Program Information Report

Science, Computer Technology, Engineering & Math

Computer Networking Academy (CVCNAC)
Advanced Certificate
Program Effective Term: **Fall 2022**

High Demand Occupation   High Skill Occupation   High Wage Occupation

Program is also available online

This Cisco Networking Academy program prepares students for a job as a network technician where they will install, configure, and troubleshoot Local Area Networks under the supervision of a network administrator. The focus is placed on cabling systems and internetworking hardware. It also gives students the knowledge they'll need to pass the Cisco Certified Network Associate Examination.

Program Admission Requirements:
Students must complete the Computer Systems Technology (CTCSTC) Certificate with a GPA of 2.0 or better or have equivalent industry experience to be admitted into the program.

Major/Area Requirements		(13 credits)
CNT 206	Introduction to Networks	4
CNT 216	Switching, Routing and Wireless Essentials	4
CNT 226	Enterprise Networking, Security, and Automation (ENSA)	4
CNT 295	CNT Cisco Certification Preparation	1

Minimum Credits Required for the Program: **13**

WASHTENAW COMMUNITY COLLEGE

PROGRAM CHANGE FORM

Program Code: CVCNA1	**Current Program Name:** Computer Networking Academy Ⅰ	**Effective Term: SS 2022**
Division Code: BCT	**Department:** CSIT	

Directions:

1. Attach the current program listing from the WCC catalog or website and indicate any changes to be made.

2. Draw lines through any text that should be deleted and write in additions. Extensive narrative changes can be included on a separate sheet.

3. Check the boxes below for each type of change being proposed. Changes to courses, discontinuing a course, or adding new courses as part of the proposed program change, must be approved separately using CurricUNET, but should be submitted at the same time as the program change form.

4. If changes affect the program assessment plan or if program outcomes are updated, please submit a Program Assessment Plan Change form. These changes must be approved separately from the program change form and should be submitted at the same time. Current program assessment plans can be found on the Curriculum and Assessment Program Information page.

Requested Changes:

☐ Remove course(s): _____
☐ Add course(s): _____
☒ Program title (new title is <u>Computer Networking Academy</u>)
☐ Description
☐ Advisors
☐ Program admission requirements
☐ Continuing eligibility requirements

<mark>Show all changes on the <mark>catalog page you attach.</mark></mark>

☐ Program outcomes (may also result from removing or adding a course)*
☐ Program assessment plan*
☐ Accreditation information
☐ Other _____

Note: A change to the Award Type requires the submission of a new program proposal form and a separate program inactivation form. Contact the Director of Curriculum & Assessment for more information.

 * Please submit a Program Assessment Plan Change form.

Rationale for proposed changes:

Remove the "I" from the program title. We no longer offer the Computer Networking Academy II advanced certificate. Therefore, there is no need for this program to imply that it is the first certificate program in a series of program certificates.

Financial/staffing/equipment/space implications:

None
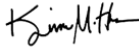
List departments that have been consulted regarding their use of this program.
This only affects our department.

Signatures:

Reviewer	Print Name	Signature	Date
Initiator	John Trame	*John Trame*	1/27/2022
Department Chair	Scott Shaper	*Scott Shaper*	1/28/22
Division Dean/Administrator	Eva Samulski	*Eva Samulski*	1/28/22

<mark>Please return completed form to the Office of Curriculum & Assessment, SC 257 or by e-mail to curriculum.assessment@wccnet.edu</mark>

Once reviewed by the appropriate faculty committees we will secure the signature of the VPI and President.			
Reviewer	**Print Name**	**Signature**	**Date**
Curriculum Committee Chair	Randy Van Wagnen		3-1-22
Assessment Committee Chair	Shawn Deron		3/03/2022
Vice President for Instruction	Kimberly Hurns		
Do not write in shaded area. Entered in: Banner_____ C&A Database_____ Log File _____			

Reviewed by C&A Committees 2/17/22

Science, Computer Technology, Engineering & Math

Computer Networking Academy I (CVCNA1)
Advanced Certificate
Program Effective Term: Fall 2021

High Demand Occupation   High Skill Occupation   High Wage Occupation

Program is also available online

This Cisco Networking Academy program prepares students for a job as a network technician where they will install, configure, and troubleshoot Local Area Networks under the supervision of a network administrator. The focus is placed on cabling systems and internetworking hardware. It also gives students the knowledge they'll need to pass the Cisco Certified Network Associate Examination.

Program Admission Requirements:
Students must complete the Computer Systems Technology (CTCSTC) Certificate with a GPA of 2.0 or better or have equivalent industry experience to be admitted into the program.

