



**Macomb
Community College**

Education • Enrichment • Economic Development

Discover. Connect. Advance.



TEST THE WATERS

At Macomb, you can “test the waters,” exploring the features and benefits of each IT specialty for about **one-quarter the cost of a publicly funded Michigan four-year university**, before making your choice and earning your Associate of Applied Science degree.

2 + 2 = \$1,000,000

Although skill-specific certificates are available in all of Macomb’s IT specialties, a bachelor’s degree is the requirement for the most desirable IT jobs. And U.S. Census Bureau statistics show that a student with a four-year degree will earn one-million dollars more over their lifetime!

PLANNING TO TRANSFER TO A FOUR-YEAR COLLEGE OR UNIVERSITY?

Macomb’s IT program provides a direct path to a bachelor’s degree at select colleges and universities, and up to 90 credits earned at Macomb may be transferable. Students intending to transfer to another college or university should talk to a Macomb counselor or academic advisor before registering for classes.

Center Campus: 586.286.2228

South Campus: 586.445.7211

Email: answer@macomb.edu

WORKING IN A VIRTUAL WORLD

The Information Technology Department at Macomb Community College has nine areas of study to launch your career and shape the future of technology.

COMPUTER APPLICATIONS

Applications Professional: learn about the use of commercially available software to increase the productivity of professionals

IT Professional: gain knowledge in Windows-based applications, Web design, programming, and networking

COMPUTER NETWORKING

Networking Specialist—Cisco Network Professional: focuses on the Cisco Networking Academy, wired and wireless networking technologies, network security, and troubleshooting techniques

Networking Specialist—Microsoft Enterprise Administrator: handle day-to-day management of the server operating system, file structure, and directory services

Networking Specialist—Network Security Professional: tools and techniques used to safeguard the communications networks of an organization from unauthorized access

PROGRAMMING

Programming: creation of custom software using languages such as C++, C#, Java, and the .NET Framework

Programming for Electronic Games: creation of computer games for multiple potential audiences, whose target uses include entertainment, training, and scenario planning (simulation)

WEB AND INTERNET TECHNOLOGIES

Website Programming: creation of interactive websites utilizing programming tools such as JavaScript, ASP.NET, and PHP—this specialty supports the creation of e-commerce websites

Web Specialist: gain Web programming skills and the design phase of Web Applications development



**For general information about
Macomb Community College:**

www.macomb.edu

866.Macomb1 (866.622.6621)

answer@macomb.edu



APPLICATIONS PROFESSIONAL

Everybody likes the big-name schools and it all sounds great. But when you actually sit down and realize the bills you're going to have, it becomes less appealing. I opted to go to Macomb for the first two years because I would be getting the same type of learning under my belt. It saved me a ton of money, which was awesome!

—George Westerman,
SQL Developer

THE PROGRAM

Macomb's Information Technology Applications Professional (ITAP) program emphasizes software applications and communication skills required in business. The focus is on developing expert-level application skills, with special emphasis on enhancing critical thinking and decision-making capabilities, while being sufficiently prepared for professional certification.

The program also emphasizes the development of effective communication skills. Students will create concise and thorough applicable reports and proposals that include a specific level of critical detail used in the decision-making process.

A certificate* option is available as an alternative to the associate degree. Certificate programs offer a high degree of specialization in a short program of instruction and may later be applied toward an associate degree.

*Macomb's Gainful Employment information can be found at www.macomb.edu/ge/list

JOB OUTLOOK

With state and government agencies now requiring companies to produce all records pertaining to a litigious issue within a specified period of time, it has become necessary for them to convert all records to an electronic format. Because of this, highly skilled applications professionals are in demand.

Employment of software developers is projected to grow 30 percent by 2020, much faster than the average for all occupations. Job prospects will be best for applicants with knowledge of the most up-to-date programming tools and languages.

