Computer Security & Information Assurance

Professor Mich Kabay; Associate Professors David Blythe, Jeremy Hansen, and Huw Read; Assistant Professor Susan Helser; Lecturers Matthew Bovee and Kris Rowley.

Center of Academic Excellence in Digital Forensics and Cyber Defense Education

Norwich University is one of very few academic institutions to be designated as both a Center of Academic Excellence in Cyber Defense Education (https://www.nsa.gov/resources/educators/centers-academic-excellence/cyber-defense) since 2001, by the National Security Agency of the United States of America) and a Center of Digital Forensics Academic Excellence (http://www.dc3.mil) (since 2012, by the Defense Cyber Crime Center of the United States Air Force Office of Special Operations). These designations recognize Norwich's significant contribution in meeting national demand for digital-forensics and information-assurance education, developing a growing number of professionals with expertise in both areas, and ultimately contributing to the protection of the national critical information infrastructure.

Each student has an individually-assigned faculty advisor from their very first day on campus. The faculty advisor assists in the development of an individualized academic program designed to meet the student's career goals. The student and the faculty advisor work together to keep the student's individualized program on track throughout their enrollment at Norwich. Committed to strong ties between the classroom, the computer labs, and the real world, this program focuses extensively on the practical application of classroom work to solving real-world problems in forensics and information assurance.

The Computer Security and Information Assurance (http://catalog.norwich.edu/residentialprogramscatalog/collegeofprofessionalschools/schoolofbusinessandmanagement/csia/#majorsconcentrationstext) (CSIA) major provides a foundation of study in the liberal arts, mathematics, management, and the sciences, as well as computer programming, digital forensics and information assurance. Students integrate knowledge from these disciplines to enter organizations with both practical, functional capabilities and an enterprise perspective. During Spring Semester sophomores CSIA majors must select from two available areas of specialization – Forensics (http://catalog.norwich.edu/residentialprogramscatalog/collegeofprofessionalschools/schoolofbusinessandmanagement/csia/#majorsconcentrationstext) or Information Assurance Management (http://catalog.norwich.edu/residentialprogramscatalog/collegeofprofessionalschools/schoolofbusinessandmanagement/csia/#majorsconcentrationstext) (students can successfully complete both by taking additional courses per semester). The curriculum of the major complies with the standards (http://niatec.info/viewpage.aspx?id=103) defined by the Committee on National Security Systems (CNSS (https://www.cnss.gov/cnss)) required by the National Information Assurance Training and Education Center (NIATEC (http://niatec.info/ViewPage.aspx?id=0)).

- Forensics (http://catalog.norwich.edu/residentialprogramscatalog/collegeofprofessionalschools/schoolofbusinessandmanagement/csia/#majorsconcentrationstext) Concentration (http://catalog.norwich.edu/archives/2017-18/residentialprogramscatalog/collegeofprofessionalschools/schoolofbusinessandmanagement/csia/#majorsconcentrationstext) prepares graduates for practical application of current forensics theory, ethics, techniques, skills, and tools, for all levels of digital-incident investigation relevant to solving policy violations and crimes. Students learn and apply foundational concepts, terminology and techniques ranging from the extraction and analysis of digital evidence, its sources and communication, to process-, system- and program-design.
- Information Assurance (IA) Management Concentration (http://catalog.norwich.edu/archives/2017-18/residentialprogramscatalog/collegeofprofessionalschools/schoolofbusinessandmanagement/csia/#majorsconcentrationstext) prepares graduates to analyze requirements and implement measures to protect information confidentiality, control, integrity, authenticity, availability, and utility, and to maintain their technical and managerial competence in the face of ever-changing requirements and technology. Students integrate concepts, terminology, and techniques, from operations management, organizational psychology, and information assurance, for the effective development and implementation of IA in organizations.

Goals:

To develop in or provide for students

- Foundational competency in liberal arts, mathematics, management, the sciences, and computer programming;
- An understanding and appreciation for the evolving nature and role of technology at all levels of society;
- An understanding of individual privacy rights and the impact of large-scale data collection and interconnected data sources;
- Multiple, differing perspectives on information security;
- Ethical decision-making principles for deciding how best to implement information assurance in all environments;
- Integrated knowledge and practical skills in digital forensics and information assurance;
- An appreciation for the organizational importance and applications of digital forensics and information assurance;
- Advanced specialization in the theory, practice, and application, of digital forensics or information-assurance management;
- Preparedness to participate with computer-security professionals in multiple environments, such as: industry, government, military, and academia;
- A multidisciplinary perspective coupled with the commitment to integrate human factors for success in defending information resources; and,
- Readiness for continuing, perpetual education in a constantly changing field.

