

## **INFORMATION RESOURCE MANAGEMENT (GIR)/ ENTERPRISE SYSTEMS INTEGRATION (ESI)**

### **Purpose**

The Graduate School of Engineering and Management, Department of Systems and Engineering Management, offers the Master of Science in Information Resource Management (IRM) with options for a concentration of study in strategic information management, information assurance, and/or computer networks. This program is designed to provide students with the knowledge and skills needed to oversee both the information management and information systems needs of Air Force, DoD, and allied military organizations in future assignments as middle and upper-level managers. The program is designed primarily to reflect the needs of the officer and enlisted members of the Air Force communications and information officer career field; however, it is currently open to members of other career fields as well. In order to address the requirements associated with the growing importance of “information” as a critical resource for all career fields, the program continues to expand as necessary to serve a new customer base. Overall, the IRM program provides students with a broad perspective of DoD information-related issues, including information strategy, information architectures, information security, information ethics, information system design/development/acquisition and related business process support, and the individual and organizational implications of rapidly evolving information technology. During recent years, the program has also expanded to examine knowledge, in addition to information, as a critical organization resource. Knowledge, which is supported by information, is that which resides in the heads of the organizational decision makers. Ultimately, the need to better support decision making is the impetus for capturing, storing, and disseminating organizational information and knowledge. The focus of the program is on improving the student’s understanding of, and the ability to manage information/knowledge in today’s dynamic information technology and global environment.

Program graduates are well-grounded in coursework related to follow-on assignments within the communications and information and other career fields, as well as other assignments in support of information resource management requirements at the base, MAJCOM, and higher levels. The output advanced academic degree (AAD) codes are 1AUY and 0IYY.

## **Objectives**

All graduates of the IRM program should be able to:

- Use effective oral and written communications.
- Understand and apply concepts and techniques of descriptive and inferential statistics to analyze problems under conditions of risk and uncertainty.
- Understand and apply the concepts, methods, and tools related to planning, directing, and controlling resources (financial, human, information/knowledge) in an information resource management context.
- Understand how to take advantage of information and knowledge as a resource to improve organizational effectiveness, efficiency, and ultimately competitive advantage.
- Know how information technology affects information and knowledge as a resource and how it may modify existing organizational structure, strategy and processes.
- Know how to examine processes from beginning to end by employing innovative technologies, organizational resources, and strategies for improvement.
- Conduct strategic information planning to link the management of information, knowledge, information architectures, information technology, and systems to an organization's strategic business goals.
- Conduct and present methodical research to solve problems and support decisions.

## **Admission Standards and Procedures**

The general requirements for admission to the Information Resource Management Master of Science program in the Department of Systems and Engineering Management are:

- Baccalaureate degree or equivalent
- Cumulative undergraduate grade point average of at least 3.0 on a 4.0 scale
- Graduate Record Examination (GRE) score of 1100 with a minimum of 500 in each of math and verbal, or Graduate Management Admissions Test (GMAT) score of 550
- Mathematics through college algebra with a grade of C or higher.

Students in the Wright-Patterson area who do not meet these criteria may register for individual courses as a part-time student (space available) but are expected to meet the above criteria prior to being granted candidacy for the degree. For prospective students, waivers to the criteria and/or approvals for an extended program (beyond the 18-month program to include undergrad preparatory work) may be granted (on an individual basis) by the Department of Systems and Engineering Management. Admission procedures are specified in the AFIT home page <http://www.afit.edu/en/admissions>.

### **Curriculum Description**

The IRM program encompasses six academic quarters and a short term (18 total months) for DoD-sponsored, full-time students. The short term provides an orientation to the IRM program, an introduction to the curriculum options, and a review of basic writing and mathematics skills.

The minimum curriculum satisfying the degree requirements consists of 6 **IRM core courses**, 1 **research methods** course, 2 **statistics courses**, 1 **management core course**, and 12 hours of **thesis research**.

The **IRM core courses** provide a thorough grounding in the concepts of information resource/systems management. The IRM core courses include:

IMGT 530	Conceptual Foundations of Information Resource Management
IMGT 580	Enterprise Information Architecture
IMGT 561	Database Management
IMGT 651	Systems Analysis and Design
IMGT 657	Data Communications
IMGT 690	Capstone Seminar in Information Resource Management

The **research methods** and **statistics courses** provide depth of study on techniques for accomplishing academic research. Both quantitative and qualitative research methods are covered in these courses.

RSCH 630	Research Methods
STAT 525	Applied Statistics for Managers I
STAT 535	Applied Statistics for Managers II

The **management core course** provides important knowledge in areas that are fundamental to the study of information resource management. The management core course and research methods include:

ORSC 542	Management and Behavior in Organizations
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The **thesis research**, which must address a problem in an information resource management or closely-related area, provides the student an opportunity to draw on the concepts of the IRM coursework and to demonstrate a mastery of research methodology in pursuit of a research question. Typically, thesis topics are provided by DoD/USAF agencies interested in sponsoring student research in areas of practical concern. Specific elective courses may be required by the thesis advisor to adequately prepare for the required thesis research. Additionally, in accordance

with customer guidance, quota students are highly recommended to take OPER 501, Quantitative Decision Making, if their academic schedule allows.

