 Linear Algebra with Differential	2	MA1E11 Engineering Calculus	2
Equations	2		2
CE2407A Uncertainty Analysis for	2	CE2407B Introduction to Numerical	2
Engineers	2	Methods for Engineers	2
PF1101A Project Management and	4	Floating 1 for Minor	4
Finance	4		4
Sub-total	20	Sub-total	20

Semester 3	Units	Semester 4	Units
BN2104 Quantitative Approaches to	Δ	RN2204 Eurodamontals of Piomochanics	Λ
Public and Global Health	4	BN2204 Fundamentals of Biomechanics	4
BN2105 Medical Device Life Cycle	4	DN2405 Diamodical Instrumentation	Λ
Management	4	BN3405 Biomedical Instrumentation	4
BN2301 Biochemistry & Biomaterials for	4	DN2406 Disimaging and AL Applications	Λ
Bioengineers	4	BN3406 Biolmaging and Al Applications	4
BN2404 Biomedical Circuits and Signal	4	ES2631 Critique and Communication of	4
Processing	4	Thinking and Design	4
EE2211 Introduction to Machine		CDE2201 Ideas to Dreaf of Concert	
Learning or EE2213 Introduction to	4	(register and Reas to Proof-of-Concept	6
Artificial Intelligence		(replaces BN3101A)	
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 Liveable Cities	4		
GE	4		
Elective 2 for Minor	4		
CDE3301 Ideas to Proof-of-Concept (replaces BN3101A)	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

# Recommended semester schedule – JC-intake students or equivalent

(for students in Engineering Scholars Programme)

Semester 1	Units	Semester 2	Units
BN1112 Introduction to Biomedical	4	BN2112 Cell Biology and Analytics for	4
Design and Manufacturing	4	Engineers	4
GEA1000 Quantitative Reasoning with	4	DN2204 Fundamentals of Diamachanies	4
Data	4	BN2204 Fundamentals of Biomechanics	4
DTK1224 Design Thinking	4	CE2407B Introduction to Numerical	2
DIK1234 Design Thinking	4	Methods for Engineers	2
MA1513 Linear Algebra with Differential	2	DV/DC/UTCD course 2 (replaces CE)	Λ
Equations	Z	RVRC/UTCP COURSE 2 (replaces GE)	4
CE2407A Uncertainty Analysis for	2	Elective 1 for Minor	4
Engineers	Z		4
PF1101A Project Management and	4	CDE3301 Ideas to Proof-of-Concept	C
Finance	4	(replaces BN3101A)	D
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	Units
BN2104 Quantitative Approaches to	4	RN2405 Piomodical Instrumentation	Δ
Public and Global Health	4	BN3405 BIOMEDICALINST UMENTATION	4
BN2105 Medical Device Life Cycle	Δ	RN2406 Bioimaging and AL Applications	Δ
Management	4	BN3406 Biolinaging and Al Applications	4
BN2301 Biochemistry & Biomaterials for	4	4 UE	4
Bioengineers			
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	C		
(replaces BN3101A)	0		
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	4	Technical Flactive 1	4
Bioengineers	4		4
BN2404 Biomedical Circuits and Signal	1	Tochnical Elective 2	4
Processing	4		4
EE2211 Introduction to Machine			
Learning or EE2213 Introduction to	4	UE	4
Artificial Intelligence			
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).

### Recommended semester schedule – poly-intake students

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

Semester 1	Units	Semester 2	Units
BN1112 Introduction to Biomedical	4	BN2112 Cell Biology and Analytics for	4
Design and Manufacturing	4	Engineers	4
GEA1000 Quantitative Reasoning with	4	CS1010E Programming Mathodology	4
Data	4		4
PF1101A Project Management and	4	MA1511 Engineering Calculus	2
Finance	4		2
MA1301 Introductory Mathematics *	Λ	CE2407B Introduction to Numerical	2
(UE)	4	Methods for Engineers	2
Elective 1 for Minor	4	Elective 2 for Minor	4
		CDE3301 Ideas to Proof-of-Concept	c
		(replaces BN3101A)	0
		PC1201 Fundamentals of Physics	Λ
		(UE) – if required	4
Sub-total	20	Sub-total	26

