The objective of the Bachelor of Information Technology and Management degree is to produce graduates prepared for a career in the information technology field, while equipping them with the critical thinking skills necessary to cope with the emergence of new technologies and with management principles needed to advance in their careers. While the program was originally designed for students who have achieved an Associate’s Degree and would like to complete a Bachelor’s Degree, students may also enter the program as first-year students.

Government studies such as Free and Aspray, The Supply of Information Technology Workers in the United States, show that technology positions will be the fastest growing segment in the United States for the next 30 years. Organizations of all kinds have become dependent on networked computing infrastructure as the key element to enabling modern business processes, and our graduates are prepared to select, manage, and maintain that infrastructure, ensuring that it meets organizational needs. Information technology professionals assume responsibility for selecting hardware and software products appropriate for an organization, integrating those products with organizational needs and infrastructure, and installing, customizing, and maintaining those applications for the organization’s computer users. Planning and managing an organization’s technology infrastructure is a difficult and complex job that requires a solid foundation in applied computing as well as management and people skills. Professionals in this discipline require special skills, such as understanding how networked systems are composed and structured and what their strengths and weaknesses are, and being prepared to deal with important software systems concerns such as reliability, security, usability, and effectiveness and efficiency for their intended purpose. These topics are difficult and intellectually demanding.

The Bachelor of Information Technology and management degree produces graduates who are able to:

- Problem solve, create, and effectively communicate innovative answers to provide technology solutions for the problems of business, industry, government, non-profit organizations, and individuals.
- Identify and analyze user needs, identify and define computing requirements appropriate to the problem solution, and take them into account in the selection, creation, evaluation, and administration of computer- and network-based systems.
- Apply current technical and mathematical concepts and practices in the core information technologies and recognize the need to engage in continuing professional development.

To meet these goals, graduates must demonstrate knowledge and proficiency in these areas:

- Information technology basics including hardware and operating systems
- Application development and programming
- Human-Computer interaction
- Databases and data management
- Networking and communications
- Websystems
- Cybersecurity
- Professionalism

Bachelor of Information Technology and Management students are required to complete a minor. The minor may be in a field which will compliment information technology such as business or professional and technical communication, or may be chosen from a field very different such as history or sociology to provide a more widely rounded educational experience.

Admission for transfer students is based on a review of college transcripts and documentation of work experience. Applicants must submit an application for admission as a degree-seeking student. Transfer applicants must hold an associate’s degree (A.A.) from an accredited college or the equivalent (completion of at least 58 credit hours). Only courses in which the student has earned a grade of C or better may be accepted for transfer. Supporting documentation to be included with the application includes official transcripts of all college-level work.

The Information Technology and Management Department also offers the following co-terminal degrees, which enables a student to simultaneously complete both an undergraduate and graduate degree in as few as five years:

- Bachelor of Information Technology and Management/ Master of Cyber Forensics and Security
- Bachelor of Information Technology and Management/ Master of Information Technology and Management
These co-terminal degrees allow students to gain greater knowledge in specialized areas while, in most cases, completing a smaller number of credit hours with increased scheduling flexibility. For more information, please visit the Information Technology and Management departmental website: appliedtech.iit.edu/itm.

For information regarding faculty visit the Information Technology and Management website at appliedtech.iit.edu/information-technology-and-management/about/people/faculty.

Transfer Admission Requirements

Admitted transfer students are expected to have satisfied the following IIT Core Curriculum requirements prior to admission. If not, the student must complete them while working on the ITM degree. The degree requires a minimum of 127 semester hours including transfer and coursework completed at IIT. A maximum of 68 applicable semester hours of transfer credit is permitted from a two-year college.

Basic Writing Proficiency Requirements

Students must take the IIT English Proficiency Examination before beginning classes at IIT. Within their first year at IIT, students who do not pass the IIT English Proficiency Examination must demonstrate basic writing proficiency by passing a composition course at IIT.

Computer Science

Two credit hours of computer programming; may be satisfied by taking ITM 311.

Humanities and Social Sciences

Twelve semester hours. Humanities include literature, philosophy (except logic), and history. Social or behavioral sciences typically include anthropology, geography, political science, psychology, sociology, and economics. Studies must include a minimum of three semester hours in Humanities and six semester hours in the Social Sciences.

Free or Technical Electives

Twenty-eight semester hours of approved courses. Students should contact the Office of Undergraduate Academic Affairs for additional information.

Mathematics*

Five to six semester hours of mathematics including a Discrete Math or Finite Math course and a Probability & Statistics or Statistics course. Students who enter the program with less than fifty-eight hours of total transfer credit or less than six hours of mathematics credit will be required to take a mathematics elective; BUS 221 Analytics for Informed Decision-Making is preferred. See IIT Core Curriculum, section D, page 25.

Natural Science or Engineering*

Ten to eleven semester hours of natural science or engineering courses. Relevant science courses include physics, chemistry, astronomy, biology, or engineering graphics. Two sequential courses must be from the same field and one must be from another field. In some cases, certain technology courses might be applied to this requirement. See IIT Core Curriculum, section D, page 25.

* A minimum 16 credit hours is required between Mathematics and Natural Science or Engineering.

