IT SOFTWARE DEVELOPER

Associate in Applied Science (AAS)
Program Code: 10-152-1
Total Credits: 60

Graduates of Mid-State's IT Software Developer program have the skills needed to design, develop, and maintain software and software systems on a wide variety of computing devices and to meet the spectrum of business needs. You'll learn to create software to run on all platforms including network servers, desktop workstations, web pages, and mobile devices. You will use state-of-the-art equipment and work in teams to design, develop, test, and implement small-scale software systems for nonprofit organizations and actual clients.

Estimated tuition and fees: mstc.edu/programcosts

ACADEMIC ADVISOR
To schedule an appointment with an academic advisor, call 715.422.5300. Academic advisors will travel to other campuses as necessary to accommodate student needs. For more information about advising, visit **mstc.edu/advising**.

CHECKLIST:
This section will be completed when meeting with your academic advisor.

❑ FAFSA (www.fafsa.gov)

❑ Financial Aid Form(s)

Form(s): _____

❑ Follow-Up Appointment:

Where: _____

When: _____

With: _____

❑ Official Transcripts
Mid-State Technical College
Student Services Assistant
1001 Centerpoint Drive
Stevens Point, WI 54481

❑ Other: _____

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MID-STATE
TECHNICAL COLLEGE

ADAMS CAMPUS
401 North Main
Adams, WI 53910

MARSHFIELD CAMPUS
2600 West 5th Street
Marshfield, WI 54449

STEVENS POINT CAMPUS
1001 Centerpoint Drive
Stevens Point, WI 54481

WISCONSIN RAPIDS CAMPUS
500 32nd Street North
Wisconsin Rapids, WI 54494

HIGH SCHOOL STUDENT

COLLEGE TRANSFER

RETURNING ADULT

CREDIT FOR PRIOR LEARNING AND EXPERIENCE

CREDIT FOR PRIOR LEARNING AND EXPERIENCE
- Certifications and Licenses
- High School Credit
- Military Experience
- National/Standardized Exams
- Transfer Credit
- Work and Life Experience

Learn about Credit for Prior Learning at **mstc.edu/cpl**.

CERTIFICATE

FUNDAMENTALS OF PROGRAMMING
Certificate • 9 Credits

For more information and additional opportunities, visit **mstc.edu/career-accelerator**.

ASSOCIATE OF ARTS (AA)

IT SOFTWARE DEVELOPER
Associate in Applied Science (AAS) • 60 Credits

Start Your Career
- Computer Applications Engineer
- Mobile Applications Developer
- Software Developer
- Apprenticeship

BACHELOR'S DEGREE

BACHELOR'S DEGREE OPTIONS
Arizona State University, Bellevue University, Colorado State University Global, Concordia University, Franklin University, Grand Canyon University (GCU), Herzing University, Indiana Wesleyan University, Lakeland University, Milwaukee School of Engineering (MSOE), Mount Mary University (MMU), Northern Michigan University, University of Phoenix, UW-Green Bay, UW-Oshkosh, UW-Stevens Point, UW-Stevens Point at Marshfield, UW-Stout, UW-Whitewater, Western Governors University, and Wisconsin Private–Nonprofit Universities/Colleges.

For more information and additional opportunities, visit **mstc.edu/transfer**.

OTHER OPTIONS

RELATED PROGRAMS
- IT Network Specialist
- IT Security Specialist
- IT User Support Technician

APPRENTICESHIP OPPORTUNITIES
- IT Software Developer Apprenticeship

PROGRAM OUTCOMES

Employers will expect you, as an IT Software Developer graduate, to be able to:

- Design software systems.
- Implement a team-based software development methodology.
- Navigate in a software development environment.
- Integrate data technologies.
- Develop software applications.
- Develop technical documentation.

TECHNICAL SKILLS ATTAINMENT

The Wisconsin Technical College System (WTCS) has implemented a requirement that all technical colleges measure program outcomes attained by students. This requirement is called Technical Skills Attainment (TSA). The main objective of TSA is to ensure graduates have the technical skills needed by employers. Students will complete the TSA requirement in the Application Development Capstone course.

