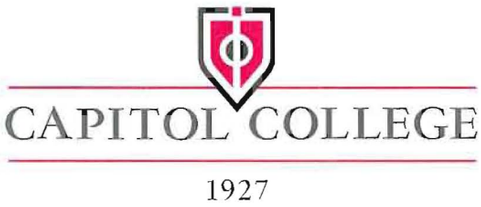

Agreement between Hagerstown Community College and Capitol College for the Articulation of the Associate of Applied Science in Information Systems Technology to the Bachelor of Science in Information Assurance Degree

Purpose

This agreement facilitates the transfer of Hagerstown Community College (HCC) students who graduate with an Associate of Applied Science in Information Systems Technology (AASIST) degree to the Bachelor of Science in Information Assurance (BSIA) degree at Capitol College (CC). This agreement defines the terms of the transfer.

The three goals inherent in the agreement are to:

1. facilitate students' transfer from the AASIST program at HCC to the BSIA program at CC as efficiently as possible.
2. establish a clear set of understandings and expectations for students, both institutions, and their respective degree programs.
3. establish a pathway for HCC's Information Systems Technology (IST) graduates to further their education by earning a bachelor's degree in information assurance as a means to advance their careers in the information assurance profession.

Articulation Agreement

HCC, a community college in Hagerstown, Maryland, and CC agree to offer articulated programs leading to the award of an AAS degree in IST from HCC and a BS degree in Information Assurance (BSIA) from CC. The two institutions further agree that students from HCC, under this articulation agreement, may transfer credits earned for the AASIST degree at HCC toward the BSIA at CC. The following general principles guide the implementation of this Agreement:

1. The program is designed for graduates of the AAS degree in IST at HCC to transfer specific courses in which they have earned the grade of C or higher. The number of courses transferred may not exceed 70 credit hours. The credit hours transferred from HCC contribute to the fulfillment of the 127 credit hours required for baccalaureate completion (BSIA) at CC.

2. The Course Transfer Tables included with this document specify courses and descriptions that will transfer from HCC to CC.

3. CC will consider, on a case-by-case basis, accepting credits from non-direct classroom instruction such as CLEP, AP, and other nationally recognized standardized examination scores. Credit awarded for experiential learning is not recognized by CC without verification through examination.

4. For a smooth transition, students at HCC may start taking courses in the BSIA program at CC while they are completing the AASIST at HCC. Students are advised to complete the AASIST program before officially transferring to CC.

5. If HCC and CC develop a dual enrollment program, this articulation agreement will not prevent students from applying for, participating in, or receiving the benefits of dual enrollment. Those students would then be subject to the dual enrollment program criteria.

6. HCC students who complete the AASIST degree will be given consideration for financial assistance at CC and will be eligible to compete for academic scholarships at CC. Students who complete the AASIST degree with a GPA over 3.0 and subsequently attend CC full-time will be considered for special larger scholarships.

7. At the request of the HCC Director of Technology and Computer Studies, the CC Academic Dean will provide general information as to the academic progress of HCC student(s) enrolled in the BSIA program. Any feedback must adhere to requirements as established by FERPA (Family Educational Rights and Privacy Act).

8. HCC and CC agree to monitor the performance of this agreement and to revise it as necessary.

9. HCC and CC agree to publicize this program.

10. The Course Transfer Table is subject to annual review for updating and revising as necessary by the appropriate HCC and CC officials without affecting the signed agreement.

11. The agreement may be terminated by either party after 60 days advance written notice to the other. Termination of the agreement will not affect students enrolled in the AASIST program at HCC who are taking courses at CC or who have been accepted into the BSIA program at CC.

12. This agreement becomes effective on the date that the last authorizing party has signed the agreement. The last signer will write the date on the signature page.

