**Program Road Map**

**Applicable to Batch No. \_\_\_\_f2023266\_\_\_\_ Session \_\_\_\_Fall 2023\_\_\_\_\_\_\_\_\_\_**

**Total Credit Hours: 136**

|  |  |
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| **1st Semester** | **2nd Semester** |
| **Pre- Req** | **Course Code** | **Course** | **Cr. Hr.** | **Pre- Req** | **Course Code** | **Course** | **Cr. Hr.** |
|  | CC111 | Programming Fundamentals | 3 |  | ISL104 | Islamic Thought and Perspectives | 3 |
|  | CC111L | Programming Fundamentals Lab | 1 | EN106 | EN107 | Expository Writing | 3 |
|  | MA107 | Calculus and Analytic Geometry | 3 | MA107 | MA108 | CS-Supporting 1 (Multivariable Calculus) | 3 |
|  | CC120 | Application of Information & Communication Technologies | 2 | CC111, CC111L | CC112 | Object Oriented Programming | 3 |
|  | CC120L | Application of Information & Communication Technologies Lab | 1 | CC111, CC111L | CC112L | Object Oriented Programming Lab | 1 |
|  | EN106 | Functional English | 3 | NS125, NS125L | CC121 | Digital Logic Design | 2 |
|  | NS125 | Applied Physics | 2 | NS125, NS125L | CC121L | Digital Logic Design Lab | 1 |
|  | NS125L | Applied Physics Lab | 1 |  | CC141 | Discrete Structures | 3 |
|  | POL106 | Ideology and Constitution of Pakistan | 3 |  |  |  |  |
|  |  | **Semester Total** | **19** |  |  | **Semester Total** | **19** |

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| **3rd Semester** | **4th Semester** |
| **Pre- Req** | **Course Code** | **Course** | **Cr. Hr.** | **Pre- Req** | **Course Code** | **Course** | **Cr. Hr.** |
| CC112, CC112L | CC213 | Data Structures | 3 |  | CC251 | Computer Networks | 2 |
| CC112,CC112L | CC213L | Data Structures Lab | 1 |  | CC251L | Computer Networks Lab | 1 |
| MA107 | MA210 | CS Supporting 2 (Linear Algebra) | 3 |  | CC230 | Database Systems | 3 |
|  | SS103 | Civics and Community Engagement | 2 |  | CC230L | Database Systems Lab | 1 |
| CC121, CC121L | CC222 | Computer Organization and Assembly Language | 2 |  |  | Technical Elective 1 (e.g., Open-Source Software Development) | 3 |
| CC121 ,CC121L | CC222L | Computer Organization and Assembly Language Lab | 1 |  | HU201 | Professional Practices | 3 |
|  | CC281 | Software Engineering | 3 |  | CS245 | Computer Architecture | 3 |
|  | MA150 | CS Supporting 3 (Probability and Statistics) | 3 |  |  | University Elective 1 | 3 |
|  |  | **Semester Total** | **18** |  |  | **Semester Total** | **19** |

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| **5th Semester** | **6th Semester** |
| **Pre- Req** | **Course Code** | **Course** | **Cr. Hr.** | **Pre- Req** | **Course Code** | **Course** | **Cr. Hr.** |
|  | CC323 | Operating Systems | 3 | CC213,CC213L | CC371 | Artificial Intelligence | 3 |
|  | CC323L | Operating Systems Lab | 1 | EN107 | EN220 | CS Supporting 4 (Technical & Business Writing) | 3 |
|  | CS341 | Theory of Automata | 3 |  | CS324 | Human Computer Interaction | 3 |
| CC213,CC213L | CC342 | Analysis of Algorithms | 3 | CS341 | CS342 | Compiler Construction | 3 |
|  | MG365 | Innovation and Entrepreneurship | 3 |  |  | Technical Elective 3 | 3 |
|  | CC361 | Information Security | 3 |  |  | Technical Elective 4 | 3 |
|  |  | Technical Elective 2 | 3 |  | SD101 | 21st Century Skills | 0 |
|  | SD100 | English Immersion | 0 |  |  |  |  |
|  |  | **Semester Total** | **19** |  |  | **Semester Total** | **18** |

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| **7th Semester** | **8th Semester** |
| **Pre- Req** | **Course Code** | **Course** | **Cr. Hr.** | **Pre- Req** | **Course Code** | **Course** | **Cr. Hr.** |
| CC230, CC230L | CS431 | Advance Database Management Systems | 2 |  |  | University Elective 2 | 3 |
| CC230, CC230L | CS431L | Advance Database Management Systems Lab | 1 |  |  | Technical Elective 7 | 3 |
| CC323, CC323L | CC425 | Parallel and Distributed Computing | 3 | CC491 | CC492 | Final Year Project II | 4 |
|  |  | Technical Elective 5 | 3 | **COOP1** |  | COOP2 (Optional) | 4 |
|  |  | Technical Elective 6 | 3 |  |  |  |  |
|  | CC491 | Final Year Project I | 2 |  |  |  |  |
|  |  | COOP1 (Optional) | 2 |  |  |  |  |
|  |  | **Semester Total** | **14 (16)\*** |  |  | **Semester Total** | **10 (14)\*** |
|  |  |  |  |  |  | **Total credit hours** | **136 (142)\*\*** |
| **\*If COOP1 is taken then 16 credit hours semester.** | **\*If COOP is taken then 14 credit hours semester.** |
| **\*\* If COOP is taken then degree is 142 credit hours.** |