Computing Sciences

FALL 2019
Degree Programs

- Computer Science (B.S., CS)
- Applied Computing (B.S., AC)
- Information Technology (B.S., IT)
- Software Engineering (M.S., SE)
- Combined B.S./M.S. (CS or AC, SE)
B.S. Computer Science

- **Established in 1970**
  - Second among the 28 Jesuit Institutions in the US; 50 Year Anniversary in 2020
  - One of the first in Pennsylvania

- **ABET Accreditation Status:**
  - Since 1990; one of the first in Pennsylvania
  - Currently one of just 17 schools in Pennsylvania; only one in NEPA

- **Curriculum:** 121-123 Credits
  - Major: 38 required, 12 elective
  - Cognate: Mathematics (11+) and Natural Science (8+)

- **Employment**
  - Software Development
  - Wide ranging opportunities
**B.S. Applied Computing**

- **Established in 1987**
  - As Computer Information Systems (CIS)
  - Renamed and focus broadened
  - Application Development Emphasis
  - Students select
    - Business Track or
    - Individualized Track

- **Accreditation Status:**
  - Preparing for ABET Accreditation as “Applied Computing”

- **Curriculum: 121 Credits**
  - Major: 32 required, 12 Elective
  - Cognate: 22 pertinent to the declared track

- **Employment**
  - Software Development in Application Area (Business, Criminal Justice, Data science, Management, etc)
B.S. Information Technology

- Established in 2016
  - Emphasis on Application of Technology
  - Replaced former related program

- Employment
  - Managing computer technology within and for organizations

- Curriculum: **120-122 Credits**
  - Major: 41 required
  - Cognate: Breadth and depth in multiple areas required. Ample electives allow for completion of a minor
  - An Internship Required

- Accreditation Status:
  - Preparing for ABET Accreditation
Declaring/Switching Majors

- **CS and AC are identical in the First Year**
  - Require the same Major and Cognate courses

- **IT requires most of the same First Year Courses**
  - Requires the same Major and Cognate courses as CS and AC, with one exception
  - Students changing major can complete the Major and Cognate requirements in 3 years

- **Programs diverge in Sophomore Year; Cognate Differences**
  - CS: Mathematics & Science, AC: track specific – minor, 2nd major, etc., IT: Electives

- **Application for Combined BS/MS Program in Junior Year**
CS Game Development Track

Established in 2019
- Optional track within ABET-Accredited Computer Science major.
- Developers in the electronic entertainment industry

Employment
- In electronic entertainment development
- In general software development

Curriculum: 121-123 Credits
- Includes All CS requirements
- Can be completed in the CS Plan of Study
- Track Requirements
  - CMPS 370 Computer Graphics
  - CMPS 372 Artificial Intelligence
  - MATH 351 Linear Algebra
  - ART 324 3D Content/Animation
  - Elective in Art/AI History
  - CMPS 490 Capstone Project (Game)
Data Science Concentration

- **Established in 2019**
  - Designed for CS/AC and Applied Mathematics majors
  - Data Scientists
  - Pursue graduate studies in data science

- **Employment**
  - In data science
  - In general software development

- **Curriculum: 121-123 Credits**
  - 20 Computer Science Credits
  - 11 Math credits
  - 10 Data Science Credits
  - Can be completed within the CS and AC Plans of Study
  - First Data Science Course during Fall of Sophomore Year
Established in 1990
- Designed to prepare professional Software Engineers in the Software Lifecycle; requirements, design, implementation, testing, integration, deployment, maintenance
- Based upon guidelines from the Software Engineering Institute

Curriculum: 36 credits
- Ten courses, plus a two-semester, six credit Thesis Project
- Designed to be completed in 2 years (full time), or 3 years (part time)
- Combined B.S./M.S. Program can be completed in 5 years total

