

# APPLIED INFORMATION TECHNOLOGY, MS

**Banner Code:** VS-MS-AIT

## Academic Advising

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The MS in Applied Information Technology is the very best graduate education in IT for high-potential leaders, especially those working on IT solutions that affect the federal government, industry or non-profit. Its objective is to graduate individuals of competence and character who can lead multidisciplinary teams in the design, justification, development, management, and sustainment of mega-systems from data to decision in the private and federal sectors. The MS in AIT provides a high quality curricula for students seeking to pursue their careers in the leading IT areas including Cyber Security, Big Data Analytics, Knowledge Mining, Data Analytics in Social Media, and Cyber-Human Interaction. Faculty include professors from the Volgenau School, the School of Business, and the College of Humanities and Social Sciences, plus industry leaders with unique reputations in the subject area as adjunct professors and guest lecturers. The faculty expose students to the pragmatic issues of IT, not just the theory.

## Admissions & Policies

### Admissions

Applicants must have completed a baccalaureate degree from an accredited program with a reputation for high academic standards and an earned GPA of 3.00 or better in their 60 highest-level credits. They must be experienced in the fundamentals of IT and quantitative methods. In addition, applicants must:

- Provide two letters of recommendation, preferably from academic references or references in industry or government who are familiar with the applicant's professional accomplishments.
- Provide a resume and detailed statement of career goals and professional aspirations.
- If their native language is not English, students must earn a minimum TOEFL score of 575 for the paper-based exam or 230 for the computer-based exam (a minimum score of 600 for the paper-based exam or 250 for the computer-based exam is required for applicants who wish to be considered for a graduate teaching assistantship).

## Requirements

### Degree Requirements

Total credits: 30-36 credits

Completion of the MS program requires a minimum of 30 approved graduate credits (10 courses). To provide a common background in the fundamentals of information sciences and technology, all students are required to complete four core courses. In addition to the core courses,

students must choose a concentration within the program by taking six courses from one of the concentration areas listed below.

Students in all concentrations may take other VSE graduate-level courses not listed below as part of their MS technical electives subject to advisor approval.

### Core Courses

#### Required Core Courses 12

For students in all concentrations except the IT Management in Federal Sector concentration

|         |   |
|---------|---|
| AIT 512 | Algorithms and Data Structures Essentials                 |
| AIT 524 | Database Management Systems                               |
| AIT 542 | Fundamentals of Computing Platforms                       |
| AIT 664 | Information: Representation, Processing and Visualization |

For students in the IT Management in Federal Sector concentration

|         |   |
|---------|---|
| AIT 524 | Database Management Systems                               |
| AIT 542 | Fundamentals of Computing Platforms                       |
| AIT 580 | Analytics: Big Data to Information                        |
| AIT 664 | Information: Representation, Processing and Visualization |

Total Credits 12

### Concentrations

#### Cyber Security (CYBR)

Complete four required courses and two electives from the following list of courses.

##### Foundation

|         |   |   |
|---------|---|---|
| AIT 660 | Cyber Security Fundamentals               | 3 |
| AIT 681 | Secure Software Development               | 3 |
| AIT 682 | Network and Systems Security              | 3 |
| AIT 702 | Incident Handling and Penetration Testing | 3 |

##### Electives 6

|         |  |
|---------|--|
| AIT 670 | Cloud Computing Security                             |
| AIT 672 | Identity and Access Management                       |
| AIT 699 | Research Project                                     |
| AIT 701 | Cyber Security: Emerging Threats and Countermeasures |
| AIT 799 | Master's Thesis                                      |

Total Credits 18

#### Cyber-Human Systems (CBHS)

Complete four required courses and two electives from the following list of courses.

