

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

**Cohort AY2026/2027**

| Course Requirements                                                                                                                  | Units      |
|--------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>Common Curriculum</b>                                                                                                             |            |
| GEA1000 Quantitative Reasoning with Data <sup>1</sup>                                                                                | 4          |
| CS1010E Programming Methodology (or other variants) <sup>2</sup>                                                                     | 4          |
| CDE2501 Sustainable Systems for 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<br>or EE2213 Introduction to Artificial Intelligence                                         | 4          |
| EG1311 Design and Make or EG1311BE Design and Make                                                                                   | 4          |
| PF1101A Project Management and Finance                                                                                               | 4          |
| <b>Sub-total for Common Curriculum</b>                                                                                               | <b>40</b>  |
| <b>Engineering Core</b>                                                                                                              |            |
| MA1511 Engineering Calculus                                                                                                          | 2          |
| MA1512 Differential Equations for Engineering                                                                                        | 2          |
| MA1508E Linear Algebra for Engineering                                                                                               | 4          |
| EG2401A Engineering Professionalism                                                                                                  | 2          |
| EG3611A Industrial Attachment or<br>CFG2101 NUS Vacation Internship Programme <sup>3</sup> and EG3612 Vacation Industrial Attachment | 10         |
| <b>Sub-total for Engineering Core</b>                                                                                                | <b>20</b>  |
| <b>Engineering Programme Requirements</b>                                                                                            |            |
| ESP1111 Engineering Principles In-Action                                                                                             | 4          |
| ESP2111 Sensor System Electronics                                                                                                    | 4          |
| ESP2107 Numerical Methods and Statistics                                                                                             | 4          |
| ESP2110 Design Project                                                                                                               | 4          |
| ESP3106 Principles of Continua                                                                                                       | 4          |
| ESP3201A Machine Learning in Engineering Science                                                                                     | 4          |
| EE2023 Signals and Systems                                                                                                           | 4          |
| ME2121 Engineering Thermodynamics and Heat Transfer                                                                                  | 4          |
| PC2020 Electromagnetics for Electrical Engineers                                                                                     | 4          |
| PC2130B Applied Quantum Physics                                                                                                      | 4          |
| PC3235B Applied Solid State Physics                                                                                                  | 4          |
| EE3331C Feedback Control Systems or ME3142 Feedback Control Systems                                                                  | 4          |
| CDE3301 Ideas to Proof-of-Concept (over 2 consecutive semesters) <sup>4</sup>                                                        | 4          |
| CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up<br>(over 2 consecutive semesters) <sup>5</sup>                    | 8          |
| <b>Sub-total for Engineering Programme Requirements</b>                                                                              | <b>60</b>  |
| <b>Unrestricted Electives</b>                                                                                                        |            |
| CDE3301 Ideas to Proof-of-Concept (over 2 consecutive semesters) <sup>4</sup>                                                        | 8          |
| CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up<br>(over 2 consecutive semesters) <sup>5</sup>                    | 4          |
| Electives for Second Major <sup>6</sup>                                                                                              | 16         |
| Other unrestricted electives                                                                                                         | 12         |
| <b>Sub-total for Unrestricted Electives</b>                                                                                          | <b>40</b>  |
| <b>Total</b>                                                                                                                         | <b>160</b> |

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**College of Design and Engineering**

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 ESP4902 Major Design Project while 8 units are counted as unrestricted elective. Students in competition teams may enrol in CDE3301C Complex Systems Design: From Mission to Prototype in Semester 3 to Semester 4 (Year 2) or Semester 5 to Semester 6 (Year 3).
- <sup>5</sup> The 12 units for CDE4301/CDE4301A are counted towards 8 units for Integrated Project while 4 units are counted as unrestricted elective.
- <sup>6</sup> Students should clear at least one elective course from List I prior to CDE3301.

