

## Informatics

College of Science, Engineering & Technology  
Department of Information Systems & Technology  
273 Wissink Hall • 507-389-1412  
Web site: <http://cset.mnsu.edu/it/>

Chair: Leon Tietz

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### Students should contact the Office of the Dean for this college prior to choosing to major in Informatics

Informatics prepares students to use information technology (IT) to solve problems in multidisciplinary real-life settings. Informatics is a bridge connecting IT to a particular field of study such as biology, chemistry, health, medicine, law, fine arts, geography, etc. Students enrolled in the Informatics program will have the opportunity to select a field or discipline that interests them in other programs at Minnesota State University and prepare themselves to apply technology to real-life problems taking into account the social, cultural and organizational settings in which computing and information technology will be used.

Admission to the Informatics program is granted by the department. Admission to the program is required before the student is permitted to take 300- and 400-level courses.

Requirements for admission to the Informatics program are:

- A minimum of 32 earned semester credits
- Completion of MATH 121 or MATH 181 with a grade of "C" (2.0) or better
- Completion of ENG 101 with a grade of "C" (2.0) or better
- Completion of IT 210 with a grade of "B" (3.0) or better
- Completion of IT 214 with a grade of "C" (2.0) or better

### POLICIES/INFORMATION

**GPA Policy.** The completion of any major or minor in the Department of Information Systems & Technology requires both:

- a GPA of 2.5 or higher for all departmental courses (ISYS or IT), or their substitutions, used to complete the major or minor, and
- a GPA of 2.5 or higher for all courses, or their substitutions, used to complete the major or minor. This includes all departmental courses (ISYS or IT), supporting courses, and General Education courses required for the major or minor.

It is recommended that students who cannot maintain a GPA of 3.0 in required 100 and 200 level courses see their advisor for a program review.

**Grade Policy.** All coursework used to complete a departmental major or minor, including required courses, required supporting courses, and required General Education courses, must be taken for a letter grade except for courses offered only as P/N.

No course completed with a grade of "D" can be used to complete a departmental major or minor program, or to meet a departmental prerequisite.

**Registration Hold Policy.** The department will place a registration hold on any student who earns a "D" or "F" in any of its courses. The department will also place such a hold on any student who drops any of its courses after the first two weeks of the semester. A student with a registration hold cannot register for courses until the hold is released, which requires filling out an appeal form and taking it to the student's advisor for discussion. Appeal forms are available from the departmental office. This hold policy does NOT apply to students who are taking 100-level ISYS or IT courses.

**Dual Major Policy.** Students can earn at most one undergraduate major from this department.

**Administrative Drop Policy.** The department will automatically drop any student enrolled in ISYS 110 or IT 110 who does not attend the first course meeting. If you cannot attend the first meeting, submit a written request to [ad-computer@mnsu.edu](mailto:ad-computer@mnsu.edu) BEFORE the first day of the course. For assistance with the process, call the departmental office at 507-389-1412.

**Incomplete Policy.** The department gives incomplete grades for only two conditions. The first condition is illness, which requires a doctor's written recommendation. The second condition arises when a death in the student's family has caused the student to be away from the campus for an extended period. The student must have a satisfactory grade ("C" or better) in the course at the time of the onset of the condition.

**Internship Policy.** The Department of Information Systems & Technology continuously strives for improvements in the academic program. Coursework, coupled with extensive laboratory experience, play an important part in the student's educational program. However, application of the concepts discussed in class to on-the-job situations is equally important. As a result, the department requires an internship for all majors.

**Excluded Courses Policy.** IT 201, IT 296, IT 321 do not count toward a major or minor in the Informatics program.

**Residency Policy.** Students must earn at least 50 percent of the credits required for a departmental major or minor at Minnesota State Mankato.

**Prerequisite Policy.** For all courses, an equivalent (cross-listed) IT course from the Department of Information Systems & Technology is accepted as a prerequisite in lieu of an ISYS course and vice versa.