Agreement between Hagerstown Community College and Capitol College for the Articulation of the Associate of Applied Science Information Systems Technology Degree to the Bachelor of Science in Information Assurance Degree

Authorizing Signatures

This agreement is authorized for implementation on the

_____ day of _____, 2010.
date month

Dr. Michael T. Wood, President
Capitol College

Dr. Guy Altieri, President
Hagerstown Community College

Dr. W. Victor Maconachy, V.P. / C.A.O.
Capitol College

Dr. Judith Oleks, V.P. of Academic Affairs
Hagerstown Community College

Helen G. Barker, Dean
Business and Information Sciences
Capitol College

Margaret Spivey
Director of Technology & Computer Studies
Hagerstown Community College

Prepared by:
Kenneth Crockett
Capitol College
December 2009

A.A.S. Degree

Information Systems Technology

The Information Systems Technology program is designed to give students the opportunity to choose the area of Information Technology most appealing to them. Students earn the A.A.S. degree in Information Systems Technology specializing in a concentration. This curriculum is for students interested in these concentrations: Computer Forensics, Computer Support, Developer, Networking Technology, and Simulation and Digital Entertainment. Students who select one of these concentrations and wish to transfer to a four-year institution or who are interested in computer science should consult an academic advisor. Completion of the Information Systems Technology degree must be within four years of catalog date due to constantly changing technology. Students who do not complete their degree requirements within four years will fall under the latest catalog. Courses with (CW 150) in the title are HCC courses aligned with Cyberwatch curriculum.

General Education Requirements* **21-23 Credits**

Arts/Humanities

Select from approved General Education course list. 3

Behavioral/Social Sciences

Select from approved General Education course list. 3

Biological/Physical Science

Select from approved General Education course list. 3-4

English

ENG	101	English Composition	3
ENG	102	Composition and Literature	3
		OR	
ENG	112	Technical Writing I	(3)

Information Literacy

IST	102	Introduction to Information Technology	3

Mathematics

MAT	101	or another MAT course from approved list	3-4

* *Please note Computer Forensics concentration requires specific General Education requirements.*

Program Requirements

Choose one of the concentrations listed below.

Concentration 1: Computer Forensics

The Computer Forensics concentration is designed to provide an introduction to the forensic investigation aspect of computers and related electronic data systems. The program includes an overview of forensic evidence collection methods, investigative techniques, and procedures suitable for persons exploring the computer forensics field as a career option or needing training for promotion.

General Education Requirements

Specific Behavioral/Social Sciences General Education Requirement

SOC	101	Introduction to Sociology.	3

Program Requirements **38 Credits**

ADJ	101	Introduction to Criminal Justice	3
ADJ	203	Criminal Law	3
ADJ	204	Criminal Investigation	3
ADJ	205	Criminalistics	4
IST	101	Basic Keyboarding	1
IST	108	Microsoft Operating System	3
IST	150	PC Tech--Repair & Troubleshooting	3
IST	151	PC Tech—Operating Systems	3
IST	154	Networking Basics	3
IST	166	Computer Forensics I--Principles and Practices	3
IST	266	Computer Forensics II—Investigations Practices	3
IST	269	Internship I	3
SOC	103	Criminology	3

Electives **9 Credits**

Approved courses are listed below. Electives should be selected in consultation with the Technology and Computer Studies Division to satisfy career goals and/or transfer college requirements.

BTC	101	Introduction to Biotechnology	3
IST	109	UNIX/Linux Operating System	3
IST	160	Introduction to Security Fundamentals	3
IST	260	MCSA/E Windows Professional	3
IST	261	MCSA/E Windows Server	3
IST	267	Network Security	3
STU	106	Professionalism in the Workplace	1

Degree Requirement..... 68-70

This degree must be completed within four years because of constantly changing technology. Students who do not complete within four years will fall under the latest catalog.

Concentration 2: Computer Support Specialist

The Computer Support Specialist concentration provides students with the skills necessary for a career in the computer support field. Courses will concentrate on current packages for word processing, spreadsheets, database management, Internet access, presentation, and web publishing. Two different operating systems will also be covered. Classes are conducted in hands-on labs. Upon completion of the program, the student will be prepared for MOS, A+, and Net+ certification exams. Students are required to keyboard 25 words a minute for two minutes with two errors or less before enrolling in IST courses beyond IST 102. A keyboarding proficiency examination is available for those who wish to test out of this requirement.

Program Requirements **39 Credits**

BUS	145	Customer Service	1
IST	101	Basic Keyboarding	1
IST	103	Presentation Software	1
IST	105	Fundamentals of Word Processing	3
IST	106	Spreadsheet Software	3
IST	107	Database Management	3
IST	108	Microsoft Operating System	3
IST	109	UNIX/Linux Operating System	3
IST	150	PC Tech: Repair and Troubleshooting	3
IST	151	PC Tech: Operating Systems	3
IST	154	Networking Basics	3
IST	203	Troubleshooting Software Applications	3
IST	204	Help Desk Technology and Services	3
IST	269	Internship I	3
WEB	101	Web Design I	3

Electives **9 Credits**

Approved courses are listed below. Electives should be selected in consultation with the Technology and Computer Studies Division to satisfy career goals and/or transfer college requirements.

