INFORMATION SYSTEMS (INFS)

500 Level Courses

INFS 501: *Discrete and Logical Structures for Information Systems.* 3 credits.
Study of discrete and logical structures for information systems analysis and design including basic set theory and proof techniques, propositional and predicate logic, trees and graphs, finite state machines, formal languages and their relation to automata, computability and computational complexity, formal semantics-operational, axiomatic and denotational approaches. Notes: Credit cannot be applied to a graduate degree in the Volgenau School or the BS degree in computer science. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May not be repeated for credit.
Recommended Prerequisite: Completion of 6 hrs of undergraduate mathematics.

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:
This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

INFS 515: *Computer Organization Course and Operating Systems.* 3 credits.
Computer hardware architecture concepts including number systems, machine representation of numbers, instruction set formats, addressing techniques, memory organization, internal processor structure and operation. Symbolic assembly language fundamental operating systems concepts: process synchronization and scheduling, interprocess communication, memory management, virtual memory, deadlocks, file I/O and disk management, and LINUX operating system case studies. Notes: Credit cannot be applied to a graduate degree in the Volgenau School or the BS degree in computer science. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May not be repeated for credit.
Recommended Prerequisite: Undergraduate courses or equivalent knowledge in structured programming in a high-level language.

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:
This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

INFS 519: *Program Design and Data Structures.* 3 credits.
Study of the fundamentals of data structures and algorithms applied in programming solutions to application problems. The course stresses programming in a modern high-level language. Laboratory required. Notes: Credit cannot be applied to a graduate degree in the Volgenau School or the BS degree in computer science. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May not be repeated for credit.
Recommended Prerequisite: Undergraduate courses or equivalent knowledge in structured programming in a high-level language.

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:
This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

INFS 580: *Analytics: Big Data to Information .* 3 credits.
The course provides an overview of Big Data and its use in commercial, scientific, governmental, and other applications. Topics include technical and non-technical disciplines required to collect, process and use enormous amounts of data available from numerous sources. Lectures cover system acquisition, law and policy, and ethical issues. It includes brief discussions of technologies involved in collecting, mining, analyzing and using results Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May not be repeated for credit.
Recommended Prerequisite: Recent previous course work in programming and statistics.

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:
This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

600 Level Courses

INFS 611: *Rapid Information Systems Prototyping.* 3 credits.
Presents software engineering, programming techniques, platforms and tools necessary for rapid development of information systems, including cloud platforms, data storage solutions, multi-platform application development, and prototyping programming languages. The course will provide a general overview of such techniques with detailed emphasis on specific techniques. Students will work in small teams and must develop

and deploy an information system prototype during the course. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May not be repeated for credit.
Recommended Prerequisite: Proficiency in an object-oriented programming language, basic data structures and algorithms knowledge.

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Schedule Type: Lecture

Grading:
This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

INFS 612: *Principles and Practices of Communication Networks.* 3 credits.
Introduces principles of computer networks and applications to Internet. Discusses details of layering, protocols, performance, resource allocation, management, security and other contemporary issues related to networks. Examples of course material are protocols such as HTTP(S), DNS, TCP/IP, RSVP, SNMP, algorithms such as Dijkstra's link state routing; and security measures such as firewalls and encryption, the principles behind them and analysis of performance. Notes: No substitutions can be made for this class. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May not be repeated for credit.
Recommended Prerequisite: INFS 501, 515, 519, and SWE 510, or equivalent

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Enrollment limited to students in the Engineering Computing college.

Schedule Type: Lecture

Grading:
This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

INFS 622: *Information Systems Analysis and Design.* 3 credits.
Integration of computing technologies, systems analysis, system design practices, and management criteria in the design of large-scale information management and decision-support systems. Includes cases, computing lab. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May not be repeated for credit.
Recommended Prerequisite: INFS 501, INFS 515, INFS 519, and SWE 510, or equivalent

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Enrollment limited to students in the Engineering Computing college.

Schedule Type: Lecture

Grading:
This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

INFS 623: *Web Search Engines and Recommender Systems.* 3 credits.
Study of Web search engines and recommender systems. Topics to include classical information retrieval methods, Boolean retrieval systems, ranked retrieval, performance metrics, Web crawling, link analysis, overall search engine architecture, fundamentals and classification of recommender systems, learning user interests and object properties, and case studies. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May not be repeated for credit.
Recommended Prerequisite: INFS 501, 515, 519, and SWE 510.

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Enrollment limited to students in the Engineering Computing college.

Schedule Type: Lecture

Grading:
This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

INFS 640: *Introduction to Electronic Commerce.* 3 credits.
Studies electronic commerce from both managerial and technical perspectives. Topics include e-commerce models and concepts; Internet and web protocols and infrastructure; e-commerce marketing and branding; security protocols and standards; e-commerce payment systems; and case studies of business-to-consumer, business-to-business, consumer-to-consumer, and e-government. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May not be repeated for credit.
Recommended Prerequisite: INFS 501, 515, and 519; and SWE 510 or equivalent.

Registration Restrictions:
Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Enrollment limited to students in the Engineering Computing college.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

INFS 697: *Topics in Information Systems.* 1-6 credits.
Presents special topics in information systems not occurring in regular INFS sequence. Notes: May be repeated for credit when distinct offerings of course differ in subject. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May be repeated within the degree.
Specialized Designation: Topic Varies

Registration Restrictions:

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus.

