COMPUTER TECHNOLOGY

Department of Applied Computing & Electronics
Associate of Applied Science (A.A.S.) Degree Program

Program Description:

Computer Technology pairs technical education with profession skills to prepare individuals for exciting careers in the information technology industry. The continued explosion of computer use has created a high demand for specialists capable of building solutions and supporting computing systems in a globally connected community. The Computer Technology Program prepares students using a curriculum well-rounded in technical experiences. Course topics include computer hardware, operating systems, software development, Internet technologies, networking, telecommunications, and application software. Technical classes are delivered using a lab-based, project-oriented, hands-on approach. Students develop the professional skills demanded by employers in the areas of problem-solving, customer service, technical writing, and oral presentation.

This program partners with Computer Technology Industry Association (CompTIA), Cisco, and Microsoft in offering students industry-based certifications. CompTIA A+ certification is the industry standard for computer support technicians. Cisco network professionals demonstrate the skills required for entry-level network support positions - the starting point for many successful careers in networking. Microsoft credentials helps students advance their careers by showing employers that they possess the skills necessary to successfully manage and troubleshoot network environments running on Windows systems.

Some classes are available online. All students attempt at least one industry certification and complete at least one online course. Academically prepared students can complete the Associate of Applied Science degree and at least one industry certification within two years. All credits earned in the program fulfill partial requirements towards a Bachelor of Applied Science (B.A.S.) degree through The University of Montana.

Student Outcomes:

Upon completion of the program students will:

- Effectively utilize information technology as a research and productivity tool.
- Demonstrate proficiency in supporting end-users by designing, installing and maintaining the hardware, software, and networking technologies used in information technology.
- Identify the societal impact of information technology and apply appropriate best practices for security and safety.
- Demonstrate the workplace skills of effective communication, problem solving, collaboration, critical thinking, and leadership.
- Describe the structure of organizations and the information technology resources needed to support it.

Students with an option in Information Systems Management will:

- Design, develop, and maintain desktop and web-based information systems to support institutions and organizations.

Students with an option in Network Management will:

- Install, configure, secure, monitor, troubleshoot, and manage networking connectivity technologies; server-based computing systems; and integrated video/voice/data systems.

Related Job Titles:

- Computer Support Specialist
- Technical Support Specialist
- Help-Desk Technician
- Network Administrator
- Systems Administrator
- Database Administrator
- Application Developer
- Web Developer

Related Occupations (U.S. Department of Labor Occupations Handbook):

- Computer Support Specialists and Systems Administrators http://www.bls.gov/oco/ocos268.htm
- Computer and Information Systems Managers http://www.bls.gov/oco/ocos258.htm
- Computer Software Engineers http://www.bls.gov/oco/ocos267.htm
- Computer Scientists and Database Administrators http://www.bls.gov/oco/ocos042.htm

Related Industry Certification Opportunities:

- CompTIA A+ Certified Computer Support Technician
- CompTIA Network+ Network Professional
- Cisco Certified Networking Associate
- Cisco Certified Entry Networking Technician
- Microsoft Certified Technology Specialist
- Microsoft Certified System Administrator

Further Educational Opportunities:

The Computer System Certificate of Applied Science is a first step for individuals interested in building a technical skill set for a career involving Information Technology. It is part of a laddered credential approach involving a one-year certificate, industry certification, a two-year associate degree, and a four-year baccalaureate degree. All credits completed for the Computer Technology A.A.S. degree fulfill partial requirements for a Bachelor of Applied Science (B.A.S.) degree.

Information Systems Management Option Program Curriculum Sequence*:

	First Year	**Autumn**	**Spring**
BUS 103S	Principles of Business	3	-
WRIT 101	College Writing I	3	-
COM 160A	Oral Communications	3	-
CRT 111	Fluency in Information Technology	3	-
CRT 112	Operating System Fundamentals	-	3
CRT 121	Introduction to Programming	-	3
CRT 122E	Ethics and Information Technology	-	3
CRT 151T	Networking Basics	-	3
CRT 172	Introduction to Computer Modeling		3
M 115	Probability and Linear Mathematics	3	-
Total		**15**	**15**
	Second Year	**Autumn**	**Spring**
ACTG 101	Accounting Procedures I	4	-
CRT 203	Systems Analysis	-	3
CRT 210T	Advanced Operating Systems	3	-
CRT 231	Object-Oriented Programming	3	-
CRT 263	Web Design and Development	-	3
CRT 275	Database Design and Implementation	3	-
CRT 285T	PC Hardware Support	3	-
CRT 289T	Professional Certification	-	1
CRT 290T	Computer Technology Internship	-	2
	Directed Electives **	-	6
Total		**16**	**15**

*Curriculum is subject to change depending upon course availability.

