INFORMATION SCIENCES AND TECHNOLOGY, B.S. (ABINGTON)

Begin Campus: Any Penn State Campus
End Campus: Abington

Program Description
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This major is structured to provide students with the theoretical frameworks and skill sets necessary to compete and be productive in the information technology-intensive global context that defines the new "Information Age." Specifically, the degree will be focused on a program that will build an understanding of core information technologies and related areas of study; will prepare students for the practical application of various information sciences and related technologies; and engage students in sharpening their abilities to think critically and to work in teams. All this will be done with considerable interdisciplinary integration in order to expose students to the cognitive, social, institutional, and global environments of IST. Team projects in most courses, a required internship, and a senior capstone experience provide additional, focused venues for involving students in the cutting-edge issues and technologies of the field.

Information Context: People, Organizations, and Society Option
Available at the following campuses: Beaver, Berks, Scranton, University Park, World Campus

This option focuses on how information technology affects social change and the delivery of information to the consumer. This includes the human-machine interface; organization and retrieval of information; digital libraries; information and telecommunications services; information and media industry structures; software services and intermediaries; telecommunications and information law and policy; sociological aspects of technology change; multimedia; and art, design, and aesthetics.

Information Systems: Design & Development Option
Available at the following campuses: Abington, Beaver, Berks, Brandywine, Harrisburg, Lehigh Valley, Scranton, University Park, World Campus, York

This option is focused on expanding the skills needed to develop advanced information technology systems using state-of-the-art tools and techniques. The emphasis is on providing the student with both knowledge in the design, implementation, testing and evolution of complex software systems as well as a set of project-oriented, team-programming experiences.

Information Technology: Integration & Application Option
Available at the following campuses: Abington, Beaver, Berks, Brandywine, Greater Allegheny, Harrisburg, Hazleton, Lehigh Valley, Mont Alto, New Kensington, Schuylkill, Scranton, University Park, Wilkes-Barre, World Campus, York

This option is designed to prepare students to use information technology to realize a variety of system-based goals (e.g., reliability, accessibility, efficiency, etc.). It is focused on developing a theoretical foundation and the skill set needed for integrating information technology into different systems for the purpose of enhancing system performance. The emphasis is on providing the student with both the theoretical frameworks needed to use information technology as a system attribute as well as a set of application-oriented experiences and skills.

What is Information Sciences and Technology?
Information Sciences and Technology is a discipline that explores how we can strengthen the power of information and technology, and use it to increase human potential. This includes focusing on creating innovative systems and technological solutions that benefit businesses, organizations, and individuals, and understanding the role of technology in how we live our lives.

MORE INFORMATION ABOUT INFORMATION SCIENCES AND TECHNOLOGY (https://ist.psu.edu/students/undergrad/majors/istbs)

You Might Like This Program If...
- You want to develop new software and web applications, help businesses operate more effectively by creating and implementing technological solutions, or understand how technology is connected to broader social issues.
- You are interested in technology but also want to work with people.
- You enjoy coming up with creative solutions to difficult challenges.

MORE INFORMATION ABOUT WHY STUDENTS CHOOSE TO STUDY INFORMATION SCIENCES AND TECHNOLOGY (https://issuu.com/istpsu/docs/ist-major)

Entrance to Major
To be eligible for entrance to the Information Sciences and Technology (ISTBS) major, students must:

1. have completed the following entrance-to-major requirements with a grade of C or better in each: IST 110; IST 140 (or equivalent CMPSC 101 or CMPSC 121) IST 210; and IST 220.
2. have achieved a minimum cumulative grade point average of 2.00 prior to and through the end of the semester during which the entrance-to-major procedure is carried out.

Entrance to the Integrated Undergraduate-Graduate (IUG) Program
The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor’s and master’s degree in a shorter period of time than would be necessary if the degrees were pursued separately. Information Sciences and Technology undergraduates may apply for admission to the ISTBS/ISTMS IUG program as early as February 15 of their sophomore year and no later than February 15 of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the ISTBS undergraduate degree program.
2. Must have completed 60 credits of an ISTBS undergraduate degree program.
3. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in Informatics. Students must complete the Graduate School application (http://gradschool.psu.edu/apply).
5. Must apply to the IUG program by February 15 of their junior year.

Degree Requirements
For the Bachelor of Science degree in Information Sciences and Technology, a minimum of 125 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>84</td>
</tr>
</tbody>
</table>

12 of the 45 credits for General Education are included in the Requirements for the Major. This includes 12 credits of General Education courses: 6 credits of GQ courses; 3 credits of GS courses; and 3 credits of GWS courses.