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

| Semester 1                                    | Units     | Semester 2                                            | Units     |
|-----------------------------------------------|-----------|-------------------------------------------------------|-----------|
| ESP1111 Engineering Principles In-Action      | 4         | ESP2111 Sensor System Electronics                     | 4         |
| CS1010E Programming Methodology               | 4         | GEA1000 Quantitative Reasoning with Data              | 4         |
| DTK1234 Design Thinking                       | 4         | EG1311 Design and Make<br>or EG1311BE Design and Make | 4         |
| MA1511 Engineering Calculus                   | 2         | MA1508E Linear Algebra for Engineering                | 4         |
| MA1512 Differential Equations for Engineering | 2         | PF1101A Project Management and Finance                | 4         |
| GE                                            | 4         | Elective 1 for Second Major (from List I)             | 4         |
| <b>Sub-total</b>                              | <b>20</b> | <b>Sub-total</b>                                      | <b>24</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 Sustainable Systems for Liveable Cities     | 4         | EE2023 Signals and Systems                                                                   | 4         |
| ME2121 Engineering Thermodynamics and Heat Transfer | 4         | ESP2107 Numerical Methods and Statistics                                                     | 4         |
| GE                                                  | 4         | ESP2110 Design Project                                                                       | 4         |
| UE                                                  | 4         | EE2211 Introduction to Machine Learning<br>or EE2213 Introduction to Artificial Intelligence | 4         |
| Elective 2 for Second Major (from List I)           | 4         | CDE3301 Ideas to Proof-of-Concept (replaces ESP4902)                                         | 6         |
| <b>Sub-total</b>                                    | <b>20</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 Ideas to Proof-of-Concept (replaces ESP4902) | 6         | ES2631 Critique and Communication of Thinking and Design                   | 4         |
| ESP3106 Principles of Continua                       | 4         | EE3331C Feedback Control Systems <u>or</u> ME3142 Feedback Control Systems | 4         |
| UE                                                   | 4         | PC2020 Electromagnetics for Electrical Engineers                           | 4         |
| UE                                                   | 4         | PC3235B Applied Solid State Physics                                        | 4         |
|                                                      |           | EG2401A Engineering Professionalism                                        | 2         |
| <b>Sub-total</b>                                     | <b>18</b> | <b>Sub-total</b>                                                           | <b>18</b> |

| Semester 7                                                                | Units     | Semester 8                                                                | Units     |
|---------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------|
| CDE4301 Innovation & Design Capstone <u>or</u> CDE4301A Ideas to Start-up | 6         | CDE4301 Innovation & Design Capstone <u>or</u> CDE4301A Ideas to Start-up | 6         |
| Elective 3 for Second Major                                               | 4         | Elective 4 for Second Major                                               | 4         |
| ESP3201A Machine Learning in Engineering Science                          | 4         | PC2130B Applied Quantum Physics                                           | 4         |
| <b>Sub-total</b>                                                          | <b>14</b> | <b>Sub-total</b>                                                          | <b>14</b> |

**Sample study plan – JC-intake students or equivalent**

(for students who opt for vacation internships **plus a specialisation**)

| Semester 1                                    | Units     | Semester 2                                            | Units     |
|-----------------------------------------------|-----------|-------------------------------------------------------|-----------|
| ESP1111 Engineering Principles In-Action      | 4         | ESP2111 Sensor System Electronics                     | 4         |
| CS1010E Programming Methodology               | 4         | GEA1000 Quantitative Reasoning with Data              | 4         |
| DTK1234 Design Thinking                       | 4         | EG1311 Design and Make<br>or EG1311BE Design and Make | 4         |
| MA1511 Engineering Calculus                   | 2         | MA1508E Linear Algebra for Engineering                | 4         |
| MA1512 Differential Equations for Engineering | 2         | PF1101A Project Management and Finance                | 4         |
| GE                                            | 4         | Elective 1 for Second Major (from List I)             | 4         |
| <b>Sub-total</b>                              | <b>20</b> | <b>Sub-total</b>                                      | <b>24</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 Sustainable Systems for Liveable Cities     | 4         | EE2023 Signals and Systems                                                                   | 4         |
| ME2121 Engineering Thermodynamics and Heat Transfer | 4         | ESP2107 Numerical Methods and Statistics                                                     | 4         |
| GE                                                  | 4         | ESP2110 Design Project                                                                       | 4         |
| Elective 2 for Second Major (from List I)           | 4         | EE2211 Introduction to Machine Learning<br>or EE2213 Introduction to Artificial Intelligence | 4         |
| Elective 3 for Second Major                         | 4         | CDE3301 Ideas to Proof-of-Concept (replaces ESP4902)                                         | 6         |
| <b>Sub-total</b>                                    | <b>20</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 Ideas to Proof-of-Concept (replaces ESP4902) | 6         | ES2631 Critique and Communication of Thinking and Design                   | 4         |
| ESP3106 Principles of Continua                       | 4         | EE3331C Feedback Control Systems <u>or</u> ME3142 Feedback Control Systems | 4         |
| Specialisation course 1                              | 4         | PC2020 Electromagnetics for Electrical Engineers                           | 4         |
| Specialisation course 2                              | 4         | PC3235B Applied Solid State Physics                                        | 4         |
|                                                      |           | EG2401A Engineering Professionalism                                        | 2         |
| <b>Sub-total</b>                                     | <b>18</b> | <b>Sub-total</b>                                                           | <b>18</b> |