Major/Area Requirements		(13 credits)
CNT 206	Introduction to Networks	4
CNT 216	Switching, Routing and Wireless Essentials	4
CNT 226	Enterprise Networking, Security, and Automation (ENSA)	4
CNT 295	CNT Cisco Certification Preparation	1

Minimum Credits Required for the Program: **13**

Science, Computer Technology, Engineering & Math

Computer Networking Academy I (CVCNA1)
Advanced Certificate
Program Effective Term: **Fall 2021**

High Demand Occupation   High Skill Occupation   High Wage Occupation

Program is also available online

This Cisco Networking Academy program prepares students for a job as a network technician where they will install, configure, and troubleshoot Local Area Networks under the supervision of a network administrator. The focus is placed on cabling systems and internetworking hardware. It also gives students the knowledge they'll need to pass the Cisco Certified Network Associate Examination.

Program Admission Requirements:
Students must complete the Computer Systems Technology (CTCSTC) Certificate with a GPA of 2.0 or better or have equivalent industry experience to be admitted into the program.

Major/Area Requirements		(13 credits)
CNT 206	Introduction to Networks	4
CNT 216	Switching, Routing and Wireless Essentials	4
CNT 226	Enterprise Networking, Security, and Automation (ENSA)	4
CNT 295	CNT Cisco Certification Preparation	1

Minimum Credits Required for the Program: **13**

WASHTENAW COMMUNITY COLLEGE

PROGRAM CHANGE OR DISCONTINUATION FORM

Program Code: **Program Name:**Computer Networking Academy I Certificate   **Effective Term: Fall 2021**

Division Code: **Department: CSIT**
BCT

Directions:

1. Attach the current program listing from the WCC catalog or Web site and indicate any changes to be made.

2. Draw lines through any text that should be deleted and write in additions. Extensive narrative changes can be included on a separate sheet.

3. Check the boxes below for each type of change being proposed. Changes to courses, discontinuing a course, or adding new courses as part of the proposed program change, must be approved separately using a Master Syllabus form, but should be submitted at the same time as the program change form.

Requested Changes:

☐ Review
☒ Remove course(s): _CNT 236_____
☒ Add course(s): _CNT 295 (proposed course)
☐ Program title (title was _____)
☒ Description - four main areas of program… (see attached)
☐ Type of award
☐ Advisors
☐ Articulation information

☐ Program admission requirements
☐ Continuing eligibility requirements
☐ Program outcomes
☐ Accreditation information
☐ Discontinuation (attach program discontinuation plan that includes transition of students and timetable for phasing out courses)
☐ Other _____

==Show all changes on the __attached page from the catalog.__==

Rationale for proposed changes or discontinuation:

1. The Cisco Networking Academy Routing & Switching program changed from 4 to 3 courses in 2019. We are removing the extra course (CNT 236) that is not a part of Cisco's Routing & Switching program.

2. Add a cert preparation course (CNT 295). Certification preparation goes beyond the scope of a standard course. Adding the one credit hour capstone course will prepare students for the industry certification related to the certificate.

Financial/staffing/equipment/space implications:
n/a

List departments that have been consulted regarding their use of this program.
n/a

Signatures:

Reviewer	Print Name	Signature	Date
Initiator	Cyndi Millns	*Cyndi Millns*	1/5/2021
Department Chair	Cyndi Millns	*Cyndi Millns*	1/5/2021
Division Dean/Administrator	Eva Samulski	*Eva Samulski*	1/5/2021

==**Please submit completed form to the Office of Curriculum and Assessment (SC 257).**==
Once reviewed by the appropriate faculty committees we will secure the signature of the VPI and President.

Vice President for Instruction	Kimberly Hurns	*Kimberly Hurns*	3/11/2021
President	Rose B. Bellanca		

Do not write in shaded area.   Entered in: Banner_____   C&A Database_____   Log File _____   Board Approval _____

Reviewed by C&A Committees 2/4/21

Computer Networking Academy I (CVCNA1)
Advanced Certificate

Program Effective Term: Fall 2004

This Cisco Networking Academy program prepares you for a job as a network technician where you will install, configure, and troubleshoot Local Area Networks under the supervision of a network administrator. The focus is placed on cabling systems and internetworking hardware. It also gives you the knowledge you'll need to pass the Cisco Certified Network Associate exam.

Program Admission Requirements:

Students must complete the Computer Systems Technology (CTCSTC) Certificate with a GPA of 2.0 or better or have equivalent industry experience to be admitted into the program.

