



School of Informatics

ADVANCED CERTIFICATE PROGRAMS

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Education is not preparation for life; education is life itself.

-- John Dewey

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Rochester Institute of Technology

School of Informatics, Golisano College of Computing & Information Sciences

~ Graduate/Advanced Certificate Programs ~

Introduction

The departments in the School of Informatics in the B. Thomas Golisano College of Computing and Information Sciences at RIT offer a variety of advanced certificate programs designed for expeditious skill development:

Certificate Name	# Courses	# Credits	Availability	
			On-Campus	Distance
Department of Information Sciences & Technologies				
Interactive Multimedia Development	6	24	√	-
Department of Networking, Security & System Administration				
Networking Planning & Design	4	16	√	√
Information Assurance	4	16	√	√

Advanced certificate programs provide an opportunity for students to gain first-hand knowledge and hands-on experience in a specialized area of the information technology discipline. The programs can be completed in one to two academic years, depending upon the pace of study. To finish the program in one academic year, the student needs to have completed the prerequisite coursework, if any, before beginning the first quarter of study. Students may, however, take one course per quarter over a period of two years or longer.¹ Each certificate program is described in detail, at the end of this handbook.

These certificate programs are intended for part-time study; therefore, RIT cannot issue I-20 paperwork for study in these certificates. However, foreign students may study part-time at a distance. The majority of the courses included in these certificates may be used as part of a MS program: either the MS in Information Technology or the MS in Human-Computer Interaction or the MS in Medical Informatics offered by the department of Information Sciences & Technologies (IST); or the MS in Networking & System Administration or the MS in Computing Security & Information Assurance offered by the department of Networking, Security & Systems Administration (NSSA). The programs can be done concurrently with other graduate study.

Admission Requirements²

Applicants must have a bachelor’s or equivalent degree from an accredited U.S. university with a minimum cumulative grade-point average of 3.0 out of 4.0 or the equivalent of a first class degree from a recognized international educational institution.

Applicants are expected to have background in current computer programming practices or to complete the programming prerequisite prior to beginning study in a certificate.

¹ Please note that all graduate study at RIT must be completed in seven (7) years or less.

² RIT’s reporting number for ETS’s GRE and TOEFL examinations is 2760.

Applicants whose native language is other than English must demonstrate strong English language skills. A minimum score of at least 570 (paper-based), 230 (computer-based) or 88 (internet-based) on the TOEFL examination is required. Contact the RIT Office of Admissions at (585) 475-2229 for other methods to satisfy this English requirement.

If the applicant does not meet the minimum English requirement, it is strongly recommended that s/he study English to reach the minimum scores before applying to the certificate program. Applicants with exceptionally strong academic or employment records may be admitted conditionally. However an English evaluation is required for course placement and these applicants will be required to take a prescribed program of study in English along with a reduced course load in the program.

Application Deadlines

The application process typically takes four to six weeks after the Graduate Enrollment Services (GES) has received a complete application. However, students with addresses outside the United States may take longer due to slow physical mail systems.

The Graduate Coordinator evaluates applications after all of the application information has been submitted and verified by GES.

Students may be admitted at any time during the year. However, acceptance into the certificate program does not guarantee availability of classes since not all classes are offered every term. As the start of the quarter approaches, many of the classes become full. Students, who apply just before the start of a quarter, may need to wait until the following quarter before starting their course work.

Quarter	Typical Starting Date of Quarter	Domestic Application Deadline
Fall	~ September 3	August 1
Winter	~ December 1	November 1
Spring	~ March 7	February 1
Summer	~ June 1	May 1

All applicants are required to submit the following:

- An electronic or paper application with a well-written statement of purpose that discusses your background relative to and your personal goals for a given certificate program
- Application fee
- Valid transcripts from all universities listed on the application
- Two (2) recommendations from educational and/or professional sources

Course Scheduling

Nearly all of our on-campus classes are offered at least once a year in the evening; some are offered one night per week. The more popular courses are also offered during daytime hours. Consult the RIT website at <https://infocenter.rit.edu/>, under the Schedule of Courses link (Public section, center column), for the proposed annual course schedule.

