

52.1202 Computer Operation and Programming

This cluster offers a sequence of planned educational classroom and laboratory experiences designed to prepare individuals to use programming languages to develop computer applications to solve various business problems. This would include fundamentals of system analysis and design as well as the systems development life cycle. Students will also write programs in various programming languages and compile and execute the programs. It will prepare individuals to update, repair, modify and expand existing programs. Instruction will include the systematic development of algorithms and programs, programming style and design, techniques for testing, debugging, and documenting programs, the software cycle, and procedural and object-oriented approaches to programming.

This cluster includes a sequence of planned educational classroom and laboratory experiences which will develop competencies in the following duty areas:

Using fundamentals of system design and analysis, including the systems development life cycle

Creating, compiling, maintaining and running computer applications

Modifying, testing, and debugging programs

Using procedural and object-oriented programming languages

Creating program documentation

Employment opportunities which are available to workers with competencies in the Computer Operation and Programming Cluster include banking institutions, manufacturing companies, educational institutions, government offices, insurance companies, retail and wholesale companies, accounting firms, hotel-motel firms, real estate firms, savings and loan institutions, medical offices, legal offices, transportation firms, advertising companies, and computer firms. Through entrepreneurship, other employment opportunities are also available.

The following are examples of occupations for which instruction may be provided at the secondary level.

Computer Operator
Entry-level programmer

The following occupational listing shows examples of occupations that may require additional training in a specialized program at the postsecondary level.

Systems Analyst
Database Administrator
Systems Specialist
Programmer/Analyst
Sr. Systems Specialist

Webmaster
Software Engineer
Applications Programmer
Information Systems Manager
Computer Operations Supervisor

In addition to those occupations already noted, there are other occupations of a professional nature requiring extensive education beyond that received at secondary and postsecondary levels.

A regional delivery system should offer training for occupations in this field as determined by employment opportunities and the needs of the students.

Training received in this program is used as a basis for entry level into the labor market and for further training at the postsecondary level. Worksite learning experiences are encouraged to provide experiences that cannot be duplicated in the classroom. Articulation between the secondary and postsecondary programs will be a part of the regional delivery system.

Workplace skills, as well as 1) skills used in work performance that are transferable across jobs and occupations and that are instrumental to job and classroom success, 2) skills used to manage life's transitions, and 3) skills employed in the resolution of interpersonal, information or task-related problems or problems related to behavior in cooperative group settings, should be included in this curriculum. Leadership skill development is an integral part of this program and is delivered through career and technical student organization activities (e.g. Future Business Leaders of America (FBLA) and Business Professionals of America (BPA). Individualized instruction and learning reinforcement are provided through cooperative career and technical education programs, as well as classroom instruction. Communication skills (thinking, listening, composing, revising, editing, and speaking) will be integrated throughout the course.

Industry Certifications - Regional systems are encouraged to provide opportunities for students to acquire the skills and knowledge needed to meet the industry certifications associated with this program. It is recommended that the related industry certification content be integrated within the core content at the preparation level.

COURSE SEQUENCE

<u>Course Title</u>	<u>Credits per Semester</u>	<u>Length in Semesters</u>	<u>Grade Level</u>
<u>Orientation</u>			
Business and Technology Concepts	.5	2	9, 10
Keyboarding and Formatting I	.5	1	9, 10
Computer Concepts and Software Applications	.5	1	9, 10

Preparation

Computer Operations and Programming I	.5	2	11
Computer Operations and Programming II	.5	2	12
Cooperative Office Education	*Variable	2	12

- As determined at the regional system level.

COMPUTER OPERATION & PROGRAMMING SUGGESTED COURSE DESCRIPTIONS

BUSINESS AND TECHNOLOGY CONCEPTS

Length of course: 2 Semesters
Credits per semester: .5
Grade level: 9, 10

This orientation-level course will provide an overview of all aspects of business marketing and management, including the concepts, functions, and skills required for meeting the challenges of operating a business in a global economy. Topics covered will include the various forms of business ownership, including entrepreneurship, as well as the basic functional areas of business (finance, management, marketing, administration and production.)