Major/Area Requirements   (16 credits)

CNT 206	Internetworking I - Fundamentals	4
CNT 216	Internetworking II - Routers	4
CNT 226	Internetworking III - Switches	4
CNT 236	Internetworking IV - WANs	4

Minimum Credits Required for the Program: **16**

Washtenaw Community College
Program Change Request Form

Program Code: CVCNT   **Program Name: Computer Networking Technology I**   **Effective Term: Fall 2001**

A program sheet for the above named program is attached. It should reflect any <u>approved</u> changes that have already been submitted for this year. Please review the program sheet carefully and indicate any changes that you would like to make. Draw lines through anything that should be removed and write in any additions. Extensive narrative changes may be written on a separate sheet. Check the boxes below for each type of change being proposed. If courses are being changed as part of this proposal, they must be approved separately, using a Course-Syllabus Approval Form (CSAF).

1. Requested Changes:

☒ Remove Course(s)
☐ Add Course(s)
☒ Increase/Decrease Credits
☐ Course Sequence
☒ Name (new name _____)
☐ Major/Program Code (new code _____)
☒ Description

☒ Advisors
☐ Articulation Agreements
☐ Program Admission Requirements/Procedures
☐ Continuing Eligibility Requirements
☐ Footnotes
☐ Other _____

Show all changes on the attached program sheet if possible.
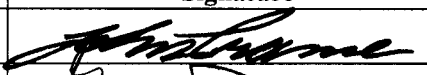
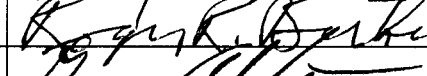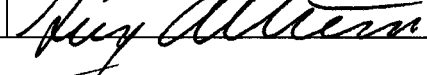## Rationale for Proposed Changes:

see attachments

3. Financial/Staffing/Equipment/Space Implications:

4. Has the department consulted with all departments that may be impacted?   Yes ☐   No ☐   NA ☐

Comments:

Signatures:

Reviewer	Print Name	Signature	Date
Program Change Initiator:	John Trame	*signature*	3/6/2001
Department Chair:	Gary Downen	*signature*	3/6/01
Division Dean:		*signature*	3/6/01
VP, Instruction/Student Services:		*signature*	4/26

Access Program File 3/30/01   Log 3/30/01 JW   Copied and Returned _____
Copies: Initiator, Department Chair, Dean, Curriculum File   New Listing to: Counseling; Admissions
Curriculum and Articulation Services:
Curriculum Development\Forms\Programs\Program Change Form 1/9/01   Document Code: Program Change Form v2.doc

WASHTENAW COMMUNITY COLLEGE
PROGRAM CHANGE REQUEST

(1) Program Title:_____Computer Networking Technology I_____ Program Number: ____CVCNT____

Effective Term: _Fall 2001_

(2) Change Information:

Current Program Course Requirements:		
Course Number	Course Title	Credit Hours
CNT 200	Networking Fundamentals	4
CNT 215	Structured Cabling Systems	4
CNT 225	Introduction to Routers	4
	Program Options	
	Novell NetWare Option	
CNT 210	NetWare Administration	3
CNT220	Advanced NetWare Administration	3
	Microsoft Windows NT Option	
CNT 211	Administering MS Windows NT	3
CNT 221	Supporting MS Windows NT Core Technologies	3
	Current Total Credits:	18

Proposed Program Course Requirements:		
Course Number	Course Title	Credit Hours
CNT 206	Internetworking I	4
CNT 216	Internetworking II	4
CNT 226	Internetworking III	4
CNT 236	Internetworking IV	4
	Current Total Credits:	16

Non-Course Program Requirements:

Non-Course Program Requirements:

(3) Rationale for Proposed Changes:

To permit content delivery in a more timely fashion; therefore, creating a more competitive program for the IT market. Change the name & description to reflect the fact that this is a Cisco Networking Academy.

(4) Financial/Staffing/Resource Implications of Change:

(5) Has this program change been reviewed by all affected instructional departments? YES _____ NO _____

(6) Signatures

	Comments	Signature	Date
Program Change Initiator			
Department Chair(s) or Area Director			
Dean(s)			
VP for Instruction/Student Services			

Computer Networking Academy I (CVCNT)
Advanced Certificate

Program Effective Term: Fall 2001

This Cisco® Networking Academy program prepares you for a job as a network technician where you will install, configure, and troubleshoot Local Area Networks under the supervision of a network administrator. The focus is placed on cabling systems and internetworking hardware.   It also gives you the knowledge you'll need to pass the Cisco® Certified Network Associate exam.

