**COMPUTER SCIENCE**

**BIOINFORMATICS**

*Path to Purple* Articulation Agreement between Rochester Community and Technical College (RCTC) and Winona State University (WSU). First two years provide an *Associate in Science (A.S.) degree in Bioinformatics Foundations at RCTC; the* second two years provide a *Bachelor of Science (B.S.) degree in Computer Science with Applied Computer Science – Bioinformatics Emphasis at WSU.*

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| I. General Education Requirements  The following courses satisfy the Minnesota Transfer Curriculum (MNTC) Goals 1-10 requirements. Consult the RCTC catalog listings to determine which courses satisfy the areas listed below. | 40 Credits |
| **Goal 1: Written and Oral Communication**  ENGL 1117 Reading & Writing Critically I  ENGL 1118 Reading & Writing Critically II  COMM 1114 Fundamentals of Speech | **11 Credits**  4 Credits  4 Credits  3 Credits |
| **Goal 2: Critical Thinking - Met by any course in MNTC goals 1-10** |  |
| **Goal 3: Natural Sciences**  BIOL 1220 Concepts of Biology  BIOL 2300 Genetics  CHEM 1127 Chemical Principles I | **12 Credits**  4 Credits  4 Credits  4 Credits |
| **Goal 4: Mathematics**  MATH 1119 Applied Calculus (3 Credits) OR  MATH 1127 Calculus I (5 Credits) | **3 Credits** |
| **Goal 5: History and Social Sciences**  Choose a minimum of two credits from two different areas from Goal 5. | **6 credits** |
| **Goal 6: Humanities and Fine Arts**  Choose a minimum of two credits from two different areas from Goal 6. | **6 Credits** |
| **Select MNTC courses to reach 40 credits.** | **2 Credits** |
| II. Program Requirements  COMP 1150 Computer Science Concepts  COMP 2243 Programming & Problem Solving  COMP 2247 Algorithms and Data Structures  (After completing these three, encourage beginning WSU CS concurrently.)  MATH 2218 Discrete Mathematics  MATH 2350 Introduction to Mathematical Statistics | 19 Credits  3 Credits  4 Credits  4 Credits  4 Credits  4 Credits |
| III Open Electives (Recommend Physical Education (See NOTE under Major Requirements at WSU.) | 1 Credits |
| **Total Credits** | **60 Credits** |

**MAJOR REQUIREMENTS AT WSU**

NOTE: Students will need to complete 2 credits of Physical Development & Wellness at RCTC or WSU to complete this degree.

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| **Computer Science Core:** (18 credits of 300-400 level CS courses with at least 12 credits beyond the Computer Science core requirements must be earned from WSU not including Common Market courses.)  CS 313 Networking and Telecommunications  M CS 341 Data Structures  CS 375 Computer Systems  W CS 385 Applied Database Management Systems  W CS 410 Software Engineering  O CS 471 Object Oriented Design and Development | **20 Credits**    3 Credits  4 Credits  4 Credits  3 Credits  3 Credits  3 Credits |
| **Applied Computer Science Requirements**  CS 344 Introduction to Web Programming  CS 444 Human Computer Interaction  CS 485 Database Systems Design | **9 Credits**  3 Credits  3 Credits  3 Credits |
| **Bioinformatics Emphasis Requirement**  CS 368 Introduction to Bioinformatics | **4 Credits**  4 Credits |
| **Bioinformatics Emphasis CS Electives**  Choose 6 credits from the following list of courses.  CS 345 Mobile Application Development  CS 366 Topics in Emerging Technologies  CS 405 Operating Systems  O CS 411 Software Testing  CS 413 Adv. Networking & Telecommunications  CS 415 Principles of Programming Languages  CS 420 Computer Architecture  CS 423 Computer and Network Security  CS 425 Numerical Analysis  CS 430 Computer Graphics  CS 433 Digital Image Processing  CS 435 Theory of Computations  CS 440 Theory of Algorithms  CS 445 Artificial Intelligence  CS 450 Compiler  CS 465 Topics: Computing Theory  CS 466 Topics: General Computing Applications  CS 467 Topics: Information System Applications  CS 472 Reusable Software Architectures  CS 476 Distributed System: Concept and Design  CS 482 Internet/Web Architecture & Development  CS 491 Practicum in Computer Science  **Note:** Only 3 credits will count in the major.  W CS 495 Computer Science Research Seminar  PHYS 332 Computer Organization  PHYS 333 Microprocessor Electronics | **6 Credits**    3 Credits  3 Credits  3 Credits  3 Credits  3 Credits  3 Credits  3 Credits  3 Credits  4 Credits  3 Credits  3 Credits  3 Credits  3 Credits  3 Credits  3 Credits  1-3 Credits  1-3 Credits  1-3 Credits  3 Credits  3 Credits  3 Credits  6 Credits  3 Credits  2 Credits  4 Credits |
| **Other Major Requirements**  BIOL 242 Organismal Diversity (WSU) OR  BIOL 1230 Survey of Life Forms (RCTC)  CHEM 213 Principles of Chemistry II (WSU) OR  CHEM 1128 Chemical Principles II (RCTC) | **8 Credits**  4 Credits  4 Credits |
| **Open Electives** | **13 Credits** |
| **Total Credits** | **60 Credits** |
| **Required for a B.S. Degree in Computer Science**  **(Applied Computer Science Option – Bioinformatics Emphasis)** | **120 Credits** |

**O = Oral Intensives M=Math/Critical Analysis Intensives W = Writing Intensives**