



# **University of Engineering and Management, Kolkata**

**B.Tech - Biotechnology (4-years degree programme)**

**Syllabus for Admission Batch 2025-2029**

### SEMESTER I

| S. No | Course Code | Course Title                                              | L | T | P | C           |
|-------|-------------|-----------------------------------------------------------|---|---|---|-------------|
| 1     | BSC 102     | Chemistry                                                 | 3 | 1 | 0 | 4           |
| 2     | BSC 103     | Mathematics I                                             | 3 | 1 | 0 | 4           |
| 3     | BSC 109     | Biology for engineers                                     | 2 | 1 | 0 | 3           |
| 4     | ESC 101     | Basic Electrical Engineering                              | 3 | 1 | 0 | 4           |
| 5     | ESC 103     | Engineering mechanics I                                   | 1 | 1 | 0 | 2           |
| 6     | HSMC 102    | Essential studies for professionals- I                    | 2 | 0 | 0 | 0.5         |
| 7     | IVC 103     | Programing for Problem Solving using Python               | 0 | 0 | 1 | 0           |
| 8     | IVC 104     | Design Thinking & Innovation-Basic                        | 0 | 0 | 1 | 0           |
| 9     | IVC 105     | Economics, finance and Entrepreneurship Skills-Foundation | 0 | 0 | 3 | 0           |
| 10    | BSC 192     | Chemistry Laboratory                                      | 0 | 0 | 3 | 1.5         |
| 11    | ESC 191     | Basic Electrical Engineering laboratory                   | 0 | 0 | 2 | 1           |
| 12    | ESC 194     | Workshop/ Manufacturing practices                         | 0 | 0 | 6 | 3           |
| 13    | HSMC 182    | Skill Development for professionals- I                    | 0 | 0 | 2 | 0.5         |
|       |             | <b>TOTAL</b>                                              |   |   |   | <b>23.5</b> |

## SEMESTER II

| S. No. | Course Code | Course Title                                            | L | T | P | C           |
|--------|-------------|---------------------------------------------------------|---|---|---|-------------|
| 1      | BSC 201     | Physics                                                 | 3 | 1 | 0 | 4           |
| 2      | BSC 204     | Mathematics II                                          | 3 | 1 | 0 | 4           |
| 3      | ESC 202     | Engineering mechanics II                                | 1 | 1 | 0 | 2           |
| 4      | ESC 203     | Programing for problem solving                          | 3 | 1 | 0 | 4           |
| 5      | HSMC 201    | English                                                 | 2 | 0 | 0 | 2           |
| 6      | HSMC 202    | Essential studies for professionals- II                 | 2 | 0 | 0 | 0.5         |
| 7      | IVC 201     | Basic Electronics engineering                           | 0 | 0 | 1 | 0           |
| 8      | IVC 202     | Design Thinking & Innovation-Advance                    | 0 | 0 | 1 | 0           |
| 9      | IVC 203     | Economics, finance and Entrepreneurship Skills- Advance | 0 | 0 | 1 | 0           |
| 10     | BSC 291     | Physics Laboratory                                      | 0 | 0 | 3 | 1.5         |
| 11     | HSMC 291    | English Laboratory                                      | 0 | 0 | 2 | 1           |
| 12     | ESC 292     | Engineering Graphics & design                           | 0 | 0 | 6 | 3           |
| 13     | ESC 293     | Programing for problem solving                          | 0 | 0 | 2 | 1           |
| 14     | HSMC 282    | Skill Development for professionals- II                 | 0 | 0 | 1 | 0.5         |
|        |             | <b>TOTAL</b>                                            |   |   |   | <b>23.5</b> |