Business Division

Computer Instruction and Electronics Department

Advisors: Michael Galea, Roland Meade, John Trame

Program Admission Requirements:

•Completion of the Computer Systems Technology Certificate (CTCSTC) with a GPA of 2.0 or better or equivalent industry experience

Major/Area Requirements (16 Credits)

CNT 206	Internetworking I	4
CNT 216	Internetworking II	4
CNT 226	Internetworking III	4
CNT 236	Internetworking IV	4

Minimum Credits Required for the Program: **16**

Program Approval Document

Advanced Certificate
Type of Degree or Certificate
In

ADVANCED COMPUTER
NETWORKING TECHNOLOGY
Name of Program

Prepared by
John Trame
And
Michael Galea

Washtenaw Community College
DATE: March 16, 1999

WASHTENAW COMMUNITY COLLEGE
PROGRAM AUTHORIZATION FORM

1. **Program Title:** Advanced Computer Networking Technology   **Program Code:** CNTA

2. **Division:** BM/EC   3. **Department:** CISD/ELED   **CIP Code:**

4. **Type of Program:** ☐ A.A.   ☐ A.S.   ☐ A.A.S.   ☐ A.T.S.

   ☒ Advanced Certificate   ☐ Mastery Certificate   ☐ Achievement Certificate   ☐ Certificate of Completion

5. **Will this program be Perkins funded?**   ☒ yes   ☐ no   6. **Effective Year:** Fall 1999

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7. **Program Description (for Catalog, brochures, etc.:**
   This is an advanced certificate program in Network Engineering. The program will provide two options: (a) Novell Engineer, and (b) Microsoft Engineer. These options will provide the students with the knowledge and skills to design, install, configure, and troubleshoot Local and Wide Area Networks, as well as pass either the Novell Certified NetWare Engineer or Microsoft Certified Systems Engineer exams.

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8. **Advisors:** Gary Downen, Charles Finkbeiner, Michael Galea, Phil Geyer, Usha Jindal, Laurence Krieg, Roland Meade, John Rinn, John Trame, Catherine Wagner

9. Admissions Criteria:	10. Criteria for Continuing Program Eligibility:
Completion of the Computer Networking Technology ~~Mastery~~ Advanced Certificate CNT	

11. **Attach a Program Approval Document [PAD],** which includes the following:
   A. Program Description
   B. Program Goals
   C. Needs Assessment
   D. Enrollment Projections
   E. Program Cost Analysis
   F. Course Descriptions
   G. Analysis of Affected Instructional Units
   H. Articulations
   I. Licensure/Accreditation

Approval Recommended:	Print Name	Signature	Date
Program Initiator:	John Trame/Michael Galea		3-17-99
Department Chair/Director:	John Trame/Roland Meade		3-17-99
Dean:	Bella H. Zuker (3/23/99)	RRButin	3/17/99
VP, Instruction/Student Services:			4/25/99
President:			6/3/99

Date of Board Approval: April 07, 1999

Available on disk

COURSE REQUIREMENTS FOR PROGRAM

Course	Title	Credit	Pre-requisites/Co-requisites
	Novell NetWare® Option		
CNT 230 †	NetWare® 5 Service and Support	4	Completion of the Computer Networking Technology Certificate, or equivalent experience.
CNT 235	Broadband Networks	4	Prerequisite: CNT 225
CNT 240 †	~~NDS Design and Implementation~~ _Novell Directory Services_	3 2	Prerequisite: CNT 220
CNT 245	Managing Internetworks	4	Prerequisite: CNT 225
CNT 250 †	Integrating Windows® NT into a Novell® Network	3 2	Prerequisite: CNT 220
CNT 255	Heterogeneous ~~Inter~~Networks ~~and Intranetworks~~	4	Corequisite: CNT 250
CNT 265	Network Design	4	Corequisite: CNT 255
		2 6	
	Microsoft Windows® NT Option		
CNT 231 †	~~Supporting~~ Microsoft Windows NT ~~Server 4.0~~ Enterprise Technologies	3´	Completion of the Computer Networking Technology Certificate, or equivalent experience.
CNT 235	Broadband Networks	4	Prerequisite: CNT 225
CNT 241 †	Internetworking Microsoft TCP/IP ~~on Microsoft Windows NT Server 4.0~~	3	Prerequisite: CNT 221
CNT 245	Managing Internetworks	4	Prerequisite: CNT 225
CNT 251 †	~~Creating and Configuring a Web Server using Microsoft Tools~~ _Microsoft Internet Information Server_	3 2	Prerequisite: CNT 231 Corequisite: CNT 241
CNT 255	Heterogeneous ~~Inter~~Networks ~~and Intranetworks~~	4	Prequisite: CNT 241
CNT 265	Network Design	4	Corequisite: CNT 255
Total Credits:		**24**	

A. PROGRAM DESCRIPTION

This certificate program trains individuals for employment as network design and implementation professionals. The program thoroughly prepares the student to pass either Novell's Certified NetWare Engineer (CNE) exams or Microsoft Certified Network Engineer (MCSE) exams. The program covers core hardware skills including designing, configuring, installing, diagnosing, repairing, upgrading and maintaining Local Area Networks (LANs) and Wide Area Networks (WANs). In addition, Network Operating Systems (MS Windows NT, Novell NetWare, and UNIX) are covered in depth.

