Department of Information Systems and Cyber Security

The Department of Information Systems and Cyber Security offers two undergraduate degree programs: one with a major in Information Systems and one with a major in Cyber Security (which is also offered 100 percent online). For admission requirements for the online B.B.A. degree in Cyber Security, please visit http://online.utsa.edu/cyber/cyber-security/. The Department offers minors in Cyber Security, Digital Forensics, Information Systems, and Network and Data Center Management which are open to all majors in the University. In addition, the Department offers a minor in Technology Management for nonbusiness majors. A Certificate in Pathogenic Outbreak Investigations is also offered in collaboration with the Departments of Biology and Computer Science in the College of Sciences.

- B.B.A. degree in Information Systems (p. 1)
- B.B.A. degree in Cyber Security (p. 3)

Bachelor of Business Administration Degree in Information Systems

The minimum number of semester credit hours for the Bachelor of Business Administration (B.B.A.) degree in Information Systems is 120, at least 39 of which must be at the upper-division level.

All candidates seeking this degree must fulfill the Core Curriculum requirements, the Common Body of Knowledge (CBK) requirements, and the degree requirements, which are listed below.

Core Curriculum Requirements (42 semester credit hours)

Students seeking the B.B.A. degree in Information Systems must fulfill University Core Curriculum requirements in the same manner as other students.

MAT 1053 and MAT 1133 should be used to satisfy the core requirement in Mathematics (020) and the core requirement in the Component Area Option (090). ECO 2023 should be used to satisfy the core requirement in Social and Behavioral Sciences (080).

MAT 1133 and ECO 2023 may be used to satisfy both Core Curriculum requirements and Common Body of Knowledge (CBK) requirements.

All degrees in the College of Business require 120 hours. If students elect to take a course that satisfies both a Core and COB requirement, students may need to take an additional course to meet the 120 hours.

Core Curriculum Component Area Requirements (http://catalog.utsa.edu/undergraduate/bachelorsdegeregulations/degreerequirements/corecurriculumcompoentarequirements/)

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year Experience Requirement</td>
<td>3</td>
</tr>
<tr>
<td>Communication</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>Life and Physical Sciences</td>
<td>6</td>
</tr>
<tr>
<td>Language, Philosophy and Culture</td>
<td>3</td>
</tr>
<tr>
<td>Creative Arts</td>
<td>3</td>
</tr>
</tbody>
</table>

American History                              6  
Government-Political Science                  6  
Social and Behavioral Sciences                3  
Component Area Option                         3  
Total Credit Hours                            42

Common Body of Knowledge (CBK)

All students seeking a B.B.A. degree in the College of Business must complete the following Common Body of Knowledge (CBK) courses in addition to the Core Curriculum.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC 1303</td>
<td>Principles of Accounting I</td>
</tr>
<tr>
<td>ACC 2303</td>
<td>Principles of Accounting II</td>
</tr>
<tr>
<td>COM 1053</td>
<td>Business and Professional Speech</td>
</tr>
<tr>
<td>or COM 1063</td>
<td>Digital Business Communication</td>
</tr>
<tr>
<td>ECO 2013</td>
<td>Introductory Macroeconomics</td>
</tr>
<tr>
<td>ECO 2023</td>
<td>Introductory Microeconomics (satisfies Social and Behavioral Sciences Core Curriculum requirement)</td>
</tr>
<tr>
<td>FIN 3013</td>
<td>Principles of Business Finance</td>
</tr>
<tr>
<td>GBA 2013</td>
<td>Legal, Social and Ethical Issues in Business</td>
</tr>
<tr>
<td>IS 1403</td>
<td>Business Information Systems Fluency</td>
</tr>
<tr>
<td>or IS 1413</td>
<td>Excel for Business Information Systems</td>
</tr>
<tr>
<td>IS 3003</td>
<td>Principles of Information Systems for Management</td>
</tr>
<tr>
<td>MAT 1133</td>
<td>Calculus for Business (satisfies Mathematics Core Curriculum requirement, Actuarial Science majors must take MAT 1214 in lieu of MAT 1133)</td>
</tr>
<tr>
<td>MGT 3003</td>
<td>Business Communication and Professional Development</td>
</tr>
<tr>
<td>MGT 3013</td>
<td>Introduction to Organization Theory, Behavior, and Management</td>
</tr>
<tr>
<td>MGT 4893</td>
<td>Management Strategy (taken in semester of graduation)</td>
</tr>
<tr>
<td>MKT 3013</td>
<td>Principles of Marketing</td>
</tr>
<tr>
<td>MS 1023</td>
<td>Business Statistics with Computer Applications I (Actuarial Science majors must take STA 3003 in lieu of MS 1023)</td>
</tr>
<tr>
<td>MS 3043</td>
<td>Business Statistics with Computer Applications II (Actuarial Science majors must take STA 3513 in lieu of MS 3043)</td>
</tr>
<tr>
<td>MS 3053</td>
<td>Management Science and Operations Technology</td>
</tr>
</tbody>
</table>

Note: Students majoring in Accounting, Actuarial Science, Economics, Finance, Management Science, and Statistics and Data Science are strongly encouraged to select IS 1413 Excel for Business Information Systems.

In addition to the Core Curriculum requirements and the College of Business Common Body of Knowledge (CBK), all candidates for the degree must complete the following degree requirements.

Gateway Course

Students pursuing the B.B.A. degree in Information Systems must successfully complete the following Gateway Course with a grade of “C-” or better in no more than two attempts. A student who is unable to successfully complete this course within two attempts, including dropping the course with a grade of “W” or taking an equivalent course at another institution, will be required to change his or her major.
Department of Information Systems and Cyber Security

MAT 1133 Calculus for Business 3

Degree Requirements

A. Major Requirements 24

IS 1001 Inside Cyber
IS 2031 Introduction to Programming Concepts Laboratory
IS 2033 Introduction to Programming Concepts
IS 2041 Intermediate Object-Oriented Programming Laboratory
IS 2043 Intermediate Object-Oriented Programming
IS 3063 Database Management for Information Systems
IS 3073 Application Development
IS 3413 Introduction to Telecommunications for Business
IS 4053 Systems Analysis and Design
IS 4063 Advanced Topics in Information Systems

B. Support Work in Major 9

9 semester credit hours of upper-division IS courses which may include ONE of the following courses:

MOT 4023 Essentials of Technology Management
MOT 4143 Introduction to Project Management

or complete one of the following tracks:

IT Project Management Track

Choose three courses from the list below:
IS 4083 Agile Project Management
MOT 4143 Introduction to Project Management
MOT 4153 Project Management Certification
MOT 4023 Essentials of Technology Management
MOT 4203 Strategic Management of Technology and Innovation