### INFORMATICS, BS

#### Required General Education

ENG	101	Composition (4)
IT	100	Introduction to Computing and Applications (4)
IT	202W	Computers in Society (4)
MATH	180	Mathematics for Computer Science (4)
PSYC	101	Psychology (4)
CMST	203	Intercultural Communication (3)
(Choose one of the following)		
ART	160	Introduction to Visual Culture (3)
CMST	310	Performance of Literature (3)
(Choose one of the following)		
MATH	121	Calculus I (4)
MATH	181	Intuitive Calculus (3)
(Choose one of the following)		
ANTH	102	Ancient Peoples (4)
ECON	100	An Introduction to US Economy (3)
ECON	201	Principal of Macroeconomics (3)
ECON	202	Principal of Microeconomics (3)
(Choose one of the following)		
PHIL	120W	Introduction to Ethics (3)
PHIL	222W	Medical Ethics (3)
(Choose one of the following)		
CMST	100	Fundamentals of Speech Communication (3)
CMST	212	Professional Communication & Interviewing (3)

#### Prerequisites to the Major

ENG	271	Technical Communication (4)
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#### Major Common Core

IT	210	Fundamentals of Programming (4)
IT	214	Fundamentals of Software Development (4)
IT	340	Introduction to Databases Systems (4)
IT	350	Information Security (4)
IT	360	Introduction to Data Communication and Networking (4)
IT	380	System Analysis & Design (4)
IT	440	Database Management System II (4)
IT	483	Web Applications and User Interface Design (4)

## INFORMATICS

IT	486	Organizational Informatics (4)
IT	495	Seminar in Information Technology (1)
(Choose one of the following) (4 credits)		
IT	497	Internship (1-12)
IT	498	Information Technology Capstone (4)

### Major Restricted Electives

(Choose at least 4 credits from the following courses)

IT	310	Data Structures & Algorithms (4)
IT	311	Business Application Programming (4)
IT	320	Machine Structures and Operating Systems (4)
IT	414	Advanced Object Oriented Programming with Design Patterns (4)
IT	430	Intelligent Systems (4)
IT	442	Database Security, Auditing, and Disaster Recovery (4)
IT	444	Data Mining and Warehousing (4)
IT	450	Information Warfare (4)
IT	460	Network and Security Protocols (4)
IT	462	Network Security, Administration and Programming (4)
IT	464	Application of Wireless and Mobil Computing
IT	480	Software Quality Assurance and Testing (4)
IT	482	Human Computer Interaction (4)
IT	484	Software Engineering (4)
IT	488	Rapid Application Development (4)
IT	496	Selected Topics in Information Technology (1-4)
IT	499	Individual Study (1-2)

**Minor Required.** Yes. See Advisor.

### COURSE DESCRIPTIONS

#### IT 100 (4) Introduction to Computing and Applications

Basic foundations in computer concepts. Topics include: hardware, software ethical, and social issues. Lab work covers various systems and applications software including word processing, email, the Internet, spreadsheets, databases, and presentation software. Cannot be counted toward any major or minor offered by IT.

Fall, Spring  
GE-9, GE-13

#### IT 110 (4) Foundations of Computing

A comprehensive introduction to information systems and technology. Includes algorithms, hardware, software, and social issues. Labs cover both hardware and software. The course provides knowledge and skills applicable to all disciplines.

Pre: MATH 112 or MATH 115 or MATH 121 or MATH 181  
Fall, Spring  
GE-13

#### IT 201 (2) Introduction to Assistive Technology

This course introduces students to assistive technology and its applicability to people with various disabilities. Hardware and software demonstrations with an emphasis placed on inexpensive and readily available solutions. Extensive use of the Internet will be employed to keep current with latest technology and to facilitate a continuing dialogue with instructor.

Variable

#### IT 202W (4) Computers in Society

Complex social and ethical issues associated with computers. Through thoughtful questions, informative readings, and the analysis of opposing viewpoints, participants gain insight into the complexity of technology-related issues in a world without clearly defined borders.

Variable  
GE-1C, GE-9, GE-13,

#### IT 210 (4) Fundamentals of Programming

This is the first course for students planning to major or minor in Information Systems or Information Technology. Programming in a high-level language, abstraction and problem-solving skills are emphasized.

Pre: IT 110 or ISYS 110 with at least 2.50 equivalent grade.  
Fall, Spring

#### IT 214 (4) Fundamentals of Software Development

A continuation of IT 210, IT 214 introduces object-oriented concepts, programming techniques, lists, stacks, queues, and trees. Students are expected to produce larger applications, utilizing multiple compilation units.

Pre: IT 210 or ISYS 210, MATH 121 or MATH 180 or MATH 181  
Fall, Spring

#### IT 296 (1-2) Introduction to Selected Topics

Special topics not covered in other 100- and 200-level courses. May be repeated for each new topic.