Program Cost

See the RIT website at <http://finweb.rit.edu/sfs/billing/tuitionandfees/1112/> for this year's tuition costs.

Prerequisite Requirements

Prerequisites are discussed in the section for each certificate. Students can satisfy prerequisite(s) through undergraduate or graduate coursework at RIT, equivalent courses at another university, or through documented work experience. Prerequisite study must be completed with the equivalent of a 'B' grade (80%) or better. If you have studied programming at another university or community college, please have an official transcript sent to RIT.

If you have equivalent work experience, please provide sufficient detail in your personal statement along with a current resume so that your depth of experience and knowledge can be determined. Some form of verification, typically in a letter of recommendation, is also recommended.

Prerequisite(s) are not part of the credit hours required for the advanced certificate. Although applicants are expected to have completed the prerequisite prior to applying, acceptance into the MS program may be possible, at the discretion of the Graduate Coordinator, even though the applicant has not completed the prerequisite course(s).

Programming Prerequisite

The prerequisite knowledge for most of these certificates includes prior academic study and/or work experience in computer programming. Specifically we require current object-oriented programming skills – ranging from introductory to experienced level depending on the certificate – prior to admission. Plus, you may need to develop additional programming skills during the course of your studies in a certificate.

Programming Courses at RIT

Individuals without OOP background can take the following course sequences at RIT to complete the programming prerequisite. C++ is recommended to support study in networking and system administration (notes and prerequisite information are shown in parenthesis after each course):

- 4002-208 Introduction to Programming (C++)
- 4002-210 Programming with Classes (C++; 4002-208)
- 4050-211 C++ for Networking and Systems Administration (C++; 2-course OOP sequence)

Java is recommended for other information technology study:

- 4002-217 Programming for Information Technology I (Java)
- 4002-218 Programming for Information Technology II (Java; 4002-217)
- 4002-219 Programming for Information Technology III (Java; 4002-218; also recommended)

Individuals who have programming experience, but who feel that they would benefit by updating their OOP skills may take one (1) of the following:

- 4002-414 Java for Programmers (undergraduate; requires OOP background)
- 4002-714 Java for Programmers (graduate; requires OOP background; offered distance and on-campus)
- 4050-211 C++ for Networking and Systems Administration (undergraduate; requires OOP background)
- 4050-302 Scripting in Perl (undergraduate; requires OOP background)
- 4050-521 Perl for System Administration (undergraduate, requires OOP and shell scripting background)
- 4055-721 Perl for System Administration (graduate; requires OOP and shell scripting background; offered distance and on-campus)

Students should complete the programming prerequisite before matriculating. However, with appropriate background and if approved by the Graduate Coordinator, it can be completed during the first quarter in a certificate program.

Facilities

The focus for the software, computers, and networks that we provide is the academic needs of our students. Students use our computing resources to investigate concepts, and to design and develop content for either stand-alone computers or networked systems. Depending upon the program and curricular goals, courses may be taught in traditional classrooms, in specially designed “studio labs” designed for active learning, or online using a web-based server system.

The Information Sciences & Technologies (IST) department has specialized laboratories that support website design and multimedia applications for the IMD certificate coursework. Ample resources are available for editing and creating content and for authoring multimedia content for either stand-alone computers or delivery via the Web. The department also has other specialized labs, including a set of Usability Testing labs that facilitate live user-interface testing, end-user observation, and test-session recording. The college contains a Streaming Media Lab with a “talk show-style” set and a green screen for digital video production; an Audio Studio with a digital control room along with dedicated media servers and video routing equipment for both voiceover/narration work and live performance production.

The Networking, Security, and Systems Administration (NSSA) department has extensive laboratory facilities to support their certificate programs. These include computer networking, system administration, telephony and data integration, security, and projects labs that are designed to facilitate the exploration of system administration and computer networking theory and practices. Extensive testing and cabling equipment, a wide variety of network appliances, and flexible topology options – via direct connection and roll-around racks – support coursework and special projects. Modeling software, such as OPNet (<http://www.opnet.com>), is available for network design and performance experimentation. A remotely-accessible virtual environment, called the Remote Laboratory Emulation System (RLES) which is built on a cluster of Sun servers running VMWare ESX, supports study at a distance. Together, these facilities provide students with the opportunity to create, configure, and experiment with the types of networked environments used in today’s corporations.