Outcomes:

Upon graduation successful students will competently demonstrate:

- Clear and effective communication of the fundamentals of computers, computer science, computer security, and information assurance;
- Facility in at least one programming language and a basic knowledge of at least one other;
- Ability to identify and discuss the fundamental hardware and software architecture of computer systems;

- Application of fundamental theory and practice of digital forensics, digital-incident investigation, and information assurance;
- Professional-level knowledge regarding cyber-law and cyber-crime, including: identifying and classifying cyber-crimes; the motivations of cyber-criminals; seizure and handling of computer-related evidence; admissibility of digital-incident evidence in courts of law; preparing and delivering professional testimony; and the key regulations and laws regarding cyber-crimes of varying types and jurisdictions;
- Ethical, responsible conduct, both personal and professional, in their computer-security and information-assurance practices consistent with the highest professional standards of the field; and,
- Depth of knowledge and application of the concepts, terminology and techniques of their chosen concentration area.

Careers for this Major:

The CSIA curriculum provides a balanced foundation of both information assurance and digital forensics. The Information Assurance Management concentration emphasizes upper-level coursework associated with implementation, management and support of corporate networks, information, and cyber defense programs. The Forensics concentration emphasizes upper-level coursework on the skills, practices and policies of digital forensics and cyber-investigation. All organizations need professionals with either skill set. However, there is a tendency for IA Management to be more oriented toward careers with for-profit commercial and non-profit public organizations, and for Forensics to be more oriented toward careers with federal, state, and local government agencies. Students' elective course choices further influence the career opportunities open to them. Potential careers include:

- Computer Network Defense
- Counterintelligence
- Counterterrorism
- Cyber-Crime Investigation & Analysis
- Cyber-Forensics Investigation
- Cyber-Incident Analysis & Response
- Cyber-Intelligence
- Cyber-Security
- Cyber-Warfare and National Security
- Information Systems/Technology Management
- Law enforcement (federal, state, local)
- Legal studies and practice of law as attorneys
- Malware Analysis
- Penetration Testing
- Threat Analysis

B.S. Computer Security & Information Assurance - Curriculum Map 2017-2018 Catalog

Print PDF Curriculum Map (http://catalog.norwich.edu/residentialprogramscatalog/collegeofprofessionalschools/schoolofbusinessandmanagement/csia/cia_1499798822923.pdf)

Students must declare either the Forensics Concentration, the Information Assurance Management Concentration, or both (see requirements below). Choice of concentration is typically declared no later than the end of the sophomore year in the CSIA program.

Freshman			
Fall	**Cr.**	**Spring**	**Cr.**
CS 100 Foundations of Computer Science and Information Assurance	3	CS 140 Programming and Computing[2]	4
EN 101 Composition and Literature I	3	EN 102 Composition and Literature II	3
MA 107 Precalculus Mathematics[1]	4	General Education Arts & Humanities (http://catalog.norwich.edu/archives/2017-18/residentialprogramscatalog/generaleducationgoals)	3
PY 211 Introduction to Psychology (General Education Social Science)	3	General Education History (http://catalog.norwich.edu/archives/2017-18/residentialprogramscatalog/generaleducationgoals)	3
		Free Elective	3
Semester Total Credits	13	Semester Total Credits	16
Sophomore			
Fall	**Cr.**	**Spring**	**Cr.**
CS 228 Introduction to Data Structures	3	CS 212 Assembly Language & Reverse Engineering	3
IA 241 Cyberlaw and Cybercrime[3]	3	CS 240 Database Management	3
MA 240 Introduction to Number Theory and Cryptology (General Education Math)	3	MA 318 Cryptology (General Education Math)	3
MG 341 Business Law I (General Education Ethics)	3	General Education Lab Science (http://catalog.norwich.edu/archives/2017-18/residentialprogramscatalog/generaleducationgoals)	4
General Education Lab Science (http://catalog.norwich.edu/archives/2017-18/residentialprogramscatalog/generaleducationgoals)	4	Free Elective	3
Semester Total Credits	16	Semester Total Credits	16
Junior			
Fall	**Cr.**	**Spring**	**Cr.**
DF 242 Computer Forensics I	4	CS 260 Data Communications and Networks	3
EN 112 Public Speaking	3	IA 342 Management of Information Assurance	3
IA 340 Introduction to Information Assurance	3	QM 213 Business and Economic Statistics I	3
Concentration Elective (see below)	3	Concentration Elective (see below)	3
Free Elective	3	Concentration Elective (see below)	3
Semester Total Credits	16	Semester Total Credits	15