Bachelor of Information Technology and Management

Transfer students are required to take 72 semester hours at IIT and transfer 55 semester hours to complete the Bachelor’s degree for a total of 127 semester hours. This includes 18 information technology courses for a total of 54 semester hours in the major. An additional 18 semester hours outside the major must be taken at IIT in order to satisfy the remaining IIT Core Curriculum Requirements. These include four 300/400 level humanities and social or behavioral science electives and two IPRO courses. Two social or behavioral science electives must be from the same field and one must be from a different field; lower level social or behavioral science electives count towards this requirement. The computer science general education requirement may be satisfied by completion of ITM 311.

All students must complete a minimum of 36 semester hours of courses with a significant written and oral communication component, identified with a (C) in the bulletin; 12 hours of (C)-coded courses must be taken in the major.

ITM students are required to complete a minor and are strongly encouraged to consider minors which complement their primary program of study; these include (but are not limited to) Business, Industrial Technology, Professional and Technical Communications; Circuits and Systems; Computer Architecture; and ROTC. Courses taken to fulfill a minor requirement may not also be used as electives in the major. The minor requirement may be waived for students entering as transfer students or who change their major to Information Technology and Management after completion of 30 hours of studies at IIT.

A maximum of nine hours of ITM graduate courses taken as an undergraduate may be applied to the Master of Information Technology and Management degree, and any graduate courses taken to fulfill undergraduate degree requirements may not also be applied to a graduate degree unless the student is enrolled in a co-terminal Master’s degree program.
### Bachelor of Information Technology and Management

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ITM Requirements</strong></td>
<td>38</td>
</tr>
<tr>
<td>ITM 100, 301, 311, 312, ITMD 361, 362, 411, 421, ITMM 471, ITMO 440, 456, ITMS 448, ITMT 403</td>
<td></td>
</tr>
<tr>
<td><strong>ITM Electives</strong></td>
<td>18</td>
</tr>
<tr>
<td>Select from ITM, ITMD, ITMM, ITMO, ITMS, ITMT, and TECH</td>
<td></td>
</tr>
<tr>
<td><strong>Mathematics Requirements</strong></td>
<td>6</td>
</tr>
<tr>
<td>MATH 230 and a Statistics Elective (BUS 221, PSYC 203 or MATH 425)</td>
<td></td>
</tr>
<tr>
<td><strong>Natural Science and Engineering Requirements</strong></td>
<td>11</td>
</tr>
<tr>
<td>EG 225 is recommended.</td>
<td></td>
</tr>
<tr>
<td>See IIT Core Curriculum, section D, page 25.</td>
<td></td>
</tr>
<tr>
<td><strong>Humanities and Social or Behavioral Science Requirements</strong></td>
<td>21</td>
</tr>
<tr>
<td>PSYC 301 is recommended.</td>
<td></td>
</tr>
<tr>
<td>See IIT Core Curriculum, sections B and C, page 25.</td>
<td></td>
</tr>
<tr>
<td><strong>Interprofessional Projects</strong></td>
<td>6</td>
</tr>
<tr>
<td><strong>Minor Electives</strong></td>
<td>15</td>
</tr>
<tr>
<td><strong>Free Electives</strong></td>
<td>12</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
<td>127</td>
</tr>
</tbody>
</table>
### Information Technology & Management Curriculum

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Credits</th>
<th>Semester 2</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITM 301</td>
<td>3</td>
<td>ITM 100</td>
<td>2</td>
</tr>
<tr>
<td>ITMD 421</td>
<td>3</td>
<td>ITM 311</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science or Engineering Elective</td>
<td>4</td>
<td>MATH 230</td>
<td>3</td>
</tr>
<tr>
<td>Humanities 200-level Elective</td>
<td>3</td>
<td>Social Sciences Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
<td><strong>13</strong></td>
<td><strong>Total Hours</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 3</th>
<th>Credits</th>
<th>Semester 4</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITM 312</td>
<td>3</td>
<td>ITMD 411</td>
<td>3</td>
</tr>
<tr>
<td>ITMD 361</td>
<td>3</td>
<td>ITMO 456</td>
<td>3</td>
</tr>
<tr>
<td>ITMO 440</td>
<td>3</td>
<td>ITMD 362</td>
<td>3</td>
</tr>
<tr>
<td>Natural Science or Engineering Elective</td>
<td>3</td>
<td>ITM Elective</td>
<td>3</td>
</tr>
<tr>
<td>Social Sciences Elective (300+)</td>
<td>3</td>
<td>Statistics Elective (BUS 221, MATH 425, PSYC 203)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
<td><strong>15</strong></td>
<td><strong>Total Hours</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 5</th>
<th>Credits</th>
<th>Semester 6</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITMM 471</td>
<td>3</td>
<td>ITM Elective</td>
<td>3</td>
</tr>
<tr>
<td>ITM Elective</td>
<td>3</td>
<td>ITM Elective</td>
<td>3</td>
</tr>
<tr>
<td>Minor Elective</td>
<td>3</td>
<td>IPRO Elective I</td>
<td>3</td>
</tr>
<tr>
<td>Humanities Elective (300+)</td>
<td>3</td>
<td>Social Sciences Elective (300+)</td>
<td>3</td>
</tr>
<tr>
<td>Free Elective</td>
<td>3</td>
<td>Minor Elective</td>
<td>3</td>
</tr>
<tr>
<td>Free Elective</td>
<td>3</td>
<td>Free Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
<td><strong>18</strong></td>
<td><strong>Total Hours</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 7</th>
<th>Credits</th>
<th>Semester 8</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITMS 448</td>
<td>3</td>
<td>ITMT 430</td>
<td>3</td>
</tr>
<tr>
<td>ITM Elective</td>
<td>3</td>
<td>ITM Elective</td>
<td>3</td>
</tr>
<tr>
<td>Minor Elective</td>
<td>3</td>
<td>IPRO Elective II</td>
<td>3</td>
</tr>
<tr>
<td>Humanities Elective (300+)</td>
<td>3</td>
<td>Minor Elective</td>
<td>3</td>
</tr>
<tr>
<td>Free Elective</td>
<td>3</td>
<td>Humanities or Social Sciences Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
<td><strong>15</strong></td>
<td><strong>Total Hours</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