Employment source: America's Career InfoNet (www.CareerInfoNet.org)

FOR MORE INFORMATION

Visit www.macomb.edu and search "Applications Professional," or contact an instructor:

Cheryl Sypniewski
sypniewskic@macomb.edu

Martin Kohl
kohl@macomb.edu

Elizabeth Jenaway
jenaway@macomb.edu



IT PROFESSIONAL

THE PROGRAM

The Information Technology—IT Professional program is designed to prepare two types of students: inexperienced students seeking entry-level positions, and experienced students seeking either IT management or project management positions, where breadth of technical knowledge is required.

The program will give the student a background in Windows-based applications (word processing, spreadsheet applications, presentations, database management), web design, programming, and networking. It additionally provides the broad background in computers necessary for business, industry, and government job environments.

A certificate* option is available as an alternative to the associate degree. Certificate programs offer a high degree of specialization in a short program of instruction and may later be applied toward an associate degree.

*Macomb's Gainful Employment information can be found at www.macomb.edu/ge/list

JOB OUTLOOK

An IT Professional degree sets the foundation for further study to qualify for job opportunities that include:

- Business Analyst
- Database Administrator
- Network Administrator
- Programmer
- Web Developer

Employment for computer and information systems managers is projected to grow 18 percent by 2020, about as fast as the average for all occupations. Growth will be driven by organizations upgrading their IT systems and switching to newer, faster, and more mobile networks. A bachelor's degree in computer or information science plus related work experience is typically required.

Employment source: America's Career InfoNet (www.CareerInfoNet.org)

Career Opportunities with an Associate Degree or Certificate	Michigan Employment % Change/Growth	Michigan Wage Median Annual Salary	Source/For More Information
Computer and information systems manager	+11%	\$75,250	www.acinet.org
Computer systems analyst	+16%	\$57,750	www.acinet.org
Computer trainer	+19%	\$57,500	www.careercruising.com

At a major university, you're basically just a number sitting in a seat. At Macomb, you actually get to know your instructor and your instructor gets to know you.

—David Czebieniak,
Sales Supervisor,
MDBRP

FOR MORE INFORMATION

Visit www.macomb.edu and search "Information Technology—IT Professional" or contact instructor:

Yi Li Zhuang
zhuangy@macomb.edu



NETWORKING SPECIALIST— CISCO NETWORK PROFESSIONAL

THE PROGRAM

The Cisco Certified Network Associate specialty is for students who want to acquire the Internet technology skills essential for success in a global economy. Offered in partnership with Cisco Systems, Inc., a global manufacturer of high-tech products for both small and large companies, the courses that comprise the Cisco Networking Academy Program prepare students to take the Cisco Certified Network Associate (CCNA) exam. The certification attests to an individual's ability to install and configure Cisco network communication equipment, troubleshoot (including Ethernet and TCP/IP networks), and improve network performance and security.

A certificate* option is available as an alternative to the associate degree. Certificate programs offer a high degree of specialization in a short program of instruction and may later be applied toward an associate degree.

*Macomb's Gainful Employment information can be found at www.macomb.edu/ge/list

JOB OUTLOOK

Employment of network and computer systems administrators is expected to grow 28 percent by 2020, faster than the average for all occupations. Demand for these workers is high and should continue to grow as firms invest in newer, faster technology and mobile networks.

Network and computer systems administrators must often have a bachelor's degree, although some positions will accept an associate degree or professional certification along with related work experience.

Employment source: America's Career InfoNet (www.CareerInfoNet.org)

I did my research, and there is no college in southeast Michigan that has a (Cisco) program as good as Macomb's. With the way they teach and the resources that are available ... it just doesn't get any better than this.

—Kim Kalinowski

FOR MORE INFORMATION

Visit www.macomb.edu and search "Cisco" or contact instructor:

John Koss
kossjo@macomb.edu

For additional information on the Cisco Academy please visit the Cisco Academy website www.netacad.com

Career Opportunities with an Associate Degree or Certificate	Michigan Employment % Change/Growth	Michigan Wage Median Annual Salary	Source/For More Information
Computer network architect	Unpredictable	\$51,000	www.acinet.org
Computer user support specialist	+8%	\$43,200	www.acinet.org
Network and computer systems administrator	+17%	\$46,300	www.acinet.org



NETWORKING SPECIALIST— MICROSOFT ENTERPRISE ADMINISTRATOR

THE PROGRAM

The Microsoft Enterprise Administrator program is for students who want to pursue a career in network administration of a Microsoft Windows network. This position is typically responsible for the day-to-day administration of Windows clients and servers for organizations of all sizes. The program contains the training and education needed to pursue the current Microsoft network administration certification.

