UNIVERSITY OF MINNESOTA
Driven to Discover℠

***Twin Cities Campus***

# Information Technology Infrastructure B.A.Sc.

*CCAPS Applied Professional Studies*

**College of Continuing and Professional Studies**

- Program Type: Baccalaureate
- Requirements for this program are current for Fall 2019
- Required credits to graduate with this degree: 120
- Required credits within the major: 89 to 98
- Degree: Bachelor of Applied Science

Information technology infrastructure (ITI) concerns the design, construction, and management of technology operations. The ITI major is the study and application of this knowledge to the needs of businesses and organizations. The curriculum combines a strong foundation in systems, networks, data, security, and the software service lifecycle with essential applied business courses. The ITI major prepares students for a variety of positions in industry, government, and business that involve computer technology processes, policies, components, and services.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Admission Requirements

Students must complete 45 credits before admission to the program.

Transfer students students are usually admitted to pre-major status before admission to this major

A GPA above 2.0 is preferred for the following:

- 2.50 transferring from another University of Minnesota college
- 2.50 transferring from outside the University

Students who have 30 transferable semester credits, preferred minimum 2.50 GPA, and a strong interest in the major may be admitted to pre-major status.

Each application for admission is individually reviewed in a holistic context.

For information about University of Minnesota admission requirements, visit the Office of Admissions website.

**Required prerequisites**

**Courses**

In regard to CSci courses: take CSci 1913 + [1103 or 1113] unless you are planning to take advanced CSci coursework. In that case, take CSci 1933 + 1133. All students must take CSci 2021.

**Algorithms & Data Structures**

CSCI 1913 - Introduction to Algorithms, Data Structures, and Program Development (4.0 cr)
*or* CSCI 1933 - Introduction to Algorithms and Data Structures (4.0 cr)

**Mathematics**

MATH 1042 - Mathematics of Design [MATH] (4.0 cr)
*or* MATH 1142 - Short Calculus [MATH] (4.0 cr)
*or* MATH 1271 - Calculus I [MATH] (4.0 cr)
*or* MATH 1571H - Honors Calculus I [MATH] (4.0 cr)

**Machine Architecture**

CSCI 2021 - Machine Architecture and Organization (4.0 cr)

**Physics**

PHYS 1101W - Introductory College Physics I [PHYS, WI] (4.0 cr)
*or* PHYS 1301W - Introductory Physics for Science and Engineering I [PHYS, WI] (4.0 cr)
*or* PHYS 1401V - Honors Physics I [PHYS, WI] (4.0 cr)

**Programming**

CSCI 1103 - Introduction to Computer Programming in Java (4.0 cr)
*or* CSCI 1113 - Introduction to C/C++ Programming for Scientists and Engineers (4.0 cr)
*or* CSCI 1133 - Introduction to Computing and Programming Concepts (4.0 cr)

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## General Requirements

All students are required to complete general University and college requirements including writing and liberal education courses. For more information about University-wide requirements, see the liberal education requirements.Required courses for the major or minor in which a student receives a D grade (with or without plus or minus) do not count toward the major or minor (including transfer courses).

## Program Requirements

**Preparatory Courses**

Take WRIT 1301 or WRIT 1401 for Freshman Composition.

**Accounting**

ACCT 2051 - Introduction to Financial Reporting (4.0 cr)
*or* APEC 1251 - Principles of Accounting (3.0 cr)

**C Programming**

INET 3101 - C Programming: Language and Applications (2.0 cr)

**Microeconomics**

ECON 1101 - Principles of Microeconomics [SOCS, GP] (4.0 cr)
*or* APEC 1101 - Principles of Microeconomics [SOCS, GP] (4.0 cr)
*or* APEC 1101H - Principles of Microeconomics [SOCS, GP] (4.0 cr)

**Public Speaking or Interpersonal Communication**

COMM 1101 - Introduction to Public Speaking [CIV] (3.0 cr)
*or* COMM 1101H - Honors: Introduction to Public Speaking [CIV] (3.0 cr)
*or* COMM 3402 - Introduction to Interpersonal Communication (3.0 cr)
*or* COMM 3605W - Persuasive Speaking and Speech Writing [WI] (3.0 cr)