**Total Credit Hours** | **127**

* Students should be aware that students not completing 30 hours of study in their first year will still be classified as a first year student in the first semester of their second year of study, which may adversely impact some financial aid. Students with issues or questions about this should discuss it with a Financial Aid Counselor.
Information Technology and Management

Information Technology Curriculum Specializations

The ITM electives may be chosen from one or more of the following course specializations. ITM required courses may not be counted toward completion of elective requirements for specializations. With the permission of the adviser, other undergraduate or graduate courses in the same area may be substituted for courses in a specialization.

**Systems Security**
Focuses on application, data, and network security and the management of information technology security.
- ITMS 478 Cyber Security Management
  - AND any one of the following:
    - ITMO 433 Enterprise Server Administration
    - ITMO 441 Network Applications and Operations
    - ITMO 450 Enterprise End-User System Administration
    - ITMO 453 Open Source Server Administration
- AND any two ITMS electives.

**Data Management**
Focuses on the design, development and administration of traditional and Internet-based data management.
- ITMD 422 Advanced Database Management
- ITMS 428 Database Security
  - AND any two of the following:
    - ITMO 444 Cloud Computing Technologies
  OR any ITMD elective(s)

**Web Design and Application Development**
Focuses on the design and development of fully-interactive Web sites and applications for Internet deployment.
- ITMO 441 Network Applications and Operations
- ITMD 462 Web Application Development
  - AND any two of the following:
    - ITMO 444 Cloud Computing Technologies
    - ITMD 415 Advanced Software Development
  OR any ITMD elective.

**Software Development**
Focuses on programming and the development of sophisticated applications.
- ITMD 415 Advanced Software Development
- ITMD 462 Web Site Application Development
  - AND any one of the following:
    - ITMD 412 Advanced Structured & Systems Programming
    - ITMD 413 Open Source Programming
    - ITMD 419 Topics in Software Development
    - ITMD 453 Enterprise Intelligent Device Applications
    - ITMD 454 Mass-Market Intelligent Device Applications
    - ITMD 455 Open Source Intelligent Device Applications
  OR any ITMD elective.

**System Administration**
Focuses on the administration and management of servers.
- ITMO 441 Network Applications and Operations
  - AND select two courses from the following:
    - ITMO 433 Enterprise Server Administration
    - ITMO 450 Enterprise End-User System Administration
    - ITMO 453 Open Source Server Administration
  OR any ITMD elective.

**Networking and Communications**
Focuses on network applications and management.
- ITMO 441 Network Applications and Operations
  - AND any one of the following:
    - ITMO 433 Enterprise Server Administration
    - ITMO 453 Open Source Server Administration
  OR any two from ITMO, ITMT, or the following:
    - ITMD 465 Rich Internet Applications
    - ITMS 443 Vulnerability Analysis and Control
    - ITMS 478 Cyber Security Management

**IT Entrepreneurship and Management**
Focuses on managerial and entrepreneurial skills needed to launch a new enterprise.
- ITMM 470 Fundamentals of Management for Technical Professionals
- ITMM 481 IT Entrepreneurship
  - AND any two from ITMM or the following:
    - BUS 100 Introduction to Business
    - ECON 151 Making Strategic Decisions in the Marketplace
  OR any BUS electives at the 200-level or above
  OR any INTM electives selected with adviser’s approval.
IIT/College of DuPage and IIT/Joliet Junior College Dual Admissions Programs

Students who meet the requirements of the Dual Admissions Program (DAP) may enroll simultaneously at the College of DuPage (COD) or Joliet Junior College (JJC) and IIT. Students accepted into the DAP will have access to advising and other services from both institutions. Students who successfully complete the institutional course requirements of both institutions under the DAP will be awarded an Associate’s Degree from COD or JJC and a Bachelor of Information Technology and Management from IIT.

Eligibility for the program
Students applying to the DAP must be enrolled in one of the following programs:

At COD: Associate of Applied Science Degree in Computer Information Systems or Associate of Applied Science Degree in Computer Internetworking Technologies

At JJC: Associate of Applied Science Degree in Computer Information Systems; Network Specialist, Programming or Web Design and Administration Options

Students must have and maintain a cumulative grade point average of at least 3.0 at COD or JJC to be eligible for admission to IIT. Students must make satisfactory academic progress at COD, as defined by COD, or at JJC, as defined by JJC.