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (http://bulletins.psu.edu/undergraduate/general-education/baccalaureate-degree-general-education-program) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major
To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>IST 110</td>
<td>Information, People and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 210</td>
<td>Organization of Data</td>
<td>3</td>
</tr>
<tr>
<td>IST 220</td>
<td>Networking and Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>IST 230</td>
<td>Language, Logic, and Discrete Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>IST 301</td>
<td>Information and Organizations</td>
<td>3</td>
</tr>
<tr>
<td>IST 331</td>
<td>Foundations of Human-Centered Design</td>
<td>3</td>
</tr>
<tr>
<td>IST 440</td>
<td>Information Sciences and Technology Integration and Problem Solving</td>
<td>3</td>
</tr>
<tr>
<td>IST 495</td>
<td>Internship</td>
<td>1</td>
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</tbody>
</table>

Additional Courses
Additional Courses: Require a grade of C or better
ENGL 202C or ENGL 202D  Effective Writing: Technical Writing or Business Writing 3
MATH 110 or MATH 140  Techniques of Calculus I or Calculus With Analytic Geometry I 4

Select one of the following: 3
- CMPSC 101  Introduction to Programming
- CMPSC 121  Introduction to Programming Techniques
- IST 140  Introduction to Application Development

Select one of the following: 3
- ECON 14  Principles of Economics
- ECON 102  Introductory Microeconomic Analysis and Policy
- ECON 104  Introductory Macroeconomic Analysis and Policy

Supporting Courses and Related Areas
- Attainment of third-level proficiency in a single foreign language 1 12
- Select 6 credits of international courses in foreign culture from College-approved list 6

Supporting Courses and Related Areas: Require a grade of C or better
Select 3 credits at the 400-level in emerging issues and technologies from College-approved list 3

Requirements for the Option
Select an option 24

1. Proficiency must be demonstrated by either examination or course work. See the admission section of the general information in this Bulletin for the placement policy for Penn State foreign language courses.

Requirements for the Option
Information Context: People, Organizations, and Society Option (24 credits)
Available at the following campuses: Beaver, Berks, Scranton, University Park, World Campus

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>IST 431</td>
<td>The Information Environment</td>
</tr>
<tr>
<td>IST 432</td>
<td>and Legal and Regulatory Environment of Information Science and Technology</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better
IST 431 & IST 432  6

Additional Courses: Require a grade of C or better
IST 240 | Introduction to Computer Languages 3
or IST 242 | Intermediate & Object-Oriented Application Development 3
IST 302 | IT Project Management 3
or IST 413 | Usability Engineering 3

Supporting Courses and Related Areas
Select 12 credits from College-approved list (at least 3 credits at the 400-level and no more than 6 credits below the 200-level) 12

Information Systems: Design & Development Option (24 credits)
Available at the following campuses: Abington, Beaver, Berks, Brandywine, Harrisburg, Lehigh Valley, Scranton, University Park, World Campus, York

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
</table>
| IST 242 | Intermediate & Object-Oriented Application Development 3
| IST 311 | Object-Oriented Design and Software Applications 3

Additional Courses
Additional Courses: Require a grade of C or better
IST 261 | Application Development Design Studio I 3
or IST 361 | Application Development Design Studio II 3
Select 6 credits of the following: 6
- IST 411  Distributed-Object Computing
- IST 412  The Engineering of Complex Software Systems
- IST 413  Usability Engineering

Supporting Courses and Related Areas
Select 9 credits from College-approved list (at least 3 credits must be at the 400-level) 9

1. Students in the Information Systems: Design and Development Option are expected to take IST 242 prior to taking the prescribed and additional courses for that option.

Information Technology: Integration & Application Option (24 credits)
Available at the following campuses: Abington, Beaver, Berks, Brandywine, Greater Allegheny, Harrisburg, Hazleton, Lehigh Valley, Mont Alto, New Kensington, Schuylkill, Scranton, University Park, Wilkes-Barre, World Campus, York

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
</table>
| IST 302 | IT Project Management 3
| IST 420 | Fundamentals of Systems and Enterprise Integration 3
| IST 421 | Advanced Enterprise Integration: Technologies and Applications 3

Additional Courses
Additional Courses: Require a grade of C or better
IST 240 | Introduction to Computer Languages 3
or IST 242 | Intermediate & Object-Oriented Application Development 3

Supporting Courses and Related Areas
Select 12 credits from College-approved list (at least 3 credits at the 400-level and no more than 6 credits below the 200-level) 12

Program Learning Objectives

Knowledge/Application:
1. Understand and apply the interdisciplinary, theoretical knowledge of the information sciences or security sciences.
   a. Define and explain the core concepts, principles, processes, and theories within the academic majors of IST and/or SRA.
   b. Apply the core concepts of the academic majors of IST and/or SRA to real-world problems.

