

**Curriculum for CN Yang Scholars Programme  
Materials Engineering  
(For AY2018-19 intake)**

| Course Type                | AU         |
|----------------------------|------------|
| Core Courses               | 107        |
| Major Prescribed Electives | 12         |
| GER-Core                   | 17         |
| GER-PE                     | 0          |
| Unrestricted Electives     | 6          |
| <b>Total</b>               | <b>142</b> |

|                              | Course Code | Course Title   | Type     | AU        |
|------------------------------|-------------|--|----------|-----------|
| <b>Year 1<br/>Semester 1</b> | CY1001      | Introductory Biology   | Core     | 3         |
|                              | CY1101      | Principles of Modern Chemistry   | Core     | 3         |
|                              | CY1308      | Physics  | Core     | 3         |
|                              | CY1500      | Introductory Research Methodology  | Core     | 3         |
|                              | CY1601      | Mathematics I  | Core     | 4         |
|                              | GC0001      | Introduction to Sustainability: Multidisciplinary Approaches and Solutions | GER-Core | 1         |
|                              |             |  |          | Total AUs |

|                              | Course Code | Course Title                           | Type | AU        |
|------------------------------|-------------|--|------|-----------|
| <b>Year 1<br/>Semester 2</b> | CY1007      | Living with Climate Change             | Core | 3         |
|                              | CY1307      | Relativity and Quantum Physics         | Core | 3         |
|                              | CY1400      | CNYS Undergraduate Research Experience | Core | 3         |
|                              | CY1602      | Mathematics II                         | Core | 4         |
|                              | MS1014      | Materials Chemistry II                 | Core | 3         |
|                              | MS1008      | Introduction to Computational Thinking | Core | 3         |
|                              |             |  |      | Total AUs |

|                                | Course Code            | Course Title                               | Type | AU        |
|--------------------------------|------------------------|--|------|-----------|
| <b>Year 1<br/>Special Term</b> | CY2003                 | Research Attachment 3 (Making & Tinkering) | Core | 4         |
|                                | Overseas Learning Trip |  |      |           |
|                                |                        |  |      | Total AUs |

|                              | Course Code | Course Title                                  | Type      | AU        |
|------------------------------|-------------|---|-----------|-----------|
| <b>Year 2<br/>Semester 1</b> | CY2001      | Research Attachment 1                         | Core      | 4         |
|                              | CY0001      | Writing and Reasoning                         | GER-Core  | 3         |
|                              | MS1015      | Materials Science                             | Core      | 3         |
|                              | MS1016      | Thermodynamics of Materials                   | Core      | 3         |
|                              | MS2012      | Introduction to Manufacturing Processes       | Core      | 3         |
|                              | MS2013      | Polymers and Composites                       | Core      | 3         |
|                              | MS2018      | Electronic & Magnetic Properties of Materials | Core      | 3         |
|                              | MS2081      | Laboratory IIA                                | Core      | 1         |
|                              |             |   | Total AUs | <b>23</b> |

|                              | Course Code | Course Title   | Type      | AU        |
|------------------------------|-------------|--|-----------|-----------|
| <b>Year 2<br/>Semester 2</b> | CY0002      | Ethics   | GER-Core  | 3         |
|                              | MS2014      | Materials Structure and Defects                          | Core      | 3         |
|                              | MS2015      | Mechanical Behaviour of Materials                        | Core      | 3         |
|                              | MS2016      | Phase Transformation and Kinetics                        | Core      | 3         |
|                              | MS2082      | Laboratory IIB   | Core      | 1         |
|                              | xxxxxx      | Unrestricted Elective                                    | UE        | 3         |
|                              |             | Introduction to Data Science and Artificial Intelligence | GER-Core  | 3         |
|                              | ML0003      | Career Preparatory Course                                | GER-Core  | 1         |
|                              |             |  | Total AUs | <b>24</b> |

| Year 3<br>Semester 1 | Course Code | Course Title                              | Type     | AU        |
|----------------------|-------------|---|----------|-----------|
|                      | MS3011      | Metallic & Ceramic Materials              | Core     | 3         |
|                      | MS3012      | Micro/Nanoelectronic Materials Processing | Core     | 3         |
|                      | MS46XX      | School Major PE (choose from Table B)     | Major PE | 3         |
|                      | MS46XX      | School Major PE (choose from Table B)     | Major PE | 3         |
|                      | CY0006      | Enterprise, Innovation and Leadership     | GER-Core | 3         |
|                      |             |   |          | Total AUs |

| Year 3<br>Semester 2 | Course Code | Course Title                                 | Type      | AU |
|----------------------|-------------|--|-----------|----|
|                      | MS3013      | Environmental Effects on Materials           | Core      | 3  |
|                      | MS3014      | Analysis of Materials                        | Core      | 3  |
|                      | MS3015      | Materials Aspects in Design                  | Core      | 3  |
|                      | MS3081      | Laboratory III                               | Core      | 1  |
|                      | MS4013      | Biomaterials                                 | Core      | 3  |
|                      | MS4014      | Nanomaterials: Fundamentals and Applications | Core      | 3  |
|                      |             |  | Total AUs | 16 |