**Directed Electives include:

- ACTG 201 Principles of Financial Accounting, 4 credits
- BUS 125T Principles of Marketing, 3 credits
- BUS 135T Business Law, 3 credits
- BUS 243T Psychology of Management and Supervision, 3 credits
- BUS 250T Entrepreneurship, 3 credits
- COM 150S Interpersonal Communications, 3 credits
- COM 220T Training Techniques, 3 credits
- WRIT 121 Technical Writing, 3 credits

Network Management Option Program Curriculum Sequence*:

	First Year	Autumn	Spring
BUS 103S	Principles of Business	3	-
WRIT 101	College Writing I	3	-
CRT 111	Fluency in Information Technology	3	-
CRT 112	Operating System Fundamentals	-	3
CRT 121	Introduction to Programming	-	3
CRT 122E	Ethics, Logic, and Critical Thinking	-	3
CRT 151T	Networking Basics	3	-
CRT 152T	Routers and Router Basics	-	3
CRT 172	Introduction to Computer Modeling	-	3
M 115	Probability and Linear Mathematics	3	-
Total		**15**	**15**
	Second Year	**Autumn**	**Spring**
COM 160A	Oral Communications	-	3
CRT 210T	Advanced Operating Systems	3	-
CRT 215T	Server Technologies	3	-
CRT 216T	Network Infrastructure	-	3
CRT 222T	Enterprise Security	-	3
CRT 231	Object-Oriented Programming	3	-
CRT 251T	Switching Basics and Intermediate Routing	3	-
CRT 252T	WAN Technologies	-	3
CRT 285T	PC Hardware Support	3	-
CRT 289T	Professional Certification	-	1
CRT 290T	Internship	-	2
Total		**15**	**15**

*Curriculum is subject to change depending upon course availability.

Course Descriptions:

ACTG 101 Accounting Procedures I 4 cr. Offered autumn and spring. basic double-entry accounting. Emphasis on analyzing, journalizing, and posting transactions; trial balance, worksheet, financial statements, and adjusting/closing procedures, accounting systems, and cash control.

ACTG 201 Principles of Financial Accounting 4 cr. Offered autumn and spring. Prereq., ACTG 101 (ACC 132T) with competency test score of 75% or better. Expansion of ACTG 101 (ACC 132T) including receivables, inventories, plant and intangible assets, and expanded liabilities. Includes partnerships, corporations, long-term liabilities, investments in debt and equity securities, and the statement of cash flow.

BUS 103S Principles of Business 3 cr. Introduction to the world of business. Examines capitalism, the economic environment, the types of business organizations, management, marketing, production, labor, financing, and business/governmental relations. Credit not allowed for both BUS 103S and BADM 100S.

BUS 125T Principles of Marketing 3 cr. Offered autumn. An overview of marketing activities including the consumer buying decision process, distribution channels, the planning process, and new marketing trends. Students learn how to introduce a new product into the marketplace, target markets, and promote products through advertising and package design.

BUS 135T Business Law 3 cr. Offered spring. An overview of law as it applies to business transactions. Topics include the nature and source of law; courts and procedure; contracts, sales, and employment; commercial paper; bailments; property; business organizations; insurance; wills and estate planning; consumer and creditor protection; torts; criminal law; and agency law.

BUS 243T Psychology of Management And Supervision 4 cr. Offered autumn. Management theory, research, and the practice of management. Topics covered include leadership styles and techniques, effective communication approaches, time management, decision making, delegation, and the basic functions of supervisory skills.

BUS 250T Entrepreneurship 3 cr. Offered spring. Prereq., CRT 101. An overview of the skill areas and business principles needed to start and operate a small business. Includes developing a business plan, identifying sources of capital formation, managing growth, and marketing issues related to new ventures.

