Computer Information Systems

The following matrix indicates those courses deemed transferable among institutions listed across the top of the matrix. The numbers on the matrix represent the number of semester hours associated with the course at each institution and which institutions have agreed to transfer the commonly numbered course in each row.

A list of the academic discipline liaisons contacts for each institution are listed at the bottom of this document.

Prefix	Number	GERTA	Course Title	BSC	DCB	LRSC	NDSCS	VCSU	WSC	SBC	TMCC	UTTC
CIS	101	ND:COMPSC	Computer Literacy				2				3	2
CIS	102		Computer Software Applications-Word	3					2			
CIS	104		Microcomputer Database	3	3	3	3		3		3	
CIS	105		Microcomputer Spreadsheet	3		3	3		2			
CIS	115		Internet		3							
CIS	128		Microcomputer Hardware I	3	3	3		3	3	3	3	3
CIS	129		Microcomputer Hardware II		3	3			3	3	3	3
CIS	130		Presentations	3					2			
CIS	141	ND:COMPSC	Introduction to Cybersecurity			3			3	3		
CIS	142		Ethical Hacking and Network Defense			3						
CIS	147	ND:COMPSC	Principles of Information Security	3	3	3		3	3		3	3
CIS	151		CIW Web Foundations	3								
CIS	152		Cascading Style Sheets	3								
CIS	164		Networking Fundamentals I	4	3	3	4	3	3	4	3	4
CIS	165		Networking Fundamentals II	4	3	3	4		3	4	3	4
CIS	180		Creating Web Pages		3	3	3	2	3		3	4
CIS	181		Creating Web Pages II		3	3	3		3	3	3	
CIS	202		Advanced Software Applications	3		3			2			
CIS	208		Database Programming	3								

Prefix	Number	GERTA	Course Title	BSC	DCB	LRSC	NDSCS	VCSU	WSC	SBC	TMCC	UTTC
CIS	211		Website Plan & Design		3	3			3		3	
CIS	212		Microsoft Windows Operating System Client	3	3	3	3		3	3	3	3
CIS	215		Implementing a Microsoft Windows Server Environment		3	3	4		3	3	3	3
CIS	216		Implementing a Microsoft Windows Network Infrastructure	4	3		4		3		3	4
CIS	217		Microsoft Exchange Server		3	3					3	
CIS	218		Planning a Network Infrastructure		3		4		3		3	3
CIS	220		Operating Systems - UNIX		3	3	3		3			
CIS	221/321		Networking Essentials	3								
CIS	229/329		Information Systems Management		3	3		3			3	
CIS	230		Electronic Publishing	3								
CIS	231		Search Engine Optimization	3								
CIS	232		Graphics Design	3	3	3	3		3		3	
CIS	233		Vector Graphics and Web Animation	3	3	3	3				3	
CIS	241		Introduction to Digital Forensics	3		3	3		3			
CIS	244		Web Server Management				4					
CIS	250		Advanced Web Design	3		3			3			
CIS	251		CIW Site Design	3								
CIS	252		XML	3								
CIS	253		PHP	3								
CIS	254		CIW E-commerce Strategies and Practices	3								
CIS	267		Intermediate Networking I	4	3	3	4		3		3	
CIS	268		Intermediate Networking II	4	3	3	4		3		3	

Prefix	Number	GERTA	Course Title	BSC	DCB	LRSC	NDSCS	VCSU	WSC	SBC	TMCC	UTTC
CIS	269/369		Enterprise Systems		3	3		3			3	
CIS	270		Building Scalable Internetworks	5								
CIS	271		Implementing Secure Converged WANs	4								
CIS	272		Building Multilayer Switched Networks	4								
CIS	273		Optimizing Converged Networks	3								
CIS	281/381		Project Management		3	3		3			3	
CIS	284		Incident Response and Disaster Recovery			3						

CIS 101 Computer Literacy

CIS 102 Computer Software Applications-Word

CIS 104 Microcomputer Database

CIS 105 Microcomputer Spreadsheet

CIS 115 Internet

CIS 128 Microcomputer Hardware I
Students learn the functionality of hardware and software components as well as suggested best practices in maintenance and safety issues. The students, through hands-on activities and labs will:
- Learn to assemble and configure a computer
- Install operating systems and software
- Troubleshoot hardware and software problems.
- In addition, this course helps students prepare for the CompTIA A+ certification.