A certificate* option is available as an alternative to the associate degree. Certificate programs offer a high degree of specialization in a short program of instruction and may later be applied toward an associate degree.

*Macomb's Gainful Employment information can be found at www.macomb.edu/ge/list

JOB OUTLOOK

Employment of network and computer systems administrators is expected to grow 28 percent by 2020, faster than the average for all occupations. Demand for these workers is high and should continue to grow as firms invest in newer, faster technology and mobile networks.

Employment source: America's Career InfoNet (www.CareerInfoNet.org)

Career Opportunities with an Associate Degree or Certificate	Michigan Employment % Change/Growth	Michigan Wage Median Annual Salary	Source/For More Information
Computer network architect	Unpredictable	\$51,000	www.acinet.org
Computer user support specialist	+8%	\$43,200	www.acinet.org
Network and computer systems administrator	+17%	\$46,300	www.acinet.org

I would tell a new student to take advantage of everything that's available to you at Macomb. You have professors who want to help you succeed. Any questions you have, they will answer them for you. The professors I connected with at Macomb have been an inspiration.

—Stephen Cavaliere,
Web Developer
Intern, CareTech
Solutions

FOR MORE INFORMATION

Visit www.macomb.edu
and search "Microsoft
Enterprise Administrator"
or contact instructor:

Patrick Horning
hornungp@macomb.edu



NETWORKING SPECIALIST— NETWORK SECURITY PROFESSIONAL

THE PROGRAM

This Network Security specialty is for students who want to focus their career on security and information assurance as a systems administrator. This position is typically responsible for overseeing the measures an organization takes to protect the confidentiality, integrity, and availability of data. Information assurance includes computer security topics, and extends the focus to include security risk management, computer forensics, ethical hacking, security policies, and analysis.

Students specializing in the Security area of study will gain skills in computer networking, website programming, and operating systems, along with courses specific to network security.

A certificate* option is available as an alternative to the associate degree. Certificate programs offer a high degree of specialization in a short program of instruction and may later be applied toward an associate degree.

*Macomb's Gainful Employment information can be found at www.macomb.edu/ge/list

JOB OUTLOOK

Network security professionals typically need an advanced degree or certification, although some positions will accept an associate degree or professional certification along with related work experience.

Employment of network and computer systems administrators is expected to grow 28 percent by 2020, faster than the average for all occupations. Demand for these workers is high and should continue to grow as firms invest in newer, faster technology and mobile networks.

Employment source: America's Career InfoNet (www.CareerInfoNet.org)

Career Opportunities with an Associate Degree or Certificate	Michigan Employment % Change/Growth	Michigan Wage Median Annual Salary	Source/For More Information
Computer network architect	Unpredictable	\$51,000	www.acinet.org
Computer user support specialist	+8%	\$43,200	www.acinet.org
Information security analyst	+22%	\$66,300	www.acinet.org
Network and computer systems administrator	+17%	\$46,300	www.acinet.org

I had the desirable skill set, and Macomb definitely provided the foundation for me to get the very good job I have now, while building on it for my future success.

—George Westerman,
SQL Developer

FOR MORE INFORMATION

Visit www.macomb.edu and search "Networking Specialist," or contact instructor:

Keith Nabozny
naboznyk@macomb.edu



THE PROGRAM

The Information Technology Computer Systems (ITCS) specialty is for students who want to become programmers, responsible for writing, testing, and maintaining the source code of computer programs. The process of writing source codes requires expertise in many different subjects, including knowledge of the desired business or organization processes, specialized algorithms, and formal logic.

