**BSCS-Scheme of Studies**

Scheme of studies for Bachelors of Science in Computer Science (BSCS) according to NCEAC and HEC is as follows

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Semester 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Serial #** | **Course Name** | **Pre- Requisite** | **Credit Hours** | **Course Code** |
| 1 | English Composition and Comprehension  |  | 3(3+0) | HUM-111 |
| 2 | University Elective-1 |  | 3(3+0) |  |
| 3 | Programming Fundamentals  |  | 4(3+1) | CS-132 |
| 4 | Calculus and Analytical Geometry  |  | 3(3+0) | MTH-120 |
| 5 | Introduction to Computing  |  | 3(2+1) | CS-131 |
| 6 | Islamic Studies |  | 2(2+0) | HUM-112 |
| **Semester Subtotal** |  | **18** |  |

**Semester 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Serial #** | **Course Name** | **Pre- Requisite** | **Credit Hours** | **Course Code** |
| 1 | Applied Physics |  | 3(3+0) | CS-151 |
| 2 | Technical and Business Writing |  | 3(3+0) | HUM-114 |
| 3 | Probability & Statistics |  | 3(3+0) | MTH-122 |
| 4 | Pakistan Studies  |  | 2(2+0) | HUM-115 |
| 5 | Object Oriented Programming  | Programming Fundamentals | 4(3+1) | CS-133 |
| 6 | Discrete Structures |  | 3(3+0) | CS-123 |
| **Semester Subtotal** |  | **18** |  |

**Semester 3**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Serial #** | **Course Name** | **Pre- Requisite** | **Credit Hours** | **Course Code** |
| 1 | Communication and Presentation Skills  | English Composition & Comprehension | 3(3+0) | HUM-216 |
| 2 | University Elective-2 |  | 3(3+0) |  |
| 3 | Digital Logic Design | Applied Physics | 4(3+1) | CS-252 |
| 4 | Data Structure and Algorithms | Object-Oriented Programming | 4(3+1) | CS-261 |
| 5 | CS Supporting-1 | Calculus and Analytical Geometry  | 3(3+0) |  |
| **Semester Subtotal** |  | **17** |  |

**Semester 4**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Serial #** | **Course Name** |  | **Credit Hours** | **Course Code** |
| 1 | Information Security |  | 3(3+0) | CS-271 |
| 2 | Software Engineering |  | 3(3+0) | CS-241 |
| 3 | Linear Algebra |  | 3(3+0) | MTH-224 |
| 4 | Computer Networks |  | 4(3+1) | CS-255 |
| 5 | Database Systems | Data Structures & Algorithms | 4(3+1) | CS-241 |
| 6 | Social Service (University Elective 3) |  | 1(1+0) |  |
| **Semester Subtotal** |  | **18** |  |

**Semester 5**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Serial #** | **Course Name** |  | **Credit Hours** | **Course Code** |
| 1 | Computer Organization & Assembly Language |  | 4(3+1) | CS-353 |
| 2 | CS Supporting-2 | Calculus and Analytical Geometry  | 3(3+0) |  |
| 3 | Design & Analysis of Algorithm | Data Structures & Algorithms | 3(3+0) | CS-362 |
| 4 | Artificial Intelligence  | Discrete Structures | 4(3+1) | CS-391 |
| 5 | CS Elective-1 |  | 3(3+0) |  |
| **Semester Subtotal** |  | **17** |  |

**Semester 6**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Serial #** | **Course Name** |  | **Credit Hours** | **Course Code** |
| 1 | Operating Systems | Data Structures & Algorithms | 4(3+1) | CS-354 |
| 2 | Foreign Language (University Elective-4) |  | 2(2+0) | HUM-317 |
| 3 | University Elective-5 |  | 3(3+0) |  |
| 4 | CS Elective-2 |  | 3(3+0) | CS-336 |
| 5 | CS Elective-3 |  | 3(3+0) | CS-351 |
| 6 | CS Elective-4 |  | 3(3+0) |  |
| **Semester Subtotal** |  | **18** |  |