IST	155	Networking I	(4)
IST	156	Networking II	(4)
IST	160	Introduction to Security Fundamentals	(3)
IST	166	Computer Forensics I—Principles and Practices	(3)
IST	253	TCP/IP	(3)
IST	260	MCSA/E: Windows Professional	(2)
IST	261	MCSA/E: Windows Server	(3)
IST	262	MCSA/E: Windows Network Infrastructure	(2)
IST	264	MCSA/E: Managing a Windows Network	(3)
IST	266	Computer Forensics II—Investigations Practices	(3)
IST	267	Network Security	(3)
STU	106	Professionalism in the Workplace	(1)

Degree Requirement..... 69-70

Concentration 3: Developer

The Developer concentration is for the student interested in a career in computer programming. Major areas of study include programming languages, documentation, structured design principles, problem solving, systems analysis and design, and business ethics. Classes are conducted in hands-on computer labs. Students are required to keyboard 20 words a minute for two minutes with two errors or less before enrolling in IST courses beyond IST 102. A keyboarding proficiency examination is available for those who wish to test out of this requirement.

Program Requirements **42 Credits**

ACC	101	Principles of Accounting I	4
ACC	102	Principles of Accounting II	4
BUS	101	Introduction to Business Organization and Management	3
IST	101	Basic Keyboarding	1
IST	107	Database Management	3
IST	108	Microsoft Operating System	3
IST	109	UNIX/Linux Operating System	3
IST	132	Introduction to C and C++ Programming	3
IST	133	Visual Basic	3
IST	134	Introduction to JAVA Programming	3
IST	173	Database Fundamentals	3
IST	202	Systems Design and Analysis	3
IST	232	Advanced C++ Programming	3
IST	269	Internship I	3

Electives **6 Credits**

Approved courses are listed below. Electives should be selected in consultation with the Technology and Computer Studies Division to satisfy career goals and/or transfer college requirements.

BUS	145	Customer Service	(1)
GDT	112	Computer Graphics	(3)
IST	103	Presentation Software	(1)
IST	105	Fundamentals of Word Processing	(3)
IST	106	Spreadsheet Software	(3)
IST	150	PC Tech: Repair and Troubleshooting	(3)
IST	151	PC Tech: Operating Systems	(3)
IST	154	Networking Basics	(3)
SDE	102	Multimedia Authoring	(3)
STU	106	Professionalism in the Workplace	(1)
WEB	101	Web Design I	(3)

Degree Requirement **69-70**

Concentration 4: Networking Technology

The Networking Technology concentration is for the student interested in a career in networking concepts. Major areas of study include network fundamentals, design, management, troubleshooting, and operating systems. Two options are offered: Network Administrator and Network Security. Classes are conducted in hands-on computer labs. This program of study embraces the body of knowledge found in the following computer industry certifications: A+, Net+, Security+, Cisco, and MCSA/E (Microsoft Certified Systems Administrator and/or Engineering) Certification. Students are required to keyboard 20 words a minute for two minutes with two errors or less before enrolling in IST courses beyond IST 102. A keyboarding proficiency examination is available for those who wish to test out of this requirement.

Hagerstown Community College is a member of CyberWATCH, a consortium of colleges, universities, business and government partners dedicated to increasing the quality and quantity of Information Security/ Assurance professionals. HCC has aligned many of its networking technology courses with approved CyberWATCH curriculum. This alignment assures students receive quality information security education that is recognized throughout the state of Maryland and Washington, DC metropolitan area. This alignment is also useful to institutions articulating with HCC by helping them quickly determine which courses are based on a common CyberWATCH model curriculum in Information Security. Each IST course included in this program will show their CyberWATCH common course equivalents immediately after the college's course number and title. i.e., IST 267 Network Security (CW 215)

HCC has successfully mapped to the National Security Telecommunications and Information Systems Security (NSTISSI) 4011 and 4013 standards. Courses mapped to NSTISSI-4011 are: IST 102 Introduction to Information Technology, IST 154 Network Fundamentals, IST 160 Introduction to Security Fundamentals, IST 267 Network Security. Courses mapped to NSTISSI-4013 are: IST 160, Introduction to Security Fundamentals and IST 266 Network Security, This advanced standard is intended for System Administrators responsible for the security oversight or management of critical networks.