In addition to degree requirements, all quota students are expected to complete an average of 12 credit hours of study per quarter over the six quarters in residence for a minimum total of 72 credit hours. Quota students must choose a 3 to 4-course concentration from alternatives established by the IRM faculty and presented below in section 5.5.6. Generally, IRM students can select any of the concentration sequences. IRM students with more advanced math backgrounds may be more qualified for the technically-oriented computer networks sequences, however, this can be discussed with a faculty advisor and decided on a case-by-case basis. Students may also elect to combine two different concentrations; for the most part, the class schedules are generally established in such a way as to support this dual concentration option. Each concentration sequence will present a unified direction and purpose and will build depth in a specific academic area related to the student's academic interests. Elective courses and additional coursework are offered and are designed to broaden the student's horizons and/or provide more in-depth knowledge in a specific area of interest.

**Course Sequence**

**INFORMATION RESOURCE/SYSTEMS MANAGEMENT CLASS 10M**

(Suggested six quarter program for the full-time student)

**FALL 10**

STAT 525	Applied Statistics for Managers I	4
IMGT 530	Conceptual Foundations of Information Resource Management	3
IMGT 657	Data Communications	4
ORSC 542	Management and Behavior in Orgs.	4
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		15

**WINTER 11**

STAT 535	Applied Statistics for Managers II	4
IMGT 651	Systems Analysis and Design	4
XXXX nnn	Elective <sup>1</sup>	3-4
XXXX nnn	Concentration Sequence 1 <sup>1</sup>	3-4
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		14-16

**SPRING 11**

RSCH 630	Research Methods	3
IMGT 561	Database Management	4
XXXX nnn	Elective <sup>1</sup>	3-4
XXXX nnn	Concentration Sequence 2 <sup>1</sup>	3-4
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		13-15

**SUMMER 11**

IMGT 799	Thesis Research	4
IMGT 580	Enterprise Architecture	4
XXXX nnn	Concentration Sequence 3 <sup>1</sup>	3-4
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### FALL 11

IMGT 799	Thesis Research	4
XXXX nm	Elective <sup>1</sup>	3-4
OPER 501 <sup>2</sup>	Quantitative Decision Making	3
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		11-12

### WINTER 12

IMGT 799	Thesis Research	4
IMGT 690	Capstone Seminar in IRM	3
XXXX nm	Elective <sup>1</sup>	3-4
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		10-11

**Total Units** (72 Minimum for full-time quota student) 74-81

<sup>1</sup> Not part of degree requirements. Choose appropriate type and number of electives based on focus sequence.

<sup>2</sup> Not part of degree requirements, but highly suggested by program faculty.

### **Concentration Sequences within the Curriculum**

#### **Information Assurance Sequence (NSA 4012 Certification)**

IMGT 687	Managerial Aspects of Information Warfare	(Fall)
IMGT 684	Strategic Information Management	(Winter)
IMGT 688	Security and Ethics in the Information Age	(Summer)

The information assurance (IA) concentration provides students with an understanding of contemporary information security issues and prepares them for leadership roles within the information assurance/security realm. All students successfully completing IRM core and three courses (with a B or better in each course) will receive the National Security Agency endorsed CNSSI No 4012 certificate which is the national information assurance training standard for Senior Systems Managers of national security systems. Further, the curriculum will help prepare the students for earning certification as a Certified Information Security Manager (CISM) and/or a Certified Information Security Professional (CISSP) as required for all DOD IA professional by DOD Directive 8570.

The IA concentration educates students on a broad spectrum of technical and managerial security issues related to information assurance, information operations, information security, and information warfare. Students learn the process of managing organizational security by examining the vulnerabilities and threats to which an organization's information assets may be exposed; understand the interrelationships among mission, information assets, and infrastructure vulnerabilities; understanding and applying concepts and techniques of risk management to selecting control measures to protect information assets at a level commensurate with their value; and by a historical analysis of information security successes and failures.

Students taking the Information Assurance sequence often accomplish their thesis research in this area as well (however, this is not mandatory). Electives provide students with

opportunities for exploration of related topics to the IA field. Topic areas such as security, ethics, and leadership offer students key insight into specific subsets of IA. The IA concentration complements the IRM and management core courses by building on concepts derived from research and successful practices.