Application process
Applicants must complete a Statement of Intent form, which permits the exchange of academic admission and advising information between IIT and COD or JJC. Applicants must also complete the application process at both COD or JJC and IIT in order to be admitted to both institutions. The IIT application may be submitted only for a bachelor’s program in Information Technology and Management. Admission to other IIT programs may have additional requirements that are outside the scope of the program.

Academic Program Requirements
Students must follow each institution’s policies regarding admission, course enrollment, transfer hours, probation, dismissal and re-instatement. Transcripts must be sent to the IIT Office of Educational Services each semester for each student attending COD or JJC and enrolled in the DAP. IIT will provide COD and JJC with major and course updates, course prerequisites and program requirements for the Information Technology and Management bachelor’s degree completion program.

Graduation Requirements
Students enrolled in the DAP must follow the COD or JJC catalog to satisfy requirements for the Associate’s Degree and the requirements set out in the IIT Undergraduate Bulletin in effect at the time of admission into the DAP for the Bachelor’s Degree.

The Center for Cyber Security and Forensics Education

The Center for Cyber Security and Forensics Education (CSAFE) is a multi-disciplinary center within the IIT School of Applied Technology. The objectives of the Center for Cyber Security and Forensics Education are to:

- Develop, promote and support education and research in cybersecurity technologies and management, information assurance, and digital forensics across all academic disciplines at Illinois Institute of Technology.
- Engage with business and industry, government, professional associations, and community colleges to enhance knowledge, awareness and education in cybersecurity and digital forensics and improve practices in information assurance.
- Coordinate the designation of Illinois Institute of Technology as a National Center of Academic Excellence in Cyber Defense Education.
- Maintain resources for education and research in cybersecurity and digital forensics, publish student and faculty research in the field, and sponsor, organize and conduct conferences and other events to promote and advance cyber security and forensics education.
- Support IIT academic departments in the delivery of the highest caliber of cyber security and digital forensics education.

The Center plans, organizes and conducts the annual ForensSecure conference in the Spring of each year, as well as additional activities and student competitions that advance the mission of the Center.

The Center actively cooperates and coordinates activities with agencies of the Federal government and with professional organizations and programs such as the Information Systems Security Association (ISSA), the Information Systems Audit and Control Association (ISACA), the Association of Information Technology Professionals (AITP), the Association for Computing Machinery (ACM), the Institute of Electrical and Electronic Engineers (IEEE), UNIFORUM, CompTIA, InfraGuard, and others. The Center makes every effort to engage in joint activities with these organizations and to encourage them to engage with the Center whenever possible.

Illinois Institute of Technology has been designated as a National Center of Academic Excellence in Cyber Defense Education by the National Security Agency and the U.S. Department of Homeland Security. This designation results from meeting stringent Center of Academic Excellence criteria and mapping of Information Technology and Management curricula to a core set of cyber defense knowledge units. Students attending Center of Academic Excellence in Cyber Defense Education institutions are eligible to apply for scholarships and grants through the Department of Defense Information Assurance Scholarship Program and the Federal Cyber Service Scholarship for Service Program. This designation reflects Illinois Tech’s commitment to producing professionals with cyber defense expertise for the Nation.

Resources for education and research as well as published student and faculty research in the form of technical reports and white papers are available on the Center’s website at http://ccsafe.iit.edu/.
Information Technology and Management

**ITM 100**
Introduction to Information Technology as a Profession
This course introduces students to the steps necessary to analyze a problem in information technology and identify and define the computing requirements appropriate to its solution, with a focus on how to design, implement, and evaluate a computer based system, process, component, or program to meet desired needs. Students learn to analyze the local and global impact of computing on individuals, organizations, and society. This course leads students to recognize the need for continuing professional development and imparts an understanding of professional, ethical, legal, security and social issues and responsibilities in information technology. Students write and present, building their ability to communicate effectively with a range of audiences, and work in teams, learning to function effectively together to accomplish a common goal.
(2-0-2) (C)

**ITM 300**
Communication in the Workplace
Review, analyze and practice verbal and written communication formats found in the workplace. Emphasis on developing skills in technical writing and oral presentations using electronic and traditional media. Credit not granted for both ITM 300 and COM 421; INTM 301 may be substituted for this course.
(3-0-3) (C)

**ITM 301**
Introduction to Contemporary Operating Systems & Hardware I
Students study the basics of computer architecture and learn to use a contemporary operating system. Hardware requirements, hardware components, software compatibility and system installation topics are covered, along with post-installation, storage, security, and system diagnosis/repair. Topics also include discussion of current and future technology industry trends.
(2-2-3)

**ITM 311**
Introduction to Software Development
A broad introduction to object-oriented programming and the related knowledge necessary to program in a contemporary programming language. This would include coverage of an Application Development Kit, a standard Integrated Development environment, and the use of GUI components.
(2-2-3)

**ITM 312**
Introduction to Systems Software Programming
Introduces basic concepts of systems programming. Students learn to apply basic programming concepts toward solving problems, create source files and implement header files, work with and effectively use basic data types, abstract data types, control structures, code modularization and arrays. Students will be introduced to object paradigm including, classes, inheritance, and polymorphism applications.
(2-2-3)

