

## Computer Security & Information Assurance

Professor Kabay; Associate Professors Blythe and Stephenson; Assistant Professor Hansen; Lecturers Almagambetov and Bovee; Adjunct Instructor Rowley.

### Center of Academic Excellence in Information Assurance Education

Since 2001, Norwich University has been designated a Center of Academic Excellence in Information Assurance Education by the National Security Agency of the United States of America. This designation is in recognition of Norwich's significant contribution in meeting the national demand for information assurance education, developing a growing number of professionals with information assurance expertise and ultimately contributing to the protection of the national information infrastructure. Norwich University has met the criteria for measuring the depth and maturity of established programs in the field of information assurance.

This degree requires a base of study in the Liberal Arts, Mathematics, the sciences, Information Systems, and Computer Programming fundamentals. It also provides flexibility for specialized study in such fields as computer forensics, information warfare, and advanced information security.

The Information Assurance program focuses on enabling our graduates to analyze requirements for 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. Our students will integrate knowledge from other disciplines within the school: economics, management, computer information systems and computer science, to enter into organizations with both a functional and enterprise perspective.

Graduates will be prepared to participate with computer security professionals in industry, government, military and academic environments. They will have developed a thorough commitment to a multidisciplinary perspective, fully aware at all times that technology must be integrated with human factors for success in defending information resources. They will be ready for the next phase of their continuing and perpetual education in a constantly changing field.

The academic goal for a graduate is to address the evolving nature of the social fabric of this country as it becomes more technologically driven. The program will pay special attention to individual privacy rights and how privacy rights are affected by the increasingly interconnected banks of information about individuals. As global business continues to develop, graduates will be provided with differing perspectives on information security and with a set of ethical decision-making principles for deciding how best to implement computer security in various environments.

During the spring semester of their sophomore year, CSIA majors will be required to select a concentration. CSIA majors will have the option to choose from one of three concentrations:

- Forensics;
- Information Warfare; or
- Advanced Information Security.

Graduates will have entry-level ability to participate in information systems security assurance planning, procedures and practices. At a minimum, graduates will be expected to meet the standards as established by the National Security Telecommunications and Information Systems Security Committee (NSTISSC) for Information Systems Security Professionals.

### B.S. Computer Security & Information Assurance - Curriculum Map

<b>First Year</b>			
<b>Fall</b>	<b>Credits</b>	<b>Spring</b>	<b>Credits</b>
EN 101 Composition and Literature I	3	IS 131 Computer Programming	3
IS 130 Introduction to Computing	3	General Education-Lab Science Elective 1	4
IS 100 Foundations of CSIA	3	General Education-History Elective	3
MA 107 Precalculus Mathematics	4	EN 102 Composition and Literature II	3
		General Education-Arts & Humanities Elective	3
	<b>13</b>		<b>16</b>
<b>Second Year</b>			
<b>Fall</b>	<b>Credits</b>	<b>Spring</b>	<b>Credits</b>
PY 211 Introduction to Psychology	3	IS 240 Database Management	3
MG 341 Business Law I	3	IS 260 Data Communications and Network	3
CJ 341 Cyber Law and Cyber Crime	3	MA 318 Cryptology	3
IS 228 Introduction to Data Structures	3	MG 346 Business Law II	3
MA 240 Introduction to Number Theory and Cryptology	3	QM 213 Business and Economic Statistics I	3
	<b>15</b>		<b>15</b>

Third Year			
Fall	Credits	Spring	Credits
IS 340 Information Systems Security Assurance I	3	IS 302 Software Engineering II	3
MG 309 Management of Organizations	3	MG 351 Organizational Behavior	3
EN 112 Public Speaking	3	Major/Concentration Elective	3
IS 301 Software Engineering I	3	IS 342 Management of Information Assurance	3
Major/Concentration Elective	3	EN 204 Professional and Technical Writing	3
	<b>15</b>		<b>15</b>
Fourth Year			
Fall	Credits	Spring	Credits
IS 455 Contemporary Issues in Computer Science	3	EC 201 Principles of Economics (Macro)	3
Major/Concentration Elective	3	IS456	3
Major/Concentration Elective	3	Major/Concentration Elective	3
General Education-Lab Science Elective 2	4	Major/Concentration Elective	3
Elective Course	3	General Education-Literature Elective	3
	<b>16</b>		<b>15</b>
Total Credits: 120			

