COMPUTER PROGRAMMING

ASSOCIATE OF APPLIED SCIENCE (AAS) – 60 CREDITS

About this program

This program provides the programming skills needed in computer application development, database management, computer systems and data communications. Students learn to design, write, code, document and implement computer programs for various computer platforms. They learn at least one operating system, one command-level language, one database management system and other high-level programming languages. The program prepares students to design and develop computer software systems and design information management systems. It includes the study of languages, software design, information flow and processing. Students study the design of mathematical and simulation models and large-scale programs used for processing and retrieving information.

Program outcomes

1. Demonstrate professionalism, including presentation skills, utilizing research for problem solving, working independently and in teams, being accountable and meeting deadlines.
2. Analyze business problems and prepare program definitions for computerized solutions.
3. Create, document and implement computerized solutions using a variety of languages.
4. Apply testing and debugging methods to assure quality and workability of finished programs.
5. Solve problems using appropriate mathematical and/or scientific techniques.

Curriculum overview

Crds	Requirement type
50	Required courses
3	Restricted electives in courses
2	Restricted electives in subjects
5	Restricted electives in course types
60	**Total**

Developmental courses note: A student may be required to enroll in developmental courses in reading, writing and math. A student's scores on the Accuplacer assessment will determine enrollment in developmental courses. The purpose of developmental courses is to prepare students for the demands of a college-level curriculum. *Credits may vary.*

Accreditation: Minnesota State Community and Technical College is accredited by the Higher Learning Commission, a regional accreditation agency recognized by the U.S. Department of Education. The Higher Learning Commission 230 South LaSalle Street, Suite 7-500 Chicago, IL 60604-1411 http://www.ncahigherlearningcommission.org Phone: 312.263.0456 / 800.621.7440

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Curriculum requirement details

Required courses

Course	Crds
CPTR1001 - Introduction To Programming and Scripting	3
CPTR1040 - Introduction to Programming Logic	3
CPTR2001 - Scripting for Automation	3
CPTR2224 - Linux I	3
CPTR2230 - Structured Query Language	3
CPTR2235 - Comparative Languages	3
CPTR2238 - Database Integration	3
CPTR2240 - Database Administration	3
CPTR2242 - Java Programming	3
CPTR2255 - Software Security and Testing	3
CPTR2265 - Software Engineering	3
CPTR2296 - Topics in Computers	3
CSCI1110 - Informatics	3
CSCI1121 - Computer Science I	4
ENGL1101 - College Writing	3
MATH1114 - College Algebra	4

Other requirements or restricted electives

3 credits from one or more of these Courses:

Course title	Credits
COMM1120 - Introduction to Public Speaking	3
COMM1130 - Small Group Communication	3
COMM1140 - Interpersonal Communication	3

2 credits from one or more of these Subjects:

- CPTR
- CSCI
- CSEC

5 credits from these Course Types:

- General Education w/MnTC Goals

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Course summaries

CPTR1001 - Introduction To Programming and Scripting ..... ***(3 credits)***
This course is an introduction to computer programming. Emphasis will be on programming concepts, program design methodology, program debugging, problem solving and writing clear code.

CPTR1040 - Introduction to Programming Logic ..... ***(3 credits)***
This course introduces students to computer programming logic and troubleshooting. Students are introduced to algorithm development and structure programming. These concepts are foundational to learning to program and general troubleshooting.

CPTR2001 - Scripting for Automation ..... ***(3 credits)***
Students will build on the skills learned in Introduction to Programming and Scripting. Students will learn scripting styles, procedures and methods for system, database, web and network environments.

Prerequisites:

- CPTR1001

CPTR2224 - Linux I ..... ***(3 credits)***
This course deals with Linux installation, configuration and system administration. This course lays the groundwork for continued study of Linux.

CPTR2230 - Structured Query Language ..... ***(3 credits)***
This course covers the basics of SQL (Structured Query Language) programming. SQL is a popular computer language used by small and large business organizations and computer programmers. The primary purpose of SQL is in working with databases and relational database management systems to store, retrieve, edit, manipulate and format data for end users and decision makers.

CPTR2235 - Comparative Languages ..... ***(3 credits)***
This course is an exercise in algorithmic problem solving when applied to contrasting computer languages. The goal is to develop an understanding of the strengths and weaknesses of various computer languages when creating solutions to different problems. Using a mixed language method is explored to address more complex problem domains.

Prerequisites:

- CPTR1001

CPTR2238 - Database Integration ..... ***(3 credits)***
This course covers the integration of data from multiple databases with strategies for development of integrated database applications. Development of new databases and maintenance of existing databases is covered, in addition to the storage, organization and analysis of data.

CPTR2240 - Database Administration ..... ***(3 credits)***
Students in this course will identify core database concepts and create database models. Installation, configuration and maintenance of a database management system (DBMS) will be covered. Students will analyze and administer a database's performance optimization. Additional topics will include user administration within the database, backup and restoration, and database normalization.