Senior			
Fall	**Cr.**	**Spring**	**Cr.**
CS 301 Software Engineering	3	IA 456 Cyber Defense Practicum (Capstone)	3
IA 455 Contemporary Issues in Information Assurance	3	Concentration Elective (see below)	3
Concentration Elective (see below)	3	Concentration Elective (see below)	3
General Education Literature (http://catalog.norwich.edu/archives/2017-18/residentialprogramscatalog/generaleducationgoals)	3	Free Elective	3
Free Elective	3	Free Elective	3
Semester Total Credits	15	Semester Total Credits	15
Total Credits For This Major: 122			

1 Requires a math placement score of 2. Students scoring below 2 must successfully complete the appropriate necessary prerequisite math courses first. With a math placement score of 3, the MA107 requirement may be waived and the credit hours replaced with a free elective.

2 Prerequisite: C or higher in IS 100 or CS 100, or instructor permission

3 Cross-listed as CJ 341

Concentrations

Forensics Concentration 2017-2018 Catalog

All courses used to fulfill a concentration must be completed with a grade of C or higher.

Required Courses		
DF 311	Network Forensics	3
DF 312	Malware Forensics	3
DF 411	Cyber Investigation	3
Elective Courses - Choose any non-duplicate three of the following courses:		
CS 221	GUI Programming	3
CS 250	Virtual Systems Administration	3
CS 270	Operating Systems & Parallelism	3
CS 330	Ethics in Computing and Technology	3
CS 406	Special Topics in Computer Science *	3
CS 407	Politics of Cyberspace	3
CS 410	Computing Internship *	3
DF 423	Advanced Digital Forensics	3
IA 360	Network Security	3
MG 309	Management of Organizations	3
MG 346	Business Law II	3
MG 351	Organizational Behavior	3
PY 234	Forensic Psychology	3
Total Cr.		18

* May be taken more than once for credit by approval, contingent on each section taken covering substantively different content.

Information Assurance Management Concentration 2017-2018 Catalog

All courses used to fulfill a concentration must be completed with a grade of C or higher.

Required Courses		
CS 270	Operating Systems & Parallelism	3
IA 360	Network Security	3
MG 309	Management of Organizations	3
MG 351	Organizational Behavior	3
Elective Courses - Choose any non-duplicate two of the following:		
CS 221	GUI Programming	3
CS 250	Virtual Systems Administration	3
CS 330	Ethics in Computing and Technology	3
CS 406	Special Topics in Computer Science *	3
CS 407	Politics of Cyberspace	3
CS 410	Computing Internship *	3
DF 311	Network Forensics	3
DF 312	Malware Forensics	3
DF 411	Cyber Investigation	3
DF 423	Advanced Digital Forensics	3
MG 346	Business Law II	3
PY 234	Forensic Psychology	3
Total Cr.		18

* May be taken more than once for credit by approval, contingent on each section taken covering substantively different content.

Computer Science Courses

CS 100 Foundations of Computer Science and Information Assurance 3 Cr.
This survey of computing and information assurance fundamentals is required for computer science and information assurance majors. The course focuses on learning to use key concepts and terminology in information technology, computer science, networking, and information security. Discussions regarding computing ethics, safety, and professionalism are included throughout. Prerequisites: By permission only for non-computer science and non-CSIA majors.

CS 120 Business Applications & Problem Solving Techniques 3 Cr.
An introductory course in management information processing. The course explores the most important aspects of information systems with specific emphasis on business applications, practical usage, and current information. The student will obtain skills in word processing, spreadsheet analysis, and presentation tools using professional software packages. Structured problem-solving techniques will be emphasized throughout the course. Practical implementation projects and case studies will be used to reinforce topics such as computer, academic, and professional ethics for an information-based society. Not open to CS or CSIA majors.