Program Requirements **36 Credits**

IST	101	Basic Keyboarding	1
IST	108	Microsoft Operating System (CW 130)	3
IST	109	UNIX/Linux Operating System (CW 140)	3
IST	140	Fundamentals of Wireless Computing (CW 245)	3
IST	150	PC Tech: Repair and Troubleshooting	3
IST	151	PC Tech: Operating Systems	3
IST	154	Networking Basics	3
IST	155	Networking I (CW 150)	4
IST	156	Networking II (CW 151)	4
IST	260	MCSA/E: Windows Professional	3
IST	261	MCSA/E: Windows Server (CW 230)	3
IST	269	Internship I (CW 269)	3

Choose one of the following options (12 credits) to complete this Degree:

Option A: Network Administrator

IST	255	Networking III (CW 250)	4
IST	256	Networking IV (CW 251)	4
IST	264	MSCA/E: Managing a Windows Network	3

Option B: Network Security

(Mapping is pending to NSTISSI-4011, National Standard for Information Systems Security [INFOSEC] Professionals.) The option Network Security mapping is pending to NSTISSI-4011, National Training Standard for Information Systems Security [INFOSEC] Professionals.

IST	160	Introduction to Security Fundamentals (CW 160)	3
IST	253	TCP/IP	3
IST	254	Network Design and Defense	3
IST	267	Network Security (CW 215)	3

Degree Requirement **69-70**

Concentration 5: Simulation and Digital Entertainment

The Simulation and Digital Entertainment (SDE) concentration provides students with the skills to design and develop computer games for fun, advertising, education, and simulations. Course concentration will be game design, programming, documentation, structured design principles, problem solving, and business ethics. Classes are conducted in hands-on labs.

Program Requirements **33 Credits**

ENG	112	Technical Writing I	3
GDT	112	Computer Graphics	3
GDT	114	Graphic Design I	3
GDT/ART	116	Digital Imaging	3
SDE	102	Multimedia Authoring	3
SDE	104	Game Programming I	3
SDE	104	Introduction to Object-Oriented Programming	3
SDE	201	Multimedia Algorithms	3
SDE	203	3D and Advanced Animation	3
SDE	205	Game Programming II	3
SDE	207	Multimedia Project Development	3
SPD	103	Public Speaking	3

Electives **12 Credits**

Electives should be selected in consultation with the Technology and Computer Studies Division to satisfy career goals and/or transfer college requirements. Select 12 elective credits from the following list.

ART	103	Drawing I	(3)
CAD	152	Computer-Aided Design I	(3)
ENG	114	Mythology	(3)
ENG	116	Basic Screenwriting	(3)
GDT	220	Digital Video and Audio	(3)

HIS	102	History of Civilization II	(3)
IST	132	Introduction to C and C++ Programming	(3)
IST	133	Visual Basic	(3)
MUS	175	Introduction to Electronic Music	(3)
SDE	269	Internship I	(3)
WEB	101	Web Design I	(3)
WEB	110	Web Design II	(3)