An *applications programmer* writes and revises programs that run on specific software. A *computer programmer* focuses on one or more of the following areas (with employment opportunities increasing with each added area of expertise): multimedia, the Internet, specific computer languages, research, management, and database.

Macomb's program prepares students pursuing either career path to be effective problem solvers capable of developing systems solutions using available methods and techniques.

A certificate* option is available as an alternative to the associate degree. Certificate programs offer a high degree of specialization in a short program of instruction and may later be applied toward an associate degree.

*Macomb's Gainful Employment information can be found at www.macomb.edu/ge/list

JOB OUTLOOK

Most computer programmers have a bachelor's degree; however, some employers hire workers with an associate degree. Most programmers specialize in several programming languages. Employment of computer programmers is expected to increase 12 percent by 2020, about as fast as the average for all occupations.

Employment source: America's Career InfoNet (www.CareerInfoNet.org)

Career Opportunities with an Associate Degree or Certificate	Michigan Employment % Change/Growth	Michigan Wage Median Annual Salary	Source/For More Information
Computer software engineer	+25%	\$60,050	www.acinet.org
Database administrator	+13%	\$49,100	www.acinet.org
Database developer	+13%	\$42,000	www.careercruising.com

I had Professor Kohl for Java. To be honest, I think I was the worst one in the class, and that really bothered me. He said, "Don't get down on yourself. Stick with it and it'll pay off." And that rung in my ears. Sometimes you need to hear that to get on the right path.

—George Westerman,
SQL Developer

FOR MORE INFORMATION

Visit www.macomb.edu and search "Programming" or contact an instructor:

Elizabeth Jenaway
jenawaye@macomb.edu

Martin Kohl
kohl@macomb.edu



PROGRAMMING FOR ELECTRONIC GAMES

THE PROGRAM

The Information Technology Gaming program is for individuals who want to design, develop, and program computer games for entertainment or as a learning tool. Often combining advanced physics, artificial intelligence, 3D graphics, digitized sound, an original musical score, and a complex strategy united by an overriding theme, computer games have become highly sophisticated and so, too, the skills demanded by those responsible for their creation and programming.

Each aspect of the game can consume all of one or more programmer's time. Some programmers may specialize in one area of game programming, but many are familiar with several aspects. The number of programmers needed for each feature depends somewhat on programmers' skills, but typically is dictated by the type of game being developed.

Using the Python programming language C++ and Microsoft's XNA Development Platform, students in Macomb's Gaming program acquire those highly specialized skills that can lead to successful careers in computer gaming or in the production of training materials, including simulations, for a variety of companies.

A certificate* option is available as an alternative to the associate degree. Certificate programs offer a high degree of specialization in a short program of instruction and may later be applied toward an associate degree.

*Macomb's Gainful Employment information can be found at www.macomb.edu/ge/list

JOB OUTLOOK

Now that computers and their corresponding technology are at the center of most types of information and entertainment, game development is a growing field, with many opportunities for jobs and advancement. Game programming requires skills equivalent to those of a business programmer. Often game programmers experience a career evolution in which they move from game programmer to business programmer and back.

Employment of software developers is projected to grow 30 percent by 2020, much faster than the average for all occupations. The main reason for the rapid growth is a large increase in the demand for computer software.

Source: America's Career InfoNet (www.CareerInfoNet.org)

Career Opportunities with an Associate Degree or Certificate	Michigan Employment % Change/Growth	Michigan Wage Median Annual Salary	Source/For More Information
Computer software engineer	+25%	\$60,050	www.acinet.org

The program at Macomb was great to experience all the fields of gaming.

—Wilson Yang,
Gaming Program
graduate

FOR MORE INFORMATION

Visit www.macomb.edu and search "IT Gaming" or contact instructor:

George Schleis
schleisg@macomb.edu



WEBSITE PROGRAMMING

THE PROGRAM

The Website Programming course of study offers degree and certificate options aimed at preparing students for positions that require knowledge of website design, website architecture, SEO (search engine optimization), development, deployment, maintenance, and support for the World Wide Web, Corporate Internet, Intranet, and/or Extranet. Students completing the program will gain skills necessary to understand and implement HTML, CSS, SEO, JavaScript, and other Web programming and coding techniques.