Cyber Analytics Track

Choose three courses from the list below:
IS 4023 Applied Big Data with Machine Learning
IS 4183 Advanced Database Concepts and Applications
IS 4233 Introduction to Cloud Computing
IS 4483 Digital Forensic Analysis I
IS 4533 Malware Analysis

Recommended Four-Year Academic Plan

First Year

Fall

AIS 1203 Academic Inquiry and Scholarship (core) 3
American History (core) 3
Life & Physical Sciences (core) 3
MAT 1053 Mathematics for Business (core) 3
WRC 1013 Freshman Composition I (Q) (core) 3

Credit Hours 15

Spring

COM 1053 Business and Professional Speech (CBK) 3
or COM 1063 or Digital Business Communication

ECO 2023 Introductory Microeconomics (core and CBK) 1 3
IS 1403 Business Information Systems Fluency (CBK) 3
or IS 1413 or Excel for Business Information Systems

MAT 1133 Calculus for Business (core and CBK) 1 3
WRC 1023 Freshman Composition II (Q) (core) 3

IS 1001 Inside Cyber (major) 1

Credit Hours 16

Second Year

Fall

ACC 2013 Principles of Accounting I (CBK) 3
ECO 2013 Introductory Macroeconomics (CBK) 3
IS 2031 Introduction to Programming Concepts Laboratory (major) 1
IS 2033 Introduction to Programming Concepts (major) 3
MS 1023 Business Statistics with Computer Applications I (CBK) 3

Government-Political science (core) 3

Credit Hours 16

Spring

ACC 2033 Principles of Accounting II (CBK) 3
IS 2041 Intermediate Object-Oriented Programming Laboratory (major) 1
IS 2043 Intermediate Object-Oriented Programming (major) 3
IS 3003 Principles of Information Systems for Management (CBK) 3
MS 3043 Business Statistics with Computer Applications II (CBK) 3

Language, Philosophy & Culture (core) 3

Credit Hours 16

Third Year

Fall

IS 3063 Database Management for Information Systems (major) 3

Total Credit Hours 33

Course Sequence Guide for B.B.A. Degree in Information Systems

This course sequence guide is designed to assist students in completing their UTSA undergraduate business degree requirements. This is a term-by-term sample course guide. Students must satisfy other requirements in their catalog and meet with their academic advisor for an individualized degree plan. Progress within this guide depends upon such factors as course availability, individual student academic preparation, student time management, work obligations, and individual financial considerations. Students may choose to take courses during Summer terms to reduce course loads during long semesters.

Recommended Four-Year Academic Plan

First Year

Fall

AIS 1203 Academic Inquiry and Scholarship (core) 3
American History (core) 3
Life & Physical Sciences (core) 3
MAT 1053 Mathematics for Business (core) 3
WRC 1013 Freshman Composition I (Q) (core) 3

Credit Hours 15

Spring

COM 1053 Business and Professional Speech (CBK) 3
or COM 1063 or Digital Business Communication

ECO 2023 Introductory Microeconomics (core and CBK) 1 3
IS 1403 Business Information Systems Fluency (CBK) 3
or IS 1413 or Excel for Business Information Systems

MAT 1133 Calculus for Business (core and CBK) 1 3
WRC 1023 Freshman Composition II (Q) (core) 3

IS 1001 Inside Cyber (major) 1

Credit Hours 16

Second Year

Fall

ACC 2013 Principles of Accounting I (CBK) 3
ECO 2013 Introductory Macroeconomics (CBK) 3
IS 2031 Introduction to Programming Concepts Laboratory (major) 1
IS 2033 Introduction to Programming Concepts (major) 3
MS 1023 Business Statistics with Computer Applications I (CBK) 3

Government-Political science (core) 3

Credit Hours 16

Spring

ACC 2033 Principles of Accounting II (CBK) 3
IS 2041 Intermediate Object-Oriented Programming Laboratory (major) 1
IS 2043 Intermediate Object-Oriented Programming (major) 3
IS 3003 Principles of Information Systems for Management (CBK) 3
MS 3043 Business Statistics with Computer Applications II (CBK) 3

Language, Philosophy & Culture (core) 3

Credit Hours 16

Third Year

Fall

IS 3063 Database Management for Information Systems (major) 3

Total Credit Hours 33

Course Sequence Guide for B.B.A. Degree in Information Systems

This course sequence guide is designed to assist students in completing their UTSA undergraduate business degree requirements. This is a term-by-term sample course guide. Students must satisfy other requirements in their catalog and meet with their academic advisor for an individualized degree plan. Progress within this guide depends upon such factors as course availability, individual student academic preparation, student time management, work obligations, and individual financial considerations. Students may choose to take courses during Summer terms to reduce course loads during long semesters.
IS 3413  Introduction to Telecommunications for Business (major)  3
MS 3053  Management Science and Operations Technology (CBK)  3
Creative Arts (core)  3
Government-Political Science (core)  3

Credit Hours  15

Spring
FIN 3013  Principles of Business Finance (CBK)  3
IS 3073  Application Development (major)  3
MGT 3003  Business Communication and Professional Development (CBK)  3
MGT 3013  Introduction to Organization Theory, Behavior, and Management (CBK)  3
Upper-division IS elective (3XXX or 4XXX level) (major)  3

Credit Hours  15

Fourth Year
Fall
GBA 2013  Legal, Social and Ethical Issues in Business (CBK)  3
IS 4053  Systems Analysis and Design (major)  3
MKT 3013  Principles of Marketing (CBK)  3
Upper-division IS elective (3XXX or 4XXX level) (major)  3
American History (core)  3

Credit Hours  15

Spring
IS 4063  Advanced Topics in Information Systems (major)  3
MGT 4893  Management Strategy (CBK)  3
Upper-division IS elective (3XXX or 4XXX level) (major)  3
Life & Physical Sciences (core)  3

Credit Hours  12

Total Credit Hours  120

1 College of Business students should take MAT 1133 and ECO 2023 to satisfy both Core Curriculum and CBK requirements.

**Bachelor of Business Administration Degree in Cyber Security**

The minimum number of semester credit hours for the Bachelor of Business Administration (B.B.A.) degree in Cyber Security is 120, at least 39 of which must be at the upper-division level.

All candidates seeking this degree must fulfill the Core Curriculum requirements, the Common Body of Knowledge (CBK) requirements, and the degree requirements, which are listed below.

**Core Curriculum Requirements (42 semester credit hours)**

Students seeking the B.B.A. degree in Cyber Security must fulfill University Core Curriculum requirements in the same manner as other students.