NOTES:

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STUDENT HANDBOOK

Visit **mstc.edu/studenthandbook** to view Mid-State's student handbook, which contains information about admissions, enrollment, appeals processes, services for people with disabilities, financial aid, graduation, privacy, Mid-State's Student Code of Conduct, and technology.

GRADUATION REQUIREMENT

The GPS for Student Success course is required for all Mid-State program students and is recommended to be completed before obtaining 12 credits. (Not counted in the total credit value for this program.) Some students are exempt from this requirement. Please see your program advisor for more information.

GPS for Student Success ✎
10890102 ....1 credit
Integrate necessary skills for student success by developing an academic plan, identifying interpersonal attributes for success, adopting efficient and effective learning strategies, and utilizing Mid-State resources, policies, and processes. This course is recommended to be completed prior to obtaining 12 credits and is a graduation requirement unless you receive an exemption from your program advisor.

ADDITIONAL COURSES AS NEEDED

The following courses may be recommended or required if the student does not achieve minimum Accuplacer scores.

College Reading and Writing 1
10831104 ....3 credits
Provides learners with opportunities to develop and expand reading and writing skills to prepare for college-level academic work. Students will employ critical reading strategies to improve comprehension, analysis, and retention of texts. Students will apply the writing process to produce well-developed, coherent, and unified written work.

Pre-Algebra
10834109 ....3 credits
Provides an introduction to algebra. Includes operations on real numbers, solving linear equations, percent and proportion, and an introduction to polynomials and statistics. Prepares students for elementary algebra and subsequent algebra-related courses.
Prerequisite: Accuplacer Math score of 65, Accuplacer Algebra score of 30, ABE Math Prep V 76854785 and ABE Math Prep VI 76854786 with a grade of "S." (Note: ABE Math Prep V and VI courses cannot be used to satisfy program completion requirements at Mid-State.)

SAMPLE FULL-TIME CURRICULUM OPTION

Term		15 credits
10152101	Intro to Programming ☑	3
10152121	Object-Oriented Programming 1 ☑	3
10152150	Web Design 1 ☑	3
10801195	Written Communication ☑ -or-	
10801136	English Composition 1 ☑	3
10804135	Quantitative Reasoning ☑	3

Term		15 credits
10152122	Object-Oriented Programming 2	3
10152159	User Experience Design	3
10152174	Collaborative Application Development	3
10156101	Database Concepts and Design	3
10801196	Oral/Interpersonal Communication ☑ -or-	
10801198	Speech ☑	3

Term		15 credits
10152155	Web Programming 1 ☑	3
10152160	Introductory Mobile Application Development	3
10152175	Software Architecture	3
10156102	SQL Development	3
10801197	Technical Reporting	3

Term		15 credits
10152158	Web Programming 2	3
10152161	Intermediate Mobile Application Development	3
10152176	Application Development Capstone	3
10809166	Intro to Ethics: Theory & Application ☑	3
10809188	Developmental Psychology ☑ -or-	
10809198	Intro to Psychology ☑	3

Total credits 60

SAMPLE PART-TIME CURRICULUM OPTION

Term		9 credits
10152101	Intro to Programming ☑	3
10152121	Object-Oriented Programming 1 ☑	3
10152150	Web Design 1 ☑	3

Term		9 credits
10152122	Object-Oriented Programming 2	3
10152174	Collaborative Application Development	3
10156101	Database Concepts and Design	3

Term		6 credits
10801195	Written Communication ☑ -or-	
10801136	English Composition 1 ☑	3
10804135	Quantitative Reasoning ☑	3

Term		6 credits
10152159	User Experience Design	3
10801196	Oral/Interpersonal Communication ☑ -or-	
10801198	Speech ☑	3

Term		9 credits
10152155	Web Programming 1 ☑	3
10152160	Introductory Mobile Application Development	3
10801197	Technical Reporting	3

Term		9 credits
10152158	Web Programming 2	3
10152161	Intermediate Mobile Application Development	3
10809166	Intro to Ethics: Theory & Application ☑	3

Term		6 credits
10152175	Software Architecture	3
10156102	SQL Development	3

Term		6 credits
10152176	Application Development Capstone	3
10809188	Developmental Psychology ☑ -or-	
10809198	Intro to Psychology ☑	3

Total credits 60

☑ This course has options available to receive credit for prior learning (CPL) or work experience. Visit the website at **mstc.edu/cpl** or contact your advisor for details.