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**College of Design and Engineering**

| <b>Semester 7</b>                                                     | <b>Units</b> | <b>Semester 8</b>                                                     | <b>Units</b> |
|-----------------------------------------------------------------------|--------------|-----------------------------------------------------------------------|--------------|
| CDE4301 Innovation & Design Capstone<br>or CDE4301A Ideas to Start-up | 6            | CDE4301 Innovation & Design Capstone<br>or CDE4301A Ideas to Start-up | 6            |
| ESP3201A Machine Learning in<br>Engineering Science                   | 4            | Elective 4 for Second Major                                           | 4            |
| Specialisation course 3                                               | 4            | PC2130B Applied Quantum Physics                                       | 4            |
| Specialisation course 4                                               | 4            | Specialisation course 5                                               | 4            |
| <b>Sub-total</b>                                                      | <b>18</b>    | <b>Sub-total</b>                                                      | <b>18</b>    |

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

| Semester 1                                    | Units     | Semester 2                                            | Units     |
|-----------------------------------------------|-----------|-------------------------------------------------------|-----------|
| ESP1111 Engineering Principles In-Action      | 4         | ESP2111 Sensor System Electronics                     | 4         |
| CS1010E Programming Methodology               | 4         | GEA1000 Quantitative Reasoning with Data              | 4         |
| DTK1234 Design Thinking                       | 4         | EG1311 Design and Make<br>or EG1311BE Design and Make | 4         |
| MA1511 Engineering Calculus                   | 2         | MA1508E Linear Algebra for Engineering                | 4         |
| MA1512 Differential Equations for Engineering | 2         | PF1101A Project Management and Finance                | 4         |
| GE                                            | 4         | Elective 1 for Second Major (from List I)             | 4         |
| <b>Sub-total</b>                              | <b>20</b> | <b>Sub-total</b>                                      | <b>24</b> |

| Semester 3                                          | Units     | Semester 4                                                                                   | Units     |
|-----------------------------------------------------|-----------|----------------------------------------------------------------------------------------------|-----------|
| CDE2501 Sustainable Systems for Liveable Cities     | 4         | EE2023 Signals and Systems                                                                   | 4         |
| ME2121 Engineering Thermodynamics and Heat Transfer | 4         | ESP2107 Numerical Methods and Statistics                                                     | 4         |
| GE                                                  | 4         | ESP2110 Design Project                                                                       | 4         |
| UE                                                  | 4         | EE2211 Introduction to Machine Learning<br>or EE2213 Introduction to Artificial Intelligence | 4         |
| Elective 2 for Second Major (from List I)           | 4         | CDE3301 Ideas to Proof-of-Concept (replaces ESP4902)                                         | 6         |
| <b>Sub-total</b>                                    | <b>20</b> | <b>Sub-total</b>                                                                             | <b>22</b> |

| Semester 5                                                          | Units     | Semester 6                    | Units     |
|---------------------------------------------------------------------|-----------|-------------------------------|-----------|
| CDE3301 Ideas to Proof-of-Concept (replaces ESP4902)                | 6         | EG3611A Industrial Attachment | 10        |
| ESP3106 Principles of Continua                                      | 4         |                               |           |
| ES2631 Critique and Communication of Thinking and Design            | 4         |                               |           |
| EE3331C Feedback Control Systems or ME3142 Feedback Control Systems | 4         |                               |           |
| PC2020 Electromagnetics for Electrical Engineers                    | 4         |                               |           |
| EG2401A Engineering Professionalism                                 | 2         |                               |           |
| <b>Sub-total</b>                                                    | <b>24</b> | <b>Sub-total</b>              | <b>10</b> |

| Semester 7                                                         | Units     | Semester 8                                                         | Units     |
|--------------------------------------------------------------------|-----------|--------------------------------------------------------------------|-----------|
| CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up | 6         | CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up | 6         |
| Elective 3 for Second Major                                        | 4         | Elective 4 for Second Major                                        | 4         |
| ESP3201A Machine Learning in Engineering Science                   | 4         | PC2130B Applied Quantum Physics                                    | 4         |
| UE                                                                 | 4         | PC3235B Applied Solid State Physics                                | 4         |
| UE                                                                 | 4         |                                                                    |           |
| <b>Sub-total</b>                                                   | <b>22</b> | <b>Sub-total</b>                                                   | <b>18</b> |