CS 140 Programming and Computing 4 Cr.
An introduction to fundamental computing concepts and programming, designed for students with little programming background. The course uses a high-level language and emphasizes object-oriented design and implementation techniques. Good software engineering practice and language-specific concepts are introduced by means of programming projects that illustrate the importance of software quality attributes. This course serves as the basis for more advanced programming classes. Classroom 3 hours, laboratory 2 hours. Prerequisite: C or higher in IS 100 or CS 100, or by instructor permission.

CS 212 Assembly Language & Reverse Engineering 3 Cr.
An introduction to assembly lanuage and reverse engineering, including relationship among machine language, assemblers, disassemblers, compilers, and interpreters. This courses provides requisite skills for computer forensics, malware analysis, and cryptology. Prerequisites: 'C' or higher in IS 131 or CS 140.

CS 221 GUI Programming 3 Cr.
A study of the design and implementation of the graphical user interface. The course will present fundamentals of usability and human factors in GUI design. One or more of the following will be studied and implemented in a student project: Visual Basic programming, Web programming, GUI code generators. Prerequisite: IS 131.

CS 228 Introduction to Data Structures 3 Cr.
An introduction to the basic concepts of algorithm analysis, data representation, and the techniques used to operate on the data. Topics include searching, sorting, linked lists, stacks, queues, trees, hash tables, graphs, Prerequisite: C or higher in IS 131 or CS 140.

CS 240 Database Management 3 Cr.
A study of the concepts and structures necessary to design and implement a database management system. Various data models will be examined and related to specific examples of database management systems including Structured Query Language (SQL). Techniques of system design, system implementation, data security, performance, and usability will be examined. Prerequisite: C or higher in IS 131 or CS 140.

CS 250 Virtual Systems Administration 3 Cr.
This course includes a combination of classroom lecture on network and virtualization theory as well as a variety of hands on exercises to provide students with an understanding of how to configure and manage a VMware ESX environment. Students will also learn how to carry out administration tasks specific to the day-to-day operations of the NUCAC-DF. Some of these tasks will include how to build and maintain classroom environments, understanding requirements given by professors and instructors for classrooms, and overall maintenance of the systems in the Center for Advanced Computing and Digital Forensics. Pre-Requisite: by instructor permission.

CS 260 Data Communications and Networks 3 Cr.
An introductory study in fundamental concepts of computer networks and data communication including a survey of major protocols, standards, and architectures. Students use concepts and terminology of data communications effectively in describing how software applications and network services communicate with one another. Students read and analyze network traces to monitor communications, diagnose issues, and evaluate protocols. Prerequisite: C or higher in IS 131 or CS 140.

CS 270 Operating Systems & Parallelism 3 Cr.
An introduction to the theory and structure of modern operating systems, including hardware abstraction, process management, memory management, system performance, and security. Specific attention to multi-threaded processing, semaphores, locking and interprocess communication. Prerequisites: C or higher in IS 131 or CS 140.

CS 300 Management Information Systems 3 Cr.
This course provides an overview of information systems, their role in organizations, and the relationship of information systems to the objectives and structure of an organization. Management of software projects, decision making with regard to systems development, and organizational roles with regard to information systems is also discussed. Not open to CS or CSIA students.

CS 301 Software Engineering 3 Cr.
An in-depth introduction to the software development life cycle, the techniques of information analysis, testing, and the logical specification of software. Particular attention to project management, documentation, and interpersonal communication. Utilizing industry-standard methods, the student progresses through the phases of specification, design, implementation, and testing of information systems. Object-oriented design techniques are used to design new logical and new physical systems for business-related problems. Prerequisite C” or higher in IS 131 or CS 140.

CS 330 Ethics in Computing and Technology 3 Cr.
The course examines ethical dilemmas resulting from current technological trends, as well as the ethical standards and creeds of a variety of organizations (e.g., Association for Computing Machinery). Students learn to evaluate case studies from an ethical perspective. Students are expected to conduct literature surveys, produce bibliographies, write literature reviews, and present oral summaries of research as well as offer critical evaluation of writings related to ethics and technology. This course meets the General Education Ethics requirement.

