

# DOCTOR OF PHILOSOPHY IN INFORMATION TECHNOLOGY

## Overview

To receive a Ph.D., students must meet coursework requirements and pass qualifying exams, a comprehensive exam, and a thesis defense. At the conclusion of their studies, graduates of this degree should be able to:

- Demonstrate mastery of one or more core areas of information technology through original research and published documentation of such research.
- Research, design, and deliver optimal technical and policy technology solutions for the problems of business, industry, government, non-profit organizations, and individuals in the student's particular core area(s).
- Lead, manage, and work with teams in an enterprise environment to collaboratively arrive at optimal technology solutions.

## Curriculum

Students in the Ph.D. program have course requirements that depend on whether they enter the program with a Master of Science in Information Technology or a related computing field, a master's degree not in information technology or a computing field, or with a bachelor's degree in information technology. A student's adviser may require specific core or elective courses be taken. Possible elective courses may include PSYC 540, PSYC 545, PSYC 546, PSYC 554, and MATH 525.

### Students With a Master of Science in Information Technology or a Related Computing Field <sup>1</sup>

| Requirement                                     | Credits |
|---|---------|
| Minimum Total Credits Required                  | 72      |
| Maximum Transfer Credit <sup>2</sup>            | 32      |
| 500-, 600-, or 700-Level Course Credit Required | 40      |

| Code   | Title   | Credit Hours |
|--|---|--------------|
| <b>Required Courses (12)</b>   |   |              |
| Select a minimum of three courses from three different core course groups as listed below. |   | 9            |
| ITM 695  | Doctoral Seminar  | 3            |
| <b>Readings and Special Problems Course (0-6)</b>  |   |              |
| ITMT 597   | Special Problems in Information Technology <sup>4</sup> | 0-6          |
| <b>General Electives (0-6)</b>   |   |              |
| Select zero to six credit hours  |   | 0-6          |
| <b>Ph.D. Research (24-28)</b>  |   |              |
| ITM 691  | Research and Thesis Ph.D.                               | 24-28        |
| <b>Transfer Credit (32)</b>  |   |              |
| A maximum of 32 credit hours of master's transfer credit is allowed.                       |   | 32           |

### Students With a Master's degree Not in Information Technology or a Computing Field <sup>1</sup>

| Requirement                                     | Credits |
|---|---------|
| Minimum Total Credits Required                  | 72      |
| Maximum Transfer Credit <sup>2</sup>            | 23      |
| 500-, 600-, or 700-Level Course Credit Required | 49      |

| Code  | Title                                      | Credit Hours |
|---|--|--------------|
| <b>Required Courses (18)</b>  |  |              |
| Select a minimum of one course from each of the following core course groups: Software Development, System Technologies, and Business Development |  | 9            |
| Select a minimum of two courses from two of the following core course groups: Cybersecurity, Data Analytics and Management, Management            |  | 6            |
| ITM 695   | Doctoral Seminar <sup>3</sup>              | 3            |
| <b>Readings and Special Problems Course (0-9)</b>   |  |              |
| ITMT 597  | Special Problems in Information Technology | 0-9          |
| <b>General Electives (0-9)</b>  |  |              |
| Select zero to nine credit hours in conjunction with adviser  |  | 0-9          |
| <b>Ph.D. Research (24-31)</b>   |  |              |
| ITM 691   | Research and Thesis Ph.D.                  | 24-31        |
| <b>Transfer Credit (23)</b>   |  |              |
| A maximum of 23 credit hours of masters transfer credit is allowed.   |  | 23           |

### Students With a Bachelor's degree in Information Technology

| Requirement                                     | Credits |
|---|---------|
| Minimum Credits Required                        | 72      |
| 500-, 600-, or 700-Level Course Credit Required | 72      |

| Code  | Title   | Credit Hours |
|---|---|--------------|
| <b>Required Courses (18)</b>  |   |              |
| Select a minimum of one course from each of the following core course groups: Software Development, System Technologies, and Business Development |   | 9            |
| Select a minimum of two courses from two of the following core course groups: Cybersecurity, Data Analytics and Management, Management            |   | 6            |
| ITM 695   | Doctoral Seminar <sup>3</sup>                           | 3            |
| <b>Readings and Special Problems Course (0-9)</b>   |   |              |
| ITMT 597  | Special Problems in Information Technology <sup>4</sup> | 0-9          |
| <b>General Electives (9-21)</b>   |   |              |
| Select 9-21 credit hours in conjunction with adviser  |   | 9-21         |

|                       |                                 |
|-----------------------|---------------------------------|
| <b>Ph.D. Research</b> | <b>(24-36)</b>                  |
| ITM 691               | Research and Thesis Ph.D. 24-36 |

<sup>1</sup> Students with a degree in a related computing field or a master's degree not in information technology or a related computing field may be required to complete prerequisite and specific core or elective courses selected by their adviser. Undergraduate-level prerequisite courses will not be applied to the degree.