**ITM 497**
Independent Study
Special projects.
(Credit: Variable)

Information Technology and Management: Development

**ITMD 361**
Fundamentals of Web Development
This course will cover the creation of Web pages and sites using HTML, CSS, Javascript, jQuery and graphical applications, as well as the client and server architecture of the Internet and related web technologies. The creation and deployment of modern, standards-compliant web pages are addressed. Students create and deploy a Web site with multiple pages and cross-linked structures.
(2-2-3)

**ITMD 362**
Human Computer Interaction and Web Design
Students in this course will learn the importance of human computer interaction design and the effectiveness of user-centered design. The course will cover a survey of methods frequently used by the HCI profession, such as usability testing and prototyping, as well as general design principles and how to use design guidelines. A particular emphasis will be placed on usability for Web site engineering, and students will apply knowledge from the field in the design and construction of user-centered Web sites.
Prerequisite(s): [(ITMD 361)]
(2-2-3)
Course Descriptions

ITMD 411
Intermediate Software Development
This course covers a broad spectrum of object-oriented programming concepts and application programming interfaces. The student considers the details of object-oriented development in topics of multi-threading, data structure collections, stream I/O and client interfaces. Software engineering topics of packaging and deployment are covered as well. Hands-on exercises reinforce concepts taught throughout the course.
Prerequisite(s): [(ITM 311)]
(2-2-3)

ITMD 412
Advanced Structured and Systems Programming
Structured programming continues with advanced concepts including strings, arrays, pointers, data structures, file manipulation, and dynamic memory management. Students create more complex applications that work with user input, manipulate user supplied text or text obtained from a file, apply standard library routines for working with literal text, use pointers to store complex structures within arrays, and read and write data from files, the console, and the terminal. The object-oriented programming (OOP) paradigm is covered in depth including the philosophy of OOP, classes and objects, inheritance, template classes, and making use of class libraries.
Prerequisite(s): [(ITM 312)]
(2-2-3)

ITMD 413
Open Source Programming
Contemporary open-source programming languages and frameworks are presented. The student considers design and development topics in system, graphical user interface, network and Web programming. Dynamic scripting languages are covered using object-oriented, concurrent and functional programming paradigms. Concepts gained throughout the course are reinforced with numerous exercises which will culminate in an open-source programming project.
Prerequisite(s): [(ITM 411)]
(2-2-3)

ITMD 415
Advanced Software Development
This course considers Web container application development for enterprise systems. The primary focus is on database connectivity (JDBC) integration with Web application programming using an enterprise-level application framework. A Web application term project considers the design and implementation of a database instance that serves as the information tier in a contemporary 3-tier enterprise solution.
Prerequisite(s): [(ITM 411)]
(2-2-3)

ITMD 419
Topics in Software Development
This course will cover a particular topic in software development, varying from semester to semester, in which there is particular student or staff interest. Prerequisite(s): consent of instructor. This course may be taken more than once but only 9 hours of ITMD 419/519 credit may be applied to a degree.
(Credit: Variable)

ITMD 421
Data Modeling and Applications
Basic data modeling concepts are introduced. Hands-on database design, implementation, and administration of single-user and shared multi-user database applications using a contemporary relational database management system.
(2-2-3)

ITMD 422
Advanced Database Management
Advanced topics in database management and programming including client server application development are introduced. Expands knowledge of data modeling concepts and introduces object-oriented data modeling techniques. Students will learn the use of Structured Query Language in a variety of application and operating system environments.
Prerequisite(s): [(ITM 421)]
(3-0-3)

ITMD 453
Enterprise Intelligent Device Applications
Intelligent device application development is covered with proprietary enterprise and open-source technologies on media device, mobile and robotic platforms. Utilizing contemporary toolkits, the student considers design and development on emulated and real “smart” devices including smart phones, personal digital assistants, sensors, actuators and robots. Numerous exercises reinforce concepts gained throughout the course. A term project will integrate course topics into a comprehensive intelligent device application.
Prerequisite(s): [(ITM 311)]
(2-2-3)

ITMD 454
Mass-Market Intelligent Device Applications
Intelligent device application development is covered with leading mass-market and open-source technologies on media device, mobile and robotic platforms. Utilizing contemporary toolkits, the student considers design and development on emulated and real “smart” devices including smart phones, personal digital assistants, sensors, actuators and robots. Numerous exercises reinforce concepts gained throughout the course. A term project will integrate course topics into a comprehensive intelligent device application.
Prerequisite(s): [(ITM 311)]
(2-2-3)

ITMD 455
Open Source Intelligent Device Applications
Intelligent device application development is covered with mainstream open-source technologies on media device, mobile and robotic platforms. Utilizing contemporary toolkits, the student considers design and development on emulated and real “smart” devices including smart phones, personal digital assistants, sensors, actuators and robots. Numerous exercises reinforce concepts gained throughout the course. A term project will integrate course topics into a comprehensive intelligent device application.
Prerequisite(s): [(ITM 311)]
(2-2-3)
ITMD 460  
**Fundamentals of Multimedia**  
Students are introduced to computer-based multimedia theory, concepts and applications. Topics include desktop publishing, hypermedia, presentation graphics, graphic images, animation, sound, video, multimedia on the World Wide Web and integrated multimedia authoring techniques.  
(2-2-3) (C)

