MASSACHUSETTS
STATE ARTICULATION AGREEMENT

BETWEEN

MASSACHUSETTS COMMUNITY COLLEGES AND MASSACHUSETTS CHAPTER 74 APPROVED SECONDARY CAREER/VOCATIONAL TECHNICAL PROGRAMS

INFORMATION SUPPORT SERVICES AND NETWORKING

Effective Date: December 5, 2012

MASSACHUSETTS STATE ARTICULATION AGREEMENT

From:	***To:***
A Chapter 74 Approved Secondary Career/Vocational Technical Program	***Community College Courses****

In this Program:	**One or more of the following course(s) or equivalent:**	
Information Support Services and Networking	CISCO Networking I	Introduction to Information Technology
	Computer Concepts	Introduction to Networking
	Computer Concepts with Applications	Introduction to Operating Systems
	Computer Configuration and Hardware	Microcomputer Environment
	Computer Hardware and Support	Network Fundamentals
	Computer Networks I	Network Workstation Administration
	Computer Service and Repair	Networking Essentials
	Internetworking	Networking I
	Introduction to Computer Networks	Operating Systems
	Introduction to Computer Systems	PC Hardware & Software
	Introduction to Data Communication & Networks	System Support—Hardware
		Wireless Networking

In accordance with the definition of an articulation agreement found in the Carl D. Perkins Career and Technical Education Improvement Act of 2006, this state level articulation agreement has been established between all Massachusetts Community Colleges and all high schools having Chapter 74 approved secondary career/vocational technical programs in *Information Support Services and Networking* to provide students with a non-duplicative sequence of progressive achievement leading to technical skill proficiency, a credential, a certificate, or a degree linked through this credit transfer agreement

The principles, policies, and guidelines in this transfer agreement shall apply uniformly to all students attempting to transfer credits earned in Massachusetts secondary CVTE programs.

****The specific course a student receives credit for is determined by the community college curriculum.***

SECTION I: ADMISSION CRITERIA AND PROCEDURES APPLY

1) Students eligible for credit are subject to the same application and admission requirements as all other students. The graduation requirements will be no different from the graduation requirements for all other students.

2) The minimum high school grade point average (GPA) of 2.0 plus an average grade of B (3.0/80% or higher) earned in the course/s that comprise the Massachusetts Chapter 74 approved Secondary Career/Vocational Technical program listed above.

3) Massachusetts students who have completed the Chapter 74 approved secondary career/vocational technical program covered by this agreement shall provide evidence (transcript) that he/she earned a 3.0 GPA/80% or higher in the technical courses that will be awarded advanced credit at all 15 Massachusetts Community Colleges.

SECTION II: AWARDING OF CREDIT

1) Articulated credits accepted by a community college pursuant to this agreement shall be placed on the student's college transcript prior to the end of the first semester. When possible the posting will be within 60 days of receiving the student's high school transcript but no later than 30 days after the semester add-drop deadline.

2) The credit *shall not* be held in escrow or be dependent upon the results of the college placement test results, required prerequisites, etc.

3) Student will receive credit regardless of their college major.

4) The student will be awarded up to 4 credits or the number of credits (3–4 credits) that will allow the student to move to the next class level without penalty. The intent of this section is to award the student the appropriate number of credits so that he/she will be in sync with the native student who attends the community college and who has completed the introductory class.

SECTION III: SECONDARY SCHOOL ELIGIBILITY FOR ADVANCED CREDIT

The Massachusetts Community Colleges will honor this agreement for two years after the student's date of high school graduation. In cases where a student's graduation exceeds 2 years, the community college will determine eligibility on a case by case basis.

This agreement is contingent upon a high school with Chapter 74 approved programs maintaining:

1) Current accreditation by the New England Association of Schools and Colleges; and

2) Current approval by the Massachusetts Department of Elementary and Secondary Education pursuant to Massachusetts General Law Chapter 74 and the Vocational Technical Education Regulations.

