# Bachelor of Technology: Computer Science & Engineering

# B.Tech. / B.Tech. (Honours)

# Structure of Programmes:

Credits required for graduation:  140

Credits required as essential distribution requirement: 120

Credits free to choose from anywhere (including from programme and specialization beyond minimum): 20

(Subject to meeting the pre-requisites).

# Specializations Available

Programme: B.Tech. / B.Tech. (Honours) in Computer Science & Engineering,

(a) With specialization in Artificial Intelligence & Machine Learning, or

(b) With specialization in Cyber Security

University Core:

 Minimum number of credits to be completed: 20

 List of courses that comprise of University core:

|  |  |  |
| --- | --- | --- |
| Course Code | Course title | Credits |
| ENG111 | English Language Building Skills | 3 |
| ENG121 | Communication English | 3 |
| ENG211 | Soft Skill & Professional Communication Skills | 3 |
| HMM411 | One course on Management for Engineers | 3 |
| HUM311 | One course on Humanities | 2 |
| HMM421 | Professional Ethics | 2 |
| HUM411 | History of Uzbekistan 1 | 2 |
| HUM421 | History of Uzbekistan 2 | 2 |

School Core:

 Minimum number of credits to be completed: 44

 List of courses that comprise of School core:

|  |  |  |
| --- | --- | --- |
| Course Code | Course title | Credits |
| CSE111 | Programming for Problem Solving | 2 |
| MTH111 | Calculus | 4 |
| PHY111 | Engineering Physics | 4 |
| EEE111 | Principles of Electrical Engineering | 1.5 |
| ECE111 | Basics of Electronics  | 1.5 |
| ECE151 | Principles of Electrical & Electronics Engineering Laboratory  | 1 |
| CSE112 | Introduction to Computer Science and Engineering  | 1 |
| CSE121 | Object Oriented Programming Using Java | 3 |
| MTH121 | Linear algebra, Statistics and Probability | 2 |
| PHY121 | Semiconductor Physics | 2.5 |
| CHY121 | Engineering Chemistry | 3.5 |
| CSE212 | Discrete Structure | 4 |
| CSE214 | Application based Programming in Python | 2 |
| CSE419 | Major Project- 1 | 2 |
| CSE412 | Internship Assessment | 2 |
| CSE429 | Major Project - 2 | 6 |

Programme Core:

 Minimum number of credits to be completed: 40

 List of courses that comprise of Programme core:

|  |  |  |
| --- | --- | --- |
| Course Code | Course title | Credits |
| CSE122 | Creativity & Design for Engineers | 2 |
| CSE211 | Computer Organization and Architecture | 3 |
| CSE213 | Data Structures  | 4 |
| CSE215 | Project Based Learning (PBL) -1 | 1 |
| CSE221 | Principles of Operating System | 4 |
| CSE222 | Theory of Computation  | 2 |
| CSE223 | Compiler Design | 3 |
| CSE224 | Data Base Management System | 4 |
| CSE225 | Computer Networks | 3 |
| CSE226 | Project Based Learning (PBL) -2 | 1 |
| CSE311 | Design and Analysis of Algorithm  | 4 |
| CSE312 | Software Engineering | 3 |
| CSE313 | Project Based Learning (PBL) -3 | 1 |
| CSE321 | Internet Technologies | 1.5 |
| CSE322 | Web Technologies | 2.5 |
| CSE323 | Project Based Learning (PBL) -4 | 1 |

Specialization Core (For each specialization):

 Minimum number of credits to be completed: 12

List of courses that comprise of Specialization core for Artificial Intelligence &

Machine Learning:

|  |  |  |
| --- | --- | --- |
| Course code | Course title | Credits |
| CSE388 | Artificial Intelligence  | 3 |
| CSE389 | Concept of Machine Learning | 3 |
| CSE471 | Soft Computing | 3 |
| CSE472 | Pattern Recognition | 3 |

 List of courses that comprise of Specialization core for Cyber Security:

|  |  |  |
| --- | --- | --- |
| Course Code | Course title | Credits |
| CSE484 | Concept of Cyber Security | 3 |
| CSE485 | Cryptography  | 3 |
| CSE486 | Network Security | 3 |
| CSE487 | Security Architecture | 3 |

Electives:

 Minimum number of elective credits to be completed for this degree: 36

 Minimum credits to be completed for Program Elective: 24

 List of courses that comprise of Electives relevant to this degree:

|  |  |  |
| --- | --- | --- |
| Course Code | Electives | Credits  |
| CSE371 | Mathematical Techniques for Computer Science & Engineering | 3 |
| CSE372 | Introduction to Graph Theory and its Applications | 3 |
| CSE373 | Introduction to Cloud Computing | 3 |
| CSE374 | Android Application Development | 3 |
| CSE375 | Distributed System Concepts & Design | 3 |
| CSE376 | Digital Image Processing | 3 |
| CSE377 | Natural Language Processing | 3 |
| CSE378 | Wireless Networks | 3 |
| CSE379 | Web Designing | 3 |
| CSE381 | Big data Analytics | 3 |
| CSE382 | Data Mining | 3 |
| CSE383 | Software Project Management | 3 |
| CSE384 | Mobile Computing | 3 |
| CSE385 | Real Time System | 3 |
| CSE386 | Business Intelligence | 3 |
| CSE387 | Android with Internet of Things | 3 |
| CSE388 | Artificial Intelligence | 3 |
| CSE389 | Concept of Machine Learning | 3 |
| CSE471 | Soft Computing | 3 |
| CSE472 | Pattern Recognition | 3 |
| CSE473 | Human Computer Interaction | 3 |
| CSE474 | Machine Learning for Health care | 3 |
| CSE475 | Information Retrieval | 3 |
| CSE476 | Neural Networks | 3 |
| CSE477 | Introduction to Deep Learning | 3 |
| CSE478 | Machine Learning for Networking | 3 |
| CSE479 | Fuzzy Logic | 3 |
| CSE481 | Intelligent Agent | 3 |
| CSE482 | Robotics & Intelligent systems  | 3 |
| CSE483 | Recommender Systems | 3 |
| CSE484 | Concept of Cyber Security | 3 |
| CSE485 | Cryptography  | 3 |
| CSE486 | Network Security | 3 |
| CSE487 | Security Architecture | 3 |
| CSE488 | Introduction to block chain | 3 |
| CSE489 | Ethical Hacking | 3 |
| CSE671 | Info. Security & audit Monitoring | 3 |
| CSE672 | Web Application Security | 3 |
| CSE673 | Cloud Security | 3 |
| CSE674 | Web & Mobile App. Security | 3 |
| CSE675 | Penetration Testing | 3 |
| CSE676 | Disaster Recovery Management | 3 |
| CSE677 | Risk management | 3 |
| CSE678 | IoT Security | 3 |
| ECE364 | Introduction to IoT (Not for CSE) | 2 |
| ECE365 | Wireless sensor network  | 2 |
|  | Programming for Problem Solving (Not for CSE) | 2 |
|  | Introduction to Biology for Engineers | 2 |
|  | Basics of Data Mining | 2 |
|  | Concepts of Cyber Security | 2 |
|  | Introduction to Computer Vision | 2 |
|  | Introduction to Machine Leaning | 2 |

**Sample Curriculum Plan B.tech Batch 2019-2023**

**SEMESTER 1**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **Course Type (Code)** | **Course Code** | **Course Title** | **L** | **T** | **P** | **C** |
| 1 | SC | CSE111 | Programming for Problem Solving | 0 | 0 | 4 | **2** |
| 2 | SC | MTH111 | Calculus and Abstract Algebra | 3 | 1 | 0 | **4** |
| 3 | SC | PHY111 | Engineering Physics | 3 | 0 | 2 | **4** |
| 4 | SC | EEE111 | Principles of Electrical Engineering | 1.5 | 0 | 0 | **1.5** |
| SC | ECE111 | Basics of Electronics  | 1.5 | 0 | 0 | **1.5** |
| 5 | SC | EEE151 | Principles of Electrical & Electronics Engineering Laboratory  | 0 | 0 | 2 | **1** |
| 6 | SC | CSE112 | Introduction to Computer Science and Engineering  | 1 | 0 | 0 | **1** |
| 7 | UC | ENG111 | English Language Building Skills | 3 | 0 | 0 | **3** |
|   |   |  | **TOTAL** | **13.0** | **1.0** | **8.0** | **18.0** |

**SEMESTER 2**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S. No.** |  **Course Type (Code)** | **Course Code** | **Course Title** | **L** | **T** | **P** | **C** |
| 1 | SC | CSE121 | Object Oriented Programming Using Java | 2 | 0 | 2 | **3** |
| 2 | SC | MTH121 | Linear algebra, statistics and probability | 1.5 | 0.5 | 0 | **2** |
| 3 | SC | PHY121 | Semiconductor Physics | 2 | 0 | 1 | **2.5** |
| 4 | SC | CHY121 | Engineering Chemistry | 3 | 0 | 1 | **3.5** |
| 5 | PC | CSE122 | Creativity & Design for Engineers | 2 | 0 | 0 | **2** |
| 6 | UC | ENG121 | Communication English | 3 | 0 | 0 | **3** |
|   |   |  | **TOTAL** | **15.0** | **1.0** | **4.0** | **18.0** |