ITMD 462  
**Web Site Application Development**  
Programming the Common Gateway Interface (CGI) for Web pages is introduced with emphasis on creation of interfaces to handle Web-based form data. CGI programming is taught in multiple languages. Security of Web sites is covered with an emphasis on controlled access sites. Setup, administration and customization of content management systems including blog and portal sites is introduced. Students design and create a major Web site with including basic CGI programs with Web interfaces and process data flows from online forms with basic database structures.  
Prerequisite(s): [(ITMD 361)]  
(2-2-3) (C)

ITMD 463  
**Intermediate Web Application Development**  
In-depth examination of the concepts involved in the development of Internet applications. Students will learn the differences and similarities between Internet applications and traditional client/server applications. A discussion of the technologies involved in creating these Internet applications is included, and students will learn to use these technologies to create robust server-side applications.  
Prerequisite(s): [(ITMD 361)]  
(2-2-3)

ITMD 464  
**Advanced Web Application Development**  
Strategies for management of electronic commerce allow students to learn to re-engineer established business processes to increase enterprise competitive advantage, provide better customer service, reduce operating costs, and achieve a better return on investment. Students will learn to evaluate, use, and deploy state-of-the-art tools and techniques needed to develop a reliable e-commerce offering on the Web. The course will cover state-of-the-art programming and development tools. This class will provide students with hands-on exposure needed to design and build a fully functional e-commerce Web site.  
Prerequisite(s): [(ITMD 463)]  
(2-2-3)

ITMD 465  
**Rich Internet Applications**  
Students learn to create interactive rich Internet applications using Web development frameworks, applications and techniques that primarily operate on the client-side. These applications often exhibit the same characteristics as desktop applications and are typically delivered through a standards-based Web browser, via a browser plug-in, or independently via sandboxes or virtual machines. Current software frameworks used to download, update, verify and execute these applications are addressed, as well as writing applications for deployment in these frameworks.  
Prerequisite(s): [(ITMD 361)]  
(2-2-3)

ITMD 466  
**Service-Oriented Architectures**  
This course covers IT enterprise systems employing web services technologies in SOA and ESB architectural patterns. The student considers SOA which defines and provisions IT infrastructure and allows for a loosely-coupled data exchange over disparate applications participating in business processes. The simplification of integration and flexible reuse of business components within SOA is greatly furthered by ESB. Lab exercises using contemporary toolkits are utilized to reinforce platform-agnostic course topics.  
Prerequisite(s): [(ITMD 361 and ITMD 411)]  
(2-2-3)

ITMD 467  
**Web Systems Integration**  
In this project-based course, student teams will build an enterprise-grade website and web infrastructure integrating server-side applications, databases, and client-side Rich Internet applications as a solution to a defined business problem.  
Prerequisite(s): [(ITMD 462 and ITMD 465)]  
(2-2-3)

ITMD 469  
**Topics in Application Development**  
This course will cover a particular topic in application development, varying from semester to semester, in which there is particular student or staff interest. This course may be taken more than once but only 9 hours of ITM 469/569 or ITMD 469/569 credit may be applied to a degree.  
(Credit: variable)

---

**Information Technology and Management: Management**

ITMM 437  
**Service Level Agreements**  
Management of service level agreements (SLAs) at an enterprise level is presented from both a client and service provider perspective. Fundamental structure and issues of contract law are introduced and various models for management of service level agreements are presented. The role of SLAs in enterprise architecture and planning is addressed and service level definitions, quality of service, and performance metrics are examined.  
Prerequisite(s): [(ITMM 470)]  
(3-0-3)

ITMM 470  
**Fundamentals of Management for Technology Professionals**  
This course explores fundamentals of management for professionals in high-technology fields. It addresses the challenges of managing technical professionals and technology assets; human resource management; budgeting and managerial accounting; management of services, infrastructure, outsourcing and vendor relationships; technology governance and strategy; and resource planning.  
(3-0-3)
**Course Descriptions**

**ITMM 471**  
**Project Management for Information Technology & Management**  
Basic principles of project management are taught. Includes Software Development concepts of requirements analysis, object modeling and design and software testing. Management of application development and major Web development projects will also be addressed.  
(3-0-3)

**ITMM 481**  
**IT Entrepreneurship**  
This course prepares students to become leaders in information technology and to build ITM companies. Students design and develop a prototype ITM product and prepare a business plan and venture proposal presentation.  
(3-0-3)

**ITMM 485**  
**Legal and Ethical Issues in Information Technology**  
Current legal issues in information technology are addressed including elements of contracting, payment systems and digital signatures, privacy concerns, intellectual property, business torts and criminal liability including hacking, computer trespass and fraud. Examination of ethical issues including privacy, system abuse, and ethical practices in information technology equip students to make sound ethical choices and resolve legal and moral issues that arise in information technology.  
(3-0-3)

**Information Technology and Management: Operations**

**ITMO 433**  
**Enterprise Server Administration**  
Students learn to set up and maintain and administer X86-based servers and associated networks using a contemporary industry-standard proprietary operating system. Topics include hardware requirements; software compatibility; system installation, configuration and options and post-installation topics; administrative and technical practices required for system security; process management; performance monitoring and tuning; storage management; back-up and restoration of data; and disaster recovery and prevention. Also addressed is configuration and administration of common network and server services such as DNS, DHCP, remote access, email, basic virtualization, web and web services, and more.  
Prerequisite(s): [(ITM 301) and (ITMO 440)]  
(2-2-3)