**Semester 7**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Serial #** | **Course Name** |  | **Credit Hours** | **Course Code** |
| 1 | Final Year Project Part-I |  | 3(0+3) | CS-401 |
| 2 | Theory of Automata |  | 3(3+0) | CS-363 |
| 3 | CS Supporting-3 |  | 3(3+0) |  |
| 4 | Parallel & Distributed Computing | Operating Systems | 3(3+0) | CS-457 |
| **Semester Subtotal** |  | **12** |  |

**Semester 8**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Serial #** | **Course Name** |  | **Credit Hours** | **Course Code** |
| 1 | Final Year Project Part-II |  | 3(0+3) | CS-402 |
| 2 | Compiler Construction | Theory of Automata | 3(3+0) | CS-465 |
| 3 | CS Elective-5 |  | 3(3+0) |  |
| 4 | Professional Practices  |  | 3(3+0) | CS-484 |
| **Semester Subtotal** |  | **12** |  |

**Total Credit Hours** = 18+18+17+18+17+18+12+12 = **130**1. **Computer Science – Elective Courses Not limited to the list below**
* Software Requirements & Specifications 3 (3+0)
* Software Quality Assurance 3 (3+0)
* Software Project Management 3 (3+0)
* Mobile Application Development 3 (2+1)
* Human Computer Interaction 3 (3+0)
* Theory of Programming Languages 3 (3+0)
* Computer Graphics 3 (2+1)
* Digital Image Processing 3 (2+1)
* Digital Signal Processing 3 (3+0)
* Computer Vision 3 (3+0)
* Distributed Computing 3 (2+1)
* Data and Network Security 3 (3+0)
* Wireless Networks 3 (2+1)
* Social Computing 3 (3+0)
* Web Design and Development 3 (2+1)
* Data Warehousing 3 (2+1)
* Expert Systems 3 (3+0)
* Artificial Neural Network 3 (3+0)
* Fuzzy Logic 3 (3+0)
* Web Engineering 3 (3+0)
* Fundamentals of Data Mining 3 (3+0)
* Computational Intelligence 3 (3+0)
* Multi Agent Systems 3 (3+0)
* Natural Language Processing 3 (3+0)
* Game Development 3 (3+0)
* Logical Paradigms of Computing 3 (3+0)
* Formal Methods for Software Engineering 3 (3+0)
1. **University Elective Courses (List is not exhaustive)**
* Fundamentals of Financial Accounting 3 (3+0)
* Financial Management 3 (3+0)
* Introduction to Management 3 (3+0)
* Entrepreneurship 3 (3+0)
* Foreign Language 2 (2+0)
* Human Resource Management 3 (3+0)
* Marketing 3 (3+0)
* Economics 3 (3+0)
* International Relations 3 (3+0)
* Foreign/Regional Language (French, German, Sindhi, Punjabi, Urdu etc.) 3 (3+0)
* Philosophy 3 (3+0)
* Introduction to Social Work 1 (1+0)
* Social Welfare System in Pakistan 1 (1+0)
* Society and Social Institution 1(1+0)
* Human Growth & Personality Development 1 (1+0)
1. **Undergraduate Minor\***
2. Elective courses for Artificial Intelligence Specialization:
* Programming for Artificial Intelligence 3(2+1)
* Machine Learning 3(2+1)
* Artificial Neural Networks 3(2+1)
* Knowledge Representation & Reasoning 3(3+0)
* Computing Vision 3(2+1)
1. Elective Courses for Data Science Specialization:
* Advance Statistics 3(3+0)
* Introduction to Data Science 3(2+1)
* Data Mining 3(2+1)
* Data Visualization 3(2+1)
* Data Warehousing & Business Intelligence 3(2+1)

c) Elective Courses for Cyber Security Specialization:* Introduction to Cyber Security 3(3+0)
* Digital Forensics 3(2+1)
* Information Assurance 3(3+0)
* Network Security 3(2+1)
* Secure Software Design and Development 3(2+1)

**\*** Undergraduate minors may be offered as CS electives in above scheme of study. |