



2009-2010  
Career and Technical  
Programs

Computer  
Information  
Technology  
(541)463-5826

Two-Year Associate  
of Applied Science  
Degree

Career Pathway  
Certificate of  
Completion,  
Computer Network  
Security

# Computer Network Operations

**Purpose** To train entry-level network support technicians and more advanced network administrators in specific computer networking skills and general troubleshooting of hardware and software related problems.

**Learning Outcomes** The graduate will:

- install and configure workstations, servers and networked printers.
- install and configure internetworking devices such as switches and routers.
- install and configure a variety of network operating systems and provide for interoperability between them.
- administer an organization's computer network infrastructure.
- understand network security issues and use appropriate tools to insure network integrity.
- understand the critical features of wireless networking.
- understand fundamental networking theory, terminology, and industry recognized standards.
- interpret the concepts of a computer network related problem-solving task.
- use appropriate library and information resources to research network management issues and tools and support lifelong technical learning.

**Employment Trends** The Oregon Labor Market Information System projects statewide 359 annual openings for network and computer systems administrators and computer support specialists, and 37 annual openings in Lane County. For the decade ending in 2016, the statewide projected increase is 20% annually, and for Lane County 21% annually.

**Wages** Statewide average hourly wage for network and computer systems administrators is \$30.83, and annually \$64,125. Lane County average hourly wage is \$28.33, and annually \$58,927.

## Costs in Addition to Tuition (estimate)\*

Books and lab fees ..... \$2,500-3,000

Students taking courses using CIT labs are assessed a one-time fee up to \$28 per term. See the CIT department for details.

\* Subject to change without notice.

**Prerequisites** Students must qualify for WR 121, either by placement testing or completing prerequisite courses, and by the third term, qualify to begin MTH 095. Each student should consult with a counselor or advisor to plan a program of study.

**Computer Network Security** Students who complete the Computer Network Operations degree are well positioned to continue their studies in computer network security by completing the curriculum for the Network Security Certificate of Completion offered by the CIT department. See the following Computer Network Security Certificate of Completion description or contact the certificate coordinator Ron Little, (541) 463-5464, [littrle@lanecc.edu](mailto:littrle@lanecc.edu).

**Cooperative Education (Co-op)** Co-op is a required and important part of the Computer Network Operations program. It provides relevant field experience that integrates theory and practice while providing opportunities to develop skills, explore career options, and network with professionals and employers in the computer network field. Contact Larry Scott, Computer Network Operations Co-op Coordinator, Bldg. 19, Rm. 154, (541) 463-5458, [scottl@lanecc.edu](mailto:scottl@lanecc.edu).

**Program Lead** Gary Bricher, Bldg. 19, Room 148, (541) 463-5294, [bricherg@lanecc.edu](mailto:bricherg@lanecc.edu)

**Program Advisor** Shirley Lukacs, Bldg. 16, Rm. 162M, (541) 463-3244, [lukacss@lanecc.edu](mailto:lukacss@lanecc.edu)

**Program Counselor** Debby Ganser, Bldg. 16, Rm. 162L, (541) 463-5034, [ganserd@lanecc.edu](mailto:ganserd@lanecc.edu)

# Computer Network Operations

**Note** Students completing the curriculum for the Computer Network Operations degree will also satisfy the requirements for the Computer Specialist certificate. In addition, students taking CS 295 Web Development 2 as the Fall term, second-year elective will satisfy the requirements for the Web Programming certificate. Students taking CS 188 Wireless Networking, and CS 285 Operating System Hardening as the Winter and Spring term, second-year electives would need to complete only one additional course, CS 286 Firewalls and VPNs, to qualify for the Computer Network Security certificate.

**Note** The first-year networking curriculum is known as the “CIT Core.” These courses provide a solid foundation in information technology.

**Note** Students with an interest in Geographic Information Systems could take GIS 245 Maps and Spatial Information, GIS 246 Introduction to GIS, and GIS 248 Applications in GIS, as their three electives and then be left with just one class, CIS 247 Information Analysis and Visualization, to qualify for the GIS certificate.

First Year	Fall
CIS 100 Computing Careers Exploration <sup>D,G</sup> .....	2
CIS 102 Problem Solving with Computers <sup>D,G</sup> .....	4
CIS 125H Software Tools 1: XHTML <sup>4,D,G</sup> .....	3
CIS 140 Operating Systems: Managing Windows <sup>D,G</sup> .....	4
WR 121 English Composition: Exposition and Introduction to Argument <sup>*.W</sup> .....	4
<b>Total Credits</b>	<b>17</b>

	Winter
ART 288 Introduction to Web Design <sup>4,D,G</sup> .....	2
CS 133JS Beginning Programming Javascript <sup>*.4,D,G,S</sup> .....	4
CIS 125D Software Tools 1 Databases <sup>D,G</sup> .....	4
CS 179 Introduction to Computer Networks <sup>*.D,G</sup> .....	4
ET 287 Microcomputer Hardware <sup>D,G</sup> .....	4
<b>Total Credits</b>	<b>18</b>

	Spring
CS 295 Web Development 1 <sup>*.4,D,G</sup> .....	4
CG 203 Human Relations at Work <sup>H</sup> .....	3
CIS 227N Systems Support: Network and Operating Systems <sup>*.D,G</sup> .....	4
MTH 095 Intermediate Algebra or higher <sup>*.M</sup> .....	5
<b>Total Credits</b>	<b>16</b>