MAT 1053 and MAT 1133 should be used to satisfy the core requirement in Mathematics (O20) and the core requirement in the Component Area Option (O90). ECO 2023 should be used to satisfy the core requirement in Social and Behavioral Sciences (O80).

MAT 1133 and ECO 2023 may be used to satisfy both Core Curriculum requirements and Common Body of Knowledge (CBK) requirements.

All degrees in the College of Business require 120 hours. If students elect to take a course that satisfies both a Core and COB requirement, students may need to take an additional course to meet the 120 hours.

**Core Curriculum Component Area Requirements**

All students seeking a B.B.A. degree in the College of Business must complete the following Common Body of Knowledge (CBK) courses in addition to the Core Curriculum.

<table>
<thead>
<tr>
<th>Component Area Option</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year Experience Requirement</td>
<td>3</td>
</tr>
<tr>
<td>Communication</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>Life and Physical Sciences</td>
<td>6</td>
</tr>
<tr>
<td>Language, Philosophy and Culture</td>
<td>3</td>
</tr>
<tr>
<td>Creative Arts</td>
<td>3</td>
</tr>
<tr>
<td>American History</td>
<td>6</td>
</tr>
<tr>
<td>Government-Political Science</td>
<td>6</td>
</tr>
<tr>
<td>Social and Behavioral Sciences</td>
<td>3</td>
</tr>
<tr>
<td>Component Area Option</td>
<td>3</td>
</tr>
</tbody>
</table>

**Common Body of Knowledge (CBK)**

All students seeking a B.B.A. degree in the College of Business must complete the following Common Body of Knowledge (CBK) courses in addition to the Core Curriculum.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC 2013 Principles of Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACC 2033 Principles of Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>COM 1053 Business and Professional Speech</td>
<td>3</td>
</tr>
<tr>
<td>or COM 1063 Digital Business Communication</td>
<td></td>
</tr>
<tr>
<td>ECO 2013 Introductory Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>ECO 2023 Introductory Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>FIN 3013 Principles of Business Finance</td>
<td>3</td>
</tr>
<tr>
<td>GBA 2013 Legal, Social and Ethical Issues in Business</td>
<td>3</td>
</tr>
<tr>
<td>IS 1403 Business Information Systems Fluency</td>
<td>3</td>
</tr>
<tr>
<td>or IS 1413 Excel for Business Information Systems</td>
<td></td>
</tr>
<tr>
<td>IS 3003 Principles of Information Systems for Management</td>
<td>3</td>
</tr>
<tr>
<td>MAT 1133 Calculus for Business (satisfies Mathematics Core Curriculum requirement, Actuarial Science majors must take MAT 1214 in lieu of MAT 1133)</td>
<td>3</td>
</tr>
<tr>
<td>MGT 3003 Business Communication and Professional Development</td>
<td>3</td>
</tr>
<tr>
<td>MGT 3013 Introduction to Organization Theory, Behavior, and Management</td>
<td>3</td>
</tr>
<tr>
<td>MGT 4893 Management Strategy (taken in semester of graduation)</td>
<td>3</td>
</tr>
<tr>
<td>MKT 3013 Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>MS 1023 Business Statistics with Computer Applications I (Actuarial Science majors must take STA 3003 in lieu of MS 1023)</td>
<td>3</td>
</tr>
</tbody>
</table>
**Degree Requirements**

**A. Major Requirements**

IS 3033 Operating Systems Security 15
IS 3413 Introduction to Telecommunications for Business
IS 3423 Network Security
IS 3513 Information Assurance and Security
IS 3523 Intrusion Detection and Incident Response

**B. Support Work in Major**

9 semester credit hours from the following:

- IS 3043 Secure Mobile App Development
- IS 3073 Application Development
- IS 3433 Introduction to Digital Forensics
- IS 3453 Networking Fundamentals
- IS 3533 Cyber Law and Legal System
- IS 3833 Cyber Operations
- IS 4033 Network Operations
- IS 4223 Emerging Network Technologies
- IS 4463 Web Application Security
- IS 4473 Information Assurance Policy
- IS 4483 Digital Forensic Analysis I
- IS 4513 Industrial Control Systems
- IS 4523 Digital Forensic Analysis II
- IS 4533 Malware Analysis
- IS 4543 Cyber Attack and Defend
- IS 4943 Internship in Cyber Security
- MOT 4023 Essentials of Technology Management
  or MOT 4143 Introduction to Project Management

**C. Additional Support Work**

9 semester credit hours from the following:

- IS 1001 Inside Cyber
- IS 2031 Introduction to Programming Concepts Laboratory
- IS 2033 Introduction to Programming Concepts

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**Course Sequence Guide for B.B.A. Degree in Cyber Security**

This course sequence guide is designed to assist students in completing their UTSA undergraduate business degree requirements. This is a term-by-term sample course guide. Students must satisfy other requirements in their catalog and meet with their academic advisor for an individualized degree plan. Progress within this guide depends upon such factors as course availability, individual student academic preparation, student time management, work obligations, and individual financial considerations. Students may choose to take courses during Summer terms to reduce course loads during long semesters.

**Recommended Four-Year Academic Plan**

**First Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>AIS 1203</td>
<td>Academic Inquiry and Scholarship (core)</td>
</tr>
<tr>
<td>MAT 1053</td>
<td>Mathematics for Business (core)</td>
</tr>
<tr>
<td>WRC 1013 or COM 1053</td>
<td>Business and Professional Speech (CBK)</td>
</tr>
<tr>
<td>American History</td>
<td>3</td>
</tr>
<tr>
<td>Life &amp; Physical Sciences (core)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credit Hours</strong></td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>ECO 2013 or ECO 2023</td>
<td>Introductory Macroeconomics (core and CBK)</td>
</tr>
<tr>
<td>IS 1001</td>
<td>Inside Cyber ( major)</td>
</tr>
<tr>
<td>IS 1403 or IS 1413</td>
<td>Business Information Systems Fluency (CBK)</td>
</tr>
<tr>
<td>or Excel for Business Information Systems</td>
<td></td>
</tr>
<tr>
<td>MAT 1133</td>
<td>Calculus for Business (core and CBK)</td>
</tr>
<tr>
<td>WRC 1023</td>
<td>Freshman Composition II (Q) (core)</td>
</tr>
<tr>
<td><strong>Credit Hours</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>ACC 2013</td>
<td>Principles of Accounting I (CBK)</td>
</tr>
<tr>
<td>ECO 2013</td>
<td>Introductory Macroeconomics (CBK)</td>
</tr>
<tr>
<td>IS 2041 or IS 2043</td>
<td>Intermediate Object-Oriented Programming</td>
</tr>
<tr>
<td>IS 2031</td>
<td>Introduction to Programming Concepts Laboratory (support work)</td>
</tr>
<tr>
<td>IS 2033</td>
<td>Introduction to Programming Concepts (support work)</td>
</tr>
<tr>
<td>MS 1023</td>
<td>Business Statistics with Computer Applications I (CBK)</td>
</tr>
<tr>
<td>Government-Political Science (core)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credit Hours</strong></td>
<td>16</td>
</tr>
</tbody>
</table>
### Minor in Cyber Security

The Minor in Cyber Security is open to all majors in the University. A student majoring in Information Systems will be required to take 18 semester credit hours of coursework. Other majors may be required to take additional hours depending on their academic background.