**Sample study plan – JC-intake students or equivalent**

(for students who opt for industrial attachment **plus a specialisation**)

| Semester 1                                    | Units     | Semester 2                                            | Units     |
|-----------------------------------------------|-----------|-------------------------------------------------------|-----------|
| ESP1111 Engineering Principles In-Action      | 4         | ESP2111 Sensor System Electronics                     | 4         |
| CS1010E Programming Methodology               | 4         | GEA1000 Quantitative Reasoning with Data              | 4         |
| DTK1234 Design Thinking                       | 4         | EG1311 Design and Make<br>or EG1311BE Design and Make | 4         |
| MA1511 Engineering Calculus                   | 2         | MA1508E Linear Algebra for Engineering                | 4         |
| MA1512 Differential Equations for Engineering | 2         | PF1101A Project Management and Finance                | 4         |
| GE                                            | 4         | Elective 1 for Second Major (from List I)             | 4         |
| <b>Sub-total</b>                              | <b>20</b> | <b>Sub-total</b>                                      | <b>24</b> |

| Semester 3                                          | Units     | Semester 4                                                                                   | Units     |
|-----------------------------------------------------|-----------|----------------------------------------------------------------------------------------------|-----------|
| CDE2501 Sustainable Systems for Liveable Cities     | 4         | EE2023 Signals and Systems                                                                   | 4         |
| ME2121 Engineering Thermodynamics and Heat Transfer | 4         | ESP2107 Numerical Methods and Statistics                                                     | 4         |
| GE                                                  | 4         | ESP2110 Design Project                                                                       | 4         |
| Elective 2 for Second Major (from List I)           | 4         | EE2211 Introduction to Machine Learning<br>or EE2213 Introduction to Artificial Intelligence | 4         |
| Elective 3 for Second Major                         | 4         | CDE3301 Ideas to Proof-of-Concept<br>(replaces ESP4902)                                      | 6         |
| <b>Sub-total</b>                                    | <b>20</b> | <b>Sub-total</b>                                                                             | <b>22</b> |

| Semester 5                                                             | Units     | Semester 6                    | Units     |
|------------------------------------------------------------------------|-----------|-------------------------------|-----------|
| CDE3301 Ideas to Proof-of-Concept<br>(replaces ESP4902)                | 6         | EG3611A Industrial Attachment | 10        |
| ESP3106 Principles of Continua                                         | 4         | Elective 4 for Second Major   | 4         |
| ES2631 Critique and Communication of Thinking and Design               | 4         |                               |           |
| EE3331C Feedback Control Systems or<br>ME3142 Feedback Control Systems | 4         |                               |           |
| PC2020 Electromagnetics for Electrical Engineers                       | 4         |                               |           |
| EG2401A Engineering Professionalism                                    | 2         |                               |           |
| <b>Sub-total</b>                                                       | <b>24</b> | <b>Sub-total</b>              | <b>14</b> |

| Semester 7                                                            | Units     | Semester 8                                                            | Units     |
|-----------------------------------------------------------------------|-----------|-----------------------------------------------------------------------|-----------|
| CDE4301 Innovation & Design Capstone<br>or CDE4301A Ideas to Start-up | 6         | CDE4301 Innovation & Design Capstone<br>or CDE4301A Ideas to Start-up | 6         |
| ESP3201A Machine Learning in Engineering Science                      | 4         | PC2130B Applied Quantum Physics                                       | 4         |
| Specialisation course 1                                               | 4         | PC3235B Applied Solid State Physics                                   | 4         |
| Specialisation course 2                                               | 4         | Specialisation course 4                                               | 4         |
| Specialisation course 3                                               | 4         | Specialisation course 5                                               | 4         |
| <b>Sub-total</b>                                                      | <b>22</b> | <b>Sub-total</b>                                                      | <b>22</b> |