Degree Requirement 66-68

Capitol College	*Hagerstown Community College*
CS 130 Computer Science Fundamentals Introduces students to the discipline, methodologies, and techniques of software development. The emphasis is on developing essential programming skills, an understanding of object-oriented design and good software engineering practices using the Java programming language. Program constructs include selection, looping, arrays, graphical output of data, the use of the standard Java class library, and construction of simple user-defined classes. Programming projects are assigned as part of the homework requirements. Prerequisite: CT-115 or equivalent, MA-110 or MA114. (4-0-4)	**CSC 132 Introduction to C++** CSC-132 Introduction to C and C++ Programming This course provides students with a thorough understanding of the basic principles of C and C++. It covers the basic syntax and structure of the language with an emphasis on problem solving techniques. Students create programs using input/output statements; if, while, do while, and for-loop logic structures; arrays, functions, pointers and reference variables, record structures, header files, file I/O, and basic object-oriented programming techniques. Students will be able to recognize and correct common programming errors. Course fee required. Prerequisite: IST 102 and MAT 101. Semester offered: Fall. 3 Credits
CS 220 Database Management An overview of database systems, with an emphasis on relational databases. Terminology, basic analysis and design using Entity-Relationship diagrams and relational schemas. Database implementation, queries and updates using SQL. Client/server and middleware. An overview of database administration, transactions and concurrency. Data warehouses. Projects, which are assigned as homework, are implemented in Oracle. Prerequisite: A grade of C or better in CS-130 or CT-115. You may take this course and CS-130 concurrently. (3-0-3)	**IST 173 Database Fundamentals** IST-173 Database Fundamentals Introduction to relational database management systems and their applications. Students learn about types of databases, data modeling, designing relational databases, normalization and relationship, and recent trends in database management. Students apply learned concepts using a modern database application to create tables, queries, forms, and reports. Prerequisite: IST 102 or consent of TCS Division. Semester offered: Periodically. 3 Credits
CS 230 Computer Science Fundamentals II Advance pointers and dynamic memory usage. Concepts of object-oriented design and programming. Includes classes, friend functions, templates, operator overloading, polymorphism, inheritance, exception handling, containers, iterators and the standard template library. Applications involve the use of simple data structures such as stacks, queues, linked lists and binary trees. Recursion, searching and sorting algorithms. The above concepts are implemented through a series of hands-on programming projects, all of which are completed as part of the	**CSC 232 Advanced C++** CSC-232 Advanced C++ Programming This course continues to introduce students to object-oriented programming (OOP) using C++ and Visual C++. It builds on the foundation of IST/CSC 132. Students learn OOP concepts such as classes, friends, and templates and use these to build a program designed to run under a Microsoft Windows environment. Using a hands-on approach, students have the opportunity to design, code, and test object-oriented applications. Additional time outside of class will be necessary to write programs. Course fee required. Prerequisite: IST 132 or CSC 132. Semester offered: Spring. 3 Credits

homework requirements. Prerequisite: CS-130. (3-0-3)	
CT 115 Introduction to Programming An introductory programming course that teaches computer essentials and programming essentials: components of a computer, the computer as a tool for connecting to networks/internet, digital vs. analog, binary arithmetic, how information is stored, algorithms, branching, looping, functions and arrays. An important aspect of this course is to present students with techniques for translating problem descriptions into computer algorithms, which are then implemented as a computer program. Extensive programming assignments are completed as part of the homework assignments. Acceptance based on placement test score. (3-0-3)	**SDE 130 Introduction to Object Oriented Programming** This course in intended to show basic concepts in programming. Using Alice, a utility form Carnegie Mellon University, students will learn file management, programming techniques, program design and implementation, basic Object Oriented Programming (OOP), control statements and structure. Students will be able to recognize and correct common programming errors as well as utilize program problem solving techniques. Course fee required. Co-requisite: IST 102. Semesters offered: Fall, Spring. 3 credits
CT 152 Introduction to Unix Unix file and operating system. Understanding multi-user and multitasking concepts. Editors, X-windows, Awk, email, Internet commands, shell commands and shell scripts. Projects, which provide practical experience, are completed as part of the homework requirements. (3-0-3)	**IST 109 Unix/Linux Operating System** Using RedHat Linux, this course covers the basic concepts, commands, and skills used in the UNIX/Linux operating systems. The shells examined are the C, Bourne, and Korn. Because UNIX/ Linux is a very extensive operating system, this course uses the command line and introduces students to basic elements, such as utilities, electronic mail, Visual Editor, directories, messaging, shell programming, permissions, system security, online help, controlling user processes, printing, sed, and awk. The course is recommended for users with an operating systems background. Course fee required. Prerequisite: IST 102 or consent of TCS Division. Semesters offered: Fall, Spring. 3 Credits
NT 100 Computer Architecture & Construction Basic introduction to the design and construction of a current model PC including operating systems and some diagnostic software. Students build, configure, test and troubleshoot PCs in the laboratory. This material can be used as a basis for studying for both the CompTIA A+ exam. (1-4-3)	**IST 150 PC Tech: Repair and Troubleshooting** This course prepares students to acquire skills needed to be a successful computer technician and also prepares students for CompTIA's A+ certification exams. In this class students experience techniques used to diagnose hardware problems, configure PC components, and replace defective computer parts. Students also