CS 406 Special Topics in Computer Science 3 Cr.
A study of topics chosen from areas of current interest that are not offered as part of the permanent curriculum. Topics are chosen by instructors on a semester-by semester basis. Students may take the course more than once, provided each semester taken covers a substantively different topic. Prerequisite: By permission of instructor.

CS 407 Politics of Cyberspace 3 Cr.
This course explores the interrelations of modern computing and communications technology with politics, power, news, privacy, crime, and creativity. The course assumes only a rudimentary familiarity with the basic concepts and terminology of modern Internet usage and computing and is not a technology-focused course. Prerequisite: Open to 2nd-semester sophomores or higher, or by instructor permission.

CS 410 Computing Internship 3 Cr.
Internships in computing and information technology provide computing majors with the opportunity to apply and expand their knowledge within the computing discipline. Students must be Junior standing, or higher and have good academic standing. The student must have the internship approved beforehand by a computing faculty member and have the written consent of the Chair or Director of Computing. In addition, a supervisor within the sponsoring organization must agree to provide a written description of the internship beforehand, and provide progress reports during and after the internship experience. Prerequisites: Good Academic Standing, Junior or higher status.

CS 420 Computer Science capstone I 3 Cr.
A two-semester course sequence normally taken in the Senior year. Based on the subject matter mastered during their previous coursework, students (individually or in a group) identify a current topic to study in depth. As part of their studies, they develop either a working software project or produce a substantial data or hardware artifact. This course represents the first semester of a students work towards such a project. Prerequisites: Junior standing or higher, Computer Science majors only.

CS 421 Computer Science capstone II 3 Cr.
As the second semester of the two-course capstone sequence, this course serves as a continuation of CS 420. Prerequisites: CS 420.

CS 430 Computer Science Undergraduate Thesis I 3 Cr.
The computer science undergraduate thesis is a two-semester course sequence normally taken in the Senior year. The course introduces students to the breadth of tasks involved in independent research, including library work, problem formulation, experimentation, and writing and speaking. Based on the subject matter mastered during previous coursework, students (individually or in a group) identify a current topic to study in depth. Students produce an original research paper. This course represents the first semester of a student's work towards such a project. Prerequisites: Junior standing or higher, Computer Science majors only.

CS 431 Computer Science Undergraduate Thesis II 3 Cr.
As the second semester of the two-course thesis sequence, this course serves as a continuation of CS 430. Prerequisite: CS 430.

Digital Forensics Courses

DF 242 Computer Forensics I 4 Cr.
This course provides the student with an ability to perform basic forensic techniques and use appropriate media analysis software. Knowledge of the security, structure and protocols of network operating systems and devices are covered as students learn to gather evidence in a networked environment and to image and restore evidence properly without destroying its value. Students learn and practice gaining evidence from a computer system while maintaining its integrity and a solid chain of custody. Within the laboratory, students gain hands-on experience in the use of current investigative tools. Classroom 3 hours, laboratory 2 hours. Cross-listed as CJ 442. Prerequisites: CJ 341 or IA 241 and a C or higher in IS 130 or CS 140.

DF 311 Network Forensics 3 Cr.
Introduces digital forensic concepts and practices on local area networks, wide area networks and large scale networks such as the Internet. Lectures include topics based on table of contents in (Davidoff and Ham 2012) such as investigative techniques, and how to conduct an investigation, manage evidence and follow a cyber-trail. A large part of the course involves demonstrations and hands-on labs, including: use of network forensic tools such as packet monitors, security information and event managers (SIEMs), tracers, and other tools useful for analyzing events. Many of the labs involve analysis of packet captures of both actual attacks and theoretical malfeasance by offenders. Students have a final lab exercise instead of a final exam and are expected to research and present a final project. Prerequisite: IS 460 or CS 260.

DF 312 Malware Forensics 3 Cr.
This predominantly laboratory-based course is an introduction to malware forensics including both static and dynamic analysis. Students study profiling, malware behavior, behavior of malware on computer networks, anti-reversing and anti-debugging techniques, and packers. Prerequisite: CS 212.