**ITMO 440**  
**Introduction to Data Networks and the Internet**  
This course covers current and evolving data network technologies, protocols, network components, and the networks that use them, focusing on the Internet and related LANs. The state of worldwide networking and its evolution will be discussed. This course covers the Internet architecture, organization, and protocols including Ethernet, 802.11, routing, the TCP/UDP/IP suite, DNS, SNMP, DHCP, and more. Students will be presented with Internet-specific networking tools for searching, testing, debugging, and configuring networks and network-connected host computers. There will be opportunities for network configuration and hands-on use of tools.  
(2-2-3)

**ITMO 441**  
**Network Administration and Operations**  
Students learn the details, use, and configuration of network applications. Currently protocols and application technologies considered include SNMP, SMTP, IMAP, POP, MIME, BOOTP, DHCP, SAMBA, NFS, AFS, X, HTTP, DNS, NetBIOS, and CIFS/SMB. Windows workgroups and domains: file and printer sharing, remote access, and Windows networking are addressed. A research paper in the above topic areas is required.  
Prerequisite(s): [(ITMO 440) OR (ITMO 540)]  
(2-2-3)

**ITMO 444**  
**Cloud Computing Technologies**  
Computing applications hosted on dynamically-scaled, virtual resources available as services are considered. Collaborative and non-collaborative “cloud-resident” applications are analyzed with respect to cost, device/location independence, scalability, reliability, security, and sustainability. Commercial and local cloud architectures are examined. A group-based integration of course topics will result in a project employing various cloud computing technologies.  
Prerequisite(s): [(ITMO 411 and ITMO 456)]  
(2-2-3)

**ITMO 450**  
**Enterprise End-User System Administration**  
Students learn to set up, configure, and maintain end-user desktop and portable computers and devices in an enterprise environment using a contemporary proprietary operating system, including the actual installation of the operating system in a networked client-server environment. User account management, security, printing, disk configuration, and backup procedures are addressed, with particular attention to coverage of networked applications. System installation, configuration and administration issues as well as network file systems, network access and compatibility with other operating systems are also addressed. Administration of central server resources associated with management and provisioning of end-user systems in workgroups, domains or forests is also addressed.  
Prerequisite(s): [(ITMD 411 and ITMO 456)]  
(2-2-3)

**ITMO 453**  
**Open Source Server Administration**  
Students learn to set up, configure, and administer an industry-standard open source server operating system, including integration with client systems using a variety of operating systems in a mixed environment. Topics include hardware requirements; software compatibility; administrative and technical practices required for system security; process management; performance monitoring and tuning; storage management; back-up and restoration of data; and disaster recovery and prevention. Also addressed are configuration and administration of common network and server services such as DNS, DHCP, firewall, proxy, remote access, file and printer sharing, email, web and web services, and more. as well as support issues for open source software.  
Prerequisite(s): [(ITMO 456) and (ITMO 440)]  
(2-2-3)
ITMO 454
Operating System Virtualization
This course will cover technologies allowing multiple instances of operating systems to be run on a single physical system. Concepts addressed include hypervisors, virtual machines, paravirtualization and virtual appliances. Both server and desktop virtualization will be examined in detail, with short coverage of storage virtualization and application virtualization. Business benefits, business cases and security implications of virtualization will be discussed. Extensive hands-on assignments and a group project will allow students to gain firsthand experience of this technology. Prerequisite(s): [(ITM 301) OR (ITMO 456)]

(2-2-3)

ITMO 456
Introduction to Open Source Operating Systems
Students learn to set up and configure an industry-standard open source operating system, including system installation, and basic system administration; system architecture; package management; command-line commands; devices, filesystems, and the filesystem hierarchy standard. Also addressed are applications, shells, scripting and data management; user interfaces and desktops; administrative tasks; essential system services; networking fundamentals; and security, as well as support issues for open source software. Multiple distributions are covered with emphasis on the two leading major distribution forks.

(2-2-3)

Information Technology and Management: Security

ITMS 428/528
Database Security
Students will engage in an in-depth examination of topics in database security including security considerations in applications & systems development, encryption methods, cryptography law and security architecture & models. Prerequisite(s): ITMD 421

(3-0-3)

ITMS 443
Vulnerability Analysis and Control
This course addresses hands-on ethical hacking, penetration testing, and detection of malicious probes and their prevention. It provides students with in-depth theoretical and practical knowledge of the vulnerabilities of networks of computers including the networks themselves, operating systems and important applications. Integrated with the lectures are laboratories focusing on use of open source and freeware tools; students will learn in a closed environment to probe, penetrate and hack other networks. Prerequisite(s):

(2-2-3)

ITMS 448
Cyber Security Technologies
Prepares students for a role as a network security administrator and analyst. Topics include viruses, worms, other attack mechanisms, vulnerabilities and countermeasures, network security protocols, encryption, identity and authentication, scanning, firewalls, security tools, and organizations addressing security. A component of this course is a self-contained team project that, if the student wishes, can be extended into a fully operational security system in a follow-on course. Prerequisite(s): [(ITMO 440) and (ITMO 456)]

(2-2-3)

ITMS 458
Operating System Security
This course will address theoretical concepts of operating system security, security architectures of current operating systems, and details of security implementation using best practices to configure operating systems to industry security standards. Server configuration, system-level firewalls, file system security, logging, anti-virus and anti-spyware measures and other operating system security strategies will be examined. Prerequisite(s): [(ITMO 456)]

(2-2-3)

ITMS 478
Cyber Security Management
In-depth examination of topics in the management of information technology security including access control systems & methodology, business continuity & disaster recovery planning, legal issues in information system security, ethics, computer operations security, physical security and security architecture & models using current standards and models.