### SEMESTER III

| S. No. | Course Code | Course Title                                        | L         | T        | P         | C         |
|--------|-------------|-----------------------------------------------------|-----------|----------|-----------|-----------|
| 1      | BSBT301     | Biochemistry                                        | 2         | 0        | 0         | 2         |
| 2      | BSBT302     | Microbiology                                        | 2         | 0        | 0         | 2         |
| 3      | BSBT 303    | Genetics                                            | 2         | 0        | 0         | 2         |
| 4      | BSBT306     | Biophysics                                          | 2         | 0        | 0         | 2         |
| 5      | BSBT304     | Cell & Molecular Biology                            | 2         | 0        | 0         | 2         |
| 6      | BSBT305     | Plant Biology                                       | 2         | 0        | 0         | 2         |
| 7      | HSMC301     | Effective Technical Communication                   | 3         | 0        | 0         | 3         |
| 8      | BSBT391     | Biochemistry Lab                                    | 0         | 0        | 2         | 1         |
| 9      | BSBT392     | Microbiology Lab                                    | 0         | 0        | 2         | 1         |
| 7      | BSBT393     | Genetics Lab                                        | 0         | 0        | 2         | 1         |
| 10     | BSBT394     | Cell & Molecular Biology Lab                        | 0         | 0        | 2         | 1         |
| 11     | BSBT395     | Plant Biology Lab                                   | 0         | 0        | 2         | 1         |
| 12     | PSBT381     | Technical Seminar                                   | 0         | 0        | 6         | 3         |
| 13     | ESEP301     | Essential Studies for Engineering Professionals III | 2         | 0        | 0         | 2         |
|        |             | <b>TOTAL</b>                                        | <b>17</b> | <b>0</b> | <b>18</b> | <b>25</b> |

### SEMESTER IV

| S. No. | Course Code | Course Title                                         | L         | T        | P         | C         |
|--------|-------------|------------------------------------------------------|-----------|----------|-----------|-----------|
| 1      | HSMC401     | Engineering Economics                                | 2         | 0        | 0         | 2         |
| 2      | PCCBT401    | Bioprocess Engineering                               | 2         | 1        | 0         | 3         |
| 3      | PCCBT402    | Green Biotechnology and Pollution Abatement          | 2         | 0        | 0         | 2         |
| 4      | PCCBT403    | Immunology & Immuno- technology                      | 2         | 0        | 0         | 2         |
| 5      | PCCBT404    | Structural Biology                                   | 2         | 1        | 0         | 3         |
| 6      | PCCBT405    | rDNA Technology                                      | 2         | 1        | 0         | 3         |
| 7      | AUBT401     | Environmental Science                                | 1         | 0        | 0         | 0         |
| 8      | PCCBT406    | Bioinformatics & Computational Biology               | 2         | 1        | 0         | 3         |
| 9      | PCCBT491    | Bioprocess Engineering Lab                           | 0         | 0        | 2         | 1         |
| 10     | PCCBT 493   | Immunology & Immuno- technology Lab                  | 0         | 0        | 4         | 2         |
| 11     | PCCBT495    | rDNATechnology Lab                                   | 0         | 0        | 4         | 2         |
| 12     | PCCBT 496   | Bioinformatics & Computational Biology Lab           | 0         | 0        | 4         | 2         |
| 13     | PSBT481     | Comprehensive viva voce                              | 0         | 0        | 2         | 1         |
| 14     | ESEP401     | Essential Studies for Engineering Professionals – IV | 2         | 0        | 0         | 2         |
|        |             | <b>Total</b>                                         | <b>18</b> | <b>4</b> | <b>14</b> | <b>28</b> |

### SEMESTER V

| S. No. | Course Code | Course Title                                        | L         | T        | P         | C         |
|--------|-------------|-----------------------------------------------------|-----------|----------|-----------|-----------|
| 1      | HSMC501     | Entrepreneurship and Startups                       | 1         | 1        | 0         | 2         |
| 2      | PCCBT501    | Analytical Techniques                               | 2         | 0        | 0         | 2         |
| 3      | PCCBT502    | Metabolic Engineering                               | 2         | 0        | 0         | 2         |
| 4      | PCCBT503    | Cheminformatics & Medicinal Chemistry               | 2         | 0        | 0         | 2         |
| 5      | PECBT501    | Biosimilars Technology                              | 2         | 0        | 0         | 2         |
| 6      | OSCBT501    | Biomaterials                                        | 2         | 0        | 0         | 2         |
| 7      | OSCBT581    | Data Structure and Algorithm                        | 0         | 0        | 2         | 1         |
| 8      | AUBT501     | Indian Constitution                                 | 1         | 0        | 0         | 0         |
| 9      | PCCBT591    | Analytical Techniques Lab                           | 0         | 0        | 2         | 1         |
| 10     | PCCBT592    | Metabolic Engineering Lab                           | 0         | 0        | 2         | 1         |
| 11     | PCCBT593    | Cheminformatics & Medicinal Chemistry Lab           | 0         | 0        | 2         | 1         |
| 12     | PECBT591    | Biosimilars Technology Lab                          | 0         | 0        | 2         | 1         |
| 13     | OSCBT591    | Biomaterials Lab                                    | 0         | 0        | 2         | 1         |
| 14     | PCCBT506    | Good Manufacturing and Laboratory Practice          | 2         | 1        | 0         | 3         |
| 15     | PSBT581     | Summer Internship- I                                | 0         | 0        | 4         | 2         |
| 16     | ESEP501     | Essential Studies for Engineering Professionals – V | 2         | 0        | 0         | 2         |
|        |             | <b>Total</b>                                        | <b>16</b> | <b>2</b> | <b>18</b> | <b>25</b> |