**Statistics**

EPSY 1261 - Understanding Data Stories through Visualization & Computing [MATH] (3.0 cr)
*or* BA 2551 - Business Statistics in R [MATH] (4.0 cr)
*or* STAT 1001 - Introduction to the Ideas of Statistics [MATH] (4.0 cr)
*or* STAT 3011 - Introduction to Statistical Analysis [MATH] (4.0 cr)

**Structures**

If you plan to take elective CSCI courses beyond curriculum requirements, enroll in CSCI 2011.
INET 3102 - Web Infrastructure (2.0 cr)
*or* CSCI 2011 - Discrete Structures of Computer Science (4.0 cr)

**Technical Writing**

One technical writing course or writing intensive science course.
PHYS 1101W - Introductory College Physics I [PHYS, WI] (4.0 cr)
*or* PHYS 1301W - Introductory Physics for Science and Engineering I [PHYS, WI] (4.0 cr)
*or* WRIT 1001 - The Art of Explaining Things: Introduction to Technical Writing and Communication (3.0 cr)
*or* WRIT 3152W - Writing on Issues of Science and Technology [WI] (3.0 cr)
*or* WRIT 3257 - Technical and Professional Presentations (3.0 cr)
*or* WRIT 3562W - Technical and Professional Writing [WI] (4.0 cr)

**Core Courses**

Include the CSCI versions of Operating Systems and Computer Networks in your planning ONLY if already taken.
INET 4031 - Introduction to Systems (4.0 cr)
INET 4051 - IT Infrastructure Operations: Capstone (3.0 cr)
INET 4082W - IT Infrastructure Projects and Processes [WI] (3.0 cr)
INET 4153 - Introduction to Security:  Policy and Regulation (4.0 cr)

**Operating Systems**

INET 4001 - Foundations of Operating Systems (4.0 cr)
*or* CSCI 4061 - Introduction to Operating Systems (4.0 cr)
INET 4002 - Foundations of Networking (3.0 cr)
*or* CSCI 4211 - Introduction to Computer Networks (3.0 cr)
INET 4707 - Introduction to Databases (4.0 cr)
*or* CSCI 4707 - Practice of Database Systems (3.0 cr)

**Business/Communication Courses**

**Management**

ABUS 4022W - Management in Organizations [WI] (3.0 cr)
*or* HSM 4561W - Health Care Administration and Management [WI] (3.0 cr)

**Business Communication**

ABUS 4023W - Communicating for Results [WI] (3.0 cr)

**Cost Accounting**

ABUS 4101 - Accounting and Finance for Managers (3.0 cr)
*or* HSM 4541 - Health Care Finance (3.0 cr)

**Quality and Process Improvement**

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ABUS 3301 - Introduction to Quality Management (3.0 cr)
*or* MM 4201 - Quality Engineering and Management (3.0 cr)

**Business/Communication Elective(s)**

Must be ABUS, IDSC, or MGMT course or other dept approved elective not included in core or technical requirements.
Take 3 or more credit(s) from the following:
- ABUS 3xxx
- ABUS 4xxx
- IDSC 3xxx
- IDSC 4xxx
- MGMT 3xxx
- MGMT 4xxx

**Upper Division Writing Intensive within the Major**

Students are required to take one upper division writing intensive course within the major. If that requirement has not been satisfied within the core major requirements, students must choose one course from the following list. Some of these courses may also fulfill other requirements.
Take 0 - 1 course(s) from the following:
- ABUS 4022W - Management in Organizations [WI] (3.0 cr)
- ABUS 4023W - Communicating for Results [WI] (3.0 cr)
- COMM 3605W - Persuasive Speaking and Speech Writing [WI] (3.0 cr)
- HSM 4561W - Health Care Administration and Management [WI] (3.0 cr)
- INET 4082W - IT Infrastructure Projects and Processes [WI] (3.0 cr)
- WRIT 3152W - Writing on Issues of Science and Technology [WI] (3.0 cr)
- WRIT 3562W - Technical and Professional Writing [WI] (4.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