### **Suggested Electives Related to the *Information Assurance Sequence***

- IMGT 680 Knowledge Management
- ORSC 638 Seminar in Leadership Theory
- ORSC 647 Organizational Policy and Strategic Management
- \*CSCE 525 Intro to Information Warfare
- \*CSCE 625 Info Sys Security, Assurance and Analysis I
- \*CSCE 725 Info Sys Security, Assurance and Analysis II
- \*EENG 571 Satellite Communications
- \*EENG 651 Command, Control, Communications, and Computer (C4) Systems
- \*\*SENG 530 Introduction to Space Programs & Operation

\* These courses are offered through the Dept. of Electrical and Computer Engineering (ENG)

\*\* This course is offered through the Dept. of Aeronautics and Astronautics (ENY)

### **Strategic Information Management Sequence**

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|----------|----------------------------------|-------------------|
| IMGT 684 | Strategic Information Management | ( <i>Winter</i> ) |
| IMGT 680 | Knowledge Management             | ( <i>Spring</i> ) |
| IMGT 669 | Business Process Improvement     | ( <i>Summer</i> ) |

Information resource management has become a fundamental concept in modern-day management thinking. Many organizations, both public and private, now understand that information and knowledge are resources critical to their survival and success. As such, they have created mechanisms for the strategic management of their information and knowledge. The Strategic Information Management sequence provides an understanding of the major mechanisms organizations have to improve their information efficiency, effectiveness, and competitive advantage.

Strategic Information Management, (IMGT 684) is the foundational course for this sequence. It explores the relationships between organizational strategies and goals and the use of strategic information management to help achieve those strategies and goals. In the second course of the sequence, students will receive exposure to a maturing element of IRM called knowledge management (IMGT 680). This course introduces students to the fundamental differences between data, information, and knowledge and explores how knowledge can be equated to the intellectual capital of organizations. This course concentrates on the people, process, and technology issues associated with organizational knowledge creation and management and identifies critical links to promoting and sustaining innovation in organizations. Students complete this concentration sequence with IMGT 669, a course in business process

improvement (BPI), where they learn the underlying theoretical and conceptual foundations of this critical management concept and how to apply it to meet organizational needs.

### **Suggested Electives Related to *Strategic Information Management Sequence***

- IMGT 687 Managerial Aspects of Information Warfare
- IMGT 688 Security and Ethics in the Information Age
- ORSC 638 Seminar in Leadership Theory
- ORSC 647 Organizational Policy and Strategic Management
- ORSC 652 Personnel Management
- \*CSCE 525 Introduction to Information Warfare
- \*CSCE 544 Data Security
- \*EENG 571 Satellite Communications
- \*EENG 651 Command, Control, Communications, and Computer (C4) Systems
- \*\*SENG 530 Introduction to Space Programs & Operation
- \* These courses are offered through the Dept. of Electrical and Computer Engineering (ENG)
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### **Computer Networks Sequence (NSA 4011 Certification)**

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|----------|--|-----------------|
| CSCE 625 | Info Sys Security, Assurance and Analysis I  | <i>(Spring)</i> |
| CSCE 654 | Computer Communication Networks              | <i>(Spring)</i> |
| CSCE 689 | Distributed Software Systems                 | <i>(Summer)</i> |
| CSCE 725 | Info Sys Security, Assurance and Analysis II | <i>(Summer)</i> |

This sequence of courses introduces students to the fundamental techniques and algorithms associated with the design and development of computer communication networks. A mixture of hardware and software techniques related to network design and analysis are presented. Design techniques presented in class are reinforced through simulation design projects. Students in this sequence will be required to take CSCE 544, Data Security, as a substitute for IMGT 657 Data Communications (IRM core course). All students successfully completing (B or better in each course) these five courses will receive a Certificate for Information Systems Security Professionals under the National Training Standard NSTISSI No. 4011 from the NSA.

Students begin the Computer Networks sequence with a comprehensive introduction to information warfare and information networks. This sequence provides a background in information security, theories of information warfare, psychological operations, and threats to information security, hacking, and virus awareness. Students also receive a thorough understanding of how computer networks and distributed systems influence the nature of decision making in a command and control (C2) environment.

Students taking the Computer Networks sequence often accomplish their thesis research in this area as well (however, this is not mandatory). Students selecting this sequence should

have a strong technical background with an undergraduate degree in computing desirable. If the student does not have the prerequisite courses for this sequence, several undergraduate courses must be completed prior to beginning the sequence. These prerequisites include: CSCE 431 – Fundamentals of Discrete Mathematics, CSCE 486 – Fundamentals of Data Structures and Program Design, CSCE 489 – Operating Systems, and CSCE 492 – Computer Systems Architecture. The IA curriculum complements the IRM and management core courses by adding technical depth.

### **Suggested Electives Related to the *Computer Networks Sequence***

- IMGT 680 Knowledge Management
- IMGT 687 Managerial Aspects of Information Warfare
- IMGT 688 Security and Ethics in the Information Age
- \*CSCE 525 Intro to Information Warfare
- \*CSCE 754 Advanced Topics in Computer Networks
- \*CSCE 554 Performance Analysis of Computer Systems and Networks
- \*CSCE 754 Advanced Topics in Computer Networks
- \*EENG 571 Satellite Communications
- \*EENG 651 Command, Control, Communications, and Computer (C4) Systems
- \*\*SENG 530 Introduction to Space Programs & Operation
- \* These courses are offered through the Dept. of Electrical and Computer Engineering (ENG)
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