### SEMESTER VI

| S. No.       | Course Code | Course Title                                         | L         | T        | P         | C         |
|--------------|-------------|------------------------------------------------------|-----------|----------|-----------|-----------|
| 1            | PCCBT601    | Bioseparation Engineering                            | 2         | 0        | 0         | 2         |
| 2            | PCCBT602    | Synthetic & Systems Biology                          | 2         | 1        | 0         | 3         |
| 3            | PCCBT603    | Animal & Plant Biotechnology                         | 2         | 1        | 0         | 3         |
| 4            | PECBT601    | Waste Management & Upcycling                         | 2         | 0        | 0         | 2         |
| 5            | OECBT601    | Database Management System                           | 2         | 0        | 0         | 2         |
| 6            | PCCBT691    | Bioseparation Engineering Lab                        | 0         | 0        | 2         | 1         |
| 7            | PCCBT692    | Synthetic & Systems Biology Lab                      | 0         | 0        | 2         | 1         |
| 8            | PCCBT693    | Animal & Plant Biotechnology Lab                     | 0         | 0        | 2         | 1         |
| 9            | PECBT691    | Waste Management & Upcycling Lab                     | 0         | 0        | 2         | 1         |
| 10           | OECBT691    | Database Management System Lab                       | 0         | 0        | 2         | 1         |
| 11           | ESEP 601    | Essential Studies for Engineering Professionals – VI | 2         | 0        | 0         | 2         |
| <b>TOTAL</b> |             |                                                      | <b>12</b> | <b>0</b> | <b>12</b> | <b>19</b> |

### SEMESTER VII

| S. No.       | Course Code | Course Title                                          | L         | T        | P         | C         |
|--------------|-------------|-------------------------------------------------------|-----------|----------|-----------|-----------|
| 1            | HSMC702     | Intellectual Property Rights (IPR) & Regulatory       | 2         | 0        | 0         | 2         |
| 2            | OSCBT701    | Data analysis and Simulations                         | 2         | 1        | 0         | 3         |
| 3            | PECBT701    | State-of-the-art Imaging                              | 2         | 0        | 0         | 2         |
| 4            | PCCBT701    | Food and Nutrition Technology                         | 2         | 1        | 0         | 3         |
| 5            | PECBT702    | Nano Biotechnology                                    | 2         | 1        | 0         | 3         |
| 6            | OSCBT702    | Bioterrorism and National Security                    | 2         | 0        | 0         | 2         |
| 7            | OSCBT 791   | Data analysis and Simulations Lab                     | 0         | 0        | 2         | 1         |
| 8            | PECBT791    | State-of-the-art Imaging Lab                          | 0         | 0        | 2         | 1         |
| 9            | PCCBT791    | Food and Nutrition Technology Lab                     | 0         | 0        | 2         | 1         |
| 10           | PSCBT791    | Project-I                                             | 0         | 0        | 8         | 4         |
| 11           | PSCBT781    | Summer Internship- II                                 | 0         | 0        | 4         | 2         |
| 12           | ESEP701     | Essential Studies for Engineering Professionals – VII | 2         | 0        | 0         | 2         |
| <b>TOTAL</b> |             |                                                       | <b>15</b> | <b>4</b> | <b>20</b> | <b>26</b> |

### SEMESTER VIII

| S. No.       | Course Code | Name                                                         | L        | T        | P         | C         |
|--------------|-------------|--------------------------------------------------------------|----------|----------|-----------|-----------|
| 1            | PSCBT891    | Project-II                                                   | 0        | 0        | 18        | 9         |
| 2            | PSCBT881    | Grand Viva                                                   | 0        | 0        | 0         | 5         |
| 3            | ESEP801     | Essential Studies for<br>Engineering Professionals<br>– VIII | 2        | 0        | 0         | 2         |
| <b>TOTAL</b> |             |                                                              | <b>2</b> | <b>0</b> | <b>20</b> | <b>16</b> |