CIS 129 Microcomputer Hardware II
Students learn the functionality of hardware and software components as well as suggested best practices in maintenance and safety issues. The students, through hands-on activities and labs will:
- Learn to assemble and configure a computer
- Install operating systems and software
- Troubleshoot hardware and software problems.
- In addition, this course helps students prepare for the CompTIA A+ certification

CIS 130 Presentations

CIS 141 Introduction to Cybersecurity

CIS 142 Ethical Hacking and Network Defense

CIS 147 Principles of Information Security

CIS 151 CIW Web Foundations
Students will learn how to create and manage their own Web pages using Hypertext Markup Language (HTML), Extensible HTML (XHTML), and CSS. Students will learn to write code manually, as well as use graphical user interface (GUI) authoring tools. Students will further learn the importance of marketing and implementing fundamentals design concepts along with validating their HTML or XHTML code. Other concepts covered include the tasks involved in various Information Technology (IT) job roles, Internet connection methods, Internet protocols, the Domain Name System (DNS), URLs, customization of Web browsers, plug-ins, e-mail, search engines, security, and project management. Course prepares students to write the Internet Business and Site Development Foundations modules of the CIW Foundations exam. These two CIW exam modules are required, and students will be assessed an exam fee. The third and final module of the CIW Foundations exam, Network Technology Foundations, will be written in CIS221 Networking Essentials.

CIS 152 Cascading Style Sheets
Students will learn how to format Web pages using Cascading Style Sheets (CSS). Concepts covered are the anatomy of a CSS rule, inline, embedded, and external style use, contextual selectors, classes, ids, pseudo-classes, font and text properties, style inheritance, the box model, and basic and advanced page layout. Prerequisite: CIS 151

CIS 164 Networking Fundamentals I
This course focuses on the following:
- Network terminology and protocols
- Local Area Networks (LANs)
- Wide Area Networks (WANs)
- Open System Interconnection
- (OSI) models
- Cabling
- Cabling tools
- Routers
- Router programming
- Ethernet
- Internet Protocol (IP) addressing
- Network standards.

The first of four courses leading to the Cisco Certified Network Associate (CCNA) certifications.
Participants completing Levels 1-3 prepare to take the industry certification exam and become a Certified CISCO Networking Associate.

CIS 165 Networking Fundamentals II
This course focuses on the following:
- Initial router configuration
- Cisco IOS Software management
- Routing protocol configuration
- TCP/IP
- Access control lists (ACLs)

Students will develop skills in configuring a router, managing Cisco IOS Software, configuring routing protocols, and creating access lists that control access to a router. The second of four courses leading to the Cisco Certified Network Associate CCNA) certification. Prerequisite: CIS 265.

CIS 180 Creating Web Pages
The learner will create basic web sites by manually writing HTML/XHTML and Cascading Style Sheets (CSS) using a text editor. The student will learn the fundamentals of site layout and design, and how to upload completed web sites to a remote server. Other skills used include critical thinking by solving problems with coding syntax and
viewing websites "live" on the World Wide Web.

CIS 181 Creating Web Pages II
Students create web sites using a current version of a graphical user interface (GUI) web authoring tool. Prerequisite: CIS 180.

CIS 202 Advanced Software Applications

CIS 208 Database Programming

CIS 211 Website Plan & Design

CIS 212 Microsoft Windows Operating System Client
The course helps learners to gain the knowledge and skills to install, configure, customize, optimize, and troubleshoot the Microsoft Windows operating system in a stand-alone and network environment.

CIS 215 Implementing a Microsoft Windows Server Environment
This course introduces the learner to the Microsoft Windows Server and the networking technologies it supports. The learner will become familiar with networking and operating system concepts and the common tasks required to administer and support the Microsoft Windows operating system in a network environment.

CIS 216 Implementing a Microsoft Windows Network Infrastructure
This course is for professionals who will be responsible for configuring, managing, and troubleshooting a network infrastructure that uses the Microsoft Windows Server products. These tasks include the following:
- Implementing routing
- Implementing, managing, and maintaining Dynamic Host Configuration Protocol (DHCP)
- Domain Name System (DNS)
- Windows Internet Name Service (WINS)
- Implementing a network access infrastructure by configuring the connections for remote access clients

CIS 217 Microsoft Exchange Server

CIS 218 Planning a Network Infrastructure
This course is for professionals who will be responsible for installing, configuring, managing, and supporting the primary networking services in the Microsoft

Windows Server operating system.

These core networking services include:

- Domain Name System (DNS)
- Windows Internet Naming Service (WINS)
- Routing and Remote Access Service (RRAS)
- Network security technologies

CIS 220 Operating Systems - UNIX

CIS 221/321 Networking Essentials
Introduces students to the concepts and terminology of data communications, local area and wide area networks, communications hardware, standards, media, signaling concepts, data communication, error prevention, detection, and correction. Course prepares students to write the Network Technology Foundation section of the CIW Foundations exam. This CIW exam section is required, and students will be assessed an exam fee. Final grade is not based on whether student passes or fails certification.