**Sample study plan – JC-intake students or equivalent**  
(for students in year-long NOC programmes)

| Semester 1                                    | Units     | Semester 2                                            | Units     |
|-----------------------------------------------|-----------|-------------------------------------------------------|-----------|
| ESP1111 Engineering Principles In-Action      | 4         | ESP2111 Sensor System Electronics                     | 4         |
| CS1010E Programming Methodology               | 4         | GEA1000 Quantitative Reasoning with Data              | 4         |
| DTK1234 Design Thinking                       | 4         | EG1311 Design and Make<br>or EG1311BE Design and Make | 4         |
| MA1511 Engineering Calculus                   | 2         | MA1508E Linear Algebra for Engineering                | 4         |
| MA1512 Differential Equations for Engineering | 2         | PF1101A Project Management and Finance                | 4         |
| GE                                            | 4         | Elective 1 for Second Major (from List I)             | 4         |
| <b>Sub-total</b>                              | <b>20</b> | <b>Sub-total</b>                                      | <b>24</b> |

| Semester 3                                          | Units     | Semester 4                                                                                   | Units     |
|-----------------------------------------------------|-----------|----------------------------------------------------------------------------------------------|-----------|
| CDE2501 Sustainable Systems for Liveable Cities     | 4         | EE2023 Signals and Systems                                                                   | 4         |
| ME2121 Engineering Thermodynamics and Heat Transfer | 4         | ESP2107 Numerical Methods and Statistics                                                     | 4         |
| GE                                                  | 4         | ESP2110 Design Project                                                                       | 4         |
| UE                                                  | 4         | EE2211 Introduction to Machine Learning<br>or EE2213 Introduction to Artificial Intelligence | 4         |
| Elective 2 for Second Major (from List I)           | 4         | CDE3301 Ideas to Proof-of-Concept (replaces ESP4902)                                         | 6         |
| <b>Sub-total</b>                                    | <b>20</b> | <b>Sub-total</b>                                                                             | <b>22</b> |

| Semester 5                                                          | Units     | Semester 6 – NOC | Units     |
|---------------------------------------------------------------------|-----------|------------------|-----------|
| CDE3301 Ideas to Proof-of-Concept (replaces ESP4902)                | 6         | NOC              |           |
| ESP3106 Principles of Continua                                      | 4         |                  |           |
| ES2631 Critique and Communication of Thinking and Design            | 4         |                  |           |
| EE3331C Feedback Control Systems or ME3142 Feedback Control Systems | 4         |                  |           |
| ESP3201A Machine Learning in Engineering Science                    | 4         |                  |           |
| <b>Sub-total</b>                                                    | <b>22</b> | <b>Sub-total</b> | <b>20</b> |

| Semester 7 – NOC | Units     | Semester 8                                       | Units     |
|------------------|-----------|--------------------------------------------------|-----------|
| NOC              |           | PC2020 Electromagnetics for Electrical Engineers | 4         |
|                  |           | PC2130B Applied Quantum Physics                  | 4         |
|                  |           | PC3235B Applied Solid State Physics              | 4         |
| <b>Sub-total</b> | <b>20</b> | <b>Sub-total</b>                                 | <b>12</b> |

A year-long NOC programme comprises the following courses (up to 40 units):

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**College of Design and Engineering**

- ETP3206L Innovation & Enterprise Internship (16 units) – replaces EG3611A (10 units), EG2401A (2 units), and UE (4 units)
- ETP3202L Innovation & Enterprise Case Study & Analysis (8 units) – replaces CDE4301A (8 units out of 12 units)
- ETP3203L Innovation & Enterprise Internship Practicum (8 units) – replaces CDE4301A (4 units out of 12 units) and UE (4 units)
- Entrepreneurship courses (up to 8 units) – replaces Electives 3 and 4 for Second Major (students will need to complete Electives 3 and/or 4 for Second Major in NUS if they are unable to complete 8 units of entrepreneurship courses during NOC)