**A. Required courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 3413</td>
<td>Introduction to Telecommunications for Business</td>
<td>3</td>
</tr>
<tr>
<td>IS 3423</td>
<td>Network Security</td>
<td>3</td>
</tr>
<tr>
<td>IS 3513</td>
<td>Information Assurance and Security</td>
<td>3</td>
</tr>
<tr>
<td>IS 3523</td>
<td>Intrusion Detection and Incident Response</td>
<td>3</td>
</tr>
</tbody>
</table>

**B. Elective courses**

Select two of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 3033</td>
<td>Operating Systems Security (major)</td>
<td>3</td>
</tr>
<tr>
<td>IS 3043</td>
<td>Secure Mobile App Development</td>
<td>3</td>
</tr>
<tr>
<td>IS 3433</td>
<td>Introduction to Digital Forensics</td>
<td>3</td>
</tr>
<tr>
<td>IS 3453</td>
<td>Networking Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>IS 3533</td>
<td>Cyber Law and Legal System</td>
<td>3</td>
</tr>
<tr>
<td>IS 3833</td>
<td>Cyber Operations</td>
<td>3</td>
</tr>
<tr>
<td>IS 4033</td>
<td>Network Operations</td>
<td>3</td>
</tr>
<tr>
<td>IS 4143</td>
<td>Wide Area Networks</td>
<td>3</td>
</tr>
<tr>
<td>IS 4223</td>
<td>Emerging Network Technologies</td>
<td>3</td>
</tr>
<tr>
<td>IS 4463</td>
<td>Web Application Security</td>
<td>3</td>
</tr>
<tr>
<td>IS 4473</td>
<td>Information Assurance Policy</td>
<td>3</td>
</tr>
<tr>
<td>IS 4483</td>
<td>Digital Forensic Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>IS 4513</td>
<td>Industrial Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>IS 4523</td>
<td>Digital Forensic Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>IS 4533</td>
<td>Malware Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IS 4543</td>
<td>Cyber Attack and Defend</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credit Hours**

| Credit Hours | 18 |

To declare a Minor in Cyber Security, obtain advice, or seek approval of course substitutions for course requirements, students must consult their academic advisor.

### Minor in Digital Forensics

The Minor in Digital Forensics is open to all majors in the University. A student majoring in Information Systems will be required to take 18 semester credit hours of coursework. Other majors may be required to take additional hours depending on their academic background.

**A. Required courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 3433</td>
<td>Introduction to Digital Forensics</td>
<td>3</td>
</tr>
<tr>
<td>IS 3513</td>
<td>Information Assurance and Security</td>
<td>3</td>
</tr>
<tr>
<td>IS 3523</td>
<td>Intrusion Detection and Incident Response</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credit Hours**

| Credit Hours | 18 |

To declare a Minor in Digital Forensics, obtain advice, or seek approval of course substitutions for course requirements, students must consult their academic advisor.
To declare a Minor in Digital Forensics, obtain advice, or seek approval of course substitutions for course requirements, students must consult their academic advisor.

**Minor in Information Systems**

The Minor in Information Systems is open to all majors in the University. The number of semester credit hours required for a student in the College of Business is 19. Other students may be required to take additional hours depending on their academic background.

**A. Required courses**  
IS 2041 Intermediate Object-Oriented Programming Laboratory  
IS 2043 Intermediate Object-Oriented Programming  
IS 3003 Principles of Information Systems for Management  
IS 3063 Database Management for Information Systems  
IS 3413 Introduction to Telecommunications for Business  
IS 4053 Systems Analysis and Design

**B. Elective course**  
Select one of the following:  
MOT 4023 Essentials of Technology Management  
MOT 4143 Introduction to Project Management  
Any IS junior- or senior-level course that counts for the IS major

To declare a Minor in Information Systems, obtain advice, or seek approval of course substitutions for course requirements, students must consult with their academic advisor.

**Minor in Network and Data Center Management**

The Minor in Network and Data Center Management is open to all majors in the University. A student majoring in Information Systems or Cyber Security will be required to take 21 semester credit hours of coursework. Other majors may be required to take additional hours depending on their academic background.

**A. Required courses**  
IS 3453 Networking Fundamentals  
IS 3513 Information Assurance and Security  
IS 3523 Intrusion Detection and Incident Response  
IS 4033 Network Operations  
IS 4213 Data Center Infrastructure Planning  
IS 4223 Emerging Network Technologies  
MOT 4143 Introduction to Project Management

To declare a Minor in Network and Data Center Management, obtain advice, or seek approval of course substitutions for course requirements, students must consult with their academic advisor.

**Certificate in Pathogenic Outbreak Investigations**

This interdisciplinary certificate program is designed for students in biology, information systems and cyber security, computer science and computer engineering disciplines to investigate biological and digital pathogen identification, propagation prediction, and mitigation. The required capstone project reinforces the cross-disciplinary learning fostered by the program and provides real-world practice.

This certificate is open only to biology, information systems and cyber security, computer science, and computer engineering majors. To apply for the Pathogenic Outbreak Investigations certificate, students should consult with the Director of the Office of Undergraduate Research for specific information about certificate requirements and consult with their academic advisors to verify that they have met all University requirements. All courses used to satisfy the requirements of this undergraduate certificate program must be college-level courses taken at UTSA. Students must fulfill all prerequisite requirements for elective courses.