Semester 3	Units	Semester 4	Units
BN2104 Quantitative Approaches to	1	BN2204 Fundamentals of Biomechanics	Λ
Public and Global Health	4	Biv2204 Fundamentals of Biomechanics	Ŧ
BN2105 Medical Device Life Cycle	4	RN2405 Biomodical Instrumentation	4
Management	4	BN3403 BIOINEUICAI INSTRUMENTATION	4
BN2301 Biochemistry & Biomaterials for	4	RN2406 Bioimaging and AL Applications	4
Bioengineers	4	BN3400 BIOIMaging and Al Applications	4
MA1513 Linear Algebra with Differential	2	ES2631 Critique and Communication of	4
Equations *	2	Thinking and Design	4
CE2407A Uncertainty Analysis for	2	CT.	Δ
Engineers *	2	GE	4
CDE3301 Ideas to Proof-of-Concept	C		
(replaces BN3101A)	б		
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	4	Tashnisal Flastiva 1	4
Bioengineers	4		4
BN2404 Biomedical Circuits and Signal	4	Technical Elective 2	4
Processing			
CDE2501 Liveable Cities	4	GE	4
EE2211 Introduction to Machine			
Learning or EE2213 Introduction to	4		
Artificial Intelligence *			
EG2401A Engineering Professionalism	2		
Sub-total	22	Sub-total	16

\* Students who are exempted from MA1301 can take MA1513 and CE2407A in Semester 1 and EE2211/EE2213 in Semester 3.

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)

### Recommended semester schedule – 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	4	BN2112 Cell Biology and Analytics for	Δ
Design and Manufacturing	4	Engineers	4
GEA1000 Quantitative Reasoning with	4	CS1010E Drogramming Mathedalogy	4
Data	4	CS1010E Programming Methodology	4
PF1101A Project Management and	4	MA1511 Engineering Coloulus	2
Finance	4	MAISII Engineering Calculus	2
MA1301 Introductory Mathematics *	Δ	CE2407B Introduction to Numerical	n
(UE)	4	Methods for Engineers	2
GE	4	Elective 1 for Minor	4
		PC1201 Fundamentals of Physics	Λ
		(UE) – if required	4
Sub-total	20	Sub-total	20

Semester 3	Units	Semester 4	Units
BN2104 Quantitative Approaches to	Δ	RN2204 Fundamentals of Riemoshanics	4
Public and Global Health	4	BN2204 Fundamentals of Biomechanics	4
BN2105 Medical Device Life Cycle	Δ	PN2405 Biomodical Instrumentation	1
Management	4	BINS405 BIOINEUICAI INSU UMENTATION	4
BN2301 Biochemistry & Biomaterials for	4	PNI2406 Disimaging and Al Applications	4
Bioengineers	4	BINS400 BIOIMaging and Al Applications	4
MA1513 Linear Algebra with Differential	· ·	ES2631 Critique and Communication of	4
Equations *	2	Thinking and Design	4
CE2407A Uncertainty Analysis for	2	CDE3301 Ideas to Proof-of-Concept	C
Engineers *	Ζ	(replaces BN3101A)	0
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	4	Technical Elective 1	4
Bioengineers			
BN2404 Biomedical Circuits and Signal	Λ	Technical Elective 2	4
Processing	4		4
EE2211 Introduction to Machine			
Learning or EE2213 Introduction to	4	CDE2501 Liveable Cities	4
Artificial Intelligence *			
EG2401A Engineering Professionalism	2	GE	4
CDE3301 Ideas to Proof-of-Concept	C		
(replaces BN3101A)	Ь		
Sub-total	24	Sub-total	20

\* Students who are exempted from MA1301 can take MA1513 and CE2407A in Semester 1 and EE2211/EE2213 in Semester 3.

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)