B. PROGRAM GOALS

This program is designed to educate students in the field of computer network design, installation, management, and troubleshooting. Students will learn how to design, install, manage, and troubleshoot networks from small, simple, heterogeneous Local Area Networks, to large, complex, heterogeneous, international Wide Area Networks, including unified voice, video, and data networks. Topics will include cabling standards; protocols; security, equipment selection, installation, management, and troubleshooting, writing Requests For Proposals, selecting venders and service providers. Graduates of this program will be employable as network administrators.

C. NEEDS ASSESSMENT

Studies abound at the national, state and local level, documenting the tremendous need for network technicians, and engineers for government, education, business and industry. The local need for Washtenaw County is documented in the ICARD study of 1998. Salaries for graduates of this program are expected to start at $45,000 per year. Ceiling wages for graduates of this program with a few years of on the job experience may top $100,000 per year.
See attachment A.

D. ENROLLMENT PROJECTIONS

The fall of 1999 should see enrollments of approximately 120 students.
Enrollment should increase approximately twenty percent per year, for four to five years, at which point enrollment should stabalize. Steady enrolments should be maintained for approximately ten years, at which time we may notice a gradual decrease for up to five years. Stability is expected to set in once more, with a significant number of employees returning for updated education/retraining.

CISCO Router and Premise Wiring

Description	Part No.	Quantity	Unit Price	Total Price
Server - DELL PowerEdge 1300 w/raid controller		2	$3,000.00	$6,000.00
PC w/modem/CD/ NIC 10GB hd		14	$1,650.00	$23,100.00
Network Printer	HP4000TN	2	$1,500.00	$3,000.00
Docking Station for removable Hard Drives		14	$25.00	$350.00
Removable Hard drive (4.3 GB) - Need 1 per PC		28	$160.00	$4,480.00
Computer/Server Subtotal				**$36,930.00**
Description	**Part No.**	**Quantity**	**Unit Price**	**Total Price**
MS Win NT Server w/5 Client	NT8137	1	$390.00	$390.00
MS Technet Unlimited Users	NT7549	1	$0.00	$0.00
Software Subtotal				**$390.00**
1', 3' and 5' patch cords	fiberdine	100	$5.00	$500.00
PVC White Cat 5 Bulk Cable 1000 ft	DBC4558WT	3	$139.99	$419.97
1000 ct Cat 5 RJ45 Connectors	???	1000	$0.49	$490.00
Cable Wrap-Lite 1000 pack	?????	1000	$0.20	$200.00
Vari-Pak Cable Tie Kit 650	DAD1455	6	$49.99	$299.94
Surface Mount Box, face plate, Jack 100pack	???	100	$9.00	$900.00
RJ45/11 Tool-Ratchet, Cutter, & Stripper	DTO1102	24	$160.00	$3,840.00
Professional LAN Tool Kit	DTK1425	1	$240.00	$240.00
Hubbell Rack 78"H x 19"W x 30"D	DRA1587	2	$1,429.99	$2,859.98
Sliding Tower Shelves	DRA1589	4	$289.99	$1,159.96
Telescoping Shelf	DRA1570	4	$149.99	$599.96
Caster Base & 4 Casters	DRA1592	2	$249.99	$499.98
Rack Mount Powerstrip w/Surge Protect 10 outlet	DRA 1162	2	$119.99	$239.98
Cat 5 Patch Panel 24 Port T568B (Hubbell)	DPA1644	4	$199.00	$796.00
Cable Management Support Bar	DPA1656	4	$8.99	$35.96
APC Back UPS Pro 650 PNP	DUP1253	6	$199.99	$1,199.94
Allied Telson SNMP rack mount hubs		4	$300.00	$1,200.00
Kalpan Fiber Switch	IS Donation	1	$0.00	$0.00
CSU/DSU	ANS Donation	6	$0.00	$0.00
Copper Cabling & Tools Subtotal				**$15,481.67**
Training		2	$7,500.00	$15,000.00
Transcender Novell NetWare (CNE) Test Prep		1	$1,500.00	$1,500.00
Transcender Microsoft Windows NT (MCSE) Test Prep Software		1	$1,500.00	$1,500.00
Transcender Cisco (CCIE) Test Prep Software		1	$1,500.00	$1,500.00
Training and professional development				**$19,500.00**
TOTAL			**$3,942.60**	**$72,301.67**