Prerequisites:

- CPTR1040

OR

- CPTR1001

CPTR2242 - Java Programming ..... ***(3 credits)***
In this course the student utilizes the Java programming language to create both Internet applets and applications.

CPTR2255 - Software Security and Testing ..... ***(3 credits)***
This course is an introduction to software security and testing. Students will learn the importance of this aspect of software development by exploring historical and current needs in the area of stable and secure software development. The use of development operations in these areas will be included.

CPTR2265 - Software Engineering ..... ***(3 credits)***
This course is an introduction to the principles of software engineering. The course covers historical and contemporary practical methods, with topics including development operations, waterfall development, iterative development, evolutionary development, source control ecosystems and testing ecosystems.

Prerequisites:

- CPTR1001

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CPTR2296 - Topics in Computers ..... ***(3 credits)***
The goal of this course is to introduce students to a computer topic chosen from a wide range of classic and state-of-the-art research, techniques, systems and technologies in the field of computer programming or networking. Topics will vary each semester. Course may be repeated for credit with a change in subtitle.

CSCI1110 - Informatics ..... ***(3 credits)***
This course explores how data is gathered and analyzed and how it can be applied to information technology solutions to maximize the benefits of data analysis, including increases in the efficiency and productivity of information systems. Students will explore the social, ethical and personal implications of implementing information technologies and how information processes can impact business on a local and global level.

CSCI1121 - Computer Science I ..... ***(4 credits)***
This course is an introduction to computer science. It includes algorithm design and structured programming using a high-level programming language. Key components of this course are designing, coding, debugging and documenting programs using techniques of good programming style. This course is intended primarily as a first course for computer science majors and/or minors.

ENGL1101 - College Writing ..... ***(3 credits)***
Meets MnTC Goal Area 1. This is an introductory course designed to prepare students for later college and career writing through a process approach with particular emphasis on revision. Students consider purpose and audience as they read, discuss and refine their work to develop confidence in their writing and communication skills.

Prerequisites:

- ELL1085
- ENGL0097
- or placement in College Level English.

MATH1114 - College Algebra ..... ***(4 credits)***
Meets MnTC Goal Areas 2 and 4. This course includes rational, polynomial, exponential, logarithmic, inverse and quadratic functions. The course also includes equations, inequalities, complex numbers and systems of linear equations. Additional topics may include matrices and determinants.

Prerequisites:

- MATH1020

OR

- Placement Exam

COMM1120 - Introduction to Public Speaking ..... ***(3 credits)***
Meets MnTC Goal Area 1. This course clarifies the process of oral communication, clarifies the basic principles of public speaking and allows the student to increase the application of these principles while both speaking and listening.

COMM1130 - Small Group Communication ..... ***(3 credits)***
Meets MnTC Goal Areas 1 and 2. This course focuses on communication issues in small groups and the importance of small group work in business today. An emphasis will be placed on improving communication skills for successful teamwork, group cohesiveness and the responsibility to group goals and tasks. Students will be provided with opportunities to build their group communication skills through practice.

COMM1140 - Interpersonal Communication ..... ***(3 credits)***
Meets MnTC Goal Area 1. This course will focus on improving students' abilities to communicate effectively in one-to-one dyadic encounters by providing experience-based instruction. Extensive in-class and out-of-class analyses allow the student to examine his/her own and others' informal social interactions. The long-term goal is for the student to apply interpersonal communication theories to daily interactions and draw his/her own conclusions about the effectiveness of interpersonal communication.

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Program Plan — "Computer Programming - Fall Start"
Locations: Moorhead,Online

1st Fall Term (15 credits)

Courses

Course	Crds
CPTR1040 - Introduction to Programming Logic	3
CPTR2224 - Linux I	3
CSCI1110 - Informatics	3
ENGL1101 - College Writing	3

3 credits in one or more of the following:

COMM1120 - Introduction to Public Speaking 3
COMM1130 - Small Group Communication 3
COMM1140 - Interpersonal Communication 3

1st Spring Term (15 credits)

Courses

Course	Crds
CPTR1001 - Introduction To Programming and Scripting	3
CPTR2230 - Structured Query Language	3
MATH1114 - College Algebra	4

5 credits in one or more of the following:

General Education w/MnTC Goals

2nd Fall Term (15 credits)

Courses

Course	Crds
CPTR2235 - Comparative Languages	3
CPTR2240 - Database Administration	3
CPTR2265 - Software Engineering	3
CSCI1121 - Computer Science I	4

2 credits in one or more of the following:

Course Subject: CPTR
Course Subject: CSCI
Course Subject: CSEC

2nd Spring Term (15 credits)

Courses

Course	Crds
CPTR2001 - Scripting for Automation	3
CPTR2238 - Database Integration	3
CPTR2242 - Java Programming	3
CPTR2255 - Software Security and Testing	3
CPTR2296 - Topics in Computers	3

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