## B.Eng (Hons) in Chemical and Biomolecular Engineering with 2nd Major in Data Analytics

*with Professional Internship*

*AY2022 - 2023 Intake onwards (CBDA)*

| Programme | Year of Study | Number of Academic Units (AU) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Major Requirement | | Interdisciplinary Collaborative Core | | Broadening and Deepening Electives (BDE) | Total |
| | | Core (C) | Major PE (MPE) | Common Core (CC) | Foundational Core (FC) | | |
| Chemical & Biomolecular Engineering with Second Major in Data Analytics | 1 | 24/25* | | 9 | | | 33/34* |
| | 2 | 28 | | 8 | 3 | | 39 |
| | 3 | 17 | | | 12 | | 29 |
| | 4 | 8 | 6 | | | 22 | 36 |
| | Total | 77/78* | 6 | 17 | 15 | 22 | 137/138* |

| Category | | | AU | Total AU |
|---|---|---|---|---|
| Interdisciplinary Collaborative Core (ICC) | **Common Core (University-level)** | | | 17 |
| | CC0001 | Inquiry and Communication in the Interdisciplinary | 2 | |
| | CC0002 | Navigating the Digital World | 2 | |
| | CC0003 | Ethics & Civics in a Multi-Cultural World | 2 | |
| | CC0005 | Healthy Living & Wellbeing | 3 | |
| | CC0006 | Sustainability: Society, Economy & Environment | 3 | |
| | CC0007 | Science & Technology for Humanity | 3 | |
| | ML0004 | Career and Entrepreneurial Development for the | 2 | |
| | | | | |
| | **Foundational Core (College-level)** | | | 15 |
| | HW0288 | Engineering Communication | 2 | |
| | CB0494 | Introduction to Data Science and Artificial | 3 | |
| | CH3880 | Professional Internship | 10 | |
| | | | | |
| Major Requirement | **CBE Core** | | | 36 |
| | EG1001 | Engineers In Society | 2 | |
| | MH1810 | Math 1 | 3 | |
| | PH1011* | Physics | 3 | |
| | CB1102 | Introduction to Chemical and Biomedical | 1 | |
| | CB1103 | Organic Chemistry For Engineers | 3 | |
| | CB1117^ | Engineering Mathematics | 4 | |
| | CB1131 | Introduction to Biomolecular Engineering | 3 | |
| | CH1104 | Materials & Energy Balance | 3 | |
| | CH1801 | Chemical & Biomolecular Engineering | 1 | |
| | CH1802 | Chemical & Biomolecular Engineering | 1 | |
| | CH2010^ | Engineering Statistics | 3 | |
| | CH2103 | Fluid Systems | 3 | |
| | CH2107^ | Introduction to Computational Thinking | 3 | |
| | CH2108 | Thermodynamics | 3 | |

| | | | | |
|---|---|---|---|---|
| Major Requirement | CH2112 | Chemical Reaction Engineering | 3 | 41 |
| | CH2114 | Heat & Mass Transfer in Chemical and Biological Systems | 3 | |
| | CH2123 | Chemical Thermodynamics | 3 | |
| | CH2151 | Unit Operations: Fluid-Solid Seperation | 3 | |
| | CH2801 | Chemical & Biomolecular Engineering Laboratory | 2 | |
| | CH2802 | Chemical & Biomolecular Engineering Laboratory | 2 | |
| | CH3104 | Biochemical Engineering | 3 | |
| | CH3109 | Decision Tools for Business & Engineering | 3 | |
| | CH3111 | Process Control and Dynamics | 3 | |
| | CH3121 | Chemical, Biological & Plant Safety | 2 | |
| | CH3140 | Unit Operations: Fluid-Fluid Separation | 3 | |
| | CH3802 | Chemical & Biomolecular Engineering Laboratory | 3 | |
| | CH4801 | Final Year Design Project | 8 | |
| | **CBE Major Prescribed Electives (MPE)** | | | |
| | CBE PE 1 | | 3 | 6 |
| | CBE PE 2 | | 3 | |
| | | | | |
| 2nd Major in Data Analytics (BDEs) | **Data Analytics Compulsory Courses** | | | 22 |
| | 1) Linear Algebra: CB1117 Engineering Mathematics | | NA | |
| | 2) Computing Skills: BG2211 Introduction to Computational | | NA | |
| | 3) Probability and Statistics: CH2010 Engineering Statistics | | NA | |
| | 4) Algorithms: MH1403 Algorithms & Computing | | 3 | |
| | 5) Database: EE4791 Database Systems (3AU) | | 3 | |
| | 6) Data Mining: EE4483 Artificial Intelligence & Data Mining | | 3 | |
| | 7) Data Visualisation/Management: BC2406 Analytics I: Visual and Predictive Techniques | | 4 | |
| | **Electives** | | | |
| | CH4244 | Numerical Method and Data Analytics | 3 | |
| | *Choose from the following:* | | | |
| | EE4414 Machine Learning Design & Application (3AU) | | 6 | |
| | EE4497 Pattern Recognition & Machine Learning (3AU) | | | |
| | MA4829 Machine Intelligence (3AU) | | | |
| | MA4830 Real Time Software for Mechatronics System (3AU) | | | |
| | MA4832 Microprocessor System (3AU) | | | |
| | MS4671 Introduction to Materials Simulation (3AU) | | | |
| | | | | |
| **Total** | | | **137/138*** | |