**Sample study plan – JC-intake students or equivalent**  
(for students in one-semester NOC programmes)

| Semester 1                                    | Units     | Semester 2                                            | Units     |
|-----------------------------------------------|-----------|-------------------------------------------------------|-----------|
| ESP1111 Engineering Principles In-Action      | 4         | ESP2111 Sensor System Electronics                     | 4         |
| CS1010E Programming Methodology               | 4         | GEA1000 Quantitative Reasoning with Data              | 4         |
| DTK1234 Design Thinking                       | 4         | EG1311 Design and Make<br>or EG1311BE Design and Make | 4         |
| MA1511 Engineering Calculus                   | 2         | MA1508E Linear Algebra for Engineering                | 4         |
| MA1512 Differential Equations for Engineering | 2         | PF1101A Project Management and Finance                | 4         |
| GE                                            | 4         | Elective 1 for Second Major (from List I)             | 4         |
| <b>Sub-total</b>                              | <b>20</b> | <b>Sub-total</b>                                      | <b>24</b> |

| Semester 3                                          | Units     | Semester 4                                                                                   | Units     |
|-----------------------------------------------------|-----------|----------------------------------------------------------------------------------------------|-----------|
| CDE2501 Sustainable Systems for Liveable Cities     | 4         | EE2023 Signals and Systems                                                                   | 4         |
| ME2121 Engineering Thermodynamics and Heat Transfer | 4         | ESP2107 Numerical Methods and Statistics                                                     | 4         |
| GE                                                  | 4         | ESP2110 Design Project                                                                       | 4         |
| UE                                                  | 4         | EE2211 Introduction to Machine Learning<br>or EE2213 Introduction to Artificial Intelligence | 4         |
| Elective 2 for Second Major (from List I)           | 4         | CDE3301 Ideas to Proof-of-Concept (replaces ESP4902)                                         | 6         |
| <b>Sub-total</b>                                    | <b>20</b> | <b>Sub-total</b>                                                                             | <b>22</b> |

| Semester 5                                                          | Units     | Semester 6 – NOC | Units     |
|---------------------------------------------------------------------|-----------|------------------|-----------|
| CDE3301 Ideas to Proof-of-Concept (replaces ESP4902)                | 6         | NOC              |           |
| ESP3106 Principles of Continua                                      | 4         |                  |           |
| ES2631 Critique and Communication of Thinking and Design            | 4         |                  |           |
| EE3331C Feedback Control Systems or ME3142 Feedback Control Systems | 4         |                  |           |
| PC2020 Electromagnetics for Electrical Engineers                    | 4         |                  |           |
| <b>Sub-total</b>                                                    | <b>22</b> | <b>Sub-total</b> | <b>20</b> |

| Semester 7                                                         | Units     | Semester 8                                                         | Units     |
|--------------------------------------------------------------------|-----------|--------------------------------------------------------------------|-----------|
| CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up | 6         | CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up | 6         |
| ESP3201A Machine Learning in Engineering Science                   | 4         | PC2130B Applied Quantum Physics                                    | 4         |
| UE                                                                 | 4         | PC3235B Applied Solid State Physics                                | 4         |
| UE                                                                 | 4         |                                                                    |           |
| <b>Sub-total</b>                                                   | <b>18</b> | <b>Sub-total</b>                                                   | <b>14</b> |

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**College of Design and Engineering**

A one-semester NOC programme comprises the following courses (up to 20 units):

- ETP3201S Innovation & Enterprise Internship (12 units) – replaces EG3611A (10 units) and EG2401A (2 units)
- ETP3204S Innovation & Enterprise Internship Practicum (Short) (4 units) – replaces Elective 3 for Second Major (4 units)
- Entrepreneurship course (4 units) – replaces Elective 4 for Second Major (4 units)

**Sample study plan – JC-intake students or equivalent**

(for students in Engineering Scholars Programme who plan to go for SEP)