<sup>2</sup> 400-level Information Technology and Management courses earned at Illinois Institute of Technology may not be applied. A maximum of 12 credit hours of 400-level courses may be transferred if the courses were applied to a master's degree.

<sup>3</sup> Students must take three sequential semesters of ITM 695.

<sup>4</sup> At least three credit hours of ITMT 597 or ITMT 691 are required in the first year.

### Notes

- To be used to satisfy requirements, courses must be passed with a grade of "B" or better. 400-level Information Technology and Management courses earned at Illinois Institute of Technology and accelerated courses cannot be used. With department approval, courses may be replaced by more advanced courses.
- The 500- and 600-level electives can include credit hours from ITMT 595. They cannot include credit hours from ITMT 597, ITM 691, or ITM 695. With department approval, up to nine credit hours may come from outside the ITM department.
- Total credits required for the degree is a minimum. A student's adviser may require other courses to be taken. Consequently the total credits taken may exceed the minimum.

## Core Courses

There are six core course areas. To meet a core requirement, a course must be taken at Illinois Institute of Technology as part of the Ph.D. or a previously completed Master's program; transfer courses from other institutions cannot be used. Core courses must be passed with "B" or better to satisfy core course requirements.

| Code                                 | Title                                 | Credit Hours |
|--------------------------------------|---------------------------------------|--------------|
| <b>Group 1: Software Development</b> |                                       | <b>(18)</b>  |
| ITMD 511                             | Application Development Methodologies | 3            |
| ITMD 512                             | Structured and Systems Programming    | 3            |
| ITMD 513                             | Open Source Programming               | 3            |
| ITMD 515                             | Advanced Software Programming         | 3            |
| ITMD 536                             | Software Testing and Maintenance      | 3            |
| ITMD 542                             | Full-Stack Web Development            | 3            |
| <b>Group 2: System Technologies</b>  |                                       | <b>(18)</b>  |
| ITMO 541                             | Network Administration and Operations | 3            |
| ITMO 544                             | Cloud Computing Technologies          | 3            |
| ITMO 553                             | Open Source System Administration     | 3            |
| ITMO 554                             | Operating Systems Virtualization      | 3            |
| ITMO 557                             | Storage Technologies                  | 3            |
| ITMT 593                             | Embedded Systems                      | 3            |
| <b>Group 3: Business Development</b> |                                       | <b>(18)</b>  |

|   |   |             |
|---|---|-------------|
| ITMD 532                                      | UML-Based Software Development                                | 3           |
| ITMD 534                                      | Human and Computer Interaction                                | 3           |
| ITMD 535                                      | Human-Computer Interaction Design                             | 3           |
| ITMM 581                                      | Information Technology Entrepreneurship                       | 3           |
| ITMM 582                                      | Business Innovation   | 3           |
| ITMM 587                                      | Product Management  | 3           |
| <b>Group 4: Cybersecurity</b>                 |   | <b>(18)</b> |
| ITMS 528                                      | Database Security   | 3           |
| ITMS 548                                      | Cyber Security Technologies                                   | 3           |
| ITMS 558                                      | Operating Systems Security                                    | 3           |
| ITMS 578                                      | Cyber Security Management                                     | 3           |
| ITMS 584                                      | Governance, Risk, and Compliance                              | 3           |
| ITMS 588                                      | Incident Response, Disaster Recovery, and Business Continuity | 3           |
| <b>Group 5: Data Analytics and Management</b> |   | <b>(18)</b> |
| ITMD 522                                      | Data Mining and Machine Learning                              | 3           |
| ITMD 523                                      | Advanced Topics in Data Management                            | 3           |
| ITMD 524                                      | Applied Artificial Intelligence and Deep Learning             | 3           |
| ITMD 526                                      | Data Warehousing  | 3           |
| ITMD 529                                      | Advanced Data Analytics                                       | 3           |
| ITMT 531                                      | Object-Oriented System Analysis, Modeling, and Design         | 3           |
| <b>Group 6: Management</b>                    |   | <b>(18)</b> |
| ITMM 537                                      | Vendor Management and Service Level Agreements                | 3           |
| ITMM 570                                      | Fundamentals of Management for Technology Professionals       | 3           |
| ITMM 571                                      | Project Management for Information Technology Management      | 3           |
| ITMM 572                                      | Process Engineering for Information Technology Managers       | 3           |
| ITMM 574                                      | Information Technology Management Frameworks                  | 3           |
| ITMM 585                                      | Legal and Ethical Issues in Information Technology            | 3           |