Please Note:
- This curriculum sequence is only for student planning. Actual student schedules will vary depending on course availability.
- Program completion time may vary based on student scheduling and course availability. For details, go to **mstc.edu/schedule**.

COURSE DESCRIPTIONS

Application Development Capstone
10152176...3 credits

Learners form self-directed Agile teams working with a client where each team will be responsible for identifying, designing, and implementing a software application. Teams will manage their projects, communicate project status, adapt to changing requirements, and overcome technical challenges. Students will build their application leveraging Agile project management software to manage their project. Additional topics: Agile software development methodology and team-based communication.
Prerequisites: Software Architecture 10152175, Web Programming 1 10152155, SQL Development 10156102, and Introductory Mobile Application 10152160.

Collaborative Application Development
10152174 ....3 credits

Introduces the Agile software development methodology and applies it to managing software development projects using the Atlassian suite of products. Students will work in small teams developing web-based applications. Additional topics: gathering requirements, team rules, peer evaluations, code reviews, pair programming, stakeholder and team communication, project management, version control, unit testing, licensing, and build automation.
Prerequisites: Web Design 1 10152150, Intro to Programming 10152101 Corequisite: Oral/Interpersonal Communication 10801196.

College Mathematics ☑
10804107 ....3 credits

Designed to review and develop fundamental concepts of mathematics pertinent to the areas of: 1) arithmetic and algebra; 2) geometry and trigonometry; and 3) probability and statistics. Special emphasis is placed on problem solving, critical thinking and logical reasoning, making connections, and using calculators. Topics include performing arithmetic operations and simplifying algebraic expressions, solving linear equations and inequalities in one variable, solving proportions and incorporating percent applications, manipulating formulas, solving and graphing systems of linear equations and inequalities in two variables, finding areas and volumes of geometric figures, applying similar and congruent triangles, converting measurements within and between US and metric systems, applying Pythagorean Theorem, solving right and oblique triangles, calculating probabilities, organizing data and interpreting charts, calculating central and spread measures, and summarizing and analyzing data.
Prerequisite: High School GPA of 3.0 or Accuplacer Arithmetic of 250 and QAS 234 or ACT of 17 or Pre-Algebra 10834109 with a grade of "C" or better or equivalent. Students are encouraged to bring transcripts for further evaluation if they do not meet these requirements.

Database Concepts and Design
10156101...3 credits

Introduces the concepts of relational database design, development, and maintenance. Topics include relational normalization, referential integrity, and Structured Query Language (SQL).

Developmental Psychology ☑
10809188...3 credits

Studies human development throughout the lifespan and explores developmental theory and research with an emphasis on the interactive nature of the biological, cognitive, and psychosocial changes that affect the individual from conception to death. Application activities and critical thinking skills enable students to gain an increased knowledge and understanding of themselves and others.
Prerequisite: High School GPA of 3.0 or Accuplacer Reading Skills of 236, Writing of 237 or ACT of 15 Reading/ 16 Writing. Students are encouraged to bring transcripts for further evaluation if they do not meet these requirements.

English Composition 1 ☑
10801136 ....3 credits

Designed for learners to develop knowledge and skills in all aspects of the writing process. Planning, organizing, writing, editing, and revising are applied through a variety of activities. Students analyze audience and purpose, use elements of research, and format documents using standard guidelines. Individuals develop critical reading skills through analysis of various written documents.
Prerequisite: High School GPA of 3.0 or Accuplacer Writing of 262 or ACT of 20 or College Reading and Writing 1 10831104 with a "C" or better or equivalent. Students are encouraged to bring transcripts for further evaluation if they do not meet these requirements.

Intermediate Algebra with Applications ☑
10804118 .... 4 credits

This course offers algebra content with applications. Topics include properties of real numbers; order of operations; algebraic solution for linear equations and inequalities; operations with polynomial and rational expressions; operations with rational exponents and radicals; and algebra of inverse, logarithmic, and exponential functions.
Prerequisite: High School GPA of 3.0 or Accuplacer Arithmetic of 263 and QAS 234 or ACT of 19 or QAS of 245, or Pre-Algebra 10834109 with a grade of "C" or better or equivalent. Students are encouraged to bring transcripts for further evaluation if they do not meet these requirements.