| Year 3<br>Special Term | Course Code | Course Title            | Type      | AU |
|------------------------|-------------|-------------------------|-----------|----|
|                        | MS3096      | Professional Attachment | Core      | 5  |
|                        |             |                         | Total AUs | 5  |

| Year 4<br>Semester 1 | Course Code | Course Title                      | Type      | AU |
|----------------------|-------------|-----------------------------------|-----------|----|
|                      | MS4211      | CNYSP Overseas Final Year Project | Core      | 8  |
|                      |             |                                   | Total AUs | 8  |

| Year 4<br>Semester 2 | Course Code | Course Title                          | Type      | AU                 |            |
|----------------------|-------------|---------------------------------------|-----------|--------------------|------------|
|                      | MS0002      | Engineers and Society                 | GER-Core  | 3                  |            |
|                      | MS4012      | Quality Control                       | Core      | 3                  |            |
|                      | MS46XX      | School Major PE (choose from Table B) | Major PE  | 3                  |            |
|                      | MS46XX      | School Major PE (choose from Table B) | Major PE  | 3                  |            |
|                      | xxxxxx      | Unrestricted Elective                 | UE        | 3                  |            |
|                      |             |                                       | Total AUs | 15                 |            |
|                      |             |                                       |           | <b>GRAND TOTAL</b> | <b>142</b> |

**Table B: School Major PE (choose courses with a total of 12 AUs)**

| School Major PE (12 AUs)                       | Type     | AU |
|--|----------|----|
| MS4601 Principles of Semiconductor Devices     | Major PE | 3  |
| MS4603 Microelectronics Process Integration    | Major PE | 3  |
| MS4610 Advanced Biomaterials                   | Major PE | 3  |
| MS4611 Biomedical Devices                      | Major PE | 3  |
| MS4612 Drug Delivery and Tissue Engineering    | Major PE | 3  |
| MS4620 Polymer Technology                      | Major PE | 3  |
| MS4621 Polymer Science                         | Major PE | 3  |
| MS4622 Composite Materials                     | Major PE | 3  |
| MS4630 Photovoltaic Devices and Energy Storage | Major PE | 3  |
| MS4631 Corrosion Engineering                   | Major PE | 3  |
| MS4640 Advanced Analysis of Materials          | Major PE | 3  |
| MS4650 Functional Nanostructured Materials     | Major PE | 3  |
| MS4651 Thin Film Technology                    | Major PE | 3  |

## MSE Specialisation Areas

Students can choose to specialise in any of the 4 Specialisation topics below. The Core courses are offered in both semesters while the Major PE/UE courses are offered in respective semesters.

Generally, students have the opportunity to take any of the Major PE courses in an academic year in accordance to the semester the respective Major PEs are offered.

The four specialisation areas and the respective courses available for each specialisation are listed as below:

### **Specialisation Area 1: Medical Materials**

- MS3014: Analysis of Materials# Core
- MS4013: Biomaterials Core
- MS4610: Advanced Biomaterials Major PE/UE
- MS4611: Biomedical Devices Major PE/UE
- MS4612: Drug Delivery & Tissue Engineering Major PE/UE
- MS4621: Polymer Science Major PE/UE

### **Specialisation Area 2: Industrial Materials Engineering**

- MS3012: Micro/Nanoelectronic Materials Processing Core
- MS3013: Environmental Effects on Materials Core
- MS4603: Microelectronic Process Integration Major PE/UE
- MS4601: Principles of Semiconductor Devices Major PE/UE
- MS4630: Photovoltaics Devices and Energy Storage Major PE/UE
- MS4631: Corrosion Engineering Major PE/UE
- MS4620: Polymer Technology Major PE/UE
- MS4622: Composite Materials# Major PE/UE

### **Specialisation Area 3: Nanoscience and Nanotechnology**

- MS3014: Analysis of Materials# Core
- MS4014: Nanomaterials: Fundamentals & applications Core
- MS4650: Functional Nanostructured Materials Major PE/UE
- MS4640: Advanced Analysis of Materials Major PE/UE
- MS4622: Composite Materials# Major PE/UE
- MS4651: Thin Film Technology Major PE/UE

### **Specialisation Area 4: Innovation and Intellectual Property**

- MS3015: Materials Aspects in Design Core
- ET0001: Enterprise and Innovation GER Core
- MS4660: Fundamentals of Intellectual Property in Materials  
Science and Engineering Major PE/UE
- MS4661: Application of Patents & Designs in Materials  
Related Industry Major PE/UE
- MS4662: Appreciating IP in Research & Development Major PE/UE

#### **Note:**

# MS3014 and MS4622 can only be counted once in the desired respective specialisation a student chooses.

Please visit the School's [website](#) for more information on the MSE Specialisation Areas