SECTION IV: APPEAL PROCESS

Matriculated students have the right to petition the college responsible for certifying credit (e.g. college transfer coordinator, academic dean or other person/s) if credit is not awarded under this agreement. Students may appeal or grieve denial of credit with any community college by referring to the grievance process in that college student handbook. If a student prevails on appeal the college must place the credit on the student's college transcript prior to the end of the first semester – within 60 days of receiving the student's high school transcript but no later than 30 days after the add-drop deadline.

SECTION V: GENERAL CONDITIONS OF THIS AGREEMENT

1) Students receiving articulated credits are strongly advised to review all enrollment, transfer and graduation requirements for four-year post-secondary schools prior to making plans to apply to any Massachusetts Community College.

2) The transferability of the associate degree credit to a baccalaureate program is determined by each four year institution and cannot be guaranteed.

3) This agreement is endorsed by the Massachusetts Community Colleges Executive Office on behalf of Massachusetts Community College Presidents' and the Massachusetts Association of Vocational Administrators.

4) This agreement will be reviewed when a substantive change in the framework occurs by the framework's review committee.

SECTION VI: FAIR NOTICE OF MATERIAL MODIFICATION

1) A fair notice period of 24 months by a community college will provide confidence to students and parents that the agreement will be in effect when the student graduates from high school. It is intended that this section not be combined with any other section for the purpose of extending the warning period to be more than 24 months.

SECTION VII: COLLEGES ARE ENCOURAGED TO DEVELOP ARTICULATION

1) Individual colleges are encouraged to continue the practice of developing individual articulation agreements in a variety of classes/programs.

2) Colleges are encouraged to consider adopting this agreement to apply to secondary non-chapter 74 programs where appropriate.

3) The community colleges continue to have the discretion to award advanced credit in cases not specifically covered by this agreement. This agreement may apply to students in secondary non-chapter 74 approved programs or in cases where a word or course title or program title may vary from this agreement, etc.

4) The community college program title changes alone will not impact this agreement because the agreement is based upon student achievement of knowledge and skills in this area as outlined in the Massachusetts Chapter 74 frameworks.

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INFORMATION SUPPORT SERVICES AND NETWORKING

Effective Date: December 5, 2012

William Messner
President, Holyoke Community College and
Chair, Massachusetts Community Colleges Council of Presidents

David J. Ferreira
Executive Director
Massachusetts Association of Vocational Administrators