#### IT 310 (4) Data Structures & Algorithms

Study of trees, hashing, and graph algorithms. Analysis of algorithms, memory management, and proof techniques.

Pre: IT 214 or ISYS 215  
Variable

#### IT 311 (4) Business Application Programming

Large-scale application development using the COBOL programming language. Emphasis on principles of application programming such as control breaks, table manipulations, file manipulations, sorting, interactive programming, sub-programming, index-sequential file handling, structure charts, and program documentation.

Pre: IT 214 or ISYS 215  
Spring

#### IT 320 (4) Machine Structures and Operating Systems

Introduction to computer hardware, Boolean logic, digital circuits, data representations, digital arithmetic, digital storage, performance metrics, pipelining, memory hierarchy, and I/O; Operating System concepts, interface, multi-tasking, threads, memory and file management, tools.

Pre: IT 214 or ISYS 215, MATH 180  
Fall

#### IT 321 (4) Micro Configuration & Maintenance

Provides a working knowledge and hands-on experience with configuring, upgrading, optimizing, troubleshooting and repairing personal computer hardware, networks and system software. Preventative maintenance and emergency recovery techniques. Does not satisfy requirements for any department major.

Pre: Jr/Sr status or consent  
Variable

#### IT 340 (4) Introduction to Database Systems

Introduction to database systems, models, management systems, file organization, database design, data modeling, normalization, conversion of data model into relational model, and SQL. Implementation of a relational database application in a team environment.

Pre: IT 210 or ISYS 210  
Fall, Spring

#### IT 350 (4) Information Security

Security concepts and mechanisms; security technologies; authentication mechanisms; mandatory and discretionary controls; cryptography and applications; threats; intrusion detection and prevention; regulations; vulnerability assessment; information assurance; forensics; anonymity and privacy issues; disaster recovery planning, legal issues and ethics.

Pre: IT 210 or ISYS 210  
Fall, Spring

#### IT 360 (4) Introduction to Data Communication and Networking

This course covers basic concepts related to data communication and networking. Topics addressed will include the OSI model, the Internet model, network management, network protocols and data security.

Pre: IT 210 or ISYS 210  
Fall, Spring

## **IT 380 (4) Systems Analysis and Design**

This course explores both structured as well as object oriented systems analysis and design. Use of upper and lower CASE tools are employed in the analysis, design and implementation of a team oriented term project.

Pre: IT 214 or ISYS 215

Fall, Spring

## **IT 412 (4) Graphics**

Concepts and algorithms used in computer graphics, including polygonal and curved images in both 2 and 3 dimensions, representation of solid objects, and color and illumination models.

Pre: IT 214 or ISYS 215, MATH 121 or MATH 181

Variable

## **IT 414 (4) Advanced Object-Oriented Programming with Design Patterns**

This course provides student with a solid understanding of the principles, techniques and design patterns involved in advanced object-oriented programming. Successful students should have a distinct advantage in the marketplace.

Pre: IT 340 or ISYS 340, IT 310

Variable

## **IT 430 (4) Intelligent Systems**

This course offers an overview of intelligent systems. Emphasis is placed on rule-based systems, fuzzy rule-based systems, neural networks, evolutionary computation and uncertainty management.

Pre: IT 214 or ISYS 215 or CS 230, STAT 154

Variable

## **IT 432 (4) Robotics**

This course is a survey of robotics including: current practice, future directions, robot anatomy, kinematics, sensors, sensor interfacing and fusion, mobile robotics, real-time programming, vision and image processing algorithms, and subsumption architecture.

Pre: IT 320

Variable

## **IT 440 (4) Database Management Systems II**

Extensive coverage of query processing and optimization; concurrency control and recovery, and security and integrity in centralized/distributed environments. Team-oriented projects in a heterogeneous client server environment

Pre: IT 214 or ISYS 215, IT 340 or ISYS 340

Variable

## **IT 442 (4) Database Security, Auditing, and Disaster Recovery**

Covers science and study of methods of protecting data, and designing disaster recovery strategy. Secure database design, data integrity, secure architectures, secure transaction processing, information flow controls, inference controls, and auditing. Security models for relational and object-oriented databases.

Pre: IT 350 or ISYS 350, IT 440 or ISYS 441

Variable

## **IT 444 (4) Data Mining and Warehousing**

The course details data mining and warehousing. Emphasis is placed on data mining strategies, techniques and evaluation methods. Various data warehousing methods are covered. Students experiment with data mining and warehousing tools.