Enrollment is limited to Graduate, Non-Degree or Undergraduate level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Enrollment limited to students in the Engineering Computing college.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

700 Level Courses

INFS 740: *Database Programming for the World Wide Web.* 3 credits.
Information systems accessible through web and Internet are becoming prevalent. Course focuses on technologies and industry standards for accessing and manipulating persistent data that are suitable for web applications. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May not be repeated for credit.
Recommended Prerequisite: CS 550

Registration Restrictions:

Enrollment is limited to Graduate or Non-Degree level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Enrollment limited to students in the Engineering Computing college.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

INFS 760: *Advanced Database Management.* 3 credits.
Study of advanced database models and languages, database design theory, transaction processing, recovery, concurrency, distributed database, and security and integrity. Discusses recent developments and research directions. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May not be repeated for credit.
Recommended Prerequisite: INFS 614.

Registration Restrictions:

Enrollment is limited to Graduate or Non-Degree level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Enrollment limited to students in the Engineering Computing college.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

INFS 770: *Knowledge Management for E-Business.* 3 credits.
Addresses knowledge management (KM) from managerial, technical viewpoints in context of large organizations doing business over web and Internet. Topics include KM life cycle for knowledge creation, aggregation, dissemination, and sharing; ontology modeling, design, and engineering; role of standards such as XML, RDF, web services, and semantic web for e-business; business rules and reasoning engines; and digital rights management for e-business. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May not be repeated for credit.
Recommended Prerequisite: INFS 622 or permission of instructor.

Registration Restrictions:

Enrollment is limited to Graduate or Non-Degree level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Enrollment limited to students in the Engineering Computing college.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

INFS 772: *Intelligent Agents and the Semantic Web.* 3 credits.
Course covers the role of intelligent agents in cooperating to access, harvest, sift and winnow information and knowledge from the semantic web. Topics include agent architectures, practical reasoning and deductive agents, beliefs-desires-intentions (BDI) framework for agent reasoning, commitments and actions; Semantic Web ontology languages, description logics, reasoning and rule languages; and agent communication languages, protocols and standards. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May not be repeated for credit.
Recommended Prerequisite: INFS 614

Registration Restrictions:

Enrollment is limited to Graduate or Non-Degree level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Enrollment limited to students in the Engineering Computing college.

Schedule Type: Lecture

Grading:

This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

INFS 774: *Enterprise Architecture.* 3 credits.
This course presents the basic concepts and methodologies for the discipline known as Enterprise IT Architecting within a framework, structure, and methodology. Enterprise IT Architecting is a necessary step for designing and developing a system of information systems. It includes the definition of the business, work, functional, information and technical perspectives. As such, it is the enabling approach for the system development process that builds complex information systems. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May not be repeated for credit.
Recommended Prerequisite: INFS 622 or permission of instructor.

Registration Restrictions:
Enrollment is limited to Graduate or Non-Degree level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Enrollment limited to students in the Engineering Computing college.

Schedule Type: Lecture

Grading:
This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

INFS 796: *Directed Readings in Information Systems.* 3 credits.
Research and analysis of contemporary problem in information system development. Notes: To register, students must complete independent study form available in department office. It must be initialed by faculty sponsor and approved by department chair. Prior approval required by faculty sponsor who supervises student's work. Written report required.. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May be repeated within the term for a maximum 12 credits.
Specialized Designation: Topic Varies

Recommended Prerequisite: Graduate standing in information systems, with at least 12 prior credits in MS.

Registration Restrictions:
Enrollment is limited to Graduate or Non-Degree level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Enrollment limited to students in the Engineering Computing college.

Schedule Type: Research

Grading:
This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

INFS 797: *Advanced Topics in Information Systems.* 1-6 credits.
Special advanced topics not occurring in regular INFS sequence. Notes: May be repeated for credit when distinct offerings of course differ in subject. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May be repeated within the degree.
Specialized Designation: Topic Varies

Registration Restrictions:
Enrollment is limited to Graduate or Non-Degree level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Enrollment limited to students in the Engineering Computing college.

Schedule Type: Lecture

Grading:
This course is graded on the Graduate Regular scale. (https://catalog.gmu.edu/policies/academic/grading/)

INFS 798: *Research Project.* 3 credits.
Master's student undertake a project using knowledge gained in prior MS courses. Topic chosen under the guidance of a member of the Graduate Faculty of the department, resulting in written technical report. Prior approval is required by the faculty sponsor. To register, student must complete a Master's Project form available from the department. It must be signed by the faculty sponsor and approved by the department chair or delegate. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May be repeated within the degree for a maximum 6 credits.
Recommended Prerequisite: 18 credits applicable toward MS.

Registration Restrictions:
Enrollment is limited to Graduate or Non-Degree level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Enrollment limited to students in the Engineering Computing college.

Schedule Type: Thesis

Grading:
This course is graded on the Satisfactory/No Credit scale. (https://catalog.gmu.edu/policies/academic/grading/)

INFS 799: *MS Thesis.* 1-6 credits.
Research project completed under supervision of a member of the Graduate Faculty of the department, resulting in a technical report accepted by three-member faculty committee. Thesis must be defended in an oral presentation. To register, students must complete thesis form available from the department. It must be signed by all committee members and the department chair or delegate. Offered by Info Sciences & Technology (https://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/information-sciences-technology/). May be repeated within the degree for a maximum 6 credits.
Recommended Prerequisite: 18 hours of credit applicable toward the MS degree.

Registration Restrictions:
Enrollment is limited to Graduate or Non-Degree level students.

Students in a Non-Degree Undergraduate degree may **not** enroll.

Enrollment limited to students in the Engineering Computing college.

Schedule Type: Thesis

Grading:
This course is graded on the Satisfactory/No Credit scale. (https://catalog.gmu.edu/policies/academic/grading/)