##### Foundation

|         |   |   |
|---------|---|---|
| AIT 582 | Applications of Metadata in Complex Big Data Problems | 3 |
|---------|---|---|

|                  |  |          |
|------------------|--|----------|
| AIT 602          | Introduction to Research in Applied Information Technology | 3        |
| AIT 716          | Human Computer Interaction                                 | 3        |
| AIT 724          | Data Analytics in Social Media                             | 3        |
| <b>Electives</b> |  | <b>6</b> |
| AIT 614          | Big Data Essentials  |          |
| AIT 624          | Knowledge Mining from Big-Data                             |          |
| AIT 699          | Research Project   |          |
| AIT 711          | Rapid Development of Scalable Applications                 |          |
| AIT 734          | Advanced Web Analytics Using Semantics                     |          |
| AIT 799          | Master's Thesis  |          |
| Total Credits    |  | 18       |

### Data Analytics and Intelligence Methods (DAIN)

Complete four required courses and two electives from the following list of courses.

#### Foundation

|         |                                |   |
|---------|--------------------------------|---|
| AIT 614 | Big Data Essentials            | 3 |
| AIT 624 | Knowledge Mining from Big-Data | 3 |
| AIT 677 | Intelligence Analysis Methods  | 3 |
| AIT 724 | Data Analytics in Social Media | 3 |

#### Electives

|               |   |    |
|---------------|---|----|
| AIT 582       | Applications of Metadata in Complex Big Data Problems | 6  |
| AIT 699       | Research Project                                      |    |
| AIT 711       | Rapid Development of Scalable Applications            |    |
| AIT 716       | Human Computer Interaction                            |    |
| AIT 734       | Advanced Web Analytics Using Semantics                |    |
| AIT 799       | Master's Thesis                                       |    |
| CFRS 500      | Introduction to Forensic Technology and Analysis      |    |
| CFRS 660      | Network Forensics                                     |    |
| Total Credits |   | 18 |

### IT Management in Federal Sector (IMFS)

Select six courses from the following:<sup>1</sup> 18

|         |  |  |
|---------|--|--|
| AIT 582 | Applications of Metadata in Complex Big Data Problems          |  |
| AIT 614 | Big Data Essentials  |  |
| AIT 622 | Determining Needs for Complex Big Data Systems                 |  |
| AIT 660 | Cyber Security Fundamentals                                    |  |
| AIT 665 | Managing Information Technology Programs in the Federal Sector |  |
| AIT 670 | Cloud Computing Security                                       |  |
| AIT 672 | Identity and Access Management                                 |  |
| AIT 677 | Intelligence Analysis Methods                                  |  |
| AIT 678 | National Security Challenges                                   |  |
| AIT 679 | Law and Ethics of Big Data                                     |  |
| AIT 685 | Capstone Seminar   |  |

|               |  |    |
|---------------|--|----|
| AIT 697       | Leading Organizations Through Change                 |    |
| AIT 701       | Cyber Security: Emerging Threats and Countermeasures |    |
| Total Credits |  | 18 |

<sup>1</sup> Students in this concentration may also take other IST graduate-level courses not listed below as part of their MS technical electives, subject to approval of the advisor.

## Accelerated Master's

### Individualized Study, BIS/Applied Information Technology, Accelerated MS Overview

Highly-qualified students in the Individualized Study, BIS have the option of obtaining an accelerated Applied Information Technology, MS.

For more detailed information, see AP.6.7 Bachelor's/Accelerated Master's Degrees. For policies governing all graduate degrees, see AP.6 Graduate Policies.

### Application Requirements

Applicants to all graduate programs at George Mason University must meet the admission standards and application requirements for graduate study as specified in Graduate Admissions. Mason undergraduate students in the BIS Program can apply in the semester in which they will have completed 90 or more credits (including 15 Mason resident credits) applicable toward the BIS. Students must have an overall GPA of at least 3.30 to apply to the program. Criteria for admission are identical to criteria for admission into the MS in AIT Program, except that students do not need to have completed an undergraduate degree prior to acceptance into the accelerated program.