CISCO

Item	Description	Cost	Quantity	Extension
Servers	Network Servers	$3,000.00	3	$9,000.00
PC Workstations	24 per labs plus instructor workstation (includes 2 PCs)	$1,600.00	52	$83,200.00
Network Printers		$1,500.00	2	$3,000.00
Docking Station	For removable hard drive	$25.00	52	$1,300.00
Removable Hard drive	Removable HD 4.3 GB	$160.00	100	$16,000.00
Network Drops	2 Rooms	$80.00	60	$4,800.00
Network Equipment	2 rooms	$600.00	2	$1,200.00
Hardware Total				**$118,500.00**
Windows NT 4.0 Server 50 user license	Licenses for Servers	$390.00	1	$390.00
Netware 5.0 OS	Licenses for Servers	$0.00	2	$0.00
Windows NT 4.0 Workstation OS	Licenses for Workstations	$39.44	50	$1,972.00
Windows 95/98	Licenses for Workstations	$0.00	48	$0.00
Software				**$2,362.00**
Projectors	Ceiling mounted, projects monitor screen	$4,500.00	1	$4,500.00
Video switches	To switch video between multiple sources at instructor workstation	$50.00	2	$100.00
Presentation equipment				$4,600.00
Training	Professional development for faculty members	$7,500.00	2	$15,000.00
Transcender Novell NetWare (CNE) Test Prep Software		1	$1,500.00	$1,500.00
Transcender Microsoft Windows NT (MCSE) Test Prep Software		1	$1,500.00	$1,500.00
Professional development				$18,000.00
			Sub-Total:	$143,462.00
Contingency		0.0%		$0.00
			Total:	$143,462.00

EMPLOYER NEEDS IN INFORMATION TECHNOLOGY

A PILOT SURVEY FOR WASHTENAW COMMUNITY COLLEGE

BY THE INSTITUTE FOR COMMUNITY AND REGIONAL DEVELOPMENT
(ICARD)
EASTERN MICHIGAN UNIVERSITY

JULY 1998

EXECUTIVE SUMMARY

Introduction

Washtenaw Community College has established a Future Jobs Initiative to enable the

College to develop courses and programs which will meet current needs and anticipate future

trends facing area employers. The College has embarked on a research effort that will provide

data relevant to strategic planning for such curriculum development among all educational

institutions. The intent of this survey of Washtenaw County employers is to secure data on the

information technology skill needs of employees, both in terms of gaps that exist between

current needs and existing educational programs, and in terms of identifying how employee

needs will be changing in the future.

Methodology

A list of employers which included representation from all SIC code industry clusters

which made up at least 5% of the employment in the county was developed. Additional

employers were added to the list to insure representation of large employers, educational

institutions, and employers from the "high tech" sector.

A mail rather than a telephone survey was used since it permitted gathering much more

detailed information from respondents. Prior contact and follow-up calls were made with all

prospective respondents to elicit their cooperation and to insure a high response rate. Thus, despite the length and difficulty of the survey, 53 (62%) of the 86 organizations on the list responded, over twice the typical response rate associated with a mailed survey.

The goal of the survey is not simply to verify that a labor shortage exists in Washtenaw County, as it does nationally, for information technology professionals and others with computer skills. The survey attempts to learn more about the specific skills which are needed and the organizational contexts in which the need is evidenced. This information can then lead to organizational responses based in reality.

The study focused on both IT professionals and IT users. IT professionals are defined as those whose positions are organized around the use or knowledge of computer systems, either as part of an Information Technology or Information Systems Department or in a position which provides IT or computer services to the organization. IT users are those employees in positions which are not defined by the knowledge and use of computers, but depend on the use of computers in the manipulation of data for a substantial element of the job

IT Professionals

- While responding organizations have large numbers of employees within Washtenaw County, the number of employees in information technology is considerably smaller. The sample is somewhat bifurcated--firms either employ very few or very many IT professionals, depending on the nature of the enterprise.

- IT positions require considerable education. On average 55% of positions require a bachelor's degree, but over a third of positions did not require a four-year degree.

- Overwhelmingly, IT employees are hired with on-the-job IT experience (81%). Only 16% of IT employees are hired directly upon completion of education or training.

Current and Anticipated Positions

- The total number of current IT professionals identified by responding organizations is 1,923. IT professionals are most likely to be currently employed as programmers (20%), software engineers (18%), and customer support technicians (13%). Network technicians and network administrators combined total 19%.

