The **Information Science & Technology minor** (IS&T) is designed to serve students seeking an instructional program that provides a broad foundation in information technology, but not seeking to earn a full degree in a specific I.T.-related field. As with all minors at CSU, a minimum of 12 credits must be **upper division** (300 or higher) courses.

The 21-credit minor consists of **one required course** (3 credits) and **six elective courses** (18 credits minimum). Most elective courses also have prerequisites (see back for details). The courses are offered by four departments in three CSU colleges:

- Computer Information Systems, College of Business
- Computer Science, College of Natural Sciences
- Journalism and Media Communication and English, College of Liberal Arts

**Note:** Majors in **Computer Information Systems**, **Computer Science**, or **Electrical and Computer Engineering** may NOT enroll in the minor. Majors in **Journalism and Media Communication** may not count JTC credits for the minor.

### Prerequisite

**Complete one before declaring the minor:**

- BUS 150 Business Computing Concepts and Applications*  
  Test-out option available at the beginning of each term  
  3 credits
- CS 110 Personal Computing*  
  4 credits

### Required Course

- JTC 413 New Communication Technologies and Society*  
  3 credits

### Elective Courses

**Six of the following:**

- CIS 210 Information Technology in Business  
  3 credits
- CIS 240 Application Design and Development  
  3 credits
- CIS 301 End User Computing  
  3 credits
- CIS 340 Advanced Application Design and Development  
  3 credits
- CIS 355 Business Database Systems  
  3 credits
- CIS 410 Web Application Development  
  3 credits
- CS 150 Interactive Programming with Java  
  4 credits
- CS 163 Java (CS1) No Prior Programming  
  4 credits
- CS 164 Java (CS1) Prior Programming  
  4 credits
- CT 310 Web Development  
  4 credits
- CT 320 Network and System Administration  
  4 credits
- JTC 300 Professional and Technical Communication*  
  3 credits
- JTC 335 Digital Photography*  
  3 credits
- JTC 372 Web Design and Management*  
  3 credits
- JTC 417 Information Graphics  
  3 credits
- CO 402 Principles of Digital Rhetoric and Design  
  3 credits

*Also offered online

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**For major restriction overrides, please contact that department's adviser:**

<table>
<thead>
<tr>
<th>Academic adviser for the minor and Journalism (JTC) course overrides:</th>
<th>Computer Information Systems (CIS) course major overrides:</th>
<th>Computer Science (CS and CT) course major overrides:</th>
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</thead>
</table>
| Ananda Luttet, Program Manager  
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Elective Courses: six courses required; at least nine credits must be upper division. Pay attention to required prerequisites and plan carefully—prerequisites will not be waived unless noted.

**Programming Courses**

- **CS 150 Interactive Java Programming** — Introduction to object-oriented programming with Java; problem-solving, creating applets for Web pages, and graphical user interfaces. *Prerequisite: 1 credit MATH.*

- **CS 163 Java No Prior Programming** — Computer programming in Java for students without previous programming experience. Topics include variables, assignment, expressions, operators, booleans, conditionals, characters and strings, control loops, arrays, objects and classes, file input/output, interfaces, recursion, lists, and sorting. *Prerequisite: MATH 124 with a minimum grade of C.*

- **CS 164 Java Prior Programming** — Computer programming in Java for students with limited programming experience. Problem decomposition for good design; expressions, operators, booleans, conditionals, characters and strings, control loops, arrays, objects and classes, file input/output, interfaces, recursion, lists, and sorting. *Prerequisite: MATH 124 with a minimum grade of C.*

- **CIS 210 Information Technology in Business** — Introduction to information systems: the IS profession; hardware, software, and programming; web and database applications; data analysis tools. *Prerequisite: One of CS 160, 161, 163, 260, or 267. CIS 200 is waived.*

- **CIS 240 Application Design and Development** — Software engineering methods including design, implementation, and testing using structured and event-driven techniques, logic, and data structures. *Prerequisite: CIS 210 and one of CS 160, 161, 163, 260, or 267.*

- **CIS 340 Advanced Application Design and Development** — Design and construction of business applications using object-orientation and advanced data structures. *Prerequisite: CIS 240.*

**Business and Communication Applications**

- **CIS 301 End User Computing** — End user applications in a Graphical User Interface environment including spreadsheet, word processing, and presentation graphics; Internet concepts.

- **CIS 355 Business Database Systems** — Physical and logical design, implementation, and administration of databases. *Prerequisite: CIS 210 and one of CS 160, 161, 163, 260, or 267.*

- **CT 320 Network and System Administration** — Installation of network and operating system services, management and support; upgrades, security, backups. *Prerequisite: CS 155 and CS 156 or CS 253.*

**Specialty Courses**

- **JTC 300 Professional and Technical Communication** — Professional writing and presentation skills applied to students' major fields. *Prerequisite: CO 150 or HONR 193.*

- **JTC 335 Digital Photography** — Basic photographic theory and practice using digital camera and image processing technology. *Prerequisite waived.*

- **JTC 417 Information Graphics** — Static and interactive data visualization and information design using charts, graphs, maps and other visual elements. *Prerequisite waived.*

- **CO 402 Principles of Digital Rhetoric and Design** — Advanced study of rhetorical contexts shaping online texts. Includes instruction in coding and digital design.

**Web Design and Development Courses**

- **JTC 372 Web Design and Management** — Design, development, and management of World Wide Web content. *Prerequisite waived.*

- **CT 310 Web Development** — Web development languages used to create fully functional dynamic web sites; server and client scripting, database access and security issues. *Prerequisite: CS 220 and CS 165.*

- **CIS 320 Project Management for Information Systems** — Project management concepts including work breakdown structure, estimating, scheduling, tools, and reports. *Prerequisite: CIS 210.*

- **CIS 410 Web Application Development** — Web development techniques and strategies including Active Server Pages using VBScript, JavaScript, ColdFusion; security, web design. *Prerequisite: CIS 355 and CIS 240.*