CIS 229/329 Information Systems Management

CIS 230 Electronic Publishing

CIS 231 Search Engine Optimization

CIS 232 Graphics Design
Students will learn how to design graphics and page layouts using Adobe Photoshop.

CIS 233 Vector Graphics and Web Animation
Students will learn how to design vector graphics for animation, presentations, applications, and Web sites using Macromedia Flash.

CIS 241 Introduction to Digital Forensics

CIS 244 Web Server Management
An in-depth study of the management of a web server including coverage of installation, role of the system administrator, TCP/IP in detail, managing Linux computers on a network, network server functions, network server applications, scripts, configuration, network troubleshooting, privacy and security, physical and local system security, kernel and networking security.

CIS 250 Advanced Web Design
Continued coverage of web design using more advanced tools such as Java Script, XML, CGI, or Perl. Prerequisites: CIS 115.

CIS 251 CIW Site Design

CIS 252 XML
This course will introduce students to Extensible Markup Language (XML). Concepts covered include objects, events, the document type definition, XLL and XSL.

CIS 253 PHP

CIS 254 CIW E-commerce Strategies and Practices
This course will prepare students to take the CIW E-commerce Strategies and Practices exam, the third level of exams needed for the Master CIW certification. During this course, students be taught the concepts of e-commerce and doing business online, including technical concerns and differences from traditional commerce. Prerequisites: CIS 251: Site Design

CIS 267 Intermediate Networking I
This course focuses on the following advanced IP addressing techniques:
- Variable Length Subnet Masking (VLSM)
- Intermediate routing protocols
- Command-line interface Configuration of switches Ethernet switching
- Virtual LANs (VLANs)
- Spanning Tree Protocol (STP)
- VLAN Trunking Protocol (VTP)

The third of four courses leading to the Cisco Certified Network Associate (CCNA) certification.
Prerequisite: CIS 266

CIS 268 Intermediate Networking II
This course focuses on the following advanced IP addressing techniques:
- Network Address Translation (NAT)
- Port Address Translation (PAT)
- DHCP
- WAN technology and terminology
- PPP
- ISDN
- DDR
- Frame Relay
- Network management
- Introduction to optical networking.

In addition, the student will prepare for taking the CCNA Exam. This is the fourth of four courses leading to the Cisco Certified Network Associate (CCNA) certification. Prerequisite: CIS 267

CIS 269/369 Enterprise Systems

CIS 270 Building Scalable Internetworks
This course covers advanced routing topics such as scalable network design, Classless Interdomain Routing, the OSPF routing protocol, the EIGRP routing protocol, route optimization, the BGP protocol and network security.

CIS 271 Implementing Secure Converged WANs
This course covers remote access topics such as asynchronous dial-up connections, the PPP protocol, ISDN, demand-dial routing, X.25, Frame Relay and Network Address Translation.

CIS 272 Building Multilayer Switched Networks
This course covers switching topics such as VLANs, Spanning-Tree Protocol, Routing between VLANs, Multi-layer switching, Hot Standby Routing Protocol, Multi-casting and Restricting Network Access.

CIS 273 Optimizing Converged Networks
This course covers troubleshooting TCP, LAN Switches, VLANs, Frame Relay, ISDN, EIGRP, OSPF and BGP. Also covered are diagnostic tools and methods.

CIS 281/381 Project Management

CIS 284 Incident Response and Disaster Recovery

Computer Science

Prefix	Number	Gerta	Course Title	BSC	DCB	DSU	LRSC	NDSCS	NDSU	MISU	UND	VCSU	WSC	SBC
CSCI	101	ND:COMPSC	Introduction to Computers	3	3	3	3			3	3/1		3	3
CSCI	105		Beginning Generative AI		3									
CSCI	114	ND:COMPSC	Microcomputer Packages						3					
CSCI	116	ND:COMPSC	Business Use of Computers					4						
CSCI	119		Survey of Computer Information Systems											3
CSCI	120	ND:COMPSC	Computer Programming I			3				3		3		
CSCI	121		Beginning Ada											
CSCI	122	ND:COMPSC	Visual Basic	3	3		3		3	3			3	3
CSCI	124		Beginning C++/Visual C++	3	3		3			4		4	3	
CSCI	125	ND:COMPSC	Beginning COBOL	3										
CSCI	126		Beginning FORTRAN							2				
CSCI	127	ND:COMPSC	Beginning Java/J++	3								3		
CSCI	128		Beginning PASCAL							3				
CSCI	129		Beginning RPG											
CSCI	133		Database Management											3
CSCI	160	ND:COMPSC	Computer Science I	4	3	3		4	4	3	4	3	4	4
CSCI	161	ND:COMPSC	Computer Science II	4	3	4		4	4	3	4	3	4	
CSCI	170		Computer Programming II								3			
CSCI	172		Intermediate Visual Basic	3			3	3					3	

