

## **Curriculum for BS in Computer Science - West Virginia State University**

**CS 100. INTRODUCTION TO COMPUTERS AND THEIR APPLICATIONS (3 credit hours)** Computer History, application and ethics, operating systems, word processing, spread sheets, databases and integrating applications, data communications and the internet computer security and privacy. Prerequisite: ACT Math score 19 or above or equivalent.

**CS 101. INTRODUCTION TO COMPUTER PROGRAMMING (3 credit hours)** The fundamental concepts of procedural programming using C, historical and social context of computing, and an overview of computer science as a discipline. Prerequisite: Eligibility for Math 120.

**CS 102. INTRODUCTION TO COMPUTER PROGRAMMING (3 credit hours)** Introduction to the fundamental concepts of the object-oriented paradigm and use of a programming language with OO specific features. Prerequisite: "C" or better in CS 101.

**CS 202. FORTRAN PROGRAMMING (3 credit hours)** Structured FORTRAN with documentation, input-output, loops, logic statements. Prerequisites: MATH 120 and CS 101.

**CS 204. INTRODUCTION TO COBOL PROGRAMMING (3 credit hours)** Provides the basic elements of the computer language necessary to run programs with an emphasis on business applications. Prerequisites: CS 101.

**CS 210. FUNDAMENTALS OF OPERATING SYSTEMS (3 credit hours)** An introduction to the organization of computer operating systems and the range of computer operations available through efficient use of operating systems. Prerequisite: CS 102.

**CS 214. INTRODUCTION TO VISUAL BASIC (3 credit hours)** This course introduces students to the standard visual basic forms, controls and event procedures. Sequential and random access file handling, database access and general language structure will be explored. Prerequisite: CS 101.

**CS 230. DATA BASE MANAGEMENT SYSTEMS (3 credit hours)** This course presents the history of data base management systems, the logical and physical structures of several current models, and deals in a practical, experiential way with the design of data bases and the management systems that control them. Prerequisites: CS 102.

**CS 236. INTRODUCTION TO PASCAL (3 credit hours)** The basic concepts and skills, including general problem-solving techniques, files and text processing, and abstract data structures. Prerequisites: CS 101.

**CS 240. DATA COMMUNICATIONS AND NETWORKING (3 credit hours)** An introduction to the theories, terminology, equipment, and distribution media associated with data communications and networking. Prerequisite: CS 102.

**CS 250. DATA STRUCTURES AND ALGORITHMS (3 credit hours)** An introduction to the implementation and use of abstract data types including dynamic arrays, linked lists, stacks, queues, trees, hash tables, and heaps as well as algorithms that operate on these structures with a preliminary study of algorithmic complexity. Prerequisite: CS 102 and MATH 205

**CS 266. INTRODUCTION TO JAVA (3 credit hours)** This course introduces students to the JAVA programming language. This object-oriented language is gaining popularity for developing secure, platform independent applications and often the language of choice for internet applications. Prerequisite: CS 102.

**CS 299. SPECIAL TOPICS (1–4 credit hours)** A sophomore-level course designed for a topic of special current interest. Prerequisite: As stated by the offering.

**CS 309. SOFTWARE ENGINEERING (3 credit hours)** Application of the tools, methods, and disciplines of computer science to solving real-world problems. Topics include: the software process, software life-cycle models, software teams, quality assurance, project duration and cost estimation. Prerequisite: CS 250.

**CS 310. COMPUTER ARCHITECTURE AND ASSEMBLY LANGUAGE PROGRAMMING (3 credit hours)** An introduction to the design and organization of computer systems. Introduction to tradeoff evaluation based on Amdahl's Law and discussion of fundamental building blocks of computer systems including the arithmetic logic unit (ALU), floating point unit (FPU), memory hierarchy, and input-output (I/O) system. Study includes the instruction set architecture (ISA), a comparison of RISC and CISC architectures. Prerequisites: CS 102 and MATH 205.

**CS 311. OBJECT-ORIENTED PROGRAMMING (3 credit hours)** Object-oriented programming using languages such as C++, Java, Smalltalk, Delphi. Prerequisite: CS 250.

**CS 335. INTRODUCTION TO SYSTEMS ANALYSIS (3 credit hours)** Life cycle of business information study, design, development, and operating phases; feasibility; project control. Prerequisites: CS 250.

**CS 336. SCRIPTING LANGUAGES (3 credit hours)** Shell scripts and batch files, programming using interpreted languages such as PERL, Python, PHP, JavaScript or VBScript for automation of system administration tasks and web programming. Prerequisite: CS 102.

**CS 365. GUI PROGRAMMING (3 credit hours)** Graphical user interface design and implementation using visual programming tools and libraries. Prerequisite: CS 250.

**CS 399. Special Topics (1–3 credit hours)** A sophomore-level course designed for a topic of special current interest. Prerequisite: As stated by the offering.

**CS 405. Algorithms (3 credit hours)** Design and analysis of algorithms and data structures, asymptotic analysis, recurrence relations, probabilistic analysis, divide and conquer, searching, sorting, and graph processing algorithms. Prerequisite: CS 250.

**CS 408. SENIOR COMPUTER SCIENCE SEMINAR (2 credit hours)** Integrates the work completed in the various courses. Reading and research oriented. (To be taken in one of the last two semesters prior to graduation.)

**CS 410. SYSTEM ADMINISTRATION (3 credit hours)** Maintenance of a multi-user computer system, managing services, managing users, managing data, file systems, networking, security. Prerequisites: CS 240 and CS 336.

**CS 415. THEORY OF COMPUTING (3 credit hours)** Formal grammars and languages, Chomsky Normal Form, Greibach Normal Form, finite automata, pushdown automata, turning machines, computability. Prerequisites: CS 250 and CS 311.

**CS 425. COMPILER DESIGN (3 credit hours)** Introduces the theory and practice of programming language translation. Topics include compiler design, lexical analysis, parsing, symbol tables, declaration and storage management, code generation, and optimization techniques. Prerequisites: CS 250 and 310.