- The survey identified 238 currently unfilled IT positions in Washtenaw County. This figure is equal to 12% of identified jobs which are currently filled.

- Survey respondents projected 683 additional jobs for IT professionals in their organizations in the next three years. This represents a 36% increase when compared to the number of IT professional currently employed in the responding organizations. Relative to the other specialists, future projections show an increase in the need for network specialists.

Recruitment

- Nearly three-fourths of respondents say that they have difficulty recruiting skilled IT workers. Almost two-thirds indicated that IT workers generally possess the necessary skills at the time of hiring, but less than half are satisfied with the current skill levels of their IT employees.

- Over one third of respondents said they have trouble retaining IT professionals and 40% indicated that turnover of IT professionals was a problem.

- Almost two thirds of respondents indicated that wages of IT workers are rising faster then for other employees.

- Seventy percent of respondents agreed or strongly agreed with the statement that "our IT workers often work more than forty hours per week."
- Recruitment of foreign nationals for IT positions is an important strategy for filling positions in some organizations.

Training

- With respect to training, 88% of respondents indicated that their IT employees need ongoing training, yet only 28% of respondents have a comprehensive training plan in place.
- Three quarters noted that providing such training contributes to a stable workforce, yet one third indicated that they often train IT employees only to have them leave for other employment.
- Only thirty percent agreed that IT education/training options within the County are adequate and affordable.
- 53% of respondents have devoted significant resources to IT training over the last three years and 65% expect to devote significant amounts over the next three years.
- Only 23% of the respondents feel that the education system is providing the skilled IT professionals currently needed.

IT Users

- On average 60% of current non-IT jobs require significant use of computers.
- 80% of respondents indicated that their non-IT computer users need ongoing training. Yet under half (43%) regularly assess the skill and training needs of these workers, and just 40% have a comprehensive training plan in place.

- Over half of IT users required additional training to raise computer skills to acceptable levels when they were hired.

- Respondents indicated that they are most likely to meet the training needs of these IT users through on-site training by current employees. The next most common is training using commercial vendors. Respondents are less likely to utilize training provided by public educational institutions.

- The skills identified as being most important for non-IT computer users are the ability to think logically and critically and general problem solving skills, along with the ability to use new software applications.

- Only 42% of employers agree that their hiring and evaluation systems adequately incorporate computer literacy.

- Satisfaction with external training options for IT users in the County seems more positive than that for IT professionals. Knowledge of training options is relatively low.

- Most have committed significant resources to training IT users over the last three years and expect to continue to do so.

IT Professionals

Current Skill Needs

- Respondents with IT professionals were asked about the current and future importance of 41 specific IT skills presented in six categories: operating systems, programming, network principles, information systems, database principles, and computer support.

- Overall the most pressing current skill emphases are to be in the categories of network principles and computer support.

Future Skills Needed

- Respondents were asked to rate the future importance (three years from now) of the same list of 41 skills. Network principles and computer support skills were again seen as important. Information system skills, network principles, and database principles are perceived to be of growing importance.
- Among the sub-categories, the largest future gains in importance were seen for JAVA and NT.

IT Users

Current Skill Needs

- Respondents were also asked about current and future skill needs of non-IT computer users. Twenty-two skills within three categories (computer literacy, applications, and functions) were rated as to their current and perceived future importance three years from now.
- Currently, over two thirds of respondents rated the following skills as being either very or quite important: word processing, spread sheets, keyboarding, computerized accounting, and email.

Future Skill Needs

- Critical skills for IT users in the future appear quite similar to the present, although some shifts within categories are anticipated. Increases are projected in the use of

computers for management functions (accounting, purchasing, inventory control, personnel) and for data communication, integration of applications and use of the Internet.

Key Issues – Opportunities and Challenges

The survey results that are analyzed above provide important data about employer needs in information technology in Washtenaw County. Tremendous opportunities exist for education and training of both IT professionals and IT users. Specific challenges, however, face the educational community, given existing structures and practices.

Entry level hiring – IT professionals

The data from the survey verify that the labor shortage which exists nationally for workers with computer skills is replicated in Washtenaw County. National and local data also show that IT positions tend to require considerable education. This situation creates a great opportunity for colleges and universities. The fact that over 55% of the local positions require at least a four-year college degree presents some specific questions to Washtenaw Community College. Which elements of the four-year curriculum—that is, the IT professional track rather than the IT user track—should the College cover? Is the computer curriculum of the College flexible enough and rigorous enough in terms of the level and type of computer courses being offered? Current offerings and the overall curriculum capabilities of the College should be analyzed in terms of the specific programs and specialties highlighted by the data from the survey.