	experience installing mother boards, configuring multiple hard drives, adding peripheral devices, configuring network connectivity, solving basic printer problems, and modifying BIOS settings. Diagnostic software and hardware procedures are included. Course fee required. Prerequisite: IST 102 or consent of TCS Division. Semesters offered: Fall, Spring. 3 Credits
IAE 201 Introduction to IA Concepts This course covers topics related to administration of network security. Topics include a survey of encryption and authentication algorithms; threats to security; operating system security; IP security; user authentication schemes; web security; email security protocols; intrusion detections; viruses; firewalls; Virtual Private Networks; network management and security policies and procedures. Laboratory projects are assigned as part of the homework requirements. Corequisites: MA-110 or MA-114 and EN-101. (3-0-3)	**IST 160 Introduction to Security Fundamentals** This is a first course in the fundamentals of information, computer and network security. The course discusses common security issues, identifies methods of assessing systems to identify critical data and presents tools and techniques for securing computers and networks. Course objectives map to the CompTIA Security+ Exam and include general security concepts, communication security, infrastructure security, basics of cryptography and operational/organizational security. Prerequisite: IST 102 or consent of TCS Division. Semester offered: Spring. 3 Credits
IAE 301 Comprehensive Computer and Network Security Part 1 Both IAE-301 and its compliment, IAE-302, are designed to provide students with an opportunity to master many of the common and basic IA principles supporting the CompTIA Security+ certification. IAE-301 centers on the administrative portion of network security. Topics include IA terms and background, introduction to organizational IA policy, risk analysis, backups and contingency planning. Also included are Linux history and commands, administrative tools and snap-ins for Windows Professional versions. (3-0-3).	**IST 254 Network Design and Defense** Network Design and Defense along with IST 269 serve as the capstone courses for the Networking Program at Hagerstown Community College. The course solidifies concepts presented in earlier coursework by reinforcing how networks function and then applying these concepts to create business solutions and network security. Units include: concepts review, network attacks, footprinting, port scanning, enumeration, OS vulnerabilities, Web servers, wireless networks, cryptography and protecting networks. Case studies are included in the course discussion. Prerequisite: IST 253. Semester offered: Spring. 3 Credits
IAE 302 Comprehensive Computer and Network Security Part 2 IAE-302 is the companion course to IAE-301. This course provides students with instruction on IA-related protocols, including IPv4 and IPv6, TCP, UDP, ICMP and other supported protocols related	**IST 267 Network Security** Network Security is a course that examines the concepts of information, computer and network security. The course is presented at the beginning and intermediate technical level using lecture, lab and discussion format. Course goals include

to secure data communications. Intrusion detection and firewall principles supporting the protection of networks in a secure enclave architecture are also discussed. Other topics include infrastructure security requirements, network enclave security architecture, introduction to IEEE 802.11 wireless security history and requirements, principles of authentication and access controls, Kerberos authentication, and the use of LDAP. This course maps to the CompTIA Security+certification. Corequisite: IAE-301. (3-0-3)	increasing awareness of security issues, defining basic security terms, identifying security infrastructure and codes, and examining policies that may be employed in security management. Course content includes examining a broad range of domains: access control, telecommunications, security management, applications development, cryptography, security architecture, operations security, disaster recovery planning, ethics, and physical security. Prerequisite: IST 160, and IST 260, and IST 261 or consent of instructor. Semester offered: Fall. 3 Credits
MA 114 Algebra and Trigonometry Algebra: basic operations on real and complex numbers, fractions, exponents and radicals. Determinates. Solution of linear, fractional, quadratic and system equations. Trigonometry: definintion and indentities, angular measurements, solving triangles, vectors, graphs and logarithms. Prerequisite: Acceptance based on placement test score. (4-0-4)	**MAT 102 Trigonometry** The study of exponential, logarithmic, trigonometric and inverse trigonometric functions, as well as their applications. Topics include: triangles, trigonometric identities and equations, polar coordinates, equations and graphs, the complex plane and DeMoivre's Theorem. Prerequisite: MAT 101 or appropriate score on placement test. Concurrent enrollment in MAT 101 is permissible. Semesters offered: Fall, Spring, Summer. 3 Credits
MA 124 Discrete Math Logic sets and sequences; algorithms, divisibility and matrices; proof, induction and recursion; counting methods and probability; relations, closure and equivalence relations, graphs and trees; Boolean algebra. Fall-evening only, Spring-daytime only. (3-0-3)	**MAT 207 Discrete Mathematics** This is an introduction to discrete mathematics with emphasis on topics relevant to computer science including: sets and logic, number systems and number theory, graph theory, matrices, algorithm design, mathematical induction and recursion. Prerequisite: MAT 101 or MAT 161. Semester offered: Summer. 3 Credits
MA 128 Introduction to Statistics Probability: definitions, theorems, permutations and combinations. Binomial, hypergeometric, Poisson and normal distributions. Sampling distribution and central limit theorem, estimation and hypothesis testing. Prerequisite:MA-110 or MA-114. Fall-daytime only; Spring-evening only. (3-0-3)	**MAT 119 Into to Statistics with Computer Apps** This course is a study of modern statistical analysis enhanced with appropriate technology and is presented for use in business, education, social studies and the natural sciences. Computer software is employed to apply course topics to real world situations. Included in the course are fundamental topics in descriptive statistics, probability, normal and binomial distributions, confidence intervals, hypothesis testing, regression and correlation, chi-square distributions and

