

**AY2023-24 CURRICULUM FOR BACHELOR OF ENGINEERING (MATERIALS ENGINEERING)**  
**WITH CN YANG SCHOLARS PROGRAMME**  
**SECOND MAJOR IN DATA ANALYTICS (MTDA)**  
**(FIRST YEAR ADMISSION)**

Last Updated : 19-Apr-23

| SUMMARY OF ACADEMIC UNIT REQUIREMENT |             |            |          |           |          |           |            |
|--------------------------------------|-------------|------------|----------|-----------|----------|-----------|------------|
| Year of Study                        | School Core | CNYSP-Core | MPE      | CC        | FC       | BDE       | Total AU   |
| 1                                    | 10          | 23         | 0        | 5         | 0        | 0         | 38         |
| 2                                    | 11          | 10         | 0        | 8         | 3        | 7         | 39         |
| 3                                    | 31          | 0          | 3        | 0         | 5        | 9         | 48         |
| 4                                    | 15          | 0          | 6        | 0         | 0        | 6         | 27         |
| <b>Total</b>                         | <b>67</b>   | <b>33</b>  | <b>9</b> | <b>13</b> | <b>8</b> | <b>22</b> | <b>152</b> |

| YEAR 1 SEMESTER 1 |                            |          |           |                       |
|-------------------|----------------------------|----------|-----------|-----------------------|
| Course Code       | Course Title               | Type     | AU        | Pre-Requisite/Remarks |
| CY1001            | Cell                       | CNY-Core | 3         | CNYSP Courses         |
| CY1101            | Molecule                   | CNY-Core | 4         |                       |
| CY1308            | Physics                    | CNY-Core | 3         |                       |
| CY1500            | Introduction to Research   | CNY-Core | 2         |                       |
| CY1601            | Mathematics I              | CNY-Core | 4         |                       |
| CC0005            | Healthy Living & Wellbeing | CC       | 3         |                       |
|                   |                            |          | <b>19</b> |                       |

| YEAR 1 SEMESTER 2 |                                         |          |           |                       |
|-------------------|-----------------------------------------|----------|-----------|-----------------------|
| Course Code       | Course Title                            | Type     | AU        | Pre-Requisite/Remarks |
| CY1007            | Climate Change                          | CNY-Core | 3         | CNYSP Course          |
| MS1014            | Materials Chemistry II                  | C        | 2         |                       |
| MS2012            | Introduction to Manufacturing Processes | C        | 3         |                       |
| EG1001            | Engineers in Society                    | C        | 2         |                       |
| MS1008^           | Introduction to Computational Thinking  | C        | 3         |                       |
| CC0002            | Navigating the Digital World            | CC       | 2         |                       |
|                   |                                         |          | <b>15</b> |                       |

| YEAR 1 SPECIAL SEMESTER |                        |          |          |                       |
|-------------------------|------------------------|----------|----------|-----------------------|
| Course Code             | Course Title           | Type     | AU       | Pre-Requisite/Remarks |
| CY2003                  | Research Attachment 3  | CNY-Core | 4        | CNYSP Course          |
|                         | Overseas Learning Trip |          |          |                       |
|                         |                        |          | <b>4</b> |                       |

| YEAR 2 SEMESTER 1 |                                               |          |           |                       |
|-------------------|-----------------------------------------------|----------|-----------|-----------------------|
| Course Code       | Course Title                                  | Type     | AU        | Pre-Requisite/Remarks |
| CY0002            | Ethics                                        | CNY-Core | 3         | CNYSP Course          |
| MS1016            | Thermodynamics of Materials                   | C        | 3         | MS1017 (co-req)       |
| MS1017            | Introduction to Materials Science             | C        | 2         |                       |
| IE2107            | Engineering Mathematics                       | BDE      | 3         | Pre-req for EE4483    |
| BC2406            | Analytics I: Visual and Predictive Techniques | BDE      | 4         |                       |
| SP0061            | Science & Technology for Humanity             | CC       | 3         |                       |
|                   |                                               |          | <b>18</b> |                       |