POST SECONDARY PROGRAM OBJECTIVES	CHAPTER 74 INFORMATIONAL SUPPORT SERVICES & NETWORKING FRAMEWORKS	
A+ 1.1 Compare and contrast the features and requirements of various Microsoft Operating Systems.	2.B.13	Identify major network operating systems: Unix, Microsoft, Novell.
	2.C.06 c	Differentiate between local computer operating systems and network operating systems.
	2.Q.01	Perform software upgrades and fixes.
A+ 1.2 Given a scenario, install, and configure the operating system using the most appropriate method.	2.E.04 c	Identify and define different graphic file formats.
	2.E.05 c	Open and run video clips.
	2.E.06 c	Create a simple video clip.
	2.E.07 c	Play and record sound clips.
	2.F.01 c	Work with multiple applications (ASCII editor and browser).
	2.G.04 c	Practice proper handling procedures for components.
	2.G.05 c	Install and configure hardware in a computer system.
	2.H.02 c	Perform basic operations within an operating system.
	2.H.03 c	Troubleshoot basic problems within an operating system.
	2.H.04 c	Customize the operating system environment.
	2.H.05 c	Return an operating system back to original configuration.
	2.H.06	Discuss the evolution of operating system types.
	2.H.07	Demonstrate ability to navigate through various operating systems.
	2.H.08	Describe major system files and their functions.
	2.H.09	Illustrate various operating system file structures.
	2.H.10	Determine hardware requirements for various operating systems.
	2.H.11	Prepare hard drive for installation of operating system.
	2.H.12	Install, configure and test operating system.
	2.H.17	Identify steps necessary to perform an upgrade.
	2.H.18	Retrieve, install, and test system patches, updates and service packs.
	2.H.19	Determine and delete unused files.
	2.I.01 c	Install software programs.
	2.I.02 c	Perform basic configuration operations.
	2.I.04 c	Uninstall applications.
	2.I.05	Validate operating system and hardware compatibility with installation requirements of the application.
	2.I.06	Acquire or verify software license for installation.
	2.I.07	Perform custom installations, including network-based installations.
	2.I.08	Identify steps necessary to perform an upgrade.
	2.I.09	Retrieve, install, and test application patches, updates and service packs.
	2.R.02	Identify major operating systems: UNIX, LINUX, Microsoft, Novell.
	2.R.03	Install server software.
	2.R.04	Configure server software for network access.
	2.R.06	Create shared user resources.
	2.S.01	Install and configure internet browser software packages.
	2.S.02	Install and configure network-based application.
	2.S.03	Configure network resources at the client level (mapped drives, printers, folders, etc.).
	2.T.01	Demonstrate how to establish and maintain user accounts, rights, and permissions.
	2.U.01	Identify types of motherboards.
	2.U.02	Identify major motherboard components and architecture.
	2.U.03	Install, configure and test motherboard.
	2.U.04	Retrieve and install appropriate drivers for motherboard.
	2.U.05	Configure jumpers and dipswitch settings.
	2.V.01	Identify and explain physical bus types.
	2.V.02	Identify and explain logical bus types.
	2.V.03	Give a detailed explanation of IRQs.
	2.V.04	Define DMA and its functions.
	2.V.05	Give a detailed explanation of I/O addresses.
	2.W.01	Illustrate the evolution of the CPU.
	2.W.02	Distinguish between the popular CPU chips in terms of their basic characteristics.
	2.W.03	Install various types of CPUs.
	2.W.04	Install required cooling components.
	2.X.02	Identify the purpose of CMOS, what it contains, and how to change its basic parameters.
	2.X.03	Install memory modules.
A+ 1.3 Compare and contrast RAM types and features.	2.X.01	Identify RAM terminology, locations and physical characteristics.