Pre: IT 440 or ISYS 441

Variable

## **IT 450 (4) Information Warfare**

Covers information warfare principles and technologies. Information warfare concepts; Protocols, Authentication, and Encryption; Network attack techniques, methodologies, and tools; Network defense; Malware: trojans, worms, viruses, and malicious code; Electronic crimes and digital evidence.

Pre: IT 350 or ISYS 350

Fall

## **IT 460 (4) Network and Security Protocols**

Advanced coverage of data communication, networking and security protocols. Topics: transmission methods, error detection and recovery, flow control, routing, security issues and performance analysis of existing and emerging protocols for secure communication.

Pre: IT 214 or ISYS 215, IT 360

Variable

## **IT 462 (4) Network, Security, Administration and Programming**

Network and server systems administration. Domain administration; file system management; networked printers; user management; workstation configuration. Network programming assignments/ projects in Layered Software Systems, HTTP Server, UDP (TFTP or DNS), CGI program, IPV6, RPC/SCTP.

Pre: IT 350 or ISYS 350, IT 460

Variable

## **IT 464 (4) Applications of Wireless and Mobile Networks**

Existing and emerging mobile and wireless data networks with emphasis on digital data communications. Gain an understanding of the unique considerations that must be given to network protocols for wireless and mobile communication and their applications.

Pre: IT 460

Variable

## **IT 480 (4) Software Quality Assurance and Testing**

Topics include software quality assurance, software quality metrics, software configuration management, software verification and validation, reviews, inspections, and audits, configuration control boards and software process improvement models, black-box and white-box testing models.

Pre: IT 380 or ISYS 380

Spring

## **IT 482 (4) Human Computer Interaction**

Concepts and techniques for user interface design and human computer interaction. Emphasizes user-centered design, interface development techniques, and usability evaluation. Various interface devices and metaphors. Visual development environments and other development tools. Project work.

Pre: IT 380 or ISYS 380 or CS 110

Fall

## **IT 483 (4) Web Applications and User Interface Design**

HTTP Protocol; Web-markup languages; Client-side, Server-side programming; Web services; Web servers; Emerging technologies; Security; Standards & Bodies; Web interface design techniques; User-centered design; Visual development environments and development tools; Interface design effectiveness.

Pre: IT 340 or ISYS 340, IT 380 or ISYS 380

Fall, Spring

## **IT 484 (4) Software Engineering**

An introduction to all important aspects of software engineering. The emphasis is on principles of software engineering including project planning, requirements gathering, size and cost estimation, analysis, design, coding, testing, implementation, and maintenance.

Pre: IT 380 or ISYS 380

Fall, Spring

## **IT 486 (4) Organizational Informatics**

An introduction to information, technology and social behavior in the organizational context. Concepts of organization theory, organization behavior, knowledge and information management, and organizational intelligence provide a critical foundation for managing information, people, and technologies in rapidly changing environments.

Pre: IT 380 or ISYS 380

Variable

**IT 488 (4) Rapid Application Development**

Low and high CASE tools and rapid application development. CASE tools ranging from traditional SDLC to object-oriented client/server environments. Extensive team-oriented applications will be developed using tools such as SYNON, OBSYDIAN, Power Builder, and MSSQL server.

Pre: IT 340 or ISYS 340, IT 380 or ISYS 380

Variable

**IT 495 (1) Seminar in Information Technology**

Provides Information Technology majors an opportunity, in a small group setting, to explore a topic not normally covered in the curriculum.

Pre: Consent

Variable

**IT 496 (1-4) Selected Topics in Information Technology**

Special topics not covered in other courses. May be repeated for credit on each new topic.

Pre: Consent

Variable

**IT 497 (1-12) Internship**

Provides students with opportunity to utilize their training in a real-world business environment working under the guidance and direction of a faculty. (At most 4 hours toward a major in this department.)

Pre: Permanent admission to IT and consent

Fall, Spring, Summer

**IT 498 (4) Information Technology Capstone**

Develop high quality software application researching and applying fundamental software engineering techniques, several advanced development and test tools, human factors of interface design and a team approach, each student controlling only a part of the system.

Pre: Senior Standing and consent

Fall, Spring

**IT 499 (1-2) Individual Study**

Problems on an individual basis.

Pre: Consent

Fall, Spring