



# 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](http://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](http://mstc.edu/advising).

### CHECKLIST:

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

- FAFSA ([www.fafsa.gov](http://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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**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

# CAREER PATHWAY • BEGIN AT ANY POINT

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](https://mstc.edu/cpl).

## CERTIFICATE

### FUNDAMENTALS OF PROGRAMMING

Certificate • 9 Credits

For more information and additional opportunities, visit [mstc.edu/career-accelerator](https://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, Lakeland University, Milwaukee School of Engineering (MSOE), Mount Mary University (MMU), Northern Michigan University, University of Maryland Global, 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](https://mstc.edu/transfer).

## OTHER OPTIONS

### RELATED PROGRAMS

- IT Network Specialist
- IT Cybersecurity 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.

## SAMPLE FULL-TIME CURRICULUM OPTION

<b>Term</b>		<b>15 credits</b>
10152101	Intro to Programming ☑	3
10152121	Object-Oriented Programming 1 ☑	3
10152150	Web Design 1 ☑	3
10801195	Written Communication ☑ <b>-or-</b>	
10801136	English Composition 1 ☑	3
10804135	Quantitative Reasoning ☑	3
<b>Term</b>		<b>15 credits</b>
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 ☑ <b>-or-</b>	
10801198	Speech ☑	3
<b>Term</b>		<b>15 credits</b>
10152155	Web Programming 1 ☑	3
10152160	Introductory Mobile Application Development	3
10152175	Software Architecture	3
10156102	SQL Development	3
10801197	Technical Reporting	3
<b>Term</b>		<b>15 credits</b>
10151162	Secure Software Applications	3
10152158	Web Programming 2	3
10152176	Application Development Capstone	3
10809166	Intro to Ethics: Theory & Application ☑	3
10809198	Intro to Psychology ☑ <b>-or-</b>	
10809188	Developmental Psychology ☑	3
<b>Total credits 60</b>		

☑ This course has options available to receive credit for prior learning (CPL) or work experience. Visit the website at [mstc.edu/cpl](http://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](http://mstc.edu/schedule).

## SAMPLE PART-TIME CURRICULUM OPTION

<b>Term</b>		<b>9 credits</b>
10152101	Intro to Programming ☑	3
10152121	Object-Oriented Programming 1 ☑	3
10152150	Web Design 1 ☑	3
<b>Term</b>		<b>9 credits</b>
10152122	Object-Oriented Programming 2	3
10152174	Collaborative Application Development	3
10156101	Database Concepts and Design	3
<b>Term</b>		<b>6 credits</b>
10801195	Written Communication ☑ <b>-or-</b>	
10801136	English Composition 1 ☑	3
10804135	Quantitative Reasoning ☑	3
<b>Term</b>		<b>6 credits</b>
10152159	User Experience Design	3
10801196	Oral/Interpersonal Communication ☑ <b>-or-</b>	
10801198	Speech ☑	3
<b>Term</b>		<b>9 credits</b>
10152155	Web Programming 1 ☑	3
10152160	Introductory Mobile Application Development	3
10801197	Technical Reporting	3
<b>Term</b>		<b>9 credits</b>
10151162	Secure Software Applications	3
10152158	Web Programming 2	3
10809166	Intro to Ethics: Theory & Application ☑	3
<b>Term</b>		<b>6 credits</b>
10152175	Software Architecture	3
10156102	SQL Development	3
<b>Term</b>		<b>6 credits</b>
10152176	Application Development Capstone	3
10809198	Intro to Psychology ☑ <b>-or-</b>	
10809188	Developmental Psychology ☑	3
<b>Total credits 60</b>		

### MULTIPLE MEASURES

**Multiple Measures Writing (MMW):** High school GPA of 2.6 and successful completion of 2.0 credits of high school writing courses with a "C" or better

**Multiple Measures Math 1 (MMM\_1):** High school GPA of 2.6 and successful completion of 1.0 credits of high school math (Algebra 1 or equivalent) with a "C" or better

**Multiple Measures Science 1 (MMS\_1):** High school GPA of 2.6 and successful completion of 1.0 credits of high school lab science course with a "C" or better

**Multiple Measures Reading (MMR):** High school GPA of 2.6 and successful completion of 2.0 credits of high school literature courses with a "C" or better