| YEAR 2 SEMESTER 2 |                                                           |          |    |                                                                                     |
|-------------------|-----------------------------------------------------------|----------|----|-------------------------------------------------------------------------------------|
| Course Code       | Course Title                                              | Type     | AU | Pre-Requisite/Remarks                                                               |
| CY0001            | Writing Across the Disciplines                            | CNY-Core | 3  | CNYSP Course                                                                        |
| CY2001            | Research Attachment 1                                     | CNY-Core | 4  | CNYSP Course<br>2-semester long, course registered only in Sem 2 (similar to URECA) |
| MS1018            | Properties of Materials                                   | C        | 2  |                                                                                     |
| MS2013            | Introduction to Polymer Science                           | C        | 3  | MS1014 & MS1016                                                                     |
| MS2083            | Laboratory on Structure-Property Relationship in Polymers | C        | 1  | MS2013 (co-requisite)                                                               |

|        |                                                             |    |           |                                            |
|--------|-------------------------------------------------------------|----|-----------|--------------------------------------------|
| ML0004 | Career and Entrepreneurial Development for the Future World | CC | 2         |                                            |
| MS0003 | Introduction to Data Science and Artificial Intelligence    | FC | 3         | <b>MS1008</b><br><b>Pre-req for EE4483</b> |
| CC0006 | Sustainability: Society, Economy & Environment              | CC | 3         |                                            |
|        |                                                             |    | <b>21</b> |                                            |

| YEAR 3 SEMESTER 1 |                                               |      |           |                                      |
|-------------------|-----------------------------------------------|------|-----------|--------------------------------------|
| Course Code       | Course Title                                  | Type | AU        | Pre-Requisite/Remarks                |
| MS2014            | Materials Structure and Defects               | C    | 3         | <b>MS1017 + MS1018 (co-req)</b>      |
| MS2015            | Mechanical Behaviour of Materials             | C    | 3         |                                      |
| MS2016            | Phase Transformation and Kinetics             | C    | 3         | <b>MS1016 (co-req)</b>               |
| MS2018            | Electronic & Magnetic Properties of Materials | C    | 3         | <b>MS1017 &amp; MS1018 (co-reqs)</b> |
| MS3012            | Micro/Nanoelectronic Materials Processing     | C    | 3         |                                      |
| MH2811^           | Mathematics II                                | C    | 3         | <b>MH1810/CY1601/CY1602</b>          |
| EE4483            | Artificial Intelligence & Data Mining         | BDE  | 3         | <b>IE2107 &amp; MS0003</b>           |
|                   |                                               |      | <b>21</b> |                                      |

| YEAR 3 SEMESTER 2 |                                      |      |           |                                                                                                                             |
|-------------------|--------------------------------------|------|-----------|-----------------------------------------------------------------------------------------------------------------------------|
| Course Code       | Course Title                         | Type | AU        | Pre-Requisite/Remarks                                                                                                       |
| MS3011            | Metallic & Ceramic Materials         | C    | 3         | <b>MS2016 (co-req)</b>                                                                                                      |
| MS3013            | Environmental Effects on Materials   | C    | 3         | <b>MS2013 + MS3011</b>                                                                                                      |
| MS3014            | Analysis of Materials                | C    | 3         |                                                                                                                             |
| MS3015            | Industrial Design                    | C    | 3         | <b>MS1015 + MS2013 + MS3011 (co-req)/<br/>MS1017 + MS1018 + MS2013 +<br/>MS2083 + MS3011 (co-req) + MS3082<br/>(co-req)</b> |
| MS3082            | Design Lab                           | C    | 1         |                                                                                                                             |
| MS4671^           | Introduction to Materials Simulation | MPE  | 3         | <b>MS0003 &amp; MS1008</b>                                                                                                  |
| EE4791            | Database Systems                     | BDE  | 3         |                                                                                                                             |
| XXXXXX            | DA Elective 1                        | BDE  | 3         |                                                                                                                             |
|                   |                                      |      | <b>22</b> |                                                                                                                             |