## Computer Security & Information Assurance Concentrations

### Forensics Concentration

CJ 421	Comparative Criminal Justice Systems	3
IS 311	Network Forensics	3
IS 312	Malware Forensics	3
IS 411	Cyber Investigation	3

### Major/Concentration Electives - Choose two of the following

EE 325	Computer Architecture and Operating Systems	3
IS 300	Management Information Systems	3
IS 330	Ethics in Computing & Technology	3
IS 370	Introduction to Information Warfare	3
IS 380	Offensive Information Operations	3
IS 406	Special Topics in Computer Science	3
IS 407	Politics of Cyberspace	3
IS 410	Computing Internship	3
IS 440	Software Engineering III	3
PO 333	American Foreign Policy	3
PY 234	Forensic Psychology	3

### Advanced Information Security Concentration

CJ 442		4
EE 325	Computer Architecture and Operating Systems	3
IS 440	Software Engineering III	3

### Major/Concentration Electives - Choose two of the following

IS 300	Management Information Systems	3
IS 311	Network Forensics	3
IS 312	Malware Forensics	3
IS 330	Ethics in Computing & Technology	3
IS 370	Introduction to Information Warfare	3

IS 380	Offensive Information Operations	3
IS 406	Special Topics in Computer Science	3
IS 407	Politics of Cyberspace	3
IS 410	Computing Internship	3
IS 411	Cyber Investigation	3
PY 234	Forensic Psychology	3

## Courses

### IS 100 Foundations of CSIA 3 Credits

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. No prerequisites. Permission is required for non-computer science and non-information assurance majors to enroll in this course. (3 credits).

### IS 120 Business Applications & Problem Solving Techniques 3 Credits

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, presentation tools and website design 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.

**IS 121 Introduction to Computer Programming 3 Credits**

An introduction to computer programming in a high-level language. This course combines the mechanics of learning a first computer language with the fundamental stylistic elements of general problem solving. Emphasis on the creation of basic gram structures, modular design, and logical flow of control is reinforced by writing programs both in and out of the classroom. Prerequisite: IS 120 or permission of instructor.

**IS 130 Introduction to Computing 3 Credits**

A breadth-first introduction to the discipline of computing. This course provides a broad survey of the sub-disciplines within computer science and information systems culminating in the exploration fo programming fundamentals. Topics include: hardware survey, software survey, software engineering strategies, algorithmic design, ethics in computing, societal impact of computing, history and theory of computing, and an introduction to information systems and their application, and introductory programming. Throughout the course, responsible computer, academic, and professional ethics in an information-based society will be stressed.

**IS 131 Computer Programming 3 Credits**

Application of fundamental programming concepts using a high level language. The course will emphasize object-oriented design and implementation techniques. Good software engineering practice will be introduced by means of programming projects that illustrate the importance of software quality attributes. Prerequisite: IS 130.

**IS 221 G.U.I. Programming 3 Credits**

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.

**IS 228 Introduction to Data Structures 3 Credits**

An introduction to the basic concepts of data and the techniques used to operate on the data. Topics will include the file handling, searching, sorting, multi linked structures, trees, and graph presentations. Prerequisite: IS 131.

**IS 240 Database Management 3 Credits**

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. Techniques of system design, system implementation, data integrity, and file security will be examined. Prerequisite: IS 228.

**IS 260 Data Communications and Network 3 Credits****IS 300 Management Information Systems 3 Credits**

This course will provide 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 will also be discussed. 3 lecture hours.

**IS 301 Software Engineering I 3 Credits**

An in-depth initiation to the system development life cycle, the techniques of information analysis, and the logical specification of the system. Documentation and communication aids are introduced as well as interpersonal approaches and techniques used in analysis. Prerequisite: IS 240.

**IS 302 Software Engineering II 3 Credits**

Utilizing techniques, the student will progress 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. Both technological and managerial aspects of system design and implementation are considered. Students will learn the importance of and design of security systems such as firewalls and passwords. Prerequisite: IS 301.