Problem-Solving:
1. Understand, apply and adapt various problem solving strategies, using appropriate technology and methods.
   a. Identify information problems and/or opportunities in terms of the human, informational and technology dimensions.
b. Analyze issues surrounding the problem and/or opportunity in terms of the human, informational, and technology dimensions; and determine the requirements appropriate to understanding the situation.

c. Design systems, architectures, processes, components, or programs to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).

d. Deploy up-to-date and appropriate techniques, methodologies, and/or tools necessary for understanding opportunities and constraints and/or the optimal design, implementation and continuance of an information based solution.

e. Evaluate the success of systems, architecture, processes, components, or programs intended to meet desired needs of the human context at varying levels of analysis (e.g., individual, group, organization, society, and/or world).

Communication (Individual and Team):

1. Communicate and work effectively (both individually and in teams) with a range of perspectives and audiences through a variety of media.
   a. Participate effectively on teams in order to accomplish a common goal.
   b. Communicate effectively with a range of audiences, formally or informally, through writing and the spoken word.
   c. Seek out, analyze, and incorporate diverse ideas and broader perspectives represented in the diversity of people.
   d. Make respectful and inclusive choices in interacting with customers, peers, supervisors, and/or subordinates with a diversity of identity characteristics (e.g., age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, gender identity, or veteran status).

Professional Responsibilities:

1. Understand professional responsibilities in terms of the ethical, legal, security and social aspects of any given problem and its solution.
   a. Demonstrate an understanding of the cognitive, social, legal, ethical, diversity, and security perspectives surrounding a given problem.
   b. Assess the impact of information, computing and technology on individuals, groups, organizations, society, and the world for the purpose of making informed decisions from a sociological, governmental, legal, and/or security perspective.

Lifelong Learning:

1. Commit to the continuous acquisition of relevant knowledge for professional development by self-teaching and/or on-going education and learning.
   a. Employ information-seeking strategies and self-directed learning in pursuit of current knowledge.
   b. Enroll in professional development and tutoring opportunities.

Academic Advising

The objectives of the university’s academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

Abington

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Suggested Academic Plan

The suggested academic plan(s) listed on this page are the plan(s) that are in effect during the 2019-20 academic year. To access previous years' suggested academic plans, please visit the archive (http://bulletins.psu.edu/undergraduate/archive) to view the appropriate Undergraduate Bulletin edition (Note: the archive only contain suggested academic plans beginning with the 2018-19 edition of the Undergraduate Bulletin).

Integration and Application Option at Abington Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
<th>Summer</th>
<th>Credits</th>
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<td>IST 210*#</td>
<td>3</td>
<td>IST 495¹</td>
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<td>1</td>
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<tr>
<td>IST 140 or CMPSC 121*</td>
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<td>IST 220*#</td>
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<td>MATH 110 or</td>
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<td>ENGL 15 or 30</td>
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<td>140 (GQ)</td>
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<td>(GWS)</td>
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Second Year

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<td>ECON 102 or</td>
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<td>STAT 200 or</td>
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<td>104 (GS)</td>
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<td>SCM 200 (GQ)</td>
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<tr>
<td>World Language</td>
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<td>CAS 100A or</td>
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<td>Level 3 (if needed)</td>
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<td>100B (GWS)</td>
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### Third Year

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<tr>
<td>IST 301*</td>
<td></td>
<td>3 IST 311*</td>
<td>3 IST 495 †</td>
</tr>
<tr>
<td>IST 302</td>
<td>3 IST 420 †</td>
<td></td>
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<tr>
<td>Support of Option</td>
<td>3 ENGL 202C or 202D (GWS)</td>
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<td>General Education Course</td>
<td>3 Support of Option</td>
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<td>General Education Course</td>
<td>3 Foreign Culture (IL)</td>
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### Fourth Year

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<tbody>
<tr>
<td>IST 421*</td>
<td>3 IST 440 (GWS)*</td>
<td>3</td>
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<td>IST 402, 451, or 461*</td>
<td>3 Support of Option</td>
<td>3</td>
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<tr>
<td>Support of Option</td>
<td>3 General Education Course</td>
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<td>Foreign Culture (IL)</td>
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<td>General Education Course</td>
<td>3 Elective</td>
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Total Credits 125-130

* Course requires a grade of C or better for the major
† Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
‡ Course satisfies General Education and degree requirement

### Support of Option Notes
Any non-required IST course can be used as a Support of Option. For example: IST 250, IST 261, IST 311.