	ANOVA. Not open to students who successfully complete MAT 109. Students will be expected to use online homework and tutorial programs. Prerequisites: MAT 101, MAT 103, MAT 108, MAT 118, MAT 131 or MAT 161 or appropriate score on placement test or consent of math department. Semesters offered: Fall, Spring, Summer. 4 Credits
Science Elective	**Bio/Phys Science**
TC 110 Intro to Telecommunications Telecommunications defined and its effects on our daily lives. Structure of the telecommunications industry. Brief history. Basic terminology. Type of analog and digital communications systems. Data communications and networking. Introduction to local area networks, and wide area networks. Microwave and cellular systems. Satellite systems. Internet and its structure, World Wide Web, website technology and terminology. (2-2-3)	**IST 155 Networking I** This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. It uses the OSI and TCP layered models to examine the nature and roles of protocols and services at the application, network, data link, and physical layers in. conjunction with the Cisco Networking Academy. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum. Introductory router/switch device configuration skills are also included. Students must have a personal computer and Internet access to complete online assignments and exams. Class also meets at least one Saturday per session per the instructor's discretion. Course fee required. Prerequisites: IST 150 and IST 151 or A+ certification or equivalent work experience. Semester offered: Fall. 4 Credits
CT 240 Internetworking with Routers and Switches Configuring routers and switches to build multiprotocol internetworks. OSI reference model, basic LAN and WAN design, dial access services, TCP/IP protocol suites, IP addressing, subnetting, static and dynamic routing, WAN technologies such as HDLC, PPP, Frame Relay, ATM and ISDN. Prerequisites: TC-110 and CT-115 or CS-130 or professor approval. (2-2-3)	**IST 156 Networking II** This course describes the architecture, components, and operation of routers, and explains the principles of routing and routing protocols. Students analyze, configure, verify, and troubleshoot the primary routing protocols RIPv1, RIPv2, EIGRP, and OSPF. By the end of this course, students will be able to recognize and correct common routing issues and problems. This course is offered in conjunction with the Cisco Networking Academy. Students must have a personal computer and Internet access to complete online assignments and exams. Class also meets at least one Saturday per session per the instructor's discretion. Course fee required.