**Students without 'A' Level Physics will take 'PH1012 Physics A' (4AU).*

*^Counted towards 2nd Major in Data Analytics requirement (total 10AU)*

**B.Eng. (Chemical & Biomolecular Engineering) with 2nd Major in Data Analytics (DA)**
Suggested Study Plan for AY2022-2023 intake (CBDA)
*with Professional Internship*

**Year 1 Semester 1**

| Course | | Type | AU |
|---|---|---|---|
| CB1102 | Introduction to Chemical and Biomedical Engineering | C | 1 |
| CB1131 | Introduction to Biomolecular Engineering | C | 3 |
| CH1801 | Chemical & Biomolecular Engineering Laboratory 1A | C | 1 |
| MH1810 | Math 1 | C | 3 |
| PH1011 | Physics | C | 3 |
| | *or* | | |
| PH1012 | Physics A *(* For students without 'A' Level Physics)* | C | 4 |
| CC0001 | Inquiry and Communication in the Interdisciplinary World | CC | 2 |
| CC0002 | Navigating the Digital World | CC | 2 |
| | | | **15** |

**Year 1 Semester 2**

| Course | | Type | AU |
|---|---|---|---|
| CB1103 | Organic Chemistry For Engineers | C | 3 |
| CB1117 | Engineering Mathematics | C | 4 |
| CH1104 | Materials & Energy Balance | C | 3 |
| CH1802 | Chemical & Biomolecular Engineering Laboratory 2 | C | 1 |
| EG1001 | Engineers in Society | C | 2 |
| CC0003 | Ethics & Civics in a Multi-Cultural World | CC | 2 |
| CC0005 | Healthy Living & Wellbeing | CC | 3 |
| | | | **18** |

* **16**

**Year 2 Semester 1**

| Course | | Type | AU |
|---|---|---|---|
| CH2103 | Fluid Systems | C | 3 |
| CH2107 | Introduction to Computational Thinking | C | 3 |
| CH2108 | Thermodynamics | C | 3 |
| CH2010 | Engineering Statistics | C | 3 |
| CH2801 | Chemical & Biomolecular Engineering Laboratory 2A | C | 2 |
| CC0006 | Sustainability: Society, Economy & Environment | CC | 3 |
| ML0004 | Career and Entrepreneurial Development for the Future World | CC | 2 |
| | | | **19** |

**Year 2 Semester 2**

| Course | | Type | AU |
|---|---|---|---|
| CH2112 | Chemical Reaction Engineering | C | 3 |
| CH2114 | Heat & Mass Transfer in Chemical and Biological Systems | C | 3 |
| CH2123 | Chemical Thermodynamics | C | 3 |
| CH2151 | Unit Operations A | C | 3 |
| CH2802 | Chemical & Biomolecular Engineering Laboratory 2B | C | 2 |
| CC0007 | Science & Technology for Humanity | CC | 3 |
| CB0494 | Introduction to Data Science and Artificial Intelligence | FC | 3 |
| | | | **20** |

**Year 3 Semester 1**

| Course | | Type | AU |
|---|---|---|---|
| CH3104 | Biochemical Engineering | C | 3 |
| CH3109 | Decision Tools for Business & Engineering | C | 3 |
| CH3111 | Process Control and Dynamics | C | 3 |
| CH3121 | Chemical, Biological & Plant Safety | C | 2 |
| CH3140 | Unit Operations: Fluid-Fluid Separation | C | 3 |
| CH3802 | Chemical & Biomolecular Engineering Laboratory 5 | C | 3 |
| HW0288 | Engineering Communication | FC | 2 |
| | | | **19** |

**Year 3 Semester 2**

| Course | | Type | AU |
|---|---|---|---|
| CH3880 | Professional Internship | FC | 10 |
| | | | **10** |

**Year 4 Semester 1**

| Course | | Type | AU |
|---|---|---|---|
| CH4801 | Final Year Design Project | C | 4 |
| | CBE PE 1 | MPE | 3 |
| EE4483 | Artificial Intelligence & Data Mining | BDE | 3 |
| BC2406 | Analytics I: Visual and Predictive Techniques | BDE | 4 |
| CH4244 | Numerical Method and Data Analytics | BDE | 3 |
| | DA Elective 2 | BDE | 3 |
| | | | **20** |

**Year 4 Semester 2**

| Course | | Type | AU |
|---|---|---|---|
| CH4801 | Final Year Design Project | C | 4 |
| | CBE PE 2 | MPE | 3 |
| MH1403 | Algorithms & Computing | BDE | 3 |
| EE4791 | Database Systems | BDE | 3 |
| | DA Elective 3 | BDE | 3 |
| | | | **16** |

**Total (AU)** **137**

**138***

**Students without 'A' Level Physics will take 'PH1012 Physics A' (4AU).*