Intermediate Mobile Application Development
10152161 ....3 credits

Provides instruction in developing software applications for mobile devices building upon the knowledge gained in Introductory Mobile Application Development. Topics include: building APIs, Map and GPS interaction, and deployment to a mobile device.
Prerequisite: Introductory Mobile Application Development 10152160.

Intro to Ethics: Theory & Application ✍
10809166 ....**3 credits**

Provides a basic understanding of the theoretical foundations of ethical thought. Diverse ethical perspectives are used to analyze and compare relevant issues. Students critically evaluate individual, social, and/or professional standards of behavior, and apply a systemic decision-making process to these situations.
Prerequisite: High School GPA of 3.0 or Accuplacer Reading Skills of 236, Writing of 237 or ACT of 15 Reading/16 Writing. Students are encouraged to bring transcripts for further evaluation if they do not meet these requirements.

Intro to Programming ✍
10152101 ....**3 credits**

Applies the basic concepts of computer programming having learners build Python applications, with an emphasis on problem solving, structured programming, debugging, and testing. Additional topics include: online software development resources, programming and documentation standards, variable lifetime/scope, data types, control structures (conditions and iterations) working within Microsoft Windows, and mathematical calculations.

Intro to Psychology ✍
10809198 ....**3 credits**

This science of psychology course is a survey of multiple aspects of behavior and mental processes. It provides an overview of topics such as research methods, theoretical perspectives, learning, cognition, memory, motivation, emotions, personality,abnormal psychology, physiological factors, social influences, and development.
Prerequisite: High School GPA of 3.0 or Accuplacer Reading Skills of 236, Writing of 237 or ACT of 15 Reading/16 Writing. Students are encouraged to bring transcripts for further evaluation if they do not meet these requirements.

Introductory Mobile Application Development
10152160 ....**3 credits**

Provides instruction in developing software applications for mobile devices using the Microsoft Visual Studio and Maui.
Prerequisite: Object-Oriented Programming 2 10152122, Database Concepts and Design 10156101 or consent of instructor.

Introductory Statistics ✍
10804189 ....**3 credits**

Students taking Introductory Statistics display data with graphs, describe distributions with numbers, perform correlation and regression analyses, and design experiments. They use probability and distributions to make predictions, estimate parameters, and test hypotheses. They draw inferences about relationships including ANOVA. Algebra knowledge and foundational skills in mathematics are important for success in this course.
Prerequisite: High School GPA of 3.0 or Accuplacer QAS 241 or ACT of 19 or Pre-Algebra 10834109 with a grade of "C" or better or College Math 10804107 with a grade of "C" or better or equivalent.

Object-Oriented Programming 1 ✍
10152121...**3 credits**

Introduces object-oriented programming and design, with a focus on building the conceptual framework necessary to understand and build object-oriented programs. This course uses C# .NET, and the Unified Modeling Language (UML), to present concepts from a variety of perspectives. Learners will create UML diagrams and write/debug C# .NET applications, applying the object-oriented basics of abstraction, encapsulation, inheritance and polymorphism. Additional topics include: object instantiation/lifetime/scope, methods, properties, visibility modifiers and collections/multiplicity.
Corequisites: Intro to Programming 10152101

Object-Oriented Programming 2
10152122...**3 credits**

Builds upon the object-oriented concepts learned in Object-Oriented Programming 1, continuing with an in-depth application of object-oriented design principles and patterns. Focus is put on SOLID principles of OO development, and coding to abstraction, utilizing Factory, Strategy, and Observer patterns. Additional topics include delegates, iterators, and data structures.
Prerequisite: Object-Oriented Programming 1 10152121

Oral/Interpersonal Communication ✍
10801196 ....**3 credits**

Focuses on developing effective listening techniques and verbal and nonverbal communication skills through oral presentation, group activity, and other projects. The study of self, conflict, and cultural contexts will be explored, as well as their impact on communication.
Prerequisite: High School GPA of 3.0 or Accuplacer Reading Skills of 236, Writing of 237, or ACT of 15 Reading/16 Writing. Students are encouraged to bring transcripts for further evaluation if they do not meet these requirements.