DF 395 Cyber Criminalistics 3 Cr.
This survey course uses lecture, case studies and hands-on lab exercises in digital investigation and cyber forensics to introduce students to the investigation and analysis of cybercrime and cyber criminals. Topics include: cybercrime typology, cyber-criminal profiling, network tracking, introduction to the tools of the cyber- criminalist, techniques of cybercrime scene assessment, digital evidence management and analyzing the forensic remnants of a cyber event. During the course of the laboratory exercises, students create a personal lab notebook recording their lab exercises and manage evidence including maintaining a proper chain of custody. Prerequisites: Open to CJ 2nd semester sophomores or higher, or by instructor permission.

DF 411 Cyber Investigation 3 Cr.
An introduction to cyber investigation, including elements of cybercrime, cyberwarfare and cyberterrorism. The course examines investigative techniques for cyber-investigators, case studies of representative cybercrimes and cyber warfare incidents, some cyber investigation tools and expert witnessing. The course builds up to a mock trial where students act as a cyber-investigation task force on an actual case of cybercrime. This is a course that incorporates extensive reading as well as hands-on lab exercises. Prerequisites: Open to CS or CSIA 2nd-semester sophomores or higher, or by instructor permission.

DF 423 Advanced Digital Forensics 3 Cr.
This course Expands upon concepts learned throughout the digital forensics concentration in the BSCSIA major. It is based upon the Certified Cyber Forensic Professional (CCFP) certification review class and covers the six domains (Ethics and Law, Forensic Science, Investigation, Digital Forensics, Application forensics and Hybrid and Emerging Technologies). Students completing this class successfully are prepared to take the CCFP certification exam and, if they pass, are qualified to become certified either as CCFPs or (ISC) Associates until they achieve three years of field experience. Prerequisite: DF 242, DF 311, DF 411 or permission of instructor.

Information Assurance Courses

IA 241 Cyberlaw and Cybercrime 3 Cr.
This course includes extensive discussion of the legal constraints, both civil and criminal, that underlie acceptable behavior using computers and networks today. Cross-listed as CJ341. Prerequisite: CJ 101 or instructor permission.

IA 340 Introduction to Information Assurance 3 Cr.
This course introduces the foundations of information assurance, with focus on concepts and terminology used in describing, analyzing, and implementing information security. Topics include the history and mission of information assurance, history of computer crime, modern and historical cryptology, information warfare, penetrating computer systems and networks, malware, social engineering, spam, phishing, physical and facilities security, network security, identification and authentication, securing stored data, data backups and archives, patch management, and protecting digital rights. 3 hours; laboratory 2 hours. Prerequisite: C or higher in IS 131 or CS 140 or permission of instructor.

IA 342 Management of Information Assurance 3 Cr.
This course focuses on management of the information assurance process. Topics include human factors in reducing security breaches, security incident detection and response, remediation, management's role in information assurance, and other considerations in framing and implementing information assurance policies. The final section reviews current topics of particular interest and activity in the field of information assurance. Prerequisite: IS 340 or IA 340 or permission of instructor.

IA 360 Network Security 3 Cr.
This course focuses on the concepts, terminology and practice of network security. Topics include the fundamental goals of network security and practical applications of wired and wireless network security techniques such as applications of cryptology in network protocols, authentication, access control, network security devices such as firewalls and intrusion detection and prevention systems, incident response, log analysis, honeypots and honeynets. Classroom 3 hours, laboratory 2 hours. Prerequisite: IS 460 or CS 260.

IA 455 Contemporary Issues in Information Assurance 3 Cr.
A capstone seminar for Computer Security and Information Assurance majors which will vary every term in accordance with the current issues of the time. Students work with the instructor as they explore today's issues and trends in preparation of a thesis or project. Emphasis is placed on critical thinking, research and evaluation of current issues. A comprehensive computer security exam is included in this course. Prerequisites: IA 340, IA 342. Open to CSIA Junior 2 or higher, or by instructor permission.

IA 456 Cyber Defense Practicum 3 Cr.
This course provides practical application of the concepts learned over the course of the CSIA program. This is the technical capstone for the program and is a required course. The class is divided into three teams. Each team rotates through red (attack), blue (defend) and white (monitor/analyze) cells over the semester. Network attack analysis, intrusion detection systems and the use of network forensics in attaché analysis and defense are covered. Several open source and commercial tools during the class are used. Scenarios on a variation of the virtual network are ran. Blue teams harden the devices on the network to resist attack and are scored on how successful they are. Red teams develop a suite of attacks that allow completion of the scenario and are scored on the completeness of attack preparations. White teams analyze the read attacks and the blue responses and present analysis to the class at the close of the exercise. The scenario changes slightly for the iterations presented. This is a100% lab class. Prerequisites: IS 340 or IA 340 and IS 460 or CS 260.