Our computing facilities are connected to the RIT gigabit campus backbone and connections to the Internet (<http://www.rit.edu/its/services/tele/>). Students have access to RIT facilities from their dorm rooms or from off-campus locations. RIT provides locations for students to develop their own presence on the Web during their studies. The overall campus facilities have consistently been rated in the top twenty universities by national surveys.

Financial Aid

The IST and NSSA departments can offer an Institute Merit Scholarship to qualified students who are not receiving significant financial support from their employers or other sources. Awards are based upon the quality of performance in previous academic study and/or employment. Students who have not completed the programming prerequisite at the time of admission may receive a reduced scholarship at the discretion of the Graduate Coordinator.

The scholarship is initially awarded for three consecutive academic quarters beginning in the quarter in which the student is admitted. The standard award usually does not cover the fourth quarter in the first year (typically summer). For the fourth quarter and each year following the initial award, the student must submit an application to request continuation of the scholarship. The award will, in general, be extended if the student has made continuous progress and has maintained at least a 3.0/4.0 (‘B’ average) GPA, which is the minimum required to earn an advanced certificate.

You may contact the RIT office of Financial Aid and Scholarships website at <http://www.rit.edu/emcs/financialaid/graduate.html> for information on paying for graduate study.

Contact Information

Please visit each department's website at <http://ist.rit.edu> (IST) or <http://nssa.rit.edu> (NSSA) for more information about the departments, their programs, and their course offerings. Visit the main RIT website at <http://www.rit.edu> for general information on RIT and links to all programs and services available at RIT.

To discuss a program, schedule an appointment – in person or via telephone – with the graduate coordinator. You can contact the Student Services office (2125 Golisano) during normal business hours (Eastern Time) or send email. Contact information is shown below.

US Mail:

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~ Advanced Certificate in Interactive Multimedia Development ~

The Advanced Certificate in Interactive Multimedia Development provides an opportunity for students to gain first-hand knowledge and hands-on experience in the art and science of web site and multimedia development. Students delve into concepts of interactive multimedia development through a series of six (6) 4-credit courses. Through collaborative, hands-on projects, they explore interactive computing, the fundamentals of website architecture and development, interactive multimedia design and development, website scripting, programming in a multimedia authoring language, and the impact of networked technologies. The specific goals of this certificate program are to:

- Provide students with the fundamental hardware and software skills necessary for building web-based multimedia, basic HTML and web page design, and the incorporation of rich media along with basic design principles.
- Present and explore concepts and theories relevant to human communication and information processing as they relate to interactive multimedia and interactive computing.
- Teach the programming skills necessary for extending the capabilities of multimedia environments to make applications that are flexible and productive for users as well as efficient to produce.
- Investigate large-scale site development and introduce advanced client-side web technologies.

The certificate can be personalized with two (2) advanced electives in website development, in multimedia application development, in usability engineering, or in a related area – such as database concepts.

Students who successfully complete this certificate will have the skills necessary for the position of a web content developer – or to continue their education through the pursuit of an advanced degree.

Timeline

Based on course prerequisites, this certificate can be completed in one (1) year (3 quarters at 2 courses per term) or over two (2) academic years (six quarters at one course per term).

All of the courses in the certificate – except 4004-741 – may be applied to the MS in Information Technology (<http://ist.rit.edu/?q=node/32>) which is also offered by the Information Sciences & Technologies department at RIT.

Prerequisite Requirements

The prerequisite knowledge for this certificate is prior academic study or extensive work experience in computer programming. Specifically, we require solid skills in computer programming – equivalent to at least one (1) programming course in a current object-oriented programming (OOP) language (Java (preferred), C#, or C++). These prerequisites should be completed prior to admission, unless the Graduate Coordinator advises otherwise.

A two-course programming course is strongly recommended, since 4004-730 requires solid understanding of object-oriented programming principles.

