**Department of Information
Technology and Management**

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IIT School of
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ILLINOIS INSTITUTE OF TECHNOLOGY

4.4.14

Proposed Changes to the Bachelor of Information Technology and Management Degree

The Curriculum Committee of the Department of Information Technology and Management has approved the following changes to the Bachelor of Information Technology and Management (BITM) degree which are now presented to the Undergraduate Studies Committee for approval. These changes now reflect the expressed desire of the UGSC and Undergraduate Academic Affairs to make the degree requirements the same for transfer students and students entering as first year students. Our program currently enrolls 80% of our undergraduates as transfer students, which makes optimization of our program to serve these students important and drove many of the specific additional changes to the degree.

The following changes are believed to be substantive and requiring approval of the Undergraduate Studies Committee:

1) Stabilize the number of hours to complete the degree at 127 by changing the mathematics requirement to a six-hour sequence. Currently hours to complete the degree are at 126-130 hours depending on the mathematics sequence taken. For transfer students, this alignment is achieved by reducing the expected hours to be transferred from 63 to 58.

2) Change the current mathematics requirement for students entering the degree as first year students from:
   ((MATH 130 and 425) or (MATH 148 and 149) or MATH 151) and a statistics elective
   to
   A mathematics elective at the level of MATH 119 or above (MATH 230 is strongly recommended), and a Statistics Elective (BUS 221, PSYC 203 or MATH 425).
   We have discussed this decision with the Mathematics Department and we understand the rigor of *MATH 230, Introduction to Discrete Mathematics.* We believe this course is far more applicable to our students than calculus and is in line with a growing belief in computing education that discrete math is preferred over calculus, and we expect our incoming students to be able to handle this course. In this iteration of the proposed change this is a recommendation rather than a requirement, as most community colleges our students transfer from do not offer discrete mathematics.
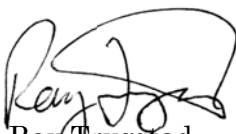
3) Add an additional required course—*ITMT 430 System Integration*—to the BITM curriculum, bringing the required course hour requirement for students entering the degree as first year students from 35 to 38 and for transfer students from 33 to 36; the difference in hours results from the waiver for *Introduction to the Profession* given to transfer students. This results in no

increase to hours required to graduate for students entering the degree as first year students due to the stabilization of the mathematics sequence discussed above, and for transfer students by a reduction in the expected hours to be transferred into the program from 63 to 58. This course is required to comply with ABET accreditation requirements for a course in this subject area, as well as for a capstone course in the degree.

The following changes are believed to be internal changes to departmental curricula and are submitted to the Undergraduate Studies Committee as information items:

1) Replace an existing required course, *ITM 302 Contemporary Operating Systems and Hardware II*, with another existing course, *ITMD 456 Introduction to Open Source Operating* systems. This is a more rigorous course and will better meet the needs of students in other courses in the curriculum. ITM 302 will no longer be offered.

2) Replace two existing six-credit-hour system administration courses,
     ITMO 451 Distributed Workstation System Administration and
     ITMO 452 Client-Server System Administration
   with three new three-credit-hour courses,
     ITMO 450 Enterprise End-User System Administration
     ITMO 451 Enterprise Server Administration
     ITMO 457 Open Source Server Administration.
   This also requires corresponding changes in three degree specializations impacted by this change:
     Systems Security
     System Administration
     Networking and Communications.
   This change increases the flexibility of this part of our curriculum and increases student options as the six-credit-hour courses have proven to be impractical for many students' schedules.

3) Remove *COM 421* as a required course for students entering as first year students, to eliminate this first–year student differentiation.

4) Change *EG 225* from a required Natural Science and Engineering elective for students entering as first year students to a recommended elective, to eliminate the first–year student differentiation.

5) Change *PSYC 301* from a required upper-level social science elective for students entering as first year students to a required upper-level social science elective for all students, to eliminate the first–year student differentiation.

6) As is normal current practice, *ITM 100 Introduction to the Profession* and the minor requirement will be explicitly waived for both students entering the degree as transfer students and for current IIT students changing majors if more than 30 hours of course work has been completed.

Changes to the curricula, specializations, and course descriptions for new courses are attached. All changes are indicated in red.

Ray Trygstad
Associate Chair

Information Technology and Management – School of Applied Technology

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Dean and Chair
C. Robert Carlson

Associate Chair and Director of Undergraduate Advising
Ray Trygstad

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 and create 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

Entering the program as a first-year student requires the completion of additional courses in technical communication, psychology, engineering graphics, and 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 60 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.