(3-0-3)

ITMS 479
Topics in Information Security
This course will cover a particular topic in information security, varying from semester to semester, in which there is particular student or staff interest. Prerequisite(s): consent of instructor. This course may be taken more than once but only 9 hours of ITMS 479/579 credit may be applied to a degree.

(Credit: variable)

Information Technology and Management: Theory & Technology

ITMT 430
System Integration
This capstone course will allow students, through completion of a major project in the integration of information systems, to demonstrate mastery of the fundamentals of system integration and architecture. They will demonstrate their ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems as well as their ability to effectively integrate IT-based solutions into the user environment. The course will also ensure students understand professional, ethical, legal, security and social issues and responsibilities; have the ability to analyze the local and global impact of computing on individuals, organizations, and society; and recognize the need for and have the ability to engage in continuing professional development. Prerequisite(s): [(ITMD 362) and (ITMD 411) and (ITMD 421) and (ITMM 471) and (ITMO 440) and (ITMO 456)]

(2-2-3)

ITMT 491
Undergraduate Research
Undergraduate Research.

(Credit: variable)
ITMT 492  
Embedded Systems and Reconfigurable Logic Design  
This course covers reconfigurable intelligent devices programmed  
with modern high level languages focusing on design and integration  
to modern environments. This course also covers the topic and de-  
ployment of wireless sensor networks and the use of rapid proto-  
typing for commercial application. Students will discover hardware,  
software and firmware design trade-offs as well as best practices in  
current embedded systems development. A final project will inte-  
grate course topics into a system using an embeddable single-board  
microcontroller.  
Prerequisite(s): [(ITM 311) OR (312)]  
(3-0-3)  

ITMT 495  
Topics in Information Technology  
This course will cover a particular topic, varying from semester to  
semester, in which there is particular student or staff interest.  
(Credit: variable)  

Technology  
TECH 465  
Introduction to Social Commerce  
Provides the student with an introduction and basic knowledge of  
social commerce to help the student develop a practical under-  
standing of the design, construction, market readiness and syner-  
gistic integration of a business mobile application used in social  
commerce. The course will provide a practitioner focus that will  
benefit the student in a start-up or company/corporate setting.  
(3-0-3)  

TECH 497  
Special Projects in Technology  
Independent study and project.  
(Credit: variable)  

Information Technology and  
Management: Graduate Courses  
The following graduate courses are available to degree-seeking un-  
dergraduate students with approval of the course instructor and fac-  
ulty adviser, and to co-terminal degree students; additional gradu-  
ate courses may be available to co-terminal degree students. See the  
current IIT Bulletin: Graduate Programs for full descriptions  

ITMD 511  
Application Development Methodologies  

ITMD 512  
Structured and Systems Programming  

ITMD 521  
Client Server Technologies and Applications  

ITMD 523  
Advanced Topics in Data Management  

ITMD 526  
Data Warehousing  

ITMD 527  
Data Analytics  

ITMD 529  
Advanced Data Analytics  

ITMD 532  
UML Based Software Development  

ITMD 535  
Data Center Architecture  

ITMD 556  
Intelligent Device Projects  

ITMM 572  
Process Engineering for Information Technology Managers  

ITMM 573  
Building and Leading Effective Teams  

ITMM 574  
Information Technology Management Frameworks  

ITMM 575  
Networking and Telecommunications Management  

ITMM 576  
Data Center Management  

ITMM 577  
Case Studies in the Management of Information Technology  

ITMM 582  
Business Innovation  

ITMM 584  
Information Technology at C-Level  

ITMM 586  
Information Technology Auditing  

ITMO 542  
Wireless Technologies and Applications  

ITMO 546  
Telecommunications Over Data Networks  

ITMO 547  
Telecommunications Over Data Networks:  
Projects & Advanced Methods  

ITMO 557  
Storage Technologies  

ITMS 518  
Coding Security  

ITMS 538  
Cyber Forensics  

ITMS 539  
Steganography  

ITMS 549  
Cyber Security Technologies:  
Projects and Advanced Methods  

ITMS 555  
Mobile Device Forensics  

ITMS 588  
Incident Response, Disaster Recovery and  
Business Continuity  

ITMT 514  
Enterprise Application Architectures  

ITMT 531  
Object Oriented System Analysis, Modeling and Design  

ITMT 533  
Operating System Design Implementation
ITMT 535
Data Center Architecture

ITMT 537
Instructional Technologies

ITMT 593
Embedded Systems

TECH 580
Topics in the Management of Technology

TECH 581
Consulting for Technical Professionals

TECH 597
Special Problems in Technology