POST SECONDARY PROGRAM OBJECTIVES	CHAPTER 74 INFORMATIONAL SUPPORT SERVICES & NETWORKING FRAMEWORKS	
A+ 1.4 Given a scenario, use appropriate operating system features and tools.	2.H.13	Explain memory management within operating systems.
A+ 1.4 Install and configure expansion cards.	2.H.16	Retrieve, install and test appropriate device drivers.
	2.R.01	Configure a NIC.
	2.AA.03	Install and configure and test various cards.
	2.AA.04	Retrieve and install appropriate drivers.
	2.BB.01	Identify and describe the various output devices and their technologies.
	2.BB.02	Install, configure and test output devices.
	2.BB.03	Retrieve and install appropriate drivers.
A+ 1.5 Install and configure storage devices and use appropriate media.	2.I.03 c	Describe basic compatibility issues.
	2.Y.01	Describe the evolution of storage devices and the technologies used.
	2.Y.02	Identify drive structures.
	2.Y.03	Identify cluster sizes used with various file systems.
	2.Y.04	Identify the various types of storage devices, their advantages and disadvantages.
	2.Y.05	Install, configure and test IDE/EIDE devices.
	2.Y.06	Install, configure and test SCSI storage devices.
	2.Y.07	Describe RAID and its uses.
A+ 1.6 Setup and configure Windows networking on a client/desktop.	2.C.13	Install and configure necessary hardware and software for a basic network installation, including the creation of a shared resource.
A+ 1.7 Perform preventive maintenance procedures using appropriate tools.	2.Q.02	Perform standard server backup procedures.
	2.Q.03	Perform standard server restoration from backup.
	2.CC.01	Identify the purpose of various types of preventive maintenance products and procedures.
	2.CC.02	Schedule and perform preventive procedures including hard drive maintenance utilities.
	2.CC.03	Describe the need for and implementation of surge protection.
	2.DD.01	Discuss effective backup and recovery strategies, and media used.
	2.DD.02	Perform a simple data backup.
	2.DD.03	Perform a simple data restoration.
A+ 1.8 Explain the differences among basic OS security settings.	6.D.01 c	Explain directory structure.
	6.D.02 c	Navigate directory structure to find a specific file/folder.
	6.D.03 c	Explain and apply procedures used to manipulate folders.
	6.D.04 c	Explain and apply procedures used to manipulate files.
	6.D.05 c	Explain and apply procedures used to compress and uncompress files.
	6.D.06 c	Explain and apply procedures used to associate file types with appropriate programs.
	6.D.07 c	Differentiate between local and network drives, internet and intranet files.
	6.E.01 c	Identify common user interface properties.
	6.E.02 c	Identify common application components, such as help, file, view, tools, options.
	6.K.10 c	Discuss the concerns regarding electronic communication and privacy.
A+ 1.9 Evaluate and select appropriate components for a custom configuration, to meet customer specifications or needs.	2.G.01 c	Identify main classification of computers.
	2.G.02 c	Identify major hardware components, their functions and relationships.
	2.G.03 c	Identify types of computer storage devices.
A+ 1.12 Install and configure various peripheral devices.	2.BB.04	Identify basic concepts, operations, and components of printers.
	2.BB.05	Identify types of printers.
	2.BB.06	Identify printer connections.
A+ 2.0 Networking	2.B.04 c	Describe the purposes of a network.
A+ 2.1 Apply and use common prevention methods.	2.B.08 c	Explain passwords and log ins as they relate to network structures.
A+ 2.3 Explain properties and characteristics of TCP/IP.	2.B.16	Identify purpose, and function of a gateway.
A+ 2.3 Implement security best practices to secure a workstation.	2.K.02 c	Explain principles of secure passwording strategies.
	2.K.03 c	Illustrate what fundamental legal issues involved with security management.
	6.L.01 c	Define the various virus types and their potential effects.
	6.L.02 c	Perform anti virus procedures, including installing, updating and scanning.
	6.L.03 c	Identify potential sources of virus infection.
	6.L.04 c	Identify basic security risks to system and personal computing equipment.