Management and Marketing Courses

MG 098 Junior Career Conference 1 Cr.
This third year seminar focuses on evolving career decisions for Business & Management majors. Guest faculty are drawn from University Board of faculty members and associates with extensive real-world business acumen. Students will experience developing skills to prepare for entering the global workplace in their chosen fields and professions. 1 lecture hour.

MG 099 Senior Career Conference 1 Cr.
This fourth year seminar focuses on evolving career decisions for Business & Management majors. Guest faculty are drawn from University Board of faculty members and associates with extensive real-world business acumen. Students will hone and finalize skills to prepare for entering the global workplace in their chosen fields and professions. 1 lecture hour.

MG 101 Introduction to Business 3 Cr.
The purpose of this course is to introduce the student to the world of business. Students will learn about business organization and ownership and will survey union management relations, marketing, accounting, finance, international business, the legal environment, and the stock market. The course is designed to explore the relationship between social responsibility and profits in our free enterprise system. Prerequisite: permission of instructor required for upperclassmen.

MG 1XX Management Transfer Elective 3 Cr.

MG 224 Principles of Entrepreneurship 3 Cr.
This course provides an introduction to the creative and innovative managerial practices of successful entrepreneurship. This course reviews the significant economic and social contributions entrepreneurs provide to society, the intense lifestyle commitment, and the skills necessary for entrepreneurial success. This course provides an overview of the entrepreneurial process. Prerequisites: not open to freshmen students.

MG 299 Topics: 4 Cr.

MG 2XX Management Transfer Elective 3 Cr.

MG 305 Introduction to Sports Management 3 Cr.
This course will provide an overview of the sports industry from the perspective of variety of stakeholders in the industry. It covers the major business disciplines of management, marketing, finance, operations, information technology, accounting, communications, ethics and law. 3 lecture hours.

MG 309 Management of Organizations 3 Cr.
A study of the functions of modern management: planning, organization, staffing, leading, and controlling. This study is applicable to the management of military, government, educational and non-profit, as well as business organizations. The ethical and social responsibilities of management and contemporary challenges such as the internationalization of organizations are integrated in all aspects of this course. Prerequisites: junior or senior standing or permission of instructor.

MG 310 Production/Operations Management 3 Cr.
Principles and applied study of the operation of manufacturing and service organizations. Managerial tools and diagnostics, decision-making, and financial management are introduced. Problems of small, medium, and large-sized businesses are studied. Prerequisites: QM 213.

MG 314 Marketing Management 3 Cr.
This course immerses the student in the strategies and processes of marketing management - market analysis, segmentation, targeting and positioning, and the implementation and evaluation of marketing plans. When the student has completed this course they will understand how a marketing plan is developed and have the skills necessary to identify, analyze and solve marketing problems. Prerequisite: EC 202 or permission of instructor. 3 lecture hours.

MG 319 International Dimensions of Business 3 Cr.
This course is designed to familiarize the student with the basic concepts and terminology of international business, and to gain an appreciation of the differences in social, political, and economic conditions among nations and how these affect the conduct of business and trade between nations. Topics include comparative cultural, political, and economic environments, international trade theory and policy, foreign exchange and exchange rate determination, the dynamics of international business-government relationships, and corporate policy and strategy of the multinational firm. Prerequisite: EC 201 or EC 202.

MG 341 Business Law I 3 Cr.
A study of the law and legal system as they affect business. Topics include the court system, constitutional law, torts, criminal law and contracts. Students will learn how morality and social responsibility are integrated into our legal system. Students must complete an ethical standards paper in an appropriate context. Prerequisite: Sophomore 1 or higher. ".

MG 346 Business Law II 3 Cr.
A continuation of the analysis of the legal dimension of business operations that was developed in Business Law I. Special emphasis will be given to the legal environment as it relates to the accounting student's professional certification. Topics include bankruptcy, commercial paper, secured transactions, agency, corporations, and partnerships. Prerequisite: MG 341 or permission of instructor.