### Data Management

**Required Data Management Courses**

This group consists of the core course INet (or CSCI) 4707 - Introduction to Databases, and two more courses.
INET 4709 - Data Management I: Fundamentals (3.0 cr)
INET 4711 - Data Management II: Distributed Systems (4.0 cr)

**Data Management Technical Electives**

Take 3 - 5 credit(s) from the following:
- INET 4007 - Security II: Cyber Security (4.0 cr)
- INET 4011 - Networking I: Network Administration (4.0 cr)
- INET 4021 - Dev Ops I: Network Programming (4.0 cr)
- INET 4032 - Systems I: Storage (4.0 cr)
- INET 4061 - Data Science I: Fundamentals (4.0 cr)
- INET 4083W - Systems II: Analysis and Design [WI] (3.0 cr)
- INET 4121 - DevOps II: Development Strategies (4.0 cr)
- INET 4165 - Security I: Principles (3.0 cr)
- INET 4062 - Data Science II: Advanced (4.0 cr)
- INET 4193 - Directed Study (1.0 - 4.0 cr)
  *or* INET 4596 - Internship (1.0 cr)
- Other technical elective with adviser approval

### Data Science

**Required Data Science Courses**

This group consists of the core course INet (or CSci) 4707 - Introduction to Databases, and two more courses.
INET 4061 - Data Science I: Fundamentals (4.0 cr)
INET 4062 - Data Science II: Advanced (4.0 cr)

**Data Science Technical Electives**

Take 3 - 5 credit(s) from the following:
- INET 4007 - Security II: Cyber Security (4.0 cr)
- INET 4011 - Networking I: Network Administration (4.0 cr)
- INET 4021 - Dev Ops I: Network Programming (4.0 cr)
- INET 4032 - Systems I: Storage (4.0 cr)
- INET 4083W - Systems II: Analysis and Design [WI] (3.0 cr)
- INET 4121 - DevOps II: Development Strategies (4.0 cr)
- INET 4165 - Security I: Principles (3.0 cr)
- INET 4709 - Data Management I: Fundamentals (3.0 cr)
- INET 4711 - Data Management II: Distributed Systems (4.0 cr)

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•INET 4193 - Directed Study (1.0 - 4.0 cr)
*or* INET 4596 - Internship (1.0 cr)
•Other technical elective with adviser approval

## DevOps (Development & Operations)

**Required DevOps Courses**

This group consists of the core course INet 4002-Foundations of Networking (or CSci 4211 if already taken) and two more courses.
INET 4021 - Dev Ops I: Network Programming (4.0 cr)
INET 4121 - DevOps II: Development Strategies (4.0 cr)

**Dev Ops Technical Electives**

Take 3 - 5 credit(s) from the following:
•INET 4007 - Security II: Cyber Security (4.0 cr)
•INET 4011 - Networking I: Network Administration (4.0 cr)
•INET 4032 - Systems I: Storage (4.0 cr)
•INET 4061 - Data Science I: Fundamentals (4.0 cr)
•INET 4083W - Systems II: Analysis and Design [WI] (3.0 cr)
•INET 4165 - Security I: Principles (3.0 cr)
•INET 4709 - Data Management I: Fundamentals (3.0 cr)
•INET 4062 - Data Science II: Advanced (4.0 cr)
•INET 4711 - Data Management II: Distributed Systems (4.0 cr)
•INET 4193 - Directed Study (1.0 - 4.0 cr)
*or* INET 4596 - Internship (1.0 cr)
•Other technical elective with adviser approval

## Networking

**Required Networking Courses**

This group consists of the core course INet 4002-Foundations of Networking (or CSci 4211 if already taken) and two more courses.
INET 4011 - Networking I: Network Administration (4.0 cr)
INET 4041 - Networking II: Emerging Technologies (4.0 cr)