Second Year	Fall
CS 279W Windows Server Administration <sup>*.D,G,S</sup> .....	4
CS 140U Introduction to Unix/Linux <sup>*.D,G</sup> .....	4
CS/CIS/GIS Elective <sup>1,3,D,G</sup> .....	4
WR 227 Technical Writing <sup>*.A</sup> .....	4

**Total Credits 16**

## Winter

CS 284 Network Security Fundamentals <sup>*.D,G,S</sup> .....	4
CIS 225 Computer End-User Support <sup>*.D,G</sup> .....	4
CS 240U Advanced Unix/Linux: Server Management <sup>*.D,G</sup> .....	4
CS/CIS/GIS Elective <sup>1,3,D,G</sup> .....	4

**Total Credits 16**

## Spring

CS 289 Cisco Router and Switch Administration <sup>*.D,G,S</sup> ....	4
CS 280CN Coop Ed: Computer Networks <sup>D,G</sup> .....	3
PE/Health requirement <sup>R</sup> .....	3
CS/CIS/GIS Elective <sup>1,3,G</sup> or Speech Elective <sup>2</sup> .....	4
Elective (optional) .....	(4)

**Total Credits 14 (18)**

- The Computer Network Operations degree contains three second-year CS/CIS/GIS electives. You may want to consider using your CS/CIS/GIS electives to take a sequence of courses from the Network Security certificate curriculum, or from one of the other degree or certificate programs, such as, Computer Programming, Computer Simulation and Game Development, Geographic Information Systems, or Computer Science transfer area. For more specific information about electives, contact the program academic advisor or program counselor to help determine what elective courses best fit your goals.
- List of approved speech electives:
  - SP 100 Basic Communication
  - SP 111 Fundamentals of Public Speaking
  - SP 112 Persuasive Speech
  - SP 130 Business and Professional Speech
  - SP 219 Small Group Discussion
- Students planning to pursue a bachelor's degree in Computer Science are advised to also complete the following courses in mathematics: MTH 111 College Algebra and MTH 231, 232, 233 Discrete Mathematics 1, 2, 3
- Instead of the Web programming courses: ART 288, CIS 125H, and CS 295, these Game programming courses may be taken: ART 245, CIS 125G, and CS 133G, respectively. Also, instead of the Web programming courses: ART 288, CIS 125H, CS 133JS, and CS 295, these Game programming courses may be taken: ART 245, CIS 125G, CS 133G, and CS 233G, respectively. In addition, instead of the Web programming courses: CS 133JS and CS 295, these programming courses may be taken: CS 133 and CS 233, respectively.

# Computer Network Operations

## Computer Network Security

### Career Pathway Certificate of Completion

**Purpose** To train those who already have networking skills to secure workstations, servers, and other networking devices.

**Learning Outcomes** The certificate recipient will:

- understand the security fundamentals required to help safeguard computer networks.
- implement wireless network security protections.
- identify and counteract attacks on workstations, servers, and other networking devices.
- identify vulnerabilities, discuss their resolutions, and generate vulnerability reports.
- install and utilize various security industry accepted tools.
- install and configure firewalls and VPNs.
- troubleshoot security issues and implement and test resolutions.

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**Wages** Statewide average hourly wage for network and computer systems administrators is \$30.83, and annually \$64,125. Lane County average hourly wage is \$28.33, and annually \$58,927.

### Costs in Addition to Tuition (estimate)\*

Books and lab fees ..... \$200-300

Students taking courses using CIT labs are assessed a one-time fee up to \$28 per term. See the CIT department for details.

\* Subject to change without notice.

**Prerequisites** The courses in this Certificate of Completion are designed to be taken with the Computer Network Operations Associate of Applied Science degree program offered by the CIT department. There are specific prerequisites for each of the four courses required for this certificate. Each of the prerequisites is a requirement in the Network Operations degree. For details see the course description of each of the four required courses. Prerequisites can be waived for current IT network technicians with the appropriate background.

**Certificate Lead** Ron Little, Bldg. 19, Room 156, (541) 463-5464, [little@lanecc.edu](mailto:little@lanecc.edu)

**Program Advisor** Shirley Lukacs, Bldg. 16, Rm. 162M, (541) 463-3244, [lukacss@lanecc.edu](mailto:lukacss@lanecc.edu)

**Program Counselor** Debby Ganser, Bldg. 16, Rm. 162L, (541) 463-5034, [ganserd@lanecc.edu](mailto:ganserd@lanecc.edu)

### Courses required

	Credits
CS 188 Wireless Networking * <sub>,D,G</sub> .....	4
CS 284 Network Security Fundamentals * <sub>,D,G</sub> .....	4
CS 285 Operating System Hardening * <sub>,D,G</sub> .....	4
CS 286 Firewalls and VPNs * <sub>,D,G</sub> .....	4
<b>Total Credits</b>	<b>16</b>

### Standard footnotes:

\* Prerequisite required

A Meets Arts/Letters requirement

B Must be passed with grade of "B-" or better to use as a prerequisite

D Degree or certificate requirement; must be passed with grade of "C-" or better

G Must be taken for a grade, not P/NP; major requirement

H Meets Human Relations/Social Science requirement

M Meets Mathematics requirement

P Meets PE/Health requirement

R Required for AAS degree

S Meets Science/Math/Computer Science requirement

W Meets Written Communications or English Composition requirement

an equal opportunity/affirmative action institution committed to cultural diversity  
and compliance with the Americans with Disabilities Act

6/09