**Multiple Measures Math 2 (MMM\_2):** High school GPA of 2.6 and successful completion of 2.0 credits of high school math including Algebra 1 and Algebra 2 with a "C" or better

**Multiple Measures Science 2 (MMS\_2):** High school GPA of 2.6 and successful completion of 1.0 credits of high school chemistry with a "C" or better

*Past high school and college transcripts are used in making course placement decisions.*

# 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**

This course is designed to review and develop fundamental concepts of mathematics in the areas of algebra, geometry, trigonometry, measurement and data. Algebra topics emphasize simplifying algebraic expressions, solving linear equations and inequalities with one variable, solving proportions and percent applications. Geometry and trigonometry topics include; finding areas and volumes of geometric figures, applying similar and congruent triangles, applying Pythagorean Theorem, and solving right triangles using trigonometric ratios. Measurement topics emphasize the application of measurement concepts and conversion techniques within and between U.S. customary and metric system to solve problems. Data topics emphasize data organization and summarization skills, including: frequency distributions, central tendency, relative position and measures of dispersion. Special emphasis is placed on problem solving, critical thinking and logical reasoning, making connections, and using calculators.

*Prerequisite: High School GPA of 2.6 and MMM\_1 or Accuplacer Arithmetic of 250 and QAS 234 or ACT Math score of 17 or Pre-Algebra 10834109 with a "C" or better*

## 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 2.6 and MMR and MMW or Accuplacer Reading Skills of 236 and Writing of 237 or ACT of 15 Reading/16 English*

## English Composition 1

**10801136.....3 credits**

Learners develop and apply skills in all aspects of the writing process. Through a variety of learning activities and written documents, learners employ rhetorical strategies, plan, organize and revise content, apply critical reading strategies, locate and evaluate information, integrate and document sources, and apply standardized English language conventions.

*Prerequisite: High School GPA of 2.6 and MMW or Accuplacer Writing of 262 or ACT English score of 20 or completion of College Reading and Writing 1 10831104 with a "C" or better*

## 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 2.6 and MMM\_1 or Accuplacer Arithmetic of 263 and QAS 234 or ACT Math score of 19 or QAS of 245 or Pre-Algebra 10834109 with a "C" or better*

## 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 2.6 and MMR and MMW or Accuplacer Reading Skills of 236 and Writing of 237 or ACT of 15 Reading/16 English*

## 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.

# COURSE DESCRIPTIONS

## **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 2.6 and MMR and MMW or Accuplacer Reading Skills of 236 and Writing of 237 or ACT of 15 Reading/16 English*

## **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 2.6 and MMM\_2 or Accuplacer QAS 241 or ACT Math score of 19 or Pre-Algebra 10834109 or College Math 10804107 with a "C" or better*

## **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 2.6 and MMR and MMW or Accuplacer Reading Skills of 236 and Writing of 237 or ACT of 15 Reading/16 English*

## **Quantitative Reasoning** ☑

**10804135**.....**3 credits**

This course is intended to develop analytic reasoning and the ability to solve quantitative problems. Topics to be covered may include construction and interpretation of graphs; descriptive statistics; geometry and spatial visualizations; math of finance; functions and modeling; probability; and logic. Appropriate use of units and dimensions, estimates, mathematical notation, and available technology will be emphasized throughout the course.

*Prerequisite: High School GPA of 2.6 and MMM\_1 or Accuplacer QAS 241 or ACT Math score of 19 or Pre-Algebra 10834109 or College Math 10804107 with a "C" or better*

## **Secure Software Applications**

**10151162** .....**3 credits**

The Secure Software Applications course teaches students about the most common attacks against applications and how to defend against those attacks through secure coding practices and good security hygiene. The class focuses on the OWASP top 10, certificates, code scanning, SDLC Security automation and more.

*Prerequisite: Intro to Programming 10152101*

## **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.*

## **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. Includes informative, persuasive, and occasion speech presentations.

*Prerequisite: High School GPA of 2.6 and MMR and MMW or Accuplacer Reading Skills of 253 and Writing of 262 or ACT of 21 Reading/19 English or completion of College Reading and Writing 1 10831104 with a "C" or better*



# COURSE DESCRIPTIONS

## 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 or Written Communication 10801195 with a "C" or better*

## 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-Oriented 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 2.6 and MMW or Accuplacer Writing of 262 or ACT English score of 20 or completion of College Reading and Writing 1 10831104 with a "C" or better*