| YEAR 3 SPECIAL SEMESTER |                         |      |          |                       |
|-------------------------|-------------------------|------|----------|-----------------------|
| Course Code             | Course Title            | Type | AU       | Pre-Requisite/Remarks |
| MS3096                  | Professional Attachment | FC   | 5        |                       |
|                         |                         |      | <b>5</b> |                       |

| YEAR 4 SEMESTER 1 |                                   |      |          |                       |
|-------------------|-----------------------------------|------|----------|-----------------------|
| Course Code       | Course Title                      | Type | AU       | Pre-Requisite/Remarks |
| MS4211            | CNYSP Overseas Final Year Project | C    | 8        | CNYSP Course          |
|                   |                                   |      | <b>8</b> |                       |

| YEAR 4 SEMESTER 2 |                                              |      |    |                                         |
|-------------------|----------------------------------------------|------|----|-----------------------------------------|
| Course Code       | Course Title                                 | Type | AU | Pre-Requisite/Remarks                   |
| MS4012^           | Quality Control                              | C    | 3  |                                         |
| MS4013            | Biomaterials                                 | C    | 2  | <b>MS2013 &amp; MS3011 (co-req)</b>     |
| MS4014            | Nanomaterials: Fundamentals and Applications | C    | 2  | <b>MS2018 &amp; MS3012 &amp; MS3013</b> |
| XXXXXX            | DA Elective 2                                | BDE  | 3  |                                         |
| XXXXXX            | DA Elective 3                                | BDE  | 3  |                                         |
| XXXXXX            | Major PE 1                                   | MPE  | 3  |                                         |
| XXXXXX            | Major PE 2                                   | MPE  | 3  |                                         |

|                          |  |  |            |  |
|--------------------------|--|--|------------|--|
|                          |  |  | <b>19</b>  |  |
| Total AU for Graduation: |  |  | <b>152</b> |  |

^ These courses are double-counted towards both MAT as well as the Second Major in Data Analytics.

| Compulsory Courses for Second Major in Data Analytics |             |                                               |    |              |                        |
|-------------------------------------------------------|-------------|-----------------------------------------------|----|--------------|------------------------|
| Course Type                                           | Course Code | Course Title                                  | AU | Offering Sem | Pre-req                |
| Core                                                  | MS4012      | Quality Control                               | 3  | 1,2          | -                      |
| Core                                                  | MH2811      | Mathematics II                                | 3  | 1,2          | MH1810/CY1601/CY1602   |
| Core                                                  | MS1008      | Introduction to Computational Thinking        | 3  | 1,2          | -                      |
| MPE                                                   | MS4671      | Introduction to Materials Simulation          | 3  | 2            | MS0003 & MS1008        |
| BDE                                                   | EE4791      | Database Systems                              | 3  | 2            | -                      |
| BDE                                                   | EE4483      | Artificial Intelligence & Data Mining         | 3  | 1            | IE2107 & MS0003        |
| BDE                                                   | BC2406      | Analytics I: Visual and Predictive Techniques | 4  | 1            | Year 2 standing/AB1202 |

| Suggested Electives for Second Major in Data Analytics |             |                                        |    |              |               |
|--------------------------------------------------------|-------------|----------------------------------------|----|--------------|---------------|
| Course Type                                            | Course Code | Course Title                           | AU | Offering Sem | Pre-req       |
| BDE                                                    | EE4414      | Machine Learning Design & Application  | 3  | 2            | EE4483        |
| BDE                                                    | EE4497      | Pattern Recognition & Machine Learning | 3  | 2            | EE2006/IE2106 |
| BDE                                                    | MA4829      | Machine Intelligence                   | 3  | 2            | -             |