Data Center Operations and Management Curricula

School of Applied Technology Data Center Operations and Management Courses
Department Web site: www.iit.edu/cpd/itm/

IIT's School of Applied Technology offers a broad range of topics in data center operations and management as undergraduate, graduate and continuing education courses. Course offerings are listed below; some courses are offered at both the undergraduate and graduate levels, indicated by both 4xx and 5xx course numbers. Continuing education course numbers are the same as the lower of the ITM course numbers but carry an "IT" prefix. Please see the reverse of this page for full curricula in this field.

Data Center Operations & Management Courses within the Information Technology & Management Curricula

ITMD 526 Data Warehousing
This class will introduce the student to concepts needed for successfully designing, building and implementing a data warehouse. The class will provide the technological and managerial knowledge base for data modeling approaches such as the star schema and database de-normalization issues. Topics such as loading the warehouse, performance considerations, and other concepts unique to the data warehouse environment will be discussed and demonstrated in detail. Prerequisite: ITMD 421 (3-0-3)

ITMD 527 Data Analytics
This is a hands-on course that focuses on the creation, maintenance, and analysis of large financial and business databases including concepts such as simulated equities, insurance, and banking database systems. The student is expected to have a working understanding of relational database concepts as well as SQL. Prerequisite: ITMD 422 or permission of instructor (3-0-3)

ITMD 529 Advanced Data Analytics
Informatics is the application of information technology to solve problems in other fields. Informaticists use technology and information to build intelligent systems used to bridge the gaps between information, technology, and the people who use it. The study of Informatics is about blending applied mathematics with technology while understanding the broader consequences of computing on society and the problem being solved. It is important for any student to develop a broad perspective of technology and the people it serves. This course builds upon the student's knowledge of mathematical concepts of predictive modeling of samples and populations with an emphasis on applying technology to solve real world problems. Prerequisite: ITMD 527 or permission of instructor (3-0-3)

ITMT 535 Data Center Architecture
The course deals with building integrated data center information infrastructures, including facility, hardware, software and network components, as solutions to particular enterprise information management needs and requirements. Students will learn critical elements of modern data center design including physical plant construction; network infrastructure; data storage technologies; power provisioning and conditioning; environmental controls and HVAC; system and physical security; modular component use; and planning for growth. Prerequisites: ITMO 540 and ITMO 554 (3-0-3)

ITMO 440/540 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, Bluetooth, 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 444/544 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. Prerequisites: ITM 301 and ITM 311 (2-2-3)

ITMO 546 Telecommunications Over Data Networks
This course covers a suite of application protocols known as Voice over IP (VoIP). It describes important protocols within that suite including RTP, SDP, MGCP and SIP and the architecture of various VoIP installations including on-net to on-net, on-net to PSTN and Inter-domain scenarios. The functions of the Network Elements that play significant roles in this architecture will be defined. Examples of network elements that are currently available as products will be examined. Prerequisite: ITMO 440 or ITMO 540 (3-0-3)

ITMS 448/548 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: ITMO 440 or ITMO 540 (2-2-3)

ITMO 454/554 Operating System Virtualization
This course will cover technologies allowing multiple instances of operating systems to be run on a single physical system. Concepts addressed will include hypervisors, virtual machines, para-virtualization and virtual appliances. Both server and desktop virtualization will be examined in detail, with brief 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: ITM 301 or ITM 302 or permission of instructor. (2-2-3)

ITMO 557 Storage Technologies
Modern enterprise data storage technologies and architectures are examined in depth. Topics include storage devices, file systems, storage networks, virtual storage, RAID, NAS, SAN, and other current enterprise-level storage models. Storage management, replication, deduplication, storage tiers, backups as well as fundamentals of business continuity, application workload, system integration, and storage/system administration are addressed. Specific knowledge and skills required to configure networked storage to include archive, backup, and restoration technologies are covered. (3-0-3)

ITMM 576 Data Center Management
This course is an in-depth examination of best practices in the management of enterprise data centers. Topics include data center consolidation; data center maintenance; server and network management methods and tools; budget and finance; service level agreements; managing data center personnel and staff; and disaster recovery. Prerequisite: ITMT 535 (3-0-3)

ITMS 588 Incident Response, Disaster Recovery and Business Continuity
Students learn to design and manage key business information security functions including incident response plans and incident response teams; disaster recovery plans; business continuity plans; and crisis management teams and plans. Reporting, response planning and budgeting are all addressed. Students working in teams will prepare an incident response, disaster recovery, business continuity, or crisis management plan for a real-world organization such as a business or a government body or agency. (3-0-3)

Master of Information Technology & Management with a Specialization in Data Center Operations and Management

This degree requires completion of 30 credit hours with a GPA of 3.0/4.0 or better. Courses may be selected from 400- and 500-level courses, but a minimum of 18 credit hours must be at the 500-level or higher.