| Semester 1                                    | Units     | Semester 2                                           | Units     |
|-----------------------------------------------|-----------|------------------------------------------------------|-----------|
| ESP1111 Engineering Principles In-Action      | 4         | ESP2111 Sensor System Electronics                    | 4         |
| ESP3106 Principles of Continua                | 4         | ESP2110 Design Project                               | 4         |
| DTK1234 Design Thinking                       | 4         | GEA1000 Quantitative Reasoning with Data             | 4         |
| MA1512 Differential Equations for Engineering | 2         | PF1101A Project Management and Finance               | 4         |
| RVRC/UTCP course 1 (replaces GE)              | 4         | RVRC/UTCP course 2 (replaces GE)                     | 4         |
| Elective 1 for Second Major (from List I)     | 4         | CDE3301 Ideas to Proof-of-Concept (replaces ESP4902) | 6         |
| <b>Sub-total</b>                              | <b>22</b> | <b>Sub-total</b>                                     | <b>26</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 – can be used for SEP                                                          | Units     |
|------------------------------------------------------|-----------|-------------------------------------------------------------------------------------------|-----------|
| EE2023 Signals and Systems                           | 4         | ESP2107 Numerical Methods and Statistics                                                  | 4         |
| ME2121 Engineering Thermodynamics and Heat Transfer  | 4         | PC2020 Electromagnetics for Electrical Engineers                                          | 4         |
| UE                                                   | 4         | EE2211 Introduction to Machine Learning or EE2213 Introduction to Artificial Intelligence | 4         |
| RVRC/UTCP course 3 (replaces CDE2501)                | 4         | UE                                                                                        | 4         |
| Elective 2 for Second Major (from List I)            | 4         | RVRC/UTCP course 4 (replaces ES2631)                                                      | 4         |
| CDE3301 Ideas to Proof-of-Concept (replaces ESP4902) | 6         |                                                                                           |           |
| <b>Sub-total</b>                                     | <b>26</b> | <b>Sub-total</b>                                                                          | <b>20</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                                                         | Units     |
|---------------------------------------------------------------------|-----------|--------------------------------------------------------------------|-----------|
| CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up  | 6         | CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up | 6         |
| Elective 3 for Second Major                                         | 4         | Elective 4 for Second Major                                        | 4         |
| ESP3201A Machine Learning in Engineering Science                    | 4         | PC2130B Applied Quantum Physics                                    | 4         |
| EE3331C Feedback Control Systems or ME3142 Feedback Control Systems | 4         | PC3235B Applied Solid State Physics                                | 4         |
| UE                                                                  | 2         | EG2401A Engineering Professionalism                                | 2         |
| <b>Sub-total</b>                                                    | <b>20</b> | <b>Sub-total</b>                                                   | <b>20</b> |

**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)
- MA2001 Linear Algebra (4 units) – replaces MA1508E Linear Algebra for Engineering (4 units)

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

**Sample study plan – JC-intake students or equivalent**

(for students in Engineering Scholars Programme who plan to go for one-semester NOC programmes)

| Semester 1                                    | Units     | Semester 2                                           | Units     |
|-----------------------------------------------|-----------|------------------------------------------------------|-----------|
| ESP1111 Engineering Principles In-Action      | 4         | ESP2111 Sensor System Electronics                    | 4         |
| ESP3106 Principles of Continua                | 4         | ESP2110 Design Project                               | 4         |
| DTK1234 Design Thinking                       | 4         | GEA1000 Quantitative Reasoning with Data             | 4         |
| MA1512 Differential Equations for Engineering | 2         | PF1101A Project Management and Finance               | 4         |
| RVRC/UTCP course 1 (replaces GE)              | 4         | RVRC/UTCP course 2 (replaces GE)                     | 4         |
| Elective 1 for Second Major (from List I)     | 4         | CDE3301 Ideas to Proof-of-Concept (replaces ESP4902) | 6         |
| <b>Sub-total</b>                              | <b>22</b> | <b>Sub-total</b>                                     | <b>26</b> |

| Semester 3                                           | Units     | Semester 4 – NOC | Units     |
|------------------------------------------------------|-----------|------------------|-----------|
| EE2023 Signals and Systems                           | 4         | NOC              |           |
| ME2121 Engineering Thermodynamics and Heat Transfer  | 4         |                  |           |
| UE                                                   | 4         |                  |           |
| RVRC/UTCP course 3 (replaces CDE2501)                | 4         |                  |           |
| Elective 2 for Second Major (from List I)            | 4         |                  |           |
| CDE3301 Ideas to Proof-of-Concept (replaces ESP4902) | 6         |                  |           |
| <b>Sub-total</b>                                     | <b>26</b> | <b>Sub-total</b> | <b>20</b> |

| Semester 5                                                                                       | Units     | Semester 6                                                                | Units     |
|--------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------|
| CDE4301 Innovation & Design Capstone <u>or</u> CDE4301A Ideas to Start-up                        | 6         | CDE4301 Innovation & Design Capstone <u>or</u> CDE4301A Ideas to Start-up | 6         |
| ESP3201A Machine Learning in Engineering Science                                                 | 4         | ESP2107 Numerical Methods and Statistics                                  | 4         |
| EE2211 Introduction to Machine Learning <u>or</u> EE2213 Introduction to Artificial Intelligence | 4         | PC2130B Applied Quantum Physics                                           | 4         |
| EE3331C Feedback Control Systems <u>or</u> ME3142 Feedback Control Systems                       | 4         | PC3235B Applied Solid State Physics                                       | 4         |
| PC2020 Electromagnetics for Electrical Engineers                                                 | 4         | UE                                                                        | 4         |
| RVRC/UTCP course 4 (replaces ES2631)                                                             | 4         | UE                                                                        | 2         |
| <b>Sub-total</b>                                                                                 | <b>26</b> | <b>Sub-total</b>                                                          | <b>24</b> |