Software Architecture
10152175...**3 credits**

Introduces N-tier software architecture where learners work in Agile teams to create and deploy ASP.NET applications comprised of data access, business, and presentation layers using MVC architecture. The application will access data from a relational database. Additional topics include: Agile project management, team communication and conflict management, requirements gathering, version control, authentication, authorization, and consuming web services.
Prerequisites: Collaborative Application Development 10152174, Object-Oriented Programming 2 10152122, Database Concepts and Design 10152156.

COURSE DESCRIPTIONS

Speech ✎
10801198 ....**3 credits**
Explores the fundamentals of effective oral presentation to small and large groups. Topic selection, audience analysis, methods of organization, research, structuring evidence and support, delivery techniques, and other essential elements of speaking successfully, including the listening process, form the basis of this course. Bring transcripts for further evaluation if they do not meet these requirements.
Prerequisite: High School GPA of 3.0 or Accuplacer Reading of 253, Writing of 262, or ACT of 21 Reading/19 Writing, or completion of College Reading and Writing 1 10831104 with a "C" or better or equivalent.

SQL Development
10156102 ....**3 credits**
Expands on Database Concepts and Design, with advanced SQL syntax (indexes, views, stored procedures, and triggers), database design, and data transformation. Additional topics include alternate database technologies, data warehousing, emerging database trends, and database administration and security.
Prerequisites: Database Concepts and Design 10156101, Introduction to Programming 10152101 Corequisite College Math 10804107

Technical Reporting
10801197 ....**3 credits**
The student prepares and presents oral and written technical reports. Types of reports may include lab and field reports, proposals, technical letters and memos, technical research reports, and case studies. Designed as an advanced communication course for students who have completed at least the prerequisite introductory writing course.
Prerequisite: English Composition 1 10801136 with a grade of "C" or better or Written Communication 10801195 with a grade of "C" or better. Proficiency in wordprocessing skills recommended.

User Experience Design
10152159...**3 credits**
Examines the design, prototyping, and evaluation of user interfaces. Learners will apply user experience standards in the development of web and software interfaces to provide a quality user experience. Topics include psychological and interaction principles (including ADA and international standards), requirements analysis, designing for different devices, style guides, usability testing, and visual design principles.
Corequisite: Web Design 1 10152150

Web Design 1 ✎
10152150 ....**3 credits**
Introduces HTML and Cascading Style Sheets (CSS) coding techniques. Learners will create/modify web pages using HTML tags and style the web pages with CSS and JavaScript. For the final course project, learners will create a personal website portfolio. Additional topics include inclusive design, copyright considerations, text editors, image optimization, FTP utilities, and browser tools.

Web Programming 1
10152155...**3 credits**
Provides instruction in php to teach students how to develop full-stack web applications. Students will work with the following languages/technologies: PHP, HTML, CSS, JavaScript, jQuery, SQL, and bootstrap. Additional topics include Object-Orientation and MVC.
Prerequisites: Database Concepts and Design 10156101, Collaborative Applications Development 10152174, and Object Oriented Programming 1 10152121

Web Programming 2
10152158...**3 credits**
Students will learn how to develop applications using Angular and NOSQL using Mongo. Additional topics include type script, templates, binding, form controls, and other front-end development frameworks.
Prerequisites: Web Programming 1 10152155, Collaborative Application Development 10152174.

Written Communication
10801195 ....**3 credits**
Develops writing skills which include prewriting, drafting, revising, and editing. A variety of writing assignments are designed to help the learner analyze audience and purpose, research and organize ideas, and format and design documents based on subject matter and content. Also develops critical reading and thinking skills through the analysis of a variety of written documents.
Prerequisite: High School GPA of 3.0 or Accuplacer Writing of 262 or ACT of 20 or College Reading and Writing 1 10831104 with a "C" or better or equivalent. Students are encouraged to bring transcripts for further evaluation if they do not meet these requirements. Proficiency in word processing skills recommended.