4.0 COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

4.3 Computer Science (S): Students will understand systems and programming concepts related to the development of computer operations. They will demonstrate competency by applying these concepts to the development of computer systems and programs.

4.3.1 Algorithms–design solutions that are correct, reliable, and efficient; compare and contrast various sorting and searching methods

4.3.2 Architecture Methods–explain digital logic, machine-level representation of data, memory-system organization, and architectural use of assembly-level programming

4.3.3 Artificial Intelligence and Robotics–discuss uses and effects of artificial intelligence and robotics

4.3.4 Complex Programs–develop complex programs that are large in scope and require analysis regarding implementation issues

4.3.5 Data Structures–develop programs utilizing abstract data types and object-oriented programming

4.3.6 Database–design programs that access and modify databases, using various file access methods

4.3.7 Human-Computer Interfaces–communicate, orally and in writing, information that enables users to operate computer systems effectively

4.3.8 Networking and Communications—install programs that utilize various network and communication protocols

4.3.9 Operating Systems–utilize operating systems and associated utilities for file management, backup and recovery, and execution of programs; compare simple and multi-user operating systems

4.3.10 Program Design–using problem-solving methods, define and analyze programs; design structured, maintainable programs to meet specifications; and, with a well-defined user interface, code, execute, test, and debug programs to produce accurate and reliable results

4.3.11 Program Modification–describe the ways in which specification changes and technological advances require the modification of programs

4.3.12 Programming Languages–compare several programming languages; create structured programs in at least two languages, utilizing control structures, procedures, functions, parameters, local variables, error recovery, and recursion

4.3.13 Programming Style–develop structured, documented, maintainable programs which create self-explanatory output

4.3.14 Simple Programs–implement algorithmic solutions and codes to well-defined problems

4.3.15 Social Issues–discuss the issues of access, privacy, and ethics and their impact on society

4.3.16 Systems Analysis–analyze computer systems, access and design available solutions, and develop appropriate systems