Students will be introduced to a wide range of careers in fields such as accounting, financial services, information technology, marketing, and management. Emphasis will be placed on using the computer while studying applications in these careers along with communication skills (thinking, listening, composing, revising, editing, and speaking), math and problem solving. Business ethics as well as other workplace skills will be taught and integrated within this course.

This course is not intended to meet the consumer education requirement, but rather to provide preparation for the skill level courses that make up the Business, Marketing and Management occupations programs.

KEYBOARDING AND FORMATTING I

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Keyboarding and Formatting I is a course designed to develop basic skills in touch keyboarding techniques for entering alphabetic, numeric, and symbol information found on computers and terminals. Students will learn to edit and format text and paragraphs, change fonts, work with headers and footers, cut and paste text, create and use tab keys, create labels, and work with multiple windows. Students will format documents such as letters, envelopes, memorandums, reports, and tables for personal, educational, and business uses. During the second half of the course, major emphasis is placed on formatting documents, improving proofreading skills, and increasing speed and accuracy.

COMPUTER CONCEPTS AND SOFTWARE APPLICATIONS

Length of course: 1 Semester
Credits per semester: .5
Grade level: 9, 10

Computer Concepts and Software Applications is an orientation-level course designed to develop awareness and understanding of application software and equipment used by employees to perform tasks in business, marketing and management. Students will apply problem-solving skills to hands-on, real-life situations using a variety of software applications, such as word processing, spreadsheets, database management, presentation software, and desktop publishing. Students will explore topics related to computer concepts, operating systems, telecommunications and emerging technologies. The development of employability skills, as well as transition skills, will be included in the course as well as an understanding of the ethical considerations that arise in using information processing equipment and gaining access to available databases.

COMPUTER OPERATIONS AND PROGRAMMING I

Length of course: 2 Semesters
Credits per semester .5
Grade level: 11

Computer Operations and Programming I is the first of two skill-level courses designed to develop computer programming and program design skills through the use of various programming languages such as Visual Basic, C#, Java, and other object-oriented languages. Students will be exposed to the fundamentals of system analysis and design (e.g. flowcharting, diagramming, system design and planning), and the systems development life cycle. Instruction will include basic programming tools that are common to many programming languages. These may include items such as input/output statements, constants, assignment statements, string and numeric variable types, conditional processing, and branching and looping control structures. Students will learn programming techniques such as counting, averaging, rounding, and generation of random numbers to develop a good programming technique. Students will apply

what they learn to create programs and applications that solve real world business related problems. Students will create programs to store, locate and retrieve data.

COMPUTER OPERATIONS AND PROGRAMMING II

Length of course: 2 Semesters
Credits per semester .5
Grade level: 12

Computer Operations and Programming II is a skill-level course for students who have completed Computer Operations and Programming I. Students will use procedural and object-oriented programming languages such as Visual Basic, C# and Java. Students will learn programming concepts such as inheritance and polymorphism, advanced data handling (pointers, arrays, strings, and files), and common algorithms (recursion, searching and sorting). Students will be able to write, compile, run, test, debug and modify programs and applications that solve real world problems. Problem examples may include tracking inventory, scheduling rooms and facilities, accessing information and performing calculations.

COOPERATIVE OFFICE EDUCATION

Length of course: 2 Semester
Credits per semester Variable
Grade level: 12

Cooperative Office Education is a capstone course designed to assist students in the development of effective business skills and attitudes through practical, advanced instruction in school and on the job through cooperative education. Approximately half the school day is spent taking classes at school and the other half in on-the-job training supervised by the designated training sponsor and coordinated by the teacher-coordinator. The related class at school is planned to develop skills and attitudes that are applied on the job. A training plan is developed jointly by the teacher-coordinator, training sponsor and student that identifies training to be provided. Training in the related class at school focuses upon the student's career and technical education, with additional assignments based upon areas where on-the-job performance indicates a need. Related instruction also includes workplace skills such as seeking and applying for employment, communicating on the job, maintaining professionalism, workplace ethics, etc.

Current generation equipment is utilized in this course to develop information management competencies required for employment in this cluster of careers. Instruction involves the use of simulations and computer-assisted instruction, as well as specific application software for database management, accounting, word processing, financial modeling, business graphics and communications between information processing systems.