COM 150S Interpersonal Communication 3 cr. Focus on communicating and listening more clearly to improve personal and professional relationships. Topics include forms of communication, communication and identity, emotion, conflict, climates, gender, and cultural diversity. Credit not allowed for both COM 150S and COMM 110S.

COM 160A Oral Communications 3 cr. Offered autumn and spring. Introduction to oral communication skills, including public speaking, interviewing, and small group communications. Focus is on the organization, delivery, and retention of oral messages, listening skill development, and nonverbal communication. Credit not allowed for both COM 160A and COMM 111A.

COM 220T Training Techniques 3 cr. Offered spring. Prereq., COM 160A, COM 115T or consent of instr. The practical application of adult learning theory to documenting procedures, creating user guides, writing instructions, developing courses, using tutorials, evaluating and using training materials, and giving effective oral presentations. Students prepare and deliver mini-courses to develop these skills.

CRT 111 Fluency in Information Technology 3 cr. Offered autumn and spring. Prerequisites: CRT100 or demonstrated computing experience. Introduces the skills and concepts of information technology, both from practical and a more theoretical point of view. During lectures and interactive computer labs, students will explore a wide range of digital and information technologies, including common PC applications, networking, databases, privacy, and security. Credit not allowed for both CRT111 and CS111.

CRT 112 Operating System Fundamentals 3 cr. Offered spring. Prereq., CRT 101 or demonstrated computing experience. Introduction to common operating systems used in modern computing. Emphasis on thorough understanding and use of command line and graphical user interfaces. Hands-on experience with single-user and multi-user/multi-access software. Focus on using, comparing, and analyzing the capabilities of existing and emerging operating systems.

CRT 121 Introduction to Programming 3 cr. Offered autumn and spring. Prereq., CRT 103T, MAT 100. An introduction to programming and problem-solving methodologies using Visual BASIC. Techniques include problem identification, logic planning, program coding, and program debugging. Structured programming and documentation techniques are stressed.

CRT 122E Ethics and Information Technology 3 cr. Offered spring. Prereq., WRIT 101 (WTS 101). Exploration of ethical issues in the field of computing. Skills needed to identify and analyze various ethical concerns. Standard ethical concepts and theories, methods of ethical analysis. Strong emphasis on practical application of the ethical process.

CRT 151T Networking Basics 3 cr. Offered spring. Prereq., CRT 101 or demonstrated computer experience. Introduction to networking field including terminology; protocols; local-area and wide-area networks; the OSI model; topologies; IP addressing; cabling and cabling tools; routers and router programming; Ethernet and network standards; and wireless technologies.

CRT 152T Routers and Routing Basics 3 cr. Offered autumn. Prereq., CRT 126T and CRT 112T or consent of instr. Covers router theory and technologies including configurations, IOS software management, routine protocol configuration, TCP/IP, access-lists and introduction to LAN switching.

CRT 172 Introduction to Computer Modeling 3 cr. Offered autumn and spring. Prereg., MAT 100 or demonstrated computing experience. Problem solving and data modeling using computer productivity software. Emphasis using spreadsheets and databases for data analysis. Formal presentation of results. Credit not allowed for both CRT 172 & CS 172.

CRT 203 Systems Analysis 3 cr. Offered spring. Prereq., CRT 280 or 281. Analysis of the system development life cycle. Emphasis on planning, analyzing, designing, implementing and supporting information systems to meet business requirements. Covers feasibility studies, time and cost estimates, modeling tools, design tools, implementation and support strategies. A simulated business design project will be developed.

CRT 210T Advanced Operating Systems 3 cr. Offered autumn. Prereq., CRT 112T, 126T. In-depth study of a secure, multi-user, client-based network operating system. Topics include installation, administration of resources, performance, network services, and security.

CRT 215T Server Technologies 3 cr. Offered autumn. Prereq., CRT 112T, CRT 126T. Server technologies commonly used in local area networking. Topics include installation, administration, storage, application services, network services, security, reliability, and availability.

CRT 216T Network Infrastructure 3 cr. Offered spring. Prereq., CRT 210T. Principles and implementation of enterprise networking services. Topics include Protocol Binding, DNS, DHCP, WINS, Remote Access, IP Routing, IP Security, Network Address Translation, and Certificate Services.