### Design and Development Option at Abington Campus
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<th>Fall</th>
<th>Credits Spring</th>
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<tbody>
<tr>
<td>IST 110*#</td>
<td>3 IST 210*#</td>
<td>3 IST 495 †</td>
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<tr>
<td>IST 140 or CMPSC 121*</td>
<td>3 IST 220*#</td>
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<tr>
<td>World Language Level 1</td>
<td>4 or 6 World Language Level 2</td>
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<td></td>
</tr>
<tr>
<td>MATH 110 or 140 (GQ)</td>
<td>4 ENGL 15 or 30 (GWS)</td>
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<tr>
<td>General Education Course</td>
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Total Credits 14-16 16-18

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<td>IST 230*</td>
<td>3 IST 242*</td>
<td>3 IST 495 †</td>
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</tr>
<tr>
<td>IST 261*</td>
<td>3 Support of Option (Web/ Mobile App or Game Development recommended)*</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>CAS 100A or 100B (GWS)</td>
<td>3 STAT 200 or SCM 200 (GQ)</td>
<td></td>
<td>4</td>
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<tr>
<td>ECON 102 or 104 (GS)</td>
<td>3 General Education Course</td>
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<tr>
<td>World Language Level 3 (if needed)</td>
<td>4 General Education Course</td>
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</tbody>
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Total Credits 16 16

#### Third Year

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<tr>
<th>Fall</th>
<th>Credits Spring</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 301*</td>
<td>3 IST 411 or 413*</td>
<td>3 IST 495 †</td>
<td>1</td>
</tr>
<tr>
<td>IST 311*</td>
<td>3 Support of Option (IST 361, Application Development Design Studio II recommended)</td>
<td></td>
<td>3</td>
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<tr>
<td>IST 331*</td>
<td>3 ENGL 202C or 202D (GWS)</td>
<td></td>
<td>3</td>
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<tr>
<td>General Education Course</td>
<td>3 Foreign Culture (IL)</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

* IST 495 - One internship for credit is required to complete degree requirements, a maximum of three internships for credit are allowed. Should be scheduled and completed during summer and can be scheduled as early as the first year.
## Information Sciences and Technology, B.S. (Abington)

<table>
<thead>
<tr>
<th>General Education Course</th>
<th>3 General Education</th>
<th>3</th>
<th>15</th>
<th>15</th>
<th>1</th>
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</thead>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 412 or 413*</td>
<td>IST 440 (GWS)*</td>
</tr>
<tr>
<td>IST 402 (or 4xx Emerging Issues and Technologies)*</td>
<td>3 Support of Option (Web/ Mobile App or Development recommended)*</td>
</tr>
<tr>
<td>Foreign Culture (IL)</td>
<td>3 General Education Course</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Elective</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3 Elective</td>
</tr>
</tbody>
</table>

Total Credits: 125-130

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

### University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

1 IST 495 - One internship for credit is required to complete degree requirements, a maximum of three internships for credit are allowed. Should be scheduled and completed during summer and can be scheduled as early as the first year.

### Career Paths

IST allows you to explore some of the biggest challenges facing society and work to solve them by leveraging information and using technology. It blends skills from a number of fields – computer science, psychology, math, business, sociology, political science – so you can help people and organizations thrive. IST’s Office of Career Solutions helps students navigate their internship and career development in the field through coaching, workshops, interview preparation, resume reviews, career fairs, job postings, and networking opportunities.

### Careers

Because our courses blend technical knowledge with skills in communication and business, an IST degree allows for careers in nearly every industry including government, defense, consulting, business, entertainment, and medicine.

MORE INFORMATION ABOUT POTENTIAL CAREER OPTIONS FOR GRADUATES OF THE INFORMATION SCIENCES AND TECHNOLOGY PROGRAM (https://www.ist.psu.edu/students/careers)

### Contact

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http://abington.psu.edu/information-sciences-and-technology-ist

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http://wilkesbarre.psu.edu/academics/ist

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https://www.worldcampus.psu.edu/degrees-and-certificates/information-sciences-and-technology-bachelors/overview

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