**Networking Technical Electives**

Take 3 - 5 credit(s) from the following:
•INET 4007 - Security II: Cyber Security (4.0 cr)
•INET 4021 - Dev Ops I: Network Programming (4.0 cr)
•INET 4032 - Systems I: Storage (4.0 cr)
•INET 4061 - Data Science I: Fundamentals (4.0 cr)
•INET 4083W - Systems II: Analysis and Design [WI] (3.0 cr)
•INET 4121 - DevOps II: Development Strategies (4.0 cr)
•INET 4165 - Security I: Principles (3.0 cr)
•INET 4709 - Data Management I: Fundamentals (3.0 cr)
•INET 4062 - Data Science II: Advanced (4.0 cr)
•INET 4711 - Data Management II: Distributed Systems (4.0 cr)
•INET 4193 - Directed Study (1.0 - 4.0 cr)
*or* INET 4596 - Internship (1.0 cr)
•Other technical elective with adviser approval

## Security

**Required Security Courses**

This group consists of the core course INet 4153-Introduction to Security: Policy and Regulation, and two more courses.
INET 4007 - Security II: Cyber Security (4.0 cr)
INET 4165 - Security I: Principles (3.0 cr)

**Security Technical Electives**

Take 3 - 5 credit(s) from the following:
•INET 4011 - Networking I: Network Administration (4.0 cr)
•INET 4021 - Dev Ops I: Network Programming (4.0 cr)
•INET 4032 - Systems I: Storage (4.0 cr)
•INET 4061 - Data Science I: Fundamentals (4.0 cr)
•INET 4083W - Systems II: Analysis and Design [WI] (3.0 cr)
•INET 4121 - DevOps II: Development Strategies (4.0 cr)
•INET 4709 - Data Management I: Fundamentals (3.0 cr)
•INET 4062 - Data Science II: Advanced (4.0 cr)
•INET 4711 - Data Management II: Distributed Systems (4.0 cr)
•INET 4193 - Directed Study (1.0 - 4.0 cr)
*or* INET 4596 - Internship (1.0 cr)
•Other technical elective with adviser approval

## Systems

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**Required Systems Courses**

This group consists of the core course INet 4031-Introduction to Systems, and two more courses.

INET 4032 - Systems I: Storage (4.0 cr)

INET 4083W - Systems II: Analysis and Design [WI] (3.0 cr)

**Systems Technical Electives**

Take 3 - 5 credit(s) from the following:

- INET 4007 - Security II: Cyber Security (4.0 cr)
- INET 4011 - Networking I: Network Administration (4.0 cr)
- INET 4021 - Dev Ops I: Network Programming (4.0 cr)
- INET 4061 - Data Science I: Fundamentals (4.0 cr)
- INET 4121 - DevOps II: Development Strategies (4.0 cr)
- INET 4165 - Security I: Principles (3.0 cr)
- INET 4709 - Data Management I: Fundamentals (3.0 cr)
- INET 4062 - Data Science II: Advanced (4.0 cr)
- INET 4711 - Data Management II: Distributed Systems (4.0 cr)
- INET 4193 - Directed Study (1.0 - 4.0 cr)

*or* INET 4596 - Internship (1.0 cr)

- Other technical elective with adviser approval

## Self-Designed

**Track Designed in Consultation with Academic Advisor**

Take 10 - 12 credit(s) from the following:

- INET 4007 - Security II: Cyber Security (4.0 cr)
- INET 4011 - Networking I: Network Administration (4.0 cr)
- INET 4021 - Dev Ops I: Network Programming (4.0 cr)
- INET 4032 - Systems I: Storage (4.0 cr)
- INET 4061 - Data Science I: Fundamentals (4.0 cr)
- INET 4083W - Systems II: Analysis and Design [WI] (3.0 cr)
- INET 4121 - DevOps II: Development Strategies (4.0 cr)
- INET 4165 - Security I: Principles (3.0 cr)
- INET 4709 - Data Management I: Fundamentals (3.0 cr)
- INET 4062 - Data Science II: Advanced (4.0 cr)
- INET 4711 - Data Management II: Distributed Systems (4.0 cr)
- INET 4193 - Directed Study (1.0 - 4.0 cr)

*or* INET 4596 - Internship (1.0 cr)

- Other technical elective with adviser approval

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