The Curriculum

The certificate program consists of the six (4) four-credit courses shown below, for a total of 24 quarter credits of graduate study. Based upon typical course availability, the plan of study could be:

Table IMD-1: IMD Certificate Program of Study

Course	Prerequisite(s)	Typical Availability
4004-741 <i>Fundamentals of Web-Based Multimedia</i>	Computer Literacy	Fall
4004-745 <i>Foundations of Human-Computer Interaction</i>	Computer Literacy	Fall [#] , Spring
4004-730 <i>Interactive Media Implementation</i>	2-course OOP sequence + 4004-741	Fall, Winter
4004-737 <i>Website Design & Technology</i>	4004-741	Fall, Winter, Spring
2 electives	(as required)	Spring

[#] = distance or online-learning section typically available

**Worksheet for
Advanced Certificate in Interactive Multimedia Development**

(not included)

~ Advanced Certificate in Information Assurance ~

The objective of the Advanced Certificate in Information Assurance is to provide individuals who have prior experience in system administration and computer networking with the knowledge and expertise needed to assume job responsibilities in the area of network security and information assurance. The certificate is comprised of four (4) courses that are designed to provide the knowledge necessary to successfully:

- Describe the tools and techniques used for the risk assessment and the management of information systems.
- Design and write effective computer and network policies that meet the information assurance goals of an organization.
- Conduct a forensic analysis of an individual computer to identify any violations of policy and the extent of the damage resulting from a compromise.
- Interface and communicate effectively with users at all levels of an organization.

Students who successfully complete this certificate will gain the knowledge necessary to successfully implement information assurance practices in positions such as network engineers or network security analysts – or to continue their education through the pursuit of an advanced degree.

Timeline

Based on course prerequisites, this certificate can be completed in one (1) year (1 quarter with 2 courses, and 2 quarters with 1 course) or over two academic years.

All of the courses from the certificate may be applied to either the MS in Networking and System Administration (<http://nssa.rit.edu/?q=node/28>) program or to the MS in Computing Security & Information Assurance (<http://nssa.rit.edu/?q=node/29>) program - both of which are offered by the NSSA department.

All of the courses from this certificate may be applied to the MS in Information Technology (<http://ist.rit.edu/?q=node/19>) which is offered by the Information Sciences & Technologies department at RIT.

Prerequisite Requirements

The prerequisite knowledge for this certificate is prior academic study or extensive work experience in:

- Object-oriented computer programming in C++, equivalent to 4002-716 (requires prior OOP experience) or 4050-211 (requires prior OOP experience).
- Scripting, ideally in Perl, equivalent to 4050-302 (requires a 2-course OOP sequence) or 4055-721 (requires a 2-course OOP sequence and previous scripting experience).
- A networking theory course covering the basic concepts, theories, and components relevant to computer networking including electricity and magnetism, data encoding and transmission, topologies, protocols, and the OSI model (equivalent to 4055-746; computer literacy required).
- Background in systems and network administration equivalent to 4055-761 (requires 4055-746).

These courses are both available in on-campus and in online-learning formats. These prerequisites should be completed prior to admission, unless the Graduate Coordinator advises otherwise.

The Curriculum

The certificate program consists of the four (4) four-credit courses shown below, for a total of 16 quarter-credits of graduate study. Based upon typical course availability, the typical plan of study could be:

Table IA-1: *Program of Study for Certificate in Information Assurance*

Course	Prerequisite(s)	Typical Availability
4055-755 Secured Wireless and Wired Networks	4055-746	Fall [#] , Spring [#]
4055-882 Enterprise Security	4055-761 or 4055-746	Fall [#] , Winter [#]
4055-780 Computer System Security	4055-761	Fall, Winter, Spring
4055-841 Advanced Computer Forensics	4050-211 (C++) and 4055-761	Fall [#] , Winter [#]

[#] = distance or online-learning section typically available

Worksheet for Advanced Certificate in Information Assurance

(not included)

~ Advanced Certificate in Network Planning & Design ~

The objective of the Advanced Certificate in Network Planning & Design is to provide individuals who have prior experience in computing and in computer networking with the knowledge and expertise necessary to seek or further their careers in the design, performance analysis, and management of computer networks. The certificate is composed of four (4) courses that provide the knowledge necessary to ensure that graduates will be able to:

- Collaborate with individuals at all levels of an organization in the design, modeling, testing, and implementation of a network environment that will meet an organization's communication needs and goals.
- Assume a leadership role in the management and the administration of a network.
- Analyze network performance issues and then design, develop and implementation plans and assist in the development of adequate use policies and procedures.
- Lead discussions about and development of policies and procedures to provide the level of security required by the company.