Graduates will have the fundamental skills necessary to serve the industry in positions ranging from Web Master, Web Developer, and Web Designer. Students who complete the sequence of classes will have sufficient training to sit for one or more CIW (Certified Internet Web Professional) Certifications. Additional studying may be necessary depending on the type of certification sought.

It's much easier to get to know your professors here, not only because of the smaller class size but because they genuinely want to see you succeed. At the other schools I've attended, I never even spoke to my professors.

—Stephen Cavaliere,
Web Developer
Intern, CareTech
Solutions

All Web courses are offered in an online or hybrid format.* In addition to the basic equipment and software required for traditional online classes, participants may be required to install curriculum-specific software such as PHP, MySQL, Visual Studio.Net, and Dreamweaver.

*Because this program is geared toward certification, the majority of the courses must be taken online and require curriculum-specific software. Consult the current college catalog for more details.

Web Specialist Option

Students completing the Web Master or Web Developer degree program may also earn a Web Specialist degree by successfully completing an additional 24 credit hours in Media and Communication Arts (MACA) Web Design courses.

A certificate** option is available as an alternative to the associate degree. Certificate programs offer a high degree of specialization in a short program of instruction and may later be applied toward an associate degree.

** Macomb's Gainful Employment information can be found at www.macomb.edu/ge/list

JOB OUTLOOK

Employment of Web developers is projected to grow faster than the average for all occupations. Job prospects should be favorable.

Source: America's Career InfoNet (www.CareerInfoNet.org)

FOR MORE INFORMATION

Visit www.macomb.edu and search "Website Programming" or contact instructor:

Jacqueline Wanner
wannerj@macomb.edu

Career Opportunities with an Associate Degree or Certificate	Michigan Employment % Change/Growth	Michigan Wage Median Annual Salary	Source/ For More Information
Web developer	Unpredictable	\$51,000	www.acinet.org
Website designer	Unpredictable	\$57,500	www.careercruising.com



WEB SPECIALIST

THE PROGRAM

Students completing the Web Master or Web Developer degree program may also earn a Web Specialist degree by successfully completing an additional 24 credit hours in Media and Communication Arts (MACA) Web Design courses.

This third-year program is designed as a multi-discipline AAS degree for students from the MACA program to gain Web programming skills, or for Computer Information Systems (ITCS) students in Web Programming to gain useful experience in the design phase of Web Applications development.

Students completing the MACA degree program in Web Design will gain skills necessary to understand and implement HTML, CSS, SEO, and other Web programming and coding techniques. ITCS students will gain invaluable skills in page design tools.

A certificate* option is available as an alternative to the associate degree. Certificate programs offer a high degree of specialization in a short program of instruction and may later be applied toward an associate degree.

* Macomb's Gainful Employment information can be found at www.macomb.edu/ge/list

OCCUPATION DESCRIPTION (WEB DEVELOPER)

Web developers design, create, and modify websites. They analyze user needs to implement website content, graphics, performance, and capacity. They may integrate websites with other computer applications, and may convert written, graphic, audio, and video components to compatible Web formats by using software designed to facilitate the creation of Web and multimedia content.

CAREER OUTLOOK

Employment of Web developers is projected to grow 22 percent by 2020, faster than the average for all occupations. Job prospects should be favorable.

Source: America's Career InfoNet (www.CareerInfoNet.org)

I appreciate Career Services—it works! I got so many connections and leads, more than what I thought there would be.

—David Czebieniak,
Sales Supervisor,
MDBRP

FOR MORE INFORMATION

Visit www.macomb.edu and search "Web Specialist" or call a Media & Communication Arts (MACA) program advisor at 586.445.7993 or a Computer Information Systems (ITCS) program advisor at 586.445.7167.