**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)
- MA2001 Linear Algebra (4 units) – replaces MA1508E Linear Algebra for Engineering (4 units)

A one-semester NOC programme comprises the following courses (up to 20 units):

- ETP3201S Innovation & Enterprise Internship (12 units) – replaces EG3611A (10 units) and EG2401A (2 units)
- ETP3204S Innovation & Enterprise Internship Practicum (Short) (4 units) – replaces Elective 3 for Second Major (4 units)
- Entrepreneurship course (4 units) – replaces Elective 4 for Second Major (4 units)

Sample study plan – poly-intake students

| Semester 1                                | Units     | Semester 2                                              | Units     |
|-------------------------------------------|-----------|---------------------------------------------------------|-----------|
| ESP1111 Engineering Principles In-Action  | 4         | ESP2111 Sensor System Electronics                       | 4         |
| CS1010E Programming Methodology           | 4         | ESP2110 Design Project                                  | 4         |
| MA1301 Introductory Mathematics *<br>(UE) | 4         | GEA1000 Quantitative Reasoning with Data                | 4         |
| PC1201 Fundamentals of Physics ^<br>(UE)  | 4         | MA1508E Linear Algebra for Engineering                  | 4         |
| Elective 1 for Second Major (from List I) | 4         | PF1101A Project Management and Finance                  | 4         |
|                                           |           | CDE3301 Ideas to Proof-of-Concept<br>(replaces ESP4902) | 6         |
| <b>Sub-total</b>                          | <b>20</b> | <b>Sub-total</b>                                        | <b>26</b> |

| Semester 3                                              | Units     | Semester 4                                                                                   | Units     |
|---------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------|-----------|
| CDE2501 Sustainable Systems for Liveable Cities         | 4         | ESP2107 Numerical Methods and Statistics                                                     | 4         |
| ME2121 Engineering Thermodynamics and Heat Transfer     | 4         | EE2023 Signals and Systems                                                                   | 4         |
| MA1511 Engineering Calculus *                           | 2         | PC2020 Electromagnetics for Electrical Engineers                                             | 4         |
| MA1512 Differential Equations for Engineering *         | 2         | PC3235B Applied Solid State Physics                                                          | 4         |
| Elective 2 for Second Major (from List I)               | 4         | EE2211 Introduction to Machine Learning<br>or EE2213 Introduction to Artificial Intelligence | 4         |
| CDE3301 Ideas to Proof-of-Concept<br>(replaces ESP4902) | 6         | EG2401A Engineering Professionalism                                                          | 2         |
|                                                         |           | GE *                                                                                         | 4         |
| <b>Sub-total</b>                                        | <b>22</b> | <b>Sub-total</b>                                                                             | <b>26</b> |

| Semester 5                                                            | Units     | Semester 6                                                             | Units     |
|-----------------------------------------------------------------------|-----------|------------------------------------------------------------------------|-----------|
| CDE4301 Innovation & Design Capstone<br>or CDE4301A Ideas to Start-up | 6         | CDE4301 Innovation & Design Capstone<br>or CDE4301A Ideas to Start-up  | 6         |
| Elective 3 for Second Major                                           | 4         | Elective 4 for Second Major                                            | 4         |
| ESP3106 Principles of Continua                                        | 4         | ES2631 Critique and Communication of Thinking and Design               | 4         |
| ESP3201A Machine Learning in Engineering Science                      | 4         | EE3331C Feedback Control Systems or<br>ME3142 Feedback Control Systems | 4         |
| GE ^                                                                  | 4         | PC2130B Applied Quantum Physics                                        | 4         |
| <b>Sub-total</b>                                                      | <b>22</b> | <b>Sub-total</b>                                                       | <b>22</b> |

\* Students who are exempted from MA1301 can take MA1511 and MA1512 in Semester 1 and a GE 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)