# MANIPAL UNIVERSITY JAIPUR
## Department of Computer Science & Engineering
### B.Tech Scheme – 2019 Onwards

| Year | Sub. Code | Subject Name | L | T | P | C | Sub. Code | Subject Name | L | T | P | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **THIRD SEMESTER** | | | | | | **FOURTH SEMESTER** | | | | | |
| II | EO2001 | Economics | 3 | 0 | 0 | 3 | BB0025 | Value, Ethics and Governance | 2 | 0 | 0 | 2 |
| | MA2101 | Engineering Mathematics – III | 2 | 1 | 0 | 3 | MA2201 | Engineering Mathematics – IV | 2 | 1 | 0 | 3 |
| | CS2101 | Data Communications | 3 | 1 | 0 | 4 | CS2201 | Operating Systems | 3 | 1 | 0 | 4 |
| | CS2102 | Computer System Architecture | 3 | 1 | 0 | 4 | CS2202 | Relational Database Management Systems | 3 | 1 | 0 | 4 |
| | CS2103 | Data Structures & Algorithms | 3 | 1 | 0 | 4 | CS2203 | Computer Organization | 3 | 1 | 0 | 4 |
| | CS2104 | Object Oriented Programming | 3 | 1 | 0 | 4 | *** *** | Open Elective – I | 3 | 0 | 0 | 3 |
| | CS2130 | Data Structures & Algorithms Lab | 0 | 0 | 2 | 1 | CS2230 | Operating Systems Lab | 0 | 0 | 2 | 1 |
| | CS2131 | Object Oriented Programming Lab | 0 | 0 | 2 | 1 | CS2231 | Relational Database Management Systems Lab | 0 | 0 | 2 | 1 |
| | | | | | | | CS2232 | Web Technology Lab | 0 | 0 | 2 | 1 |
| | | | 17 | 5 | 4 | **24** | | | 16 | 4 | 6 | **23** |
| | **Total Contact Hours (L + T + P)** | | | **25** | | | **Total Contact Hours (L + T + P) + OE** | | | **23+3= 26** | | |
| | **FIFTH SEMESTER** | | | | | | **SIXTH SEMESTER** | | | | | |
| III | CS3101 | Artificial Intelligence & Soft Computing | 3 | 1 | 0 | 4 | BB0026 | Organization and Management | 3 | 0 | 0 | 3 |
| | CS3102 | Design & Analysis of Algorithms | 3 | 1 | 0 | 4 | CS3201 | Software Engineering | 3 | 1 | 0 | 4 |
| | CS3103 | Automata Theory & Compiler Design | 3 | 1 | 0 | 4 | CS3202 | Information Systems Security | 3 | 1 | 0 | 4 |
| | CS3104 | Computer Networks | 3 | 1 | 0 | 4 | CS3203 | Data Science and Machine Learning | 3 | 0 | 0 | 3 |
| | CS31XX | Program Elective – I | 3 | 0 | 0 | 3 | CS32XX | Program Elective – II | 3 | 0 | 0 | 3 |
| | *** **** | Open Elective – II | 3 | 0 | 0 | 3 | *** **** | Open Elective – III | 3 | 0 | 0 | 3 |
| | CS3130 | Design & Analysis of Algorithms Lab | 0 | 0 | 2 | 1 | CS3230 | Software Engineering Lab | 0 | 0 | 2 | 1 |
| | CS3131 | Artificial Intelligence & Soft Computing Lab | 0 | 0 | 2 | 1 | CS3231 | Information Systems Security Lab | 0 | 0 | 2 | 1 |
| | CS3132 | Computer Networks lab | 0 | 0 | 2 | 1 | CS3270 | Minor Project | 0 | 0 | 6 | 3 |
| | | | 18 | 4 | 6 | **25** | | | 18 | 2 | 10 | **25** |
| | **Total Contact Hours (L + T + P) + OE** | | | **25+3=28** | | | **Total Contact Hours (L + T + P) + OE** | | | **25+3=28** | | |

| | | SEVENTH SEMESTER | | | | | EIGHTH SEMESTER | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IV | CS41XX | Program Elective – III | 3 | 0 | 0 | 3 | CS4270 | Major Project | | | | 12 |
| | CS41XX | Program Elective – IV | 3 | 0 | 0 | 3 | | | | | | |
| | CS41XX | Program Elective – V | 3 | 0 | 0 | 3 | | | | | | |
| | CS41XX | Program Elective – VI | 3 | 0 | 0 | 3 | | | | | | |
| | CS41XX | Program Elective – VII | 3 | 0 | 0 | 3 | | | | | | |
| | CS4170 | Industrial Training | 0 | 0 | 2 | 1 | | | | | | |
| | | | 15 | 0 | 2 | **16** | | | | | | **12** |
| | **Total Contact Hours (L + T + P)** | | **15+ 2 = 17** | | | | | | | | | |

| Program Electives (Minor Specializations) | Program Electives (PE5, PE6, PE7) | Open Electives |
|---|---|---|
| **CYBER SECURITY** | CS4144: Information Retrieval | CS0001: Data Science for Engineers |
| CS3140: Information Coding | CS4145: Computer Graphics & Multimedia | CS0002: Programming, Data Structures and Algorithms using Python |
| CS3143: Security and Privacy Foundation | CS4146: User Interface Design | CS0003: Data Structure and Algorithmsusing Java |
| CS3240: Principles of Secure Programming | CS4147: Digital Image Processing | CS0004: The Joy of Computing usingPython |
| CS4140: Cyber Security | CS4148: Internet of Things | CS0005: Fundamentals of Databases |
| CS4141: Digital Forensics & Cyber Crimes | CS4149: Big Data Analytics | CS0006: Fundamentals of Cryptography |
| | CS4150: Software Defined Networks | CS0007: Principles of Programming Languages |
| **CLOUD COMPUTING** | CS4151: Deep Neural Network | CS0008: Principles of Software Design |
| CS3141: Cloud Computing & Virtualization | CS4152: Social Network Analysis | CS0009: Fundamentals of Internet of Things |
| CS3241: Cloud Infrastructure Services | CS4153: Software Testing | CS0010: Principles of Machine Learning |
| CS4142: Cloud Computing Applications | CS4154: Linux System and Shell Programming | CS0051: HTML, CSS and JavaScript forWeb Developers |
| CS4143: Cloud Security and Privacy | CS4155: Wireless Sensor & Adhoc Network | CS0052: Networking and Security in iOS Applications |
| | CS4156: Mobile Computing | CS0053: Fundamentals of IoT Security |
| **DATA ANALYTICS** | CS4157: Natural Language Processing | CS0054: Enterprise Resource Planning |
| CS3142: Predictive Analytics | CS4158: Computer Vision | CS0080: Introduction to Data Science using R |
| CS3242: Image Processing and Pattern Analysis | CS4161: Advanced Data Structures | CS0081: Robotic Process Automation |
| CS4159: Data Visualization Techniques | CS4162: Blockchain Technologies | |
| CS4160: Fundamentals of Big Data | CS4163: Explainable Artificial Intelligence | |
| | CS4164: Advance Compiler Design | |