MG 351 Organizational Behavior 3 Cr.
This course considers the individual, the nature of organizations, and the issues resulting from the dynamic relationship of people in organizations. The course addresses such topics as learning, personality, motivation, organization structure, leadership, ethics, communication, and change.

MG 360 Health Economics & Policy 3 Cr.
This course introduces students to principles of health economics and public policy in health and social welfare. Topics include support for public health, policy intervention in health determinants, the relationship between government regulation and market competition, the demand for healthcare, and the supply of services. This course will enable students to apply economic reasoning to the health-care challenges facing society. Prerequisite: One semester of college level mathematics or QM 213.

MG 399 Topics 3 Cr.

MG 3XX Management Transfer Elective 3 Cr.

MG 408 Human Resources Management 3 Cr.
The management of human resources is one of the most challenging and critical aspects of contemporary organizational functions. This course addresses such issues as the nature of the American labor force, equal employment opportunity, personnel planning and staffing, compensation, employee well-being and job security, and collective bargaining. In addressing these issues attention is given to the ethical, legal, and moral questions involved. Prerequisite: MG 309 or permission of instructor.

MG 409 Organizational Leadership 3 Cr.
This course prepares students to apply leadership principles to the roles they play as managers. Students will discover more about themselves and learn more about the connection between the individual and the organization. Other topics include organizational culture, structure, group behavior, motivation, power, politics, organizational change, and workplace conflict.

MG 411 Consumer Behavior 3 Cr.
This course is designed to help the student understand the concepts of consumer behavior that provides the basis for marketing strategies. Students will gain an understanding of how consumers make decisions regarding the purchase and use of products and services and the internal and external factors that influence this process. Prerequisite: MG 314.

MG 416 Advanced Marketing 3 Cr.
In this course students will examine the key concepts and issues in developing a marketing strategy from the perspective of the corporate and SBU decision-maker. The course will take students through the process for formulating marketing strategies under various market conditions, for developing strategic and tactical marketing action plans, and how to evaluate and control a marketing plan and budget. Students undertaking this course will be required to use knowledge gained from previous marketing subjects in completing course assignments. Prerequisite: MG 314.

MG 426 Marketing Research 3 Cr.
This course explores the process and tools for data collection and analysis used to solve marketing problems. In addition, the subject addresses when marketing research is appropriate and how to define the research problem, as well as the role of marketing research in marketing decision making. This course will provide students with practical experience in the use of computer based data analysis techniques and make students aware of the biases and limitations inherent in various research methodologies. Prerequisites: QM 213, MG 314.

MG 429 Seminar in Advanced Management I 3 Cr.
A topics course addressing managerial problems in various environments. Prerequisites: MG 309, MG 310, FN 311, and MG 314.

MG 441 Integrated Marketing Communications 3 Cr.
This course will provide students with the necessary knowledge and skills to develop appropriate communication strategies consistent with strategic marketing principles. The role of communications in the client organization's marketing plan is emphasized. The concept of Integrated Marketing Communication (IMC) for coordinating the individual communication elements of advertising, direct marketing and public relations to achieve specific marketing objectives is stressed. Prerequisite MG 314. 3 lecture hours.

MG 448 Small Business Strategies 3 Cr.
A course that integrates the functional areas of management-human resources, finance, marketing, and operations they uniquely affect the small business enterprise. Case studies and lectures develop the student?s problem solving abilities. Prerequisites: MG 309, MG 310, FN 311, and MG 314.

MG 449 Administrative Policy and Strategy 3 Cr.
A capstone course designed to integrate the students' undergraduate studies. Case studies, collaborative assignments, writing assignments and oral presentations provide opportunities to synthesize and apply the knowledge gained from courses in the management program. A comprehensive Division examination is included in this course. Prerequisites: MG 309, MG 310, FN 311, and MG 314.

MG 450 Internship in Management 3 Cr.
The internship program is designed for students who want to apply their studies by working with a business, industry, or public agency. The student will be required to work closely with a faculty supervisor to develop and implement a structured experience tailored to the career goals of the student. Prerequisites: senior standing and written consent of the department chair and internship committee. Normally only available during the summer.

MG 4XX Management Transfer Elective 3 Cr.