Entry level hiring – IT users

Similar questions should be addressed in regard to IT users. The survey shows that three fifths (60%) of non-IT jobs require significant use of computers. It is becoming increasingly evident that employees entering the workforce must have computer skills to perform adequately on the job. Are WCC students becoming proficient enough in the basic word processing, database, and spreadsheet programs being used in the business setting at the present time? Almost all academic programs will need to incorporate some level of computer skills into the curriculum. This will require inter-departmental cooperation.

The survey provides specific data for the College to use to compare the match with current offerings and to talk further with employers about ways to tailor courses to meet specific needs and to keep up with emerging trends. The gap which exists in current skill levels suggests that computer training programs in local educational institutions, particularly community colleges, can be key to meeting the demand for better trained entry-level employees.

Training of current employees

One of the strongest findings of the study is that training of current employees is a vital need of computer-related education, for both IT professionals and IT users. 88% of employers reported that their IT professionals need ongoing training, while 80% said that this is true for IT users. Yet neither regular needs assessment nor comprehensive training plans are in place at not companies. This presents a tremendous opportunity for the College, as community colleges historically have been more flexible than four-year colleges and universities in reaching out to embrace the non-traditional formats required by the training venue.

The Challenge

While a great need has been identified, the ability of educational institutions to take maximum advantage of this opportunity will require overcoming some barriers, both external and internal. The evaluation of the education which people are receiving is that it does not adequately prepare them for the demands of their jobs. . Educators must do what they can to change this perception and break down the barrier that currently exists between them and the employer community. Two components are necessary to accomplish this: continuing and increasing flexibility in teaching formats, and even closer ties to the employer community than currently exist.

Existing employees represent a significant training challenge. Although many non-traditional formats have been instituted, the College still works incrementally from a traditional credit and degree structure. For computer training, the line between credit and non-credit courses, and degree and non-degree programs, is less distinct than in most other areas of the curriculum. This is especially true in the context evidenced in this survey, that many of those who need training not only have jobs, but they also have degrees.

One method to bring the need for flexibility directly into the decision-making forums of the College is to forge very close and ongoing links with the employer community. The interactions should always be structured as a two-way learning environment, with perspectives mutually shared. The line between the "work environment" and the "educational environment" must become less distinct than it has traditionally been. The end result should be education and training opportunities that are driven not by existing practices, but by the documented needs of computer users, both individually and organizationally.

Conclusion

The study provides Washtenaw Community College with a tested methodology, baseline information and a stable source of data. A vehicle is now in place for frequent updating and refining, with changing focus and emphasis, for continuing input to the College's needs assessment and planning processes. The intent is to increase the College's organizational responsiveness to the parallel needs of students and employers. Over time, the data collection and analysis model can be expanded to address additional questions, cover new topics, and adapt to changing educational and skill needs.

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Contributors

Computer Systems Technology is an existing certificate program for computer repair. This sequence of courses is the entree (for the non-technical learner) into the computer networking technology programs. This program will be modified to replace the existing CIS125 Introduction to LANs with CNT200 Network Concepts. The table below lists the requirements for this certificate.

Computer Systems Technology	
Course	Description
ELE150	PC Hardware Concepts
CIS121	Beginning UNIX
CIS221	UNIX Tools and Scripts
ELE155	Advanced Computer
ELE216A	Modems Installation and Configuration
ELE225A	Introduction to LANs

Computer Networking Technology Certificate

The student must complete the requirements for the Computer System Technology certificate or possess equivalent experience.

Novell® Track	
Course	Description
CNT200	Network Concepts
CNT210	NetWare® 5 Administration
CNT215	Structured Cable Systems and Documentation
CNT220	Advanced NetWare® 5 Administration
CNT225	Switching and Routing Techniques
Microsoft® Track	
CNT200	Network Concepts
CNT211	Administering Microsoft® Windows NT® 4.0
CNT215	Structured Cable Systems and Documentation
CNT221	Supporting Microsoft® Windows NT® 4.0 Core Technologies
CNT225	Switching and Routing Techniques

G. ANALYSIS OF AFFECTED INSTRUCTIONAL UNITS
This is a collaborative curriculum, developed and maintained by the ELE and CIS departments.

H. ARTICULATIONS
No articulation agreements are currently in place: however, agreements may be developed with local highschools willing to develop networking programs.

I. LICENSURE/ACCREDITATION (IF APPLICABLE)
Novell Certified NetWare Administrator (CNA)
Cisco Certified Network Associate (CCNA)