**IS 311 Network Forensics 3 Credits****IS 330 Ethics in Computing & Technology 3 Credits**

The course is designed to expose students to some of the ethical dilemmas posed to our culture as a result of the current technological trends. Students will study various ethical standards and creeds offered through a variety of organizations (e.g., ACM) Students will learn to evaluate case studies from an ethical perspective. Students will be 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 fulfills General Education Requirement #6: The ability to think critically and make ethical decisions. Prerequisite: one semester of college mathematics.

**IS 340 Information Systems Security Assurance I 3 Credits**

This course provides an overview of design considerations involved with the security of site design. The course will also provide and understanding of the Levels of Trust and system accreditation/certificate processes. Life cycle management of software, hardware, and physical plant, from planning through destruction will be examined and reinforced using case studies. Additionally understanding of the variety of security systems involving computers and networks and an ability to evaluate vulnerabilities will be discussed.

**IS 342 Management of Information Assurance 3 Credits**

This course continues the study of information assurance begun in IS 340. The focus is 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.

**IS 353 Business Programming Languages 3 Credits**

A study of programming languages commonly used in business applications. A working knowledge and appreciation of the power of several business languages are obtained through programming assignments based on business-related subjects such as payroll, mailing lists, and sorting. Prerequisite: IS 228.

**IS 370 Introduction to Information Warfare 3 Credits**

This course introduces students to the overall concept of Information Warfare (IW) and Information Operations (IO), particularly with regard to the US Federal government and the Department of Defense. Introduction to IW / IO surveys the development of Information Warfare (IW) and Information Operations (IO) as these elements of power have become more important for the United States Department of Defense (DoD) and Federal Government as a whole. 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. Prerequisites: None. Open to third and fourth year students or by permission of instructor. 3 lecture hours.

**IS 380 Offensive Information Operations 3 Credits**

This course introduces students to the overall concept of Offensive Information Operations (O-IO), which are conducted across the range of military operations at every level of war to achieve mission objectives. Combatant commanders must carefully consider the potential of IO to deter, forestall, or resolve crises. 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. Prerequisites: IS 370 Introduction to IW/IO. Open to third and fourth year students or by permission of the instructor. 3 lecture hours.

**IS 399 Test Course 3 Credits**

**IS 406 Special Topics in Computer Science 3 Credits**

A study of topics chosen from areas of current interest that are not offered as part of the permanent curriculum. This course may be taken for credit more than once.

**IS 407 Politics of Cyberspace 3 Credits**

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. Open only to juniors and seniors. 3 lecture hours.

**IS 410 Computing Internship 3 Credits**

Internships within CS/CIS are designed to provide computing majors with the opportunity to apply and expand their knowledge within the computing discipline. The student must be a junior or senior at the time of enrollment and have good academic standing. The student must have the internship approved beforehand by a faculty member in CS/CIS and have the written consent of the CS/CIS Program Coordinator. 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.

**IS 411 Cyber Investigation 3 Credits**

This course is an introduction to cyber investigation. It includes elements of cyber crime, cyber warfare and cyber terrorism. The course will examine investigative techniques for cyber investigators, case studies of representative cyber crimes 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 cyber crime. This is a course that incorporates extensive reading as well as hands-on lab exercises. No prerequisites. Open to third and fourth year students or by permission of the instructor. 3 lecture hours.

**IS 440 Software Engineering III 3 Credits**

An advanced course in the field of Software Engineering. Students will refine their use of the methods and procedures of software development from conception of an idea through its implementation and beyond. A variety of software process models will be studied. The course will seek to balance theoretical foundations with practical application. A team project will be assigned to allow for the application of software engineering techniques. The course will investigate methodologies and research with the purpose of improving personal and organizational quality and productivity. Classroom 3 hours. Prerequisites: IS 302 or permission of the Instructor.

**IS 455 Contemporary Issues in Computer Science 3 Credits**

A capstone seminar which will vary every term in accordance with the current issues of the time. Students are to work with the instructor as they explore today's issues and trends in preparation of a thesis or project. Emphasis will be placed on critical thinking, research and evaluation of current issues. A comprehensive computer exam is included in this course. Each student will be required to prepare a paper outlining ethical standards based on the student's life experiences. Prerequisites: IS 302, or permission of the instructor.

**IS 460 Data Communications and Networks 3 Credits**

An introductory study in fundamental concepts of computer networks and data communication including a survey of major protocols, standards, and architectures. Students will implement simple data communication protocols in the laboratory. Prerequisite: IS 228.