Faculty

Professor
C. R. Carlson

Industry Professors
C. Davids, R. Hendry, W. Lidinsky, R. Trygstad

Industry Associate Professor
J. Hajek

Adjunct Assistant Professors
O. Aldawud, B. Lublinsky

Adjunct Industry Professors
B. Goins, P. Gupta, D. Hood, N. Joiner, M. Schray, W. Slater, K. Vaccaro

Adjunct Industry Associate Professors
M. England, P. Huang, J. Kulp, J. Lambert, S. McBride, J. Meyers, J. Owrey, S. Shamsuddin, R. VanDame

Adjunct Instructors
B. Bailey, S. Davis, S. Hughes-Durkin, L. McHugh, J. Papademas, L. Papademas, S. Spyrison

Transfer Admission Requirements

Admitted transfer students are expected to have satisfied the following general education requirements prior to admission. If not, the student must complete them while working on the ITM degree. The degree requires

129 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.

Natural Science or Engineering
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.

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.

Mathematics
Five semester hours of mathematics at the level of MATH 119 or above; Discrete Math and Probability & Statistics are highly recommended. Students who enter the program with less than fifty-eight hours of total transfer credit or less than five hours of mathematics credit will be required to take a mathematics elective; BUS 221 Analytics for Informed Decision-Making is preferred.

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

Bachelor of Information Technology and Management

Transfer students are required to take 69 semester hours at IIT and transfer 58 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 15 semester hours outside the major must be taken at IIT in order to satisfy the remaining IIT General Education Requirements. These include three 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 42 semester hours of courses with a significant written and oral communication component, identified with a (C) in the bulletin; 15 hours of (C)-coded courses must be taken in the major.

Bachelor of Information Technology and Management students are required to complete a minor. ITM students 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 is 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

Required Courses	Credit Hours
ITM Requirements ITM 100, 301, 311, 312, ITMD 411, 421, 434, 461, ITMM 471, ITMO 440, 456, ITMS 448, ITMT 430	38
ITM Electives Select from ITM, ITMD, ITMM, ITMO, ITMS, ITMT, and TECH	18
Mathematics Requirements A mathematics elective at the level of MATH 119 or above (MATH 230 is strongly recommended), and a Statistics Elective (BUS 221, PSYC 203 or MATH 425)	6
Natural Science and Engineering Requirements (EG 225 is recommended)	11
Humanities and **Social or Behavioral Science Requirements** (not including PSYC 301)	18
Psychology Requirement PSYC 301 (as an upper-level Social or Behavioral Science requirement)	3
Interprofessional Projects	6
Minor Electives	15
Free Electives	12
Total Hours	**127**

Information Technology & Management Curriculum

Semester 1		Credits
ITM 301	Intro to Contemp Op Sys / Hardware	3
ITMD 421	Data Modeling and Applications	3
Humanities 100-level Elective		3
Natural Science or Engineering Elective		4
Total Hours		**13***

Semester 2		Credits
ITM 100	Introduction to the Profession	2
ITM 311	Introduction to Software Development	3
Mathematics elective (MATH 230 is recommended)		3
Social or Behavioral Science Elective		3
Natural Science or Engineering Elective		4
Total Hours		**15**

Semester 3		Credits
ITM 312	Introduction to Systems Software Prog	3
ITMM 471	Project Management for Info Technology	3
ITMO 440	Intro to Data Networks and the Internet	3
Natural Science or Engineering Elective		3
Social or Behavioral Science Elective		3
Total Hours		**15**

Semester 4		Credits
ITMD 411	Intermediate Software Development	3
ITMD 434	Human/Computer Interaction	3
ITMD 461	Internet Technologies & Web Design	3
ITM Elective		3
Statistics Elective (BUS 221, MATH 425, PSYC 203)		3
Minor Elective		3
Total Hours		**18**

Semester 5		Credits
ITMD 456	Intro to Open Source Operating Systems	3
ITM Elective		3
PSYC 301	Industrial Psychology	3
Minor Elective		3
Humanities Elective (300+)		3
Free Elective		3
Total Hours		**18**

Semester 6		Credits
ITM Elective		3
ITM Elective		3
IPRO Elective I		3
Social or Behavioral Science Elective (300+)		3
Minor Elective		3
Free Elective		3
Total Hours		**18**

Semester 7		Credits
ITMS 448	Cyber Security Technologies	3
ITM Elective		3
Minor Elective		3
Humanities Elective (300+)		3
Free Elective		3
Total Hours		**15**

Semester 8		Credits
ITMT 430	System Integration	3
ITM Elective		3
IPRO 497	Interprofessional Project II	3
Minor Elective		3
Humanities or Social or Behavioral Science Elective		3
Total Hours		**15**

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.