Students pursuing the Certificate in Pathogenic Outbreak Investigations must complete a minimum of 15 semester credit hours:

**A. Courses required by all majors:**
Topic: Introduction to Pathogenic Outbreak Investigations:  
BIO 4953 Special Studies in Biology  
or CS 4593 Topics in Computer Science  
or IS 3313 Introduction to Pathogenic Outbreak Investigations

Total Credit Hours 21
Total Credit Hours

Biology elective options

BIO 3713 Microbiology

CS 4593 Topics in Computer Science (Cloud Computing)

IS 4953 Special Studies in Information Systems (Topic: Malware Agent Analysis)

Information Systems/Cyber Security elective options

IS 3523 Intrusion Detection and Incident Response

IS 4463 Web Application Security

IS 4483 Digital Forensic Analysis I

IS 4523 Industrial Control Systems

IS 4533 Digital Forensic Analysis II

Computer Science elective options

CS 3113 Principles of Cyber Security

CS 3433 Computer and Information Security

CS 3753 Data Science

CS 3873 Computer Networks

CS 4223 Bioinformatics and Big Data

CS 4353 Unix and Network Security

CS 4363 Cryptography

CS 4373 Data Mining

CS 4593 Topics in Computer Science

CS 4633 Simulation Techniques

CS 4643 Cellular and Mobile Technologies

CS 4653 Software and Malware Reverse Engineering

CS 4663 Distributed and Cloud Systems Security

CS 4673 Cyber Operations

CS 4683 Secure Software Development and Analysis

CS 4713 Compiler Construction

CS 4823 Parallel Programming

CS 4833 Embedded Systems

CS 4843 Cloud Computing

CS 4853 Advanced Systems Programming

CS 4863 Distributed Computing and Systems

CS 4933 Internship in Computer Science

CS 4963 Advanced Topics in Systems and Cloud

CS 4973 Advanced Topics in Data Science

1 Undergraduate biology students are permitted to take graduate courses based on need, student background/capability, and instructor consent.

Information Systems (IS) Courses

IS 1001. Inside Cyber. (1-0) 1 Credit Hour.

An introduction to the cyber world with emphases on the security, business, technology, and career aspects of cyber. This course offers a high-level overview of the potential benefits of information systems and technology, along with the associated challenges and risks. Course Fees: BISP $10; BTSI $15; LRB1 $15.

IS 1403. Business Information Systems Fluency. (3-0) 3 Credit Hours. (TCCN = BCIS 1305)

This three-unit course concentrates on a set of core computing skills that are essential to student success, such as using e-mail, word processing, spreadsheets, basic data management, presentation software and on- and off-campus Internet resources. This is a Web-based course. Instructions and exams are accomplished through the use of a computer. Generally offered: Fall, Spring, Summer. Course Fees: BISP $10; BTSI $15; DL01 $75; LRB1 $15.

IS 1413. Excel for Business Information Systems. (3-0) 3 Credit Hours.

This course concentrates on the use of Microsoft Office Excel as a tool for organizing, presenting, and analyzing data. This is a Web-based course. All coursework (lessons, exams, and projects) is completed online using a computer. Microsoft Excel is required to complete the projects assigned in the course. Successful completion of this course will help prepare the student for taking the Microsoft Office Specialist (MOS) Microsoft Office Excel Core exam. Students who are MOS certified or have taken an equivalent course that specifically prepares students for the MOS Excel exam can petition for exemption from the course. Students in quantitative majors (such as Accounting, Actuarial Science, Economics, Finance, Management Science, and Statistics and Data Science) are strongly encouraged to this course in lieu of IS 1403. Generally offered: Fall, Spring, and Summer. Course Fees: BISP $10; BTSI $15; DL01 $75; LRB1 $15.

IS 2031. Introduction to Programming Concepts Laboratory. (0-2) 1 Credit Hour.

Prerequisite: Concurrent enrollment in, or completion of, IS 2033 or an equivalent with a grade of “C-” or better. Laboratory accompanies IS 2033. The laboratory uses an object-oriented programming language and software development tools to develop basic applications that underlie the concepts learned in the course. Successful completion of this course requires a high-level overview of the potential benefits of information systems and technology, along with the associated challenges and risks. Course Fees: BISP $10; BTSI $15; LRB1 $15.

IS 2033. Introduction to Programming Concepts. (3-0) 3 Credit Hours.

Prerequisite: Concurrent enrollment in, or completion of, IS 2033 or an equivalent with a grade of “C-” or better. An introduction to programming concepts with an object-oriented language. Addresses basic elements of programming concepts and object-oriented programming principles which include control structures, arithmetic and logical operators, classes and objects, methods and class behavior, arrays, ArrayList, and a brief introduction to GUIs (graphical user interfaces) and exception handling. Generally offered: Fall, Spring, Summer. Course Fees: BISP $10; BTSI $15; LRB1 $15.
IS 2041. Intermediate Object-Oriented Programming Laboratory. (0-2) 1 Credit Hour.
Prerequisites: Concurrent enrollment in IS 2043 and completion of IS 2031 and IS 2033, or their equivalents, with a grade of "C-" or better; or completion of IS 2043 or an equivalent with a grade of "C-" or better. Laboratory accompanies IS 2043. Laboratory uses an object-oriented programming language and software development tools to develop applications that underlie the concepts learned in IS 2043. Generally offered: Fall, Spring, Summer. Course Fees: BISP $10; BTSI $15; LRB1 $15.

IS 2043. Intermediate Object-Oriented Programming. (3-0) 3 Credit Hours.
Prerequisites: Concurrent enrollment in IS 2041 and completion of IS 2031 and IS 2033, or their equivalents, with a grade of "C-" or better; or completion of IS 2041 or an equivalent with a grade of "C-" or better. An object-oriented programming course designed to reinforce introductory object-oriented principles learned in IS 2033 and focus on concepts including inheritance, polymorphism, exception handling, data structures, searching and sorting, recursion, generic collections, file processing, object serialization, regular expressions, and GUIs (graphical user interfaces). Generally offered: Fall, Spring, Summer. Course Fees: BISP $10; BTSI $15; LRB1 $15.