	Prerequisite: IST 155. Semesters offered: Fall. 4
NT 150 Computer Networking This course is a continuation of IT-110 into the networking with major emphasis on local network equipment, network software and addressing schemes. Students build, configure, test and troubleshoot a network in the laboratory. Routers and switches are included. This material can be used as a basis for studying for both the CompTIA Network + exam. (1-4-3)	**IST 154 Networking Basics** Students become familiar with networking terminology and concepts. This course introduces the fundamental building blocks that form a modern network, such as protocols, topologies, hardware, and network operating systems. It then provides coverage of the most important concepts in contemporary networking, such as client/ server architecture, TCP/IP, Ethernet, wireless transmission, and security. A current network operating system is used to examine managing users, groups and devices. Additional networking operating systems are surveyed. Also included are discussions of the OSI model, subnets, troubleshooting, and networking integrity. Course objectives map to the CompTIA Net+ Exam. Successful completion of a DOS or Windows course is strongly recommended. Course fee required. Prerequisite: IST 102. Semesters offered: Fall, Spring. 3 credits. 3 Credits
EN 101 English Communications I This introductory college-level course focuses on effective oral and written communication skills and the development of analytical abilities through various reading and writing assignments. Students must be able to demonstrate competence in writing mechanics, including grammar, structure and logical content development when writing essays, summaries, and short reports. Rhetorical modes may include description, compare/contrast, personal experience, definition, illustration and process demonstration. Oral presentation skills are developed through the delivery of two speeches on related topics. (3-0-3)	**ENG 101 English Composition** This course examines paragraph and theme development with emphasis on syntax, organization, logical thinking, and diction as a basis for writing. Students are given extensive practice in creating and revising their own compositions. Documentation and plagiarism are discussed. Selected readings may be used. Prerequisite: ENG 100 or appropriate score on placement test. Semesters offered: Fall, Spring, Summer. 3 Credits
EN 102 English Communications II This sequel to EN101 involves more sophisticated research, reading, writing, and speaking assignments. Emphasis is on summarizing and analyzing short articles, including one in-class analysis. Students will demonstrate competence in research and documentation methods by	**ENG 102 Composition and Literature** This course refines the writing process through the reading and interpretation of literature. Students learn manuscript presentation, inquiry, and research skills by writing a clearly documented research paper. Prerequisite: ENG 101. Semesters offered: Fall, Spring, Summer. 3 Credits

conducting one major research project during the semester. Prerequisite: EN-101. (3-0-3)	
Humanities/History/Philosophy Elective #1	**Arts/Hum**
Humanities/History/Philosophy Elective #2	**Beh/Soc Sci**
General Electives – choose three from list of five	**IST 108 Microsoft Operating System** This course provides students with an understanding of both basic and advanced principles of the Windows XP operating system. A brief overview takes students through dynamic menus, task-oriented views, the Help and Support Center, and the system environment. Emphasis is placed upon Computer Management Console disk and file management, optimization for better performance, planning and performing backups, navigation of the system through both the GUI environment and command line, configuration of systems software, improving performance and system support through system utilities and security. Students are introduced to the Registry, introductory troubleshooting and evaluation of system performance are covered. Course fee required. Prerequisite: IST 102 or consent of TCS Division. May be taken concurrently with IST 102. Semesters offered: Fall, Spring. 3 Credits
	IST 140 Fundamentals of Wireless Computing Fundamentals of Wireless Computing is an introductory examination into the world of wireless technology. The course will cover the benefits and uses of wireless technology, offer a framework to navigate through the process of selecting and assembling a wireless solution, and provide technical overviews on various aspects of wireless technology including management issues, solution considerations, devices, networks, applications, and support requirements. Prerequisite: IST 102 or consent of TCS Division. Semester offered: Spring. 3 Credits
	IST 151 PC Tech: Operating Systems This course provides installation, configuration, support and troubleshooting of PC desktop operating systems and preparation for CompTIA's A+ certification exams. Topics include hardware

	requirements for installation, upgrades, customizing the user environment and memory, installing hardware/software, (including printers), troubleshooting the boot process, and recovery from OS crashes. The fundamentals of introductory networking topics include OSI model, connecting through wireless/wired networks, and TCP/IP protocols, addressing, and troubleshooting tools. Course fee required. Prerequisite: IST 108 or consent of TCS Division. May be taken concurrently with IST 150. Semesters offered: Fall, Spring. 3 Credits
	IST 253 TCP/IP Transmission Control Protocol/Internet Protocol (TCP/IP) defines the broad family of protocols and services that make the Internet possible. The course covers models, protocols, services and standards that govern TCP/IP and that guide its behavior on modern networks. Real-world and interactive examples are offered in addition to hands-on projects to reinforce key concepts and to demonstrate the use of monitoring and managing TCP/ IP in its native environment. Prerequisite: IST 154. Semester offered: Fall. 3 Credits
	IST 260 MCSA / E Windows Professional This course shows students how to set up and support the Microsoft Windows operating system and prepares them for the Microsoft Certified Professional Examination. Students gain experience installing, administering, and troubleshooting the Windows desktop environment. Course fee required. Prerequisite: IST 108, IST 151 or consent of TCS Division. Semester offered: Fall. 3 Credits