**SEMESTER 3**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S.No.** |  **Course Type (Code)** | **Course Code** | **Course Title** | **L** | **T** | **P** | **C** |
| 1 | PC | CSE211 | Computer Organization and Architecture | 3 | 0 | 0 | **3** |
| 2 | SC | CSE212 | Discrete Structure | 3 | 1 | 0 | **4** |
| 3 | PC | CSE213 | Data Structures  | 3 | 0 | 2 | **4** |
| 4 | UC | ENG211 | Soft Skill & Professional Communication Skills | 3 | 0 | 0 | **3** |
| 5 | SC | CSE214 | Application based Programming in Python | 0 | 0 | 4 | **2** |
| 6 | PC | CSE215 | Project Based Learning (PBL) -1 | 0 | 0 | 2 | **1** |
|  |   |  | **TOTAL** | **12** | **1** | **8** | **17** |

**SEMESTER 4**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S.No.** |  **Course Type (Code)** | **Course Code** | **Course Title** | **L** | **T** | **P** | **C** |
| 1 | PC | CSE221 | Principles of Operating System | 3 | 0 | 2 | **4** |
| 2 | PC | CSE222 | Theory of Computation  | 1.5 | 0.5 | 0 | **2** |
| 3 | PC | CSE223 | Compiler Design | 1.5 | 0.5 | 2 | **3** |
| 4 | PC | CSE224 | Data Base Management System | 3 | 0 | 2 | **4** |
| 5 | PC | CSE225 | Computer Networks | 3 | 0 | 0 | **3** |
| 6 | PC | CSE226 | Project Based Learning (PBL) -2 | 0 | 0 | 2 | **1** |
|   |   |  | **TOTAL** | **12** | **1** | **8** | **17** |

**SEMESTER 5**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S.No.** |  **Course Type (Code)** | **Course Code** | **Course Title** | **L** | **T** | **P** | **C** |
| 1 | PC | CSE311 | Design and Analysis of Algorithm  | 3 | 0 | 2 | **4** |
| 2 | PC | CSE312 | Software Engineering | 3 | 0 | 0 | **3** |
| 3 | PE |  | Program Elective-1 | 3 | 0 | 0 | **3** |
| 4 | PE |  | Program Elective-2 | 3 | 0 | 0 | **3** |
| 5 | OE |  | Elective – 1 | 2 | 0 | 0 | **2** |
| 6 | PC | CSE313 | Project Based Learning (PBL) -3 | 0 | 0 | 2 | **1** |
| 7 | UC | HUM311 | One course on Humanities | 2 | 0 | 0 | **2** |
|  |   |  | **TOTAL** | **16** | **0** | **4** | **18** |

**SEMESTER 6**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S.No.** |  **Course Type (Code)** | **Course Code** | **Course Title** | **L** | **T** | **P** | **C** |
| 1 | PC | CSE321 | Internet Technologies | 1.5 | 0 | 0 | **1.5** |
| 2 | PC | CSE322 | Web Technologies | 1.5 | 0 | 2 | **2.5** |
| 3 | PE |  | Program Elective-3 | 3 | 0 | 0 | **3** |
| 4 | PE |  | Program Elective-4 | 3 | 0 | 0 | **3** |
| 5 | PE |  | Program Elective-5 | 3 | 0 | 0 | **3** |
| 6 | OE |  | Elective – 2 | 2 | 0 | 0 | **2** |
| 7 | OE |  | Elective – 3 | 2 | 0 | 0 | **2** |
| 8 | PC |  | Project Based Learning (PBL) -4 | 0 | 0 | 2 | **1** |
|   |   |  | **Total** | **16** | **0** | **4** | **18** |

**SEMESTER 7**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S.No.** | **Course Type (Code)** | **Course Code** | **Course Title** | **L** | **T** | **P** | **C** |
| 1 | PE |  | Program Elective-6 | 3 | 0 | 0 | 3 |
| 2 | PE |  | Program Elective-7 | 3 | 0 | 0 | 3 |
| 3 | OE |  | Elective - 4 | 2 | 0 | 0 | 2 |
| 4 | SC | CSE411 | Major Project- 1 | 0 | 0 | 4 | 2 |
| 5 | SC | CSE412 | Internship Assessment | 0 | 0 | 4 | 2 |
| 6 | UC | HMM411 | One course on Management for Engineers | 3 | 0 | 0 | 3 |
| 7 | UC |  | History of Uzbekistan 1 | 2 | 0 | 0 | 2 |
|   |   |  | **TOTAL** | **13** | **0** | **8** | **17** |

**SEMESTER 8**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S.No.** | **Course Type (Code)**  | **Course Code** | **Course Title** | L | T | P | C |
| 1 | SC | CSE429 | Major Project - 2 | 0 | 0 | 10 | 6 |
| 2 | PE |  | Program Elective-8 | 3 | 0 | 0 | 3 |
| 3 | OE |  | Elective - 5 | 2 | 0 | 0 | 2 |
| 4 | UC | HMM421 | Professional Ethics | 2 | 0 | 0 | **2** |
| 5 | UC |  | History of Uzbekistan 2 | 2 | 0 | 0 | 2 |
| 6 | OE |  | Elective -6 | 2 | 0 | 0 | **2** |
|   |   |  | **TOTAL** |  |  |  | **17** |