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	6.L.05 c	Explain the benefits and demonstrate the use of privacy, password, and protection utilities.
A+ 2.7 Compare and contrast Internet connection types and features.	2.C.07 c	Open, and communicate over, an internet connection.
A+ 3.2 Establish basic network connectivity and configure email.	2.C.04 c	Identify network applications (fax, voice mail, online services, email).
	6.K.11 c	Define E-Mail protocol and uses.
	6.K.12 c	Define Instant Messaging protocol and uses.
A+ 3.4 Compare and contrast hardware differences in regards to tablets and laptops.	2.H.01 c	Identify major operating system fundamentals and components, and hardware compatibility.
A+ 4.1 Given a scenario, explain the troubleshooting theory.	2.EE.01	Identify stages of the troubleshooting process.
	2.EE.02	Differentiate between normal and abnormal operations.
A+ 4.2 Given a scenario, troubleshoot common problems related to motherboards, RAM, CPU and power with appropriate tools.	2.EE.03	Describe common faults to system boards.
	2.EE.04	Describe common faults to memory.
	2.EE.05	Describe common faults to data storage devices.
	2.EE.06	Describe common faults to power supplies.
	2.EE.07	Describe common faults in adapter interface cards.
	2.EE.08	Demonstrate procedures used to troubleshoot I/O ports.
	2.EE.09	Identify and resolve IRQ conflicts.
A+ 4.6 Given a scenario, troubleshoot operating system problems with appropriate tools.	2.H.14	Create a system boot disk.
	2.H.15	Demonstrate the appropriate use of system utilities.
	2.EE.10	Describe common faults to peripheral devices.
	2.EE.11	Solve common hardware problems after they have been identified.
	2.FF.01	Differentiate between operating system and application errors.
	2.FF.02	Describe common faults with an operating system.
	2.FF.03	Describe common faults with an application.
	2.FF.04	Demonstrate use of appropriate diagnostic utilities.
	2.FF.05	Solve common software problems after they have been identified.
A+ 4.7 Given a scenario, troubleshoot common security issues with appropriate tools and best practices.	2.Q.09	Recognize security problems.
	2.Q.13	Identify various security, video, building utility monitoring systems and how they link to the network.
	2.R.05	Compare and contrast file level security and domain or directory services.
	2.T.04	Distinguish between user level and share level server models.
	2.T.05	Describe good practices of password procedures.
	2.T.06	Illustrate concepts of data encryption and its use with protecting network resources.
	2.T.07	Describe firewall uses.
	2.T.08	Implement and maintain system wide virus protection software.
	2.T.09	Identify uses for VPN and network data encryption.
A+ 5.2 Explain environmental impacts and the purpose of environmental controls.	2.O.10	Identify environmental factors on computer networks.
	2.Q.10	Recognize environmental problems.
A+ 5.3 Given a scenario, demonstrate proper communication and professionalism.	2.Q.05	Monitor system status and performance.
A+ 8 Install an appropriate power supply based on a given scenario.	2.Z.02	List different power supply properties and characteristics.
	2.Z.03	Test voltages employing proper load requirements using a digital multi-meter.
	2.Z.04	Determine wattage requirements of a system.
	2.AA.01	Identify various types of cards and their uses.
	2.AA.02	Identify bus type based upon physical appearances.
A+, Net+	2.J.01 c	Illustrate the IT timeline (evolution).
	2.J.02 c	Identify professional certifications.
Net+ 1.1 Compare Layers of OSI and TCP/IP Models	2.B.01 c	Describe the function of the internet and intranets.
	2.B.02 c	Define network terms.
	2.B.07 c	Identify OSI Layer 1 through Layer 7.
Net+ 1.2 Classify How applications devices and protocols relate to the OSI model	2.C.19	Identify protocols, services, hardware and functions that pertain to each layer of OSI model.
	2.C.20	Define packets and encapsulation.
	2.D.01 c	Define what a computer program is.
Net+ 1.3 Explain the purpose and properties of IP Addressing	2.C.22	Identify function and characteristics of MAC addressing.