IS 3003. Principles of Information Systems for Management. (3-0) 3 Credit Hours.
Prerequisite: IS 1403 or IS 1413 with a grade of "C-" or better. An analysis of managerial/organizational information needs. Systematic procedures for developing information systems are covered. Includes coverage of hardware and software tools, information structures, and formal problem-solving techniques. Issues related to organizational controls, security, and globalization as a result of changing technologies are discussed. Cases will be assigned to illustrate the use of specific tools and techniques for problem solving. Generally offered: Fall, Spring, Summer. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3033. Operating Systems Security. (3-0) 3 Credit Hours.
Prerequisites: IS 2031, IS 2033, and IS 3413 with a grade of "C-" or better, or consent of instructor and Department Chair. This course examines the role of computer operating systems in the overall vulnerability of the network. A comparison of the more popular operating systems will be used to illustrate the concepts to the class. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3043. Secure Mobile App Development. (3-0) 3 Credit Hours.
Prerequisites: IS 2041 and IS 2043, or the instructor's consent. As mobile devices such as smartphones and tablets become ubiquitous, the demand for mobile apps and developers who specialize in mobile technology also surges. This course teaches students how to develop a mobile app in an advanced development environment (e.g., Android Studio) and principles of secure software engineering. The course will cover requirements analysis, interface design, functionality development, testing vulnerabilities, data security and other software design strategies with a focus on the usability of mobile apps in the real world. The course will also cover other technical, social, and marketing issues related to the adoption of mobile apps. This course can be an elective for the information systems major and cybersecurity major and minor. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3063. Database Management for Information Systems. (3-0) 3 Credit Hours.
Prerequisites: IS 2041 and IS 2043 with a grade of "C-" or better. A study of database management systems (DBMS) features, functions, and architecture, including logical design, data models, normalization, object-oriented data, and database administration. A DBMS product will be used to illustrate principles. Generally offered: Fall, Spring. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3073. Application Development. (3-0) 3 Credit Hours.
Prerequisites: IS 2041 and IS 2043 with a grade of "C-" or better. A study of the use of information systems techniques to solve managerial problems. Includes cases where students are asked to design and implement information systems that address various classes of analytic problems. Principles of decision theory are addressed. Generally offered: Fall, Spring. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3313. Introduction to Pathogenic Outbreak Investigations. (3-0) 3 Credit Hours.
This is a cross-disciplinary introduction to genetic and digital pathogens, their characteristics and methods for rapid analysis, geared toward predicting behavior during real-time outbreak investigations. The course examines both similarities and differences between biological and digital pathogens and presents core concepts from each domain to build a cohesive base for future multi-disciplinary research. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3413. Introduction to Telecommunications for Business. (3-0) 3 Credit Hours.
Includes an in-depth look at basic telecommunications terminology and concepts. Introduction to voice and data networks, signaling and multiplexing. Network topologies and protocol fundamentals and architectures are presented and compared. Ethernet, IEEE 802.11x, TCP/IP, dedicated circuit, and VPN technologies are introduced. Network security fundamentals are explored. Generally offered: Fall, Spring. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3423. Network Security. (3-0) 3 Credit Hours.
Prerequisite: IS 3413 with a grade of "C-" or better or consent of instructor and Department Chair. The course provides a foundation in networking technologies that are core to creating secure networks. Topics included in this course are basic cryptography, secure networking protocols, logical and physical security management and security devices. Relation between these technologies and operational and implementation issues for these technologies will also be discussed. (Formerly titled "Secure Network Design.") Generally offered: Fall, Spring. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3433. Introduction to Digital Forensics. (3-0) 3 Credit Hours.
The digital forensic investigation process involves organizational preparation, incident response, data collection, data analysis, and communication of findings. This course will teach students how to prepare for incidents, how to respond to incidents, and how to reliably collect digital data. Students will be introduced to various types of storage media and sources of volatile data. Students will also be introduced to forensic accounting principles and practices as well as fundamental legal issues related to digital forensics. Course Fees: BISP $20; BTSI $15; LRB1 $21.
IS 3453. Networking Fundamentals. (3-0) 3 Credit Hours.
Prerequisite: IS 3413 with a grade of "C-" or better or consent of instructor and Department Chair. This course will focus on the principles of telecommunication with particular emphasis on networking. Networking and transmission protocols will be emphasized. Both IPv4 and IPv6 will be included. This class will also include the hardware side of the network. The role of servers, switches and routers will be included. Security will be introduced. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3513. Information Assurance and Security. (3-0) 3 Credit Hours.
Prerequisite: IS 3413 with a grade of "C-" or better or consent of instructor. This course provides an in-depth presentation of information assurance topics such as fraud, eavesdropping, traffic analysis, intrusion detection and prevention, hacking, viruses, and cryptography. Risk management will also be discussed. (Formerly IS 4453. Credit cannot be earned for both IS 3513 and IS 4453.) Generally offered: Fall, Spring. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3523. Intrusion Detection and Incident Response. (3-0) 3 Credit Hours.
Prerequisite: IS 3513 with a grade of "C-" or better. This course provides an in-depth look at intrusion detection methodologies and tools and the approaches to handling intrusions when they occur; examines the laws that address cybercrime and intellectual property issues; and includes a study of proper computer and network forensics procedures to aid in the identification and tracking of intruders and in the potential prosecution of criminal activity. Generally offered: Spring. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3533. Cyber Law and Legal System. (3-0) 3 Credit Hours.
An introductory course in laws and legal issues that affect law enforcement, businesses, and investigators related to the preservation, collection, and analysis of digital data. Students will examine computer crime laws, civil and criminal laws that often involve electronic evidence, search and seizure of electronic evidence, judicial issues involving the admissibility of electronic evidence and related testimony, and legal issues involved with electronic surveillance. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 3833. Cyber Operations. (3-0) 3 Credit Hours.
Prerequisites: IS 3513 and IS 3523 with a grade of "C-" or better. This course includes discussions concerning both the defensive and offensive cyber security operations. Protecting the network and the critical infrastructure will be one of the primary emphases of the course. Offensive capabilities will also be discussed. Current events, reverse malware engineering, new technologies, policies and legal subjects will also be part of this course. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4023. Applied Big Data with Machine Learning. (3-0) 3 Credit Hours.
This course provides an overview of machine learning techniques to explore, analyze, and leverage data. Students will be introduced to tools and algorithms they can use to create machine learning models that learn from data, and to scale those models up to big data problems. This course will help prepare students for more advanced courses in cyber analysis and data-driven decision making. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4033. Network Operations. (3-0) 3 Credit Hours.
Prerequisite: IS 3453 with a grade of "C-" or better or consent of instructor and Department Chair. The course will explore the fundamentals of operating a network. Issues to be included are physical security, electrical and air conditioning issues, data storage and retention, and backup and redundancy of data. Other topics include floor loading, patch management, converting user requirements to system requirements and disaster recovery. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4053. Systems Analysis and Design. (3-0) 3 Credit Hours.