### Reserve Graduate Credit

Students may take up to 6 additional graduate credits as reserve graduate credit. These credits do not apply to the undergraduate degree. The ability to take courses for reserve graduate credit is available to all high achieving undergraduates with the permission of the department. Permission to take a graduate course for reserve graduate credit is normally granted only to Mason seniors within 15 hours of graduation.

To apply these credits to the master's degree, students must request that the credits be moved from the undergraduate degree to the graduate degree using the Bachelor's/Accelerated Master's Transition Form (<http://registrar.gmu.edu/forms>).

### Accelerated Option Requirements

Students in the accelerated master's option must maintain a minimum 3.30 GPA in the undergraduate segment until they have satisfied all requirements for the BIS degree. On completion and conferral of the undergraduate degree they submit the Bachelor's/Accelerated Master's Transition Form (<http://registrar.gmu.edu/forms>) and are admitted to graduate status.

As graduate students, accelerated master's students have an advanced standing. Students must complete all credits that satisfy requirements of the BIS program and those of the MSAIT program, with two courses overlapping from the courses necessary to earn the BIS with a

concentration IND (individualized), applied information technology emphasis as listed below.

Note: All of the prerequisite courses indicated below must be passed with a grade of C or higher.

### Emerging Technologies

| Code          | Title                              | Credits |
|---------------|------------------------------------|---------|
| AIT 597       | Developing IT Leaders of Integrity | 3       |
| GBUS 540      | Analysis of Financial Decisions    | 3       |
| Total Credits |                                    | 6       |

### Cyber Security

| Code          | Title                                | Credits |
|---------------|--------------------------------------|---------|
| AIT 673       | Cyber Incident Handling and Response | 3       |
| ISA 650       | Security Policy                      | 3       |
| Total Credits |                                      | 6       |

### Intelligence Technologies

| Code                           | Title   | Credits |
|--------------------------------|---|---------|
| Select two from the following: |   | 6       |
| AIT 675                        | Overview of the National Intelligence Community                                   |         |
| AIT 676                        | Intelligence Technologies, Research and Development in the Intelligence Community |         |
| AIT 677                        | Intelligence Analysis Methods   |         |
| AIT 678                        | National Security Challenges  |         |
| Total Credits                  |   | 6       |

## Information Technology, BS/Applied Information Technology, Accelerated MS Overview

Highly-qualified students in the Information Technology, BS have the option of obtaining an accelerated Applied Information Technology, MS.

For more detailed information, see AP.6.7 Bachelor's/Accelerated Master's Degrees. For policies governing all graduate degrees, see AP.6 Graduate Policies.

### Admission Requirements

Students in the Information Technology, BS program may apply to this option if they have earned 90 undergraduate credits with an overall GPA of at least 3.30. Criteria for admission are identical to criteria for admission to the Applied Information Technology, MS program.

### Accelerated Option Requirements

Students must complete all credits that satisfy requirements for the BS and MS programs, with 6 credits overlap.

Students register for 6 credits of AIT 500-level core courses in place of the corresponding IT 300-level courses required for the undergraduate degree requirements.

Students must register for two of the following courses in place of the corresponding 300-level courses:

| Code    | Title  | Credits |
|---------|--|---------|
| AIT 512 | Algorithms and Data Structures Essentials (satisfies the IT 306 requirement in the BS program) | 3       |
| AIT 524 | Database Management Systems (satisfies the IT 314 requirement in the BS program)               | 3       |
| AIT 542 | Fundamentals of Computing Platforms (satisfies the IT 342 requirement in the BS program)       | 3       |

Students may take additional graduate-level courses as part of their BS technical electives with advisor approval. These additional graduate-level courses will not count toward the MS degree. See AP.1.4.4 Graduate Course Enrollment by Undergraduates.

### Degree Conferral

Students must apply the semester before they expect to complete the BS requirements to have the BS degree conferred. In addition, at the beginning of the student's final undergraduate semester, students must complete a Bachelor's/Accelerated Master's Transition form that is submitted to the Office of the University Registrar and the VSE Graduate Admissions Office. At the completion of MS requirements, a master's degree is conferred.