**B. Tech. in Mathematics and Computing – 2024 Batch**

**Program offered by Department of Mathematics jointly with Department of Data Science and Computer Applications MIT Manipal**

| **Year** | **THIRD SEMESTER** | | | | | | **FOURTH SEMESTER** | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sub. Code | Subject Name | L | T | P | C | Sub. Code | **Subject Name** | L | T | P | C |
| **II** | MAT2135 | Computational Linear Algebra | 3 | 1 | 0 | 4 | MAT2235 | Algebraic Structures | 2 | 1 | 0 | 3 |
| MAT2136 | Probability and Stochastic Process | 3 | 0 | 0 | 3 | MAT2236 | Real Analysis | 3 | 0 | 0 | 3 |
| CSS\*\*\*\* | Data Structures | 3 | 1 | 0 | 4 | MAT2237 | Mathematical Logic & Computability | 3 | 0 | 0 | 3 |
| MAT2137 | Elementary Number Theory | 2 | 1 | 0 | 3 | MAT2238 | Vector Analysis and Complex Variables | 2 | 1 | 0 | 3 |
| CSS\*\*\*\* | Advanced Programming | 3 | 0 | 0 | 3 | CSS\*\*\*\* | Operating Systems | 3 | 0 | 0 | 3 |
| MAT2138 | Discrete Mathematics | 2 | 1 | 0 | 3 | CSS\*\*\*\* | Operating Systems Lab | 0 | 0 | 3 | 1 |
| CSS\*\*\*\* | Advanced Programming Lab | 0 | 0 | 3 | 1 | CSS\*\*\*\* | Database Systems | 3 | 1 | 0 | 4 |
| CSS\*\*\*\* | Data Structures Lab | 0 | 0 | 3 | 1 | CSS\*\*\*\* | Database Lab | 0 | 0 | 3 | 1 |
|  | | **16** | **4** | **6** | **22** |  | | **15** | **3** | **6** | **21** |
|  | **Total Contact Hours (L + T + P)** | | **26** | | | | **Total Contact Hours (L + T + P)** | | **24** | | | |

| **Year** | **FIFTH SEMESTER** | | | | | | **SIXTH SEMESTER** | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sub. Code** | **Subject Name** | **L** | **T** | **P** | **C** | **Sub. Code** | **Subject Name** | **L** | **T** | **P** | **C** |
| **III** | HUM3021 | Engineering Economics & Financial Management | 2 | 1 | 0 | 3 | HUM3022 | Essentials of Management | 2 | 1 | 0 | 3 |
| DSE\*\*\*\* | Fundamentals of Machine Learning | 3 | 0 | 3 | 4 | MAT3231 | Advanced Numerical Methods | 3 | 0 | 0 | 3 |
| MAT3131 | Multivariate Analysis | 3 | 0 | 3 | 4 | MAT3232 | Time Series Analysis | 3 | 1 | 0 | 4 |
| MAT3132 | Artificial Intelligence | 3 | 0 | 0 | 3 | MAT\*\*\*\*/CSS\*\*\*\* | Program Elective–I/Minor Specialization | 3 | 0 | 0 | 3 |
| MAT\*\*\*\* | Algorithms & Computational Complexity | 3 | 0 | 0 | 3 | MAT\*\*\*\*/CSS\*\*\*\* | Program Elective–II/Minor Specialization | 3 | 0 | 0 | 3 |
| IPE4302 | Open Elective –1 Creativity, Problem Solving and Innovation | 3 | 0 | 0 | 3 | \*\*\* \*\*\*\* | Open Elective – 2 | 2 | 1 | 0 | 3 |
| MAT\*\*\*\* | Algorithms & Computational Complexity Lab | 0 | 0 | 3 | 1 | MAT3241 | Scientific Computing Lab | 0 | 0 | 6 | 2 |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  | | **17** | **1** | **6** | **21** |  | | **18** | **3** | **6** | **21** |
|  | **Total Contact Hours (L + T + P)** | | **24** | | | | **Total Contact Hours (L + T + P)** | | **27** | | | |

| **Year** | **SEVENTH SEMESTER** | | | | | | **EIGHTH SEMESTER** | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sub. Code** | **Subject Name** | **L** | **T** | **P** | **C** | **Sub. Code** | **Subject Name** | **L** | **T** | **P** | **C** |
| **IV** | MAT\*\*\*\*/  CSS\*\*\*\* | Program Elective – III/ Minor Specialization | 3 | 0 | 0 | 3 | MAT4291 | Industrial Training |  |  |  | 1 |
| MAT\*\*\*\*/  CSS\*\*\*\* | Program Elective – IV/ Minor Specialization | 3 | 0 | 0 | 3 | MAT4292 | Project Work |  |  |  | 12 |
| MAT\*\*\*\* | Program Elective – V | 3 | 0 | 0 | 3 | MAT4293 | Project Work (B Tech – honours)\*\* |  |  |  | 20 |
| MAT\*\*\*\* | Program Elective – VI | 3 | 0 | 0 | 3 | MAT\*\*\*\* | B Tech – honours (Theory 1\*\*) (V semester) |  |  |  | 4 |
| \*\*\*\*\*\* | Program Elective – VII | 3 | 0 | 0 | 3 | MAT\*\*\*\* | B Tech – honours Theory 2\*\*) (VI semester) |  |  |  | 4 |
| \*\*\*\*\*\* | Open Elective – 3 | 3 | 0 | 0 | 3 | MAT\*\*\*\* | B Tech – honours Theory 3\*\*) (VII semester) |  |  |  | 4 |
| MAT4191 | Mini Project (Minor specialization) \* |  |  |  | 8 |  |  |  |  |  |  |
|  | | **18** | **0** | **0** | **18/26** |  | |  |  |  | **13/33** |
|  | **Total Contact Hours (L + T + P)** | | **18** | | | | **Total Contact Hours (L + T + P)** | |  | | | |

\*Applicable to students who opted for minor specialization

\*\*Applicable to eligible students who opted for and successfully completed the B Tech – honours requirements

**Minor Specializations:**

**Applied Mathematics**

* MAT4405 Linear Optimization
* MAT 4406 Non-Linear Optimization
* MAT4407 Combinatorics & Design of Experiments
* MAT4408 Game Theory & Statistical Decisions

**Advanced Mathematics**

* MAT4409 Applied Graph Theory
* MAT4410 Matrix Theory
* MAT4411 Advanced Algorithms and Deep Learning
* MAT4412 Algebraic Coding Theory

**Other Program Electives:**

* MAT4444 Big Data Analytics
* MAT4446 Computational Fluid Dynamics
* MAT4447 Functional Programming
* MAT4448 Fuzzy Logic and Neural Networks
* MAT4450 Geometric Topology
* MAT4453 Mathematics for Finance
* MAT4455 Reliability Theory
* MAT 4456 Theory of Computation
* MAT 4457 Topology of Metric Spaces