Prerequisite: IS 3063 with a grade of "C-" or better. An introduction to systems theory and development techniques. Topics include problem definition, system development life cycle, feasibility analyses, project management, system models and CASE tools. Generally offered: Fall, Spring. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4063. Advanced Topics in Information Systems. (3-0) 3 Credit Hours.
Prerequisite: 15 semester credit hours of information systems courses (excluding IS 1403 and IS 3003). Survey of recent developments in information technology. Analysis will focus on applications in the business community and theoretical developments that relate to those applications. Ordinarily taken during semester of graduation. Generally offered: Fall, Spring, Summer. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4083. Agile Project Management. (3-0) 3 Credit Hours.
This introductory course presents concepts and techniques for leading agile teams in many types of projects including software development, engineering, construction, product development, as well as science and technology focused efforts. The course will give students the opportunity to develop an agile mindset and a range of adaptive skills including agile methods, practices and values that are associated with achieving higher levels of performance and customer satisfaction. The course will also prepare the student to sit for the Project Management Institute's PMI-ACP certification exam. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4143. Wide Area Networks. (3-0) 3 Credit Hours.
Prerequisite: IS 3413 with a grade of "C-" or better or consent of instructor and Department Chair. This course explores the telecommunication technologies used in wide area networks. Technologies such as frame relay, ATM, TCP/IP, and voice over IP will be studied. The role of the common carriers will also be discussed. Secure network traffic over TCP/IP will be included. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4183. Advanced Database Concepts and Applications. (3-0) 3 Credit Hours.
Prerequisite: IS 3063 with a grade of "C-" or better. Databases play a critical role in the business operations of most organizations. This course provides an in-depth coverage on concepts governing the design and management of database systems. Topics include data modeling, database design, administration, optimization and performance evaluation, SQL language, procedures, functions and triggers. Students will have the opportunity to learn how to design and build modern database systems through a set of hands-on exercises and projects using MS SQL Server, Oracle and other contemporary database software. The course also covers some advanced topics such as database security, database connectivity and Web applications. Course Fees: BISP $20; BTSI $15; LRB1 $21.
IS 4213. Data Center Infrastructure Planning. (3-0) 3 Credit Hours. 
Prerequisite: IS 4033 with a grade of "C-" or better or consent of instructor and Department Chair. The purpose of this class will be to explore the electrical power, air conditioning, and fire suppressant requirements of a data center. Electrical grids, standby generators, and uninterruptable power supplies will be discussed. The course explores the various aspects of power quality, interruption of service, voltage flicker and control, voltage swells and sags and power surges. Air conditioning requirements and methods will also be included. Fire suppressant techniques will also be part of the class. A comprehensive project involving the design of the data center to include these three major issues will be part of the class. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4223. Emerging Network Technologies. (3-0) 3 Credit Hours. 
Cloud computing has become popular in industry. This class will look at what it is and how it works. Security issues will be an important part of the course. Other topics include virtual machines, storage area networks, software defined networks, and remote systems management. New hardware will also be included. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4233. Introduction to Cloud Computing. (3-0) 3 Credit Hours. 
Cloud computing has gone from a leading trend in IT to a widely adopted mainstream computing platform. This course introduces cloud computing concepts where students explore the basics of cloud services ecosystem and deployment models. Students will become acquainted with commonly used industry terms, typical business scenarios and applications for the cloud, security models, and benefits and limitations inherent in the new paradigm of computing. This course will help prepare students for more advanced courses in big data technology and cyber analysis. (Formerly titled Cloud Technologies for Business.) Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4463. Web Application Security. (3-0) 3 Credit Hours. 
Prerequisite: IS 3513 with a grade of "C-" or better or consent of instructor. The security issues related to web applications will be discussed in this course. Topics include web application authentication, authorization, as well as browser and web database security principles. Various web application security attack types such as code injection, cross-site scripting, and cross-site request forgery will be studied. The course will also include discussions about business aspects that contribute to a secure web-based transaction environment. (Formerly titled Secure Electronic Commerce.) Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4473. Information Assurance Policy. (3-0) 3 Credit Hours. 
Prerequisites: IS 3413 with a grade of "C-" or better and one 3-semester-credit-hour security course or consent of instructor and Department Chair. There are many policy issues, within the firm and at various levels of government, that affect information assurance. This course will examine how these policies affect electronic security. Subjects will include privacy of information, intellectual property protection, globalization of information systems, and other policy matters. The protection and control of secured information will also be discussed. Generally offered: Spring. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4483. Digital Forensic Analysis I. (3-0) 3 Credit Hours. 
An introductory course in collecting, examining, and preserving evidence of computer crimes. This course examines the issues, tools, and control techniques needed to successfully investigate illegal activities facilitated through the use of information technology. The tools of collecting, examining, and evaluating data in an effort to establish intent, culpability, motive, means, methods, and loss resulting from e-crimes will be examined. Generally offered: Fall. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4513. Industrial Control Systems. (3-0) 3 Credit Hours. 
Prerequisite: IS 3513 with a grade of "C-" or better, or consent of instructor and Department Chair. Many of the critical infrastructure systems contain a system control and data acquisition (SCADA) component. Frequently, the control systems are remotely accessed and therefore become the focal point for attack. This course examines the control system components from the standpoint of vulnerability and protection. (Formerly titled Cyber and Physical Systems.) Generally offered: Summer. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4523. Digital Forensic Analysis II. (3-0) 3 Credit Hours. 
Prerequisite: IS 4483. This course examines advanced digital forensic analysis topics, tools, techniques, and control mechanisms. Advanced topics include operating system artifacts, non-standard file systems, mobile devices, malware, and volatile memory. Students will gain experience with state-of-the-art forensics tools and techniques needed to successfully investigate illegal activities perpetrated through the use of information technology. Generally offered: Spring. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4533. Malware Analysis. (3-0) 3 Credit Hours. 
Prerequisites: IS 3033 and IS 3513 with grades of "C-" or better, or instructor's consent. This class is designed to introduce students to concepts, tools and techniques associated with modern malicious code analysis. The course will examine the methods employed by malicious actors to prevent analysis and neutralization of their exploits and discuss ways of leveraging resources and tools to effectively examine malicious code. Safe handling practices for malware analysis such as sandboxing, virtualization, and system isolation will be taught/practiced throughout the course. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4543. Cyber Attack and Defend. (3-0) 3 Credit Hours. 
This course will bridge the concepts of implementing a secure network with actual cyber threats. Students will learn the necessary skills to implement key IT system components, create security policies, and understand the background of what hackers do to mandate such security measures. Students will conduct red team assessments against common infrastructure components, and monitor residual effects of attacks. Course Fees: BISP $20; BTSI $15; LRB1 $21.