Individuals who successfully complete this certificate will gain the knowledge necessary to successfully lead the planning, creation and management a networked environments, in positions such as network analysts or network managers, or to continue their education through the pursuit of advanced degrees.

Timeline

Based on course prerequisites, this certificate can be completed in one (1) year (3 quarters with 2 courses the first per term, and 1 course for the 2 following terms) or over two academic years.

All of the courses from the certificate may be applied to the MS in Networking, Security & System Administration (MS/NSA; <http://nssa.rit.edu/?q=node/28>) or to the MS in Computing Security and Information Assurance (MS/CSIA; <http://nssa.rit.edu/?q=node/29>) which is also offered by the Networking, Security & Systems Administration department at RIT.

All of the courses from this certificate may be applied to the MS in Information Technology (<http://ist.rit.edu/?q=node/19>) which is offered by the Information Sciences & Technologies department at RIT.

Prerequisite Requirements

The prerequisite knowledge for this certificate is prior academic study or extensive work experience in:

- A course covering the basic concepts, theories, and components relevant to computer networking including electricity and magnetism, data encoding and transmission, topologies, protocols, and the OSI model equivalent to 4055-746 (requires computer literacy).
- Background in systems and network administration equivalent to 4055-761 (requires 4055-746). They are offered in on-campus or in online learning format.

These prerequisites should be completed prior to admission, unless the Graduate Coordinator advises otherwise.

The Curriculum

The certificate program consists of the four (4) four-credit courses shown below, for a total of 16 quarter-credits of graduate study. Based upon typical course availability, the plan of study could be:

Table NPD-1: *Network Planning and Design Certificate Program of Study*

Course	Prerequisite(s)	Typical Availability
0106-744 Project Management	Graduate standing	Fall, Winter, Spring, Summer
4055-817 Emerging Network Technologies	Graduate standing	Fall [#] , Spring [#]
4055-850 Network Design and Performance	4055-746, 4055-761	Winter [#] , Spring [#]
4055-883 Enterprise Networking	4055-850	Winter [#] , Spring [#]

[#] = distance or online-learning section typically available

Worksheet for Advanced Certificate in Network Planning & Design

(not included)

~ Course Descriptions ~

Course Descriptions for Information Technology Courses

Course descriptions for graduate and undergraduate information technology courses (4004-xxx and 4002-xxx) offered by the Information Sciences & Technologies (<http://ist.rit.edu>) department are available on the department website at <http://ist.rit.edu/?q=node/187>. Select “Information Sciences & Technologies” from the department pull-down menu.

Course Descriptions for Networking & System Administration Courses

Course descriptions for graduate (4055-xxx) and undergraduate (4050-xxx) computer networking, system administration and network security courses offered by the Networking, Security and Systems Administration department (NSSA; <http://nssa.rit.edu>) are available on the NSSA website at <http://nssa.rit.edu/?q=node/39>. Select “Networking, Security & Systems Administration” from the department pull-down menu.

Information about course availability is on the RIT website at <http://register.rit.edu/courseSchedule/>. You will need to select a specific academic term.

Academic terms at RIT are each 10 weeks long and identified by a 5-digit code: *yyyyn*, where *yyyy* is the calendar year (i.e. 2010) at the beginning of the current academic year (i.e. 2010-11) and *n* designates the term (1 = fall, 2 = winter, 3 = spring, and 4 = summer).

RIT courses are identified by a 9-digit code which specifies department (*d*), course number (*c*) and section (*s*) number: *ddd-ccc-ss*. Day sections are generally designated as *0s* or *1s*. Evening sections are generally designated *7s* and *8s*. Blended sections, which meet both on-campus and online each week, are generally designated *3s*. And online sections are designated *9s*.

2011-2012 Academic Calendar

(not included)

2012-2013 Academic Calendar

(not included)