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	2.C.23	Identify function and characteristics of protocol addressing.
	2.P.03	Summarize TCP/IP addressing.
Net+ 1.4 Explain the purpose and properties of Routing and Switches	2.B.14	Define the function of a NIC, hubs, switches, routers, bridges and repeaters.
	2.C.12 c	Demonstrate how bandwidths affect data transfer.
	2.C.21	Define current 802.1 and 802.3 specifications.
	2.P.05	Describe various telecom considerations and processes including convergence, and Voice Over IP.
	2.R.07	Differentiate between a switch and a router.
	2.R.09	Describe the use of functions of a switch/router.
	2.R.10	Demonstrate procedures used to communicate with a switch/router.
	2.R.11	Demonstrate procedures used to configure a switch/router.
	2.R.12	Demonstrate procedures used to install a switch/router.
Net+ 1.6 Explain the function of common networking protocols	2.C.05 c	Summarize the characteristics and uses of TCP/IP protocol.
	2.P.01	Describe name resolution technologies and methods.
	2.P.02	Define DHCP, DNS, WINS and host files.
Net+ 1.8 Given a scenario, implement the following networking troubleshooting methodology	2.A.01 c	Define and document a problem.
	2.A.02 c	Define possible causes of a problem.
	2.A.03 c	Determine and discuss possible solutions to a problem.
	2.A.04 c	Explain and perform basic troubleshooting and maintenance tasks.
	2.C.08 c	Demonstrate basic diagnostic skills.
	2.Q.15	Identify basic troubleshooting steps.
	2.Q.16	Identify problems using diagnostic tools when appropriate.
	2.Q.17	Identify and test solutions.
	2.Q.18	Document results and solution.
	2.Q.19	Identify the need for and use appropriately, network troubleshooting tools such as ping, ns lookup, telnet, and tracert.
	4.C.01 a	Demonstrate skills used to define and analyze a given problem.
	4.C.02 a	Explain the importance and dynamics of individual and teamwork approaches of problem solving.
	4.C.03 a	Describe methods of researching and validating reliable information relevant to the problem.
	4.C.04 a	Explain strategies used to formulate ideas, proposals and solutions to problems.
	4.C.05 a	Select potential solutions based on reasoned criteria.
	4.C.06 a	Implement and evaluate solution(s).
Net+ 2.1 Given a scenario, install and configure routers and switches.	2.C.15	Identify layer 1, 2, 3, and 4 networking devices, their purpose and their operations.
	2.C.16	Determine where layer 1, 2, 3, and 4 devices are needed.
Net+ 2.2 Given a scenario, install and configure wireless network	2.B.12 c	Compare and contrast wireless networking to wired networking.
	2.C.18	Identify channel access methods and their operations.
Net+ 2.6 Given a set of requirements, plan and implement a basic SOHO network	2.B.09 c	Demonstrate the basic design and components of LAN and WAN systems.
Net+ 2.9 Compare and contrast network devices their functions and features.	2.C.03 c	Identify and utilize modems used for dial-up access.
Net+ 3.1 Categorize standard media types and associated properties.	2.C.01 c	Construct networks using different types of cables.
	2.C.02 c	Describe how terminals are connected in a network configuration.
	2.C.14	Distinguish between prevalent networking media and connectors (length, speed, appearance, advantages, disadvantages).
Net+ 3.5 Describe Different Network topologies Net+ 3.4 Categorize WAN technologies types and properties	2.B.03 c	Differentiate between LANs, MANs and WANs.
Net+ 3.5 Describe Different Network Topologies	2.B.06 c	Analyze the current trends and developments in LANs.
	2.B.10 c	Describe network topologies (ring, star, bus).
	2.B.17	Identify advantages and disadvantages of peer-to-peer networks.
	2.B.18	Identify advantages and disadvantages of client-server networks.
	2.C.09 c	Configure a simple peer-to-peer network.
	2.C.10 c	Share a resource in a peer-to-peer networked environment.
	2.C.11 c	Access a shared resource in a peer-to-peer networked environment.
Net+ 3.7 Compare and Contrast Different LAN Technologies	2.B.05 c	Trace the evolution of networks.

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	2.B.15	Differentiate between broadband and baseband.
Net+ 4.3 Given a scenario, use appropriate software tools to troubleshoot connectivity issues.	2.P.04	Test, validate, and troubleshoot IP connectivity using TCP/IP utilities.
	2.Q.06	Identify abnormal system performance.
	2.Q.07	Recognize system alerts.
	2.Q.08	Monitor system log files.
Net+ 4.5 Describe the purpose of configuration management documentation.	2.Q.04	Maintain accurate network documentation.
	2.Q.12	Establish network documentation of inventory and assets.
Net+ 4.6 Explain different methods and rationales for network performance optimization.	2.B.11 c	Identify voice communication, data communications, and telecommunications systems.
	2.Q.11	Analyze how server usage effects network performance (web server, file server, print server, etc.).
	2.Q.14	Demonstrate ability to monitor performance from PC to hubs to server.
Net+ 5.4 Explain common threats, vulnerabilities, and mitigation techniques	2.K.01 c	Discuss security principles, vulnerability and threats.
2.5 Given a scenario, troubleshoot common router and switch problems.	2.R.08	Identify hardware needed to connect switch/router to a network.
	2.T.03	Document and manage patch panels and connections.