Bachelor of Information Technology and Management (Transfer, Part-Time Program)

Required Courses	Credit Hours
Courses Transferred (or taken at IIT)	58
Humanities Requirements 300/400 level courses required	6
Social or Behavioral Science Requirement PSYC 301 (as an upper-level Social or Behavioral Science requirement)	3
Interprofessional Projects	6
ITM Requirements ITM 301, 311, 312, ITMD 411, 421, 434, 461, ITMM 471, ITMO 440, 456, ITMS 448, ITMT 430	36
ITM Electives Select from ITM, ITMD, ITMM, ITMO, ITMS, ITMT, and TECH	18
Total Hours	**127**

Information Technology and Management Curriculum

(students entering as transfer, part time)

Semester 1		Credits
ITM 301	Intro to Contemporary Op Systems / Hardware	3
ITM 311	Introduction to Software Development	3
ITMD 421	Data Modeling and Applications	3
Total Hours		**9**

Semester 2		Credits
ITM 312	Introduction to Systems Software Programming	3
ITMO 440	Introduction to Data Networks and the Internet	3
Humanities Elective (300+)		3
Total Hours		**9**

Semester 3		Credits
ITMD 461	Internet Technologies and Web Design	3
ITMD 411	Intermediate Software Development	3
ITMM 471	Project Management for Info Technology	3
Total Hours		**9**

Semester 4		Credits
ITMO 456	Intro to Open Source Operating Systems	3
ITMD 434	Human/Computer Interaction	3
Humanities Elective (300+)		3
Total Hours		**9**

Semester 5		Credits
ITMS 448	Cyber Security Technologies	3
ITM Elective		3
PSYC 301	Industrial Psychology	3
Total Hours		**9**

Semester 6		Credits
ITMT 430	System Integration	3
IPRO Elective I		3
ITM Elective		3
Total Hours		**9**

Semester 7		Credits
IPRO 497	Interprofessional Project II	3
ITM Elective		3
ITM Elective		3
Total Hours		**9**

Semester 8		Credits
ITM Elective		3
ITM Elective		3
Total Hours		**6**

Total Credit Hours   **69**

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 *select one course from the following:*

ITMO 441 Network Applications and Operations

ITMO 450 Enterprise End-User System Administration

ITMO 451 Enterprise Server 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 *select two courses from 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 *select two courses from the following:*

ITMO 444 Cloud Computing Technologies

ITMD 455 Intelligent Device Applications

ITMD 463 Intermediate Web Site Application Development

ITMD 464 Advanced Web Site Application Development

ITMD 465 Rich Internet Applications

ITMD 466 Service Oriented Architecture

ITMD 469 Topics in Application Development

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 *select any two courses from ITMM or the following:*

BUS 100   Introduction to Business

ECON 151 Making Strategic Decisions in the Marketplace

 OR *any BUS elective at the 200-level or above.*

Software Development
Focuses on programming and the development of sophisticated applications.

ITMD 415 Advanced Software Development

ITMD 462 Web Site Application Development

AND *select one course from the following:*

ITMD 412 Advanced Structured & Systems Programming

ITMD 413 Open Source Programming

ITMD 419 Topics in Software Development

ITMD 455 Intelligent Device Applications

AND *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 450 Enterprise End-User System Administration

ITMO 451 Enterprise Server Administration

ITMO 453 Open Source Server Administration

AND *select two courses from the following:*

ITMO 417 Shell Scripting for System Administrators

ITMO 444 Cloud Computing Technologies

ITMO 454 Operating System Virtualization

ITMS 458 Operating System Security

Networking and Communications
Focuses on network applications and management.

ITMO 441 Network Applications and Operations

AND *select one course from the following:*

ITMO 451 Enterprise Server Administration

ITMO 453 Open Source Server Administration

AND *select any two courses from ITMO, ITMT, or the following:*

ITMD 465 Rich Internet Applications

ITMS 443 Vulnerability Analysis and Control

ITMS 478 Cyber Security Management

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 Baccalaureate Degree.

Information Technology and Management: Operations

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): [(ITM 301)]

(2-2-3)

ITMO 451
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 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 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: 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 411) and (ITMD 421) and (ITMD 434) and (ITMM 471) and (ITMO 440) and (ITMO 456)]

(2-2-3)