IS 4911. Independent Study. (0-0) 1 Credit Hour. 
Prerequisites: A 3.0 College of Business grade point average, and approval in writing from the instructor, the Department Chair, and the Dean of the College. See academic advisor for the required forms. Independent research in an information systems topic under the direction of a faculty member. May be repeated for credit, but not more than 6 semester credit hours of independent study, regardless of discipline, will apply to a bachelor's degree. Course Fees: BISP $20; BTSI $15.
IS 4913. Independent Study. (0-0) 3 Credit Hours.
Prerequisites: A 3.0 College of Business grade point average, and approval in writing from the instructor, the Department Chair, and the Dean of the College. See academic advisor for the required forms. Independent research in an information systems topic under the direction of a faculty member. May be repeated for credit, but not more than 6 semester credit hours of independent study, regardless of discipline, will apply to a bachelor's degree. Course Fees: BISP $20; BTSI $15.

IS 4933. Internship in Information Systems. (0-0) 3 Credit Hours.
Prerequisites: 6 semester credit hours of information systems courses (excluding IS 1403 and IS 3003), a 2.5 UTSA grade point average, and approval in writing from the instructor, the Department Chair, and the Associate/Assistant Dean of Undergraduate Studies in the College of Business. Directed internship of at least 200 hours of work under the supervision of a professional providing students with opportunities to apply concepts, principles, and techniques learned in the classroom. Written report required. A proposal form must be completed and approved prior to registration. Internship may not be repeated for credit. Course Fees: BISP $20; BTSI $15.

IS 4943. Internship in Cyber Security. (0-0) 3 Credit Hours.
Prerequisites: 6 semester credit hours of information systems courses (excluding IS 1403 and IS 3003), a 2.5 UTSA grade point average, and approval in writing from the instructor, the Department Chair, and the Associate/Assistant Dean of Undergraduate Studies in the College of Business. Directed internship of at least 200 hours of work under the supervision of a professional providing students with opportunities to apply concepts, principles, and techniques learned in the classroom. Written report required. A proposal form must be completed and approved prior to registration. Internship may not be repeated for credit. Course Fees: BISP $20; BTSI $15.

IS 4953. Special Studies in Information Systems. (3-0) 3 Credit Hours.
Prerequisite: Consent of instructor. An organized course offering specialized study not normally or not often available as part of the regular course offerings. Special Studies may be repeated for credit when the topics vary, but not more than 6 semester credit hours, regardless of discipline, will apply to a bachelor's degree. Course Fees: BISP $20; BTSI $15; LRB1 $21.

Management of Technology (MOT) Courses

MOT 4023. Essentials of Technology Management. (3-0) 3 Credit Hours.
This survey course provides an overview of the issues that impact technology management. All technology management subsystems are included: strategy, technology, resource, organizational, project, and people. The course is designed to help students develop the systems thinking necessary to successfully interact with the burgeoning technological world. The course will also provide the opportunity for students to develop the entrepreneurial skills important in managing the design, development, and commercialization of technological goods and services. (Formerly titled "Management of Technology.") Generally offered: Fall, Spring, Summer. Course Fees: BISP $20; BTSI $15; LRB1 $21.

MOT 4143. Introduction to Project Management. (3-0) 3 Credit Hours.
This introductory course presents concepts and techniques for the management of many types of projects including engineering, construction, product development, as well as science and technology projects. The course is designed to help students develop project planning skills including scope definition, scheduling, cost-estimating and risk assessment. The course will also provide the opportunity for students to develop skills in support of project leadership, team building and communication. Generally offered: Fall, Spring. Course Fees: BISP $20; BTSI $15; LRB1 $21.

MOT 4153. Project Management Certification. (3-0) 3 Credit Hours.
Prerequisite: Consent of instructor. This course is designed to give students the opportunity to prepare for the Project Management Professional (PMP) and Certified Associate in Project Management (CAPM) certification exams. The course is structured around the Project Management Institute Knowledge Areas including: integration, scope, time, cost, quality, risk, procurement, human resources, communication, and stakeholders. The course focuses on the inputs, tools, techniques and outputs associated with the core project management processes. Students will also complete diagnostics exam instruments and practice exams. Course Fees: BISP $20; BTSI $15; LRB1 $21.

MOT 4203. Strategic Management of Technology and Innovation. (3-0) 3 Credit Hours.
This course examines the issues involved in the strategic management of technology in contemporary business organizations. The course will examine new product development, emerging technologies and product portfolios; and will explore the dynamics of innovation in the firm. Course Fees: BISP $20; BTSI $15; LRB1 $21.

MOT 4313. Disruptive Innovations. (3-0) 3 Credit Hours.
This survey course focuses on technologies that may transform society and improve quality of life: the emphasis is on the nexus among biotechnology, information systems, materials, and renewable energy. The course will help students refine the systems thinking necessary to connect technology with users: it investigates the barriers that entrepreneurs face during commercialization. Cooperative learning is a defining characteristic of the course. Course Fees: BISP $20; BTSI $15; LRB1 $21.

MOT 4911. Independent Study. (0-0) 1 Credit Hour.
Prerequisite: Approval in writing from the instructor, the Department Chair, and the Dean of the College of Business. See academic advisor for the required forms. Independent research in a management of technology topic under the direction of a faculty member. May be repeated for credit, but not more than 6 semester credit hours of independent study, regardless of discipline, will apply to a bachelor's degree. Course Fees: BISP $20; BTSI $15.

MOT 4912. Independent Study. (0-0) 2 Credit Hours.
Prerequisite: Approval in writing from the instructor, the Department Chair, and the Dean of the College of Business. See academic advisor for the required forms. Independent research in a management of technology topic under the direction of a faculty member. May be repeated for credit, but not more than 6 semester credit hours of independent study, regardless of discipline, will apply to a bachelor's degree. Course Fees: BISP $20; BTSI $15.
MOT 4913. Independent Study. (0-0) 3 Credit Hours.
Prerequisite: Approval in writing from the instructor, the Department Chair, and the Dean of the College of Business. See academic advisor for the required forms. Independent research in a management of technology topic under the direction of a faculty member. May be repeated for credit, but not more than 6 semester credit hours of independent study, regardless of discipline, will apply to a bachelor’s degree. Course Fees: BISP $20; BTSI $15.

MOT 4951. Special Studies in Management of Technology. (1-0) 1 Credit Hour.
An organized course offering specialized study not normally or not often available as part of the regular course offerings. Special Studies may be repeated for credit when the topics vary, but not more than 6 semester credit hours, regardless of discipline, will apply to a bachelor's degree. Course Fees: BISP $20; BTSI $15; LRB1 $21.

MOT 4952. Special Studies in Management of Technology. (2-0) 2 Credit Hours.
An organized course offering specialized study not normally or not often available as part of the regular course offerings. Special Studies may be repeated for credit when the topics vary, but not more than 6 semester credit hours, regardless of discipline, will apply to a bachelor's degree. Course Fees: BISP $20; BTSI $15; LRB1 $21.

MOT 4953. Special Studies in Management of Technology. (3-0) 3 Credit Hours.
An organized course offering specialized study not normally or not often available as part of the regular course offerings. Special Studies may be repeated for credit when the topics vary, but not more than 6 semester credit hours, regardless of discipline, will apply to a bachelor's degree. Course Fees: BISP $20; BTSI $15; LRB1 $21.