Students whose undergraduate degree is not in a computer-related area or who do not have significant experience or certifications in the information technology field may be required to complete prerequisite requirements and will be required to complete core courses, or may demonstrate their knowledge through equivalent course-work, certification or experience. Current prerequisite requirements include hardware and operating system literacy (ITM 301 or ITM 302). The core courses will ensure an ability to program at a competent level using a contemporary programming language (ITM 411); basic knowledge of networking concepts, protocols and methods (ITMO 540); knowledge of the Internet, including the ability to build Web sites and deliver them on a server (ITMD 461); and the ability to create and administer databases using a modern database management system (ITMD 421). Courses beyond the core courses and data center offerings may be drawn from any course offered in the Information Technology & Management curriculum; see the current bulletin for full details. Course descriptions for courses offered in this curriculum may be found on the reverse of this page. For additional information on this degree program, please contact Ray Trygstad at trygstad@iit.edu or 630.682.6032.

Core Courses (9 hours)

Required courses
ITMD 411 Intermediate Software Development
and 6 hours chosen from the following:
ITMD 421 Data Modeling and Applications
ITMD 461 Internet Technologies & Web Design
ITMO 540 Intro to Data Networks & the Internet

Note: Core courses may be waived upon presentation of evidence of equivalent coursework, certification or experience or successful completion of the placement examination. Approval of waivers will be made by the student's adviser or the ITM Associate Director. If any one core course is waived, students must still complete nine hours of core course content.

Specialization in Data Center Operations and Management Courses (18 hours)

Recommended courses (12 hours)
ITMO 540 Intro to Data Networks & the Internet
ITMT 535 Data Center Architecture
ITMO 554 Operating System Virtualization
ITMM 576 Data Center Management

Plus 6 hours chosen from the following:
ITMD 526 Data Warehousing
ITMD 527 Data Analytics
ITMD 529 Advanced Data Analytics
ITMO 544 Cloud Computing Technologies
ITMO 546 Telecommunications Over Data Networks
ITMO 557 Storage Technologies
ITMS 548 Cyber Security Technologies
ITMS 578 Cyber Security Management
ITMS 588 Incident Response, Disaster Recovery and Business Continuity

Data Center Operations and Management Graduate Certificate Program

This program is designed primarily for working professionals seeking knowledge that will prepare them for careers in the operation and management of large, industry-standard enterprise data centers. A certificate representing proven academic performance is presented after the required coursework is completed with a GPA of 3.0/4.0.

Applicants should have a bachelor's degree from an accredited college or university; the degree need not be in an information technology or computer related field. Prerequisites may be required for courses included in this certificate and these prerequisites will not be applied to the certificate. All courses applied to the certificate may be later applied toward the Master of Information Technology and Management degree for those who apply and are accepted to the degree program.

Complete the following four courses:
ITMT 535 Data Center Architecture
ITMO 540 Intro to Data Networks & the Internet
ITMO 554 Operating System Virtualization
ITMM 576 Data Center Management

Students who have already completed coursework, training, or certification equivalent to ITM 540 may substitute a fourth course from the list below.
ITMO 544 Cloud Computing Technologies
ITMS 548 Cyber Security Technologies
ITMS 588 Incident Response, Disaster Recovery and Business Continuity

Course descriptions for courses offered in this certificate may be found on the reverse side of this page. For additional information on this program, please contact Ray Trygstad at trygstad@iit.edu or 630.682.6032.

About Illinois Institute of Technology's School of Applied Technology

Illinois Institute of Technology's School of Applied Technology offers hands-on, project-based technology-oriented education and training for both full-time students and working professionals. Courses are taught by IIT professors and industry professionals with significant working, teaching and research experience in their fields. The School of Applied Technology offers degree, non-degree, certificate, credit, non-credit programs, corporate training, short courses and seminars ranging from a few hours to several days in length. Both Bachelors and Masters Degrees are offered in Information Technology & Management and Industrial Technology & Management, as well as Graduate Certificates in Information Technology & Management topics and adult education/CEU courses in all fields. Graduate degrees are offered in Food Safety & Technology and Food Process Engineering. Our Information Technology & Management and Food Safety & Technology curricula are supported by extensive dedicated laboratory and research facilities.

Illinois Institute of Technology (IIT) is a private, Ph.D. granting university founded in Chicago in 1890, offering programs in engineering, science, technology, architecture, design, psychology, public administration, technical communication, business and law.