CRT 222T Enterprise Security 3 cr. Offered spring. Prereq., CRT 210T. Examination of general information technology security concepts. Topics include access control, authentication, attack methods, remote access, web security, wireless networks, cryptography, internal infrastructure security, and external attacks. Security procedures, organizational policies, risk management and disaster recovery addressed.

CRT 231 Object-Oriented Programming 3 cr. Offered autumn. Prerequisites: CRT121. Design and implementation of software using object-oriented programming practices. The class framework is used to apply the object-oriented techniques of encapsulation, polymorphism, and inheritance.

CRT 251T Switching Basics And Intermediate Routing 3 cr. Offered spring. Prereq., CRT 176T. Covers router configurations including advanced IP addressing techniques, variable length subnet masking, intermediate routing protocols, Ethernet switching, virtual LANs, spanning-tree protocol, and VLAN trunking protocol.

CRT 252T Wan Technologies 3 cr. Offered spring. Prereq., CRT 226T. Project-based course in wide-area networking including advanced IP addressing techniques, network address translation, port address translation, DHCP, WAN technology and terminology, PPP, ISDN, DDR, Frame Relay, network management, and introduction to optical networking.

CRT 263 Web Design And Development 3 cr. Offered autumn and spring. Prereq., CRT 101 or consent of instr. Provides a background and foundation skills required for designing and implementing Web sites for public and private organizations. Marketing and design techniques are applied using state-of-the-art software.

CRT 275 Database Design and Implementation 3 cr. Offered autumn. Prereq., CRT 280 or consent of instructor. Relational database design including: requirements analysis, data structure, entity relationships, normalization, relational algebra and integrity. Physical implementation focusing on data storage; retrieval and modification; concurrency; optimization; security; SQL; and XML.

CRT 285T PC Hardware Support 3 cr. Offered autumn and spring. Prereq., CRT 103T, CRT 112T. In-depth study of personal computer hardware. Focus on field replaceable components. Topics include: storage devices, processors, system boards, memory, ports, cabling, power supplies, multimedia devices, printers, and troubleshooting.

CRT 289T Professional Certification 1 cr. Reviews objectives of an information technology industry-based professional certification. A thorough review of certification objectives, preparation strategies, and exam strategies will be covered. Course can be repeated for different industry-based professional certifications.

CRT 290T Computer Technology Internship 2 cr. Offered autumn and spring. Prereq., last semester in program, minimum of “C” in all CRT courses, and approval of program director. Not open to non-majors. On-the-job training in positions requiring advanced microcomputing competencies. This experience increases students' skills, prepares them for initial employment, and increases occupational awareness and professionalism. Students work a minimum of six hours each week at an approved site and attend a weekly one-hour seminar.

M 095 Intermediate Algebra 3 cr. Offered autumn and spring. Prereq., M 090 (MAT 005) or appropriate placement score. Topics include linear equations and systems of linear equations, inequalities, applications and graphing; polynomials; rational expressions and equations; radicals, rational exponents and complex numbers; quadratic equations; introduction to exponential and logarithmic functions. Credit does not count toward Associate of Arts or Baccalaureate degrees.

M 115 Probability and Linear Math 3 cr. Offered every term. Prereq., M 090 (MAT 005D) with a grade of B- or better, M 095 (MAT 100D), or appropriate placement score. Systems of linear equations and matrix algebra. Introduction to probability with emphasis on models and probabilistic reasoning. Examples of applications of the material in many fields.

WRIT 101 College Writing I 3 cr. Offered every term. Prereq., WRIT 095 or passing score on placement test. Instruction and practice in both the expository writing and research process. Emphasis on the use of specific techniques of writing to develop style, unity, clarity, and force of ideas, and structure. Students are expected to write without major errors in sentence structure or mechanics. Grading A-F, or NC.

WRIT 121 Introduction to Technical Writing 3 cr. Offered every term. Course assumes a basic computer literacy. Passing score on placement test or consent of instructor. Introduction to technical writing situations with appropriate formats. Emphasizing on writing with document design and graphic placement introduced. Students are expected to write without major faults in grammar or usage.