Prefix	Number	Gerta	Course Title	BSC	DCB	DSU	LRSC	NDSCS	NDSU	MISU	UND	VCSU	WSC	SBC
CSCI	174		Intermediate C++/Visual C++			3						4	3	
CSCI	175		Intermediate COBOL					4						
CSCI	240		Advanced COBOL Programming											
CSCI	242		Data Structures								3	3		
CSCI	250/350		Assembly Language	3				3		3	3	3		
CSCI	270/370		Computer Organization	3		3					3	3		
CSCI	271		4th GL PowerBuilder					3						
CSCI	289	ND:COMPSC	Social Implications of Computer Technology		2						3	3	2	

CSCI 101 Introduction to Computers
General hardware and software issues such as: terminology, environments. Applications such as: word processing, spreadsheets, databases, Internet usage.

CSCI 105 Beginning Generative AI
This beginner-friendly course provides an accessible introduction to the exciting world of Generative Artificial Intelligence (AI). Students will explore the fundamental concepts, techniques, and applications of generative models, learning how AI can create new, original content such as images, text, music, and even videos. This course will equip students with the foundational knowledge and skills to understand and engage with generative AI systems.

CSCI 114 Microcomputer Packages
Experience in using word processing, spreadsheet, database, graphics, and telecommunications applications on personal computers.
CSCI 116 Business Use of Computers

CSCI 119 Survey of Computer Information Systems
Overview of computer information systems, fundamental computer concepts, and programming techniques. Hands-on experience with selected business software and one programming language is utilized.

CSCI 120 Computer Programming I
Introduction to programming in a high-level language. Emphasis on problem solving and logical thinking. Design, implementation and testing of programs for small-scale problems using elementary data types and control structures.

CSCI 121 Beginning Ada
Introduction to programming in the Ada language.

CSCI 122 Visual Basic

Introduction to programming in the BASIC/Visual BASIC language.

CSCI 124 Beginning C++/Visual C++

Introduction to programming in the C++/Visual C++ language.

CSCI 125 Beginning COBOL

Introduction to programming in the COBOL language.

CSCI 126 Beginning FORTRAN

Introduction to programming in the FORTRAN language.

CSCI 127 Beginning Java/J++

Introduction to programming in the Java/J++ language.

CSCI 128 Beginning PASCAL

Introduction to programming in the Pascal language.

CSCI 129 Beginning RPG

Introduction to programming in the RPG language.

CSCI 133 Database Management

Introduction to the structure and function of database systems, with emphasis on practical applications. Data structures, hierarchical relationships, sequential and indexed searching, updating, and deleting of records and data security and recovery will be discussed.

CSCI 160 Computer Science I

An introduction to computer science including problem solving, algorithm development and structured programming in a high-level language. Emphasis on design, coding, testing and documentation of programs using accepted standards of style.

CSCI 161 Computer Science II

Advanced concepts in computer science including data structures, algorithm analysis, standard problems such as searching and sorting and memory management issues. Prerequisite: CSCI 160

CSCI 170 Computer Programming II

Advanced techniques in programming in a high-level language. Topics include recursion, pointers and fundamental data structures and their use in developing small to medium-scale programs. Prerequisite: CSCI 110

CSCI 172 Intermediate Visual Basic

Intermediate-level programming in the BASIC/Visual BASIC language.

CSCI 174 Intermediate C++/Visual C++

Intermediate-level programming in the C++/Visual C++ language.

CSCI 175 Intermediate COBOL
Intermediate-level programming in the COBOL language.

CSCI 242 Data Structures
Manipulation of graphs and trees. Internal and external sort/merge/search techniques. Dynamic memory allocation. Time/space analysis of algorithms. Prerequisites: CSCI 161 and 223, MATH 208

CSCI 250/350 Assembly Language
Programming in assembly language.

CSCI 270/370 Computer Organization
The structure and organization of computer hardware.

CSCI 271 4th GL PowerBuilder
An introduction to PowerBuilder objects, events, scripting, data windows, transaction objects, menus, and object-oriented programming. Prerequisites: CSCI 160 or permission from instructor.

CSCI 289 Social Implications of Computer Technology
An introduction to the effects of computer technology on society and individuals and to ethical problems faced by computer professionals. Topics covered include privacy, the nature of work, centralization versus decentralization and the need for human factors analysis in the development of a new computer system.