UNIVERSITY OF MINNESOTA
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***Twin Cities Campus***

# Information Technology Infrastructure Minor

*CCAPS Applied Professional Studies*

**College of Continuing and Professional Studies**

- Program Type: Undergraduate minor related to major
- Requirements for this program are current for Fall 2019
- Required credits in this minor: 22 to 23

The information technology (IT) infrastructure minor equips students with the industry insight and business skills they need to succeed in the IT management field. Students can select from six different track options, including data science, data management, devops (development and operations), networking, security, and systems, or design their own curriculum with guidance and support from program staff. This minor is available to students who are currently enrolled in an undergraduate degree program at the University of Minnesota.

## 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.

A GPA above 2.0 is preferred for the following:

- 2.50 already admitted to the degree-granting college
- 2.50 transferring from another University of Minnesota college
- 2.50 transferring from outside the University

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

**Required prerequisites**

**Prerequisite Course**

CSCI 2011 - Discrete Structures of Computer Science (4.0 cr)

## Minor Requirements

With approval of the program, up to 6 credits of transfer coursework may be used to satisfy requirements for this minor.

## Program Sub-plans

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

### Data Management

This track features hands-on experience with data, starting in relational databases, migrating to NoSQL (big data) concepts, and culminating with building infrastructure to support data management for high availability and large distributed systems.

**Required Courses**

INET 4001 - Foundations of Operating Systems (4.0 cr)
INET 4002 - Foundations of Networking (3.0 cr)
INET 4707 - Introduction to Databases (4.0 cr)
INET 4709 - Data Management I: Fundamentals (3.0 cr)
INET 4711 - Data Management II: Distributed Systems (4.0 cr)

### Data Science

Data science explains how to use massive amounts of data to ask questions, find patterns and anomalies, and further the research and development of industries outside of IT, such as health care and biological sciences. The data science track begins with the same introductory course as the data management track to establish foundational knowledge of how data are stored and queried. The next two courses cover business intelligence, analytics, big data, and various algorithms, tools, and methodologies to engage students in very large conceptual areas.

**Required Courses**

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INET 4001 - Foundations of Operating Systems (4.0 cr)
INET 4002 - Foundations of Networking (3.0 cr)
INET 4707 - Introduction to Databases (4.0 cr)
INET 4061 - Data Science I: Fundamentals (4.0 cr)
INET 4062 - Data Science II: Advanced (4.0 cr)

### DevOps (Development & Operations)

The development and operations subplan covers the development of applications, as well as the role of code in the building, managing, and monitoring of infrastructure and operating systems and the packages required to run those applications. Students will work to understand languages such as Java and Python, as well as how to use orchestration tools like Chef and Puppet to create an environment to build and deploy applications faster than traditional methods.

**Required Courses**

INET 3101 - C Programming: Language and Applications (2.0 cr)
INET 3102 - Web Infrastructure (2.0 cr)
INET 4001 - Foundations of Operating Systems (4.0 cr)
INET 4002 - Foundations of Networking (3.0 cr)
INET 4021 - Dev Ops I: Network Programming (4.0 cr)
INET 4121 - DevOps II: Development Strategies (4.0 cr)

### Networking

The networking track develops foundational knowledge of how networks work--everything from theory to physical devices. The introductory course ensures students understand layers 1 to 7 as they are used every day. The next course delves into network sockets," the software mechanisms used to transfer data, and the final course in the track is an exploration of emerging technologies, providing a unique perspective on networking today.

**Required Courses**

INET 3101 - C Programming: Language and Applications (2.0 cr)
INET 3102 - Web Infrastructure (2.0 cr)
INET 4001 - Foundations of Operating Systems (4.0 cr)
INET 4002 - Foundations of Networking (3.0 cr)
INET 4011 - Networking I: Network Administration (4.0 cr)
INET 4041 - Networking II: Emerging Technologies (4.0 cr)

### Security

The security track provides foundational knowledge in not just "keeping people out," but also the how and why of security breaches. This specialty examines the tools and mechanisms to track who did what, and covers the exponentially growing challenges of cloud security. The introductory course attempts to unravel the motives of information thieves, while subsequent courses cover how to be sure we are doing everything we can to keep our data secure in and out of the cloud.

**Required Courses**

INET 4001 - Foundations of Operating Systems (4.0 cr)
INET 4002 - Foundations of Networking (3.0 cr)
INET 4153 - Introduction to Security:  Policy and Regulation (4.0 cr)
INET 4165 - Security I: Principles (3.0 cr)
INET 4007 - Security II: Cyber Security (4.0 cr)

### Systems

This specialty includes coursework in system administration, storage design, and system analysis and design. Stepping from the fundamentals of bare metal computing to cloud, virtualization, and software defined networking requires a unique focus within course work.

**Required Courses**

INET 4001 - Foundations of Operating Systems (4.0 cr)
INET 4002 - Foundations of Networking (3.0 cr)
INET 4031 - Introduction to Systems (4.0 cr)
INET 4032 - Systems I: Storage (4.0 cr)
INET 4083W - Systems II: Analysis and Design [WI] (3.0 cr)

### Self-Designed

The self-designed minor is based on individual academic background and professional goals.

**Required Courses**

INET 4001 - Foundations of Operating Systems (4.0 cr)
INET 4002 - Foundations of Networking (3.0 cr)

**Electives for ITI Self-Designed Minor**

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With CCAPS department/adviser approval, take 11-12 credits from among the following INET courses.
INET 4007 - Security II: Cyber Security (4.0 cr)
*or* INET 4011 - Networking I: Network Administration (4.0 cr)
*or* INET 4021 - Dev Ops I: Network Programming (4.0 cr)
*or* INET 4031 - Introduction to Systems (4.0 cr)
*or* INET 4032 - Systems I: Storage (4.0 cr)
*or* INET 4041 - Networking II: Emerging Technologies (4.0 cr)
*or* INET 4061 - Data Science I: Fundamentals (4.0 cr)
*or* INET 4082W - IT Infrastructure Projects and Processes [WI] (3.0 cr)
*or* INET 4083W - Systems II: Analysis and Design [WI] (3.0 cr)
*or* INET 4121 - DevOps II: Development Strategies (4.0 cr)
*or* INET 4153 - Introduction to Security:  Policy and Regulation (4.0 cr)
*or* INET 4165 - Security I: Principles (3.0 cr)
*or* INET 4193 - Directed Study (1.0 - 4.0 cr)
*or* INET 4596 - Internship (1.0 cr)
*or* INET 4707 - Introduction to Databases (4.0 cr)
*or* INET 4709 - Data Management I: Fundamentals (3.0 cr)
*or* INET 4062 - Data Science II: Advanced (4.0 cr)
*or* INET 4711 - Data Management II: Distributed Systems (4.0 cr)

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