Employment – Software Engineering
Combined BS/MS Program

- Both BS and MS can be completed in 5 years total
  - Specific Graduate Courses also fulfill specific Undergraduate Course Requirements
- CS, AC and CE students may apply in the Fall of Junior Year
  - Minimum GPA of 3.0 and Strong Recommendations Required
- Students may apply for Graduate Assistantships
  - Provides Full/Half Tuition Remission and Stipend
  - 20 or 10 hour per week commitment
  - Serve as Lab Instructors in the Computing Sciences Department
  - Additional Opportunities in other University Departments and Offices
Advising

► **Freshman Year**
  ▶ Advised by the CAS Academic Advising Center
  ▶ CMPS/IT 112, CMPS 134 and CMPS 144 establish department connections

► **Sophomore, Junior, and Senior Years**
  ▶ Advised by a faculty member of the department for remaining three years

► **4th and 5th Years - Students in the Combined Program**
  ▶ Advised by the undergraduate adviser and graduate program director.
Teaching Assistants (GTA’s)
- GTA’s offer tutoring sessions and office hours for introductory Computer Science courses

Center for Teaching and Learning Excellence (CTLE)
- Offer tutoring on a wide range of subjects

Faculty in the Department
- “Open Door” policy
Capstone Project

- Undergraduate programs each require a Capstone Project
  - Developed during the senior year
  - Most students work individually, but team projects are sometimes undertaken

- Project ideas come from students or faculty members
  - Each project has a Computing Sciences faculty advisor

- Technical and Communication Abilities Developed
  - Substantial writing and multiple oral presentations are required
Honors and Special Programs

- Faculty/Student Research Program (FSRP)
  - Students probe a topic in-depth through one-on-one collaboration with a professor

- Honors Program (Honors Program)
  - Students from various majors take additional specialized courses, including independent study, allowing them to work one-on-one with professors both in and outside of their major.

- Magis Honors Program in STEM (Royal Scholars Program)
  - NSF Grant supports scholarships and extracurricular enrichment activities

- Special Jesuit Liberal Arts Honors Program (SJLA)
  - Students develop enhanced writing, oral and critical-thinking skills through specially designed courses in philosophy, theology and literature.
Internships

- Internships are not required, but are strongly encouraged
- The department promulgates opportunities
- Most students do internships before their Senior year
- Internship can be done for credit or not
- Internships are with local, regional and national companies
- Students also pursue opportunities of their own
Sponsored by National Science Foundation (NSF)
Research Experience for Undergraduates (REU)
Intended for rising Juniors and Seniors
Takes place during summer months, at a host university
Students work closely with host faculty on research projects
Typically provides ample stipend covering travel, housing and food
Frequently Asked Questions

How big is the department?
- Currently there are six full-time faculty members and two full-time staff.
- Currently there are approximately 90 students in the department’s programs.
- In total, there are more than 1,200 alumni from our programs.

Are major courses taught by full-time departmental faculty?
- In CS, all major courses are taught by full-time Computing Sciences faculty.
- In AC and IT, some courses are taught by adjunct professors who possess relevant/specialized expertise from their industry experience.
- Graduate Teaching Assistants serve as lab instructors in the first-year labs.
What is the philosophy or approach taken by the department?

- We attribute the success of our programs to an emphasis on core concepts and abilities.
- Our emphasis is on “learning how to learn” and so students and graduates are prepared to adapt and evolve in new situations with diverse and with emerging applications and technologies.

What electives are available?

- Electives and Special Topics courses are offered regularly.
- Game Design: Computer Graphics, Artificial Intelligence can form a background for game development and students have developed game software for their Capstone Projects.
- Data Science Concentration – CS and AC students can complete it within their Plan of Study.
Can Computer Science I be skipped?

- Students with AP scores of 4 or better normally receive credit for CMPS 134.
- Students without AP credit can be evaluated individually.

What courses should be taken in High-school as preparation?

- An introductory computer programming course, not necessary, but would be beneficial.
- Most students have Calculus or Pre-Calculus backgrounds, but Discrete Mathematics, although rare, would be most appropriate.

What extracurriculars are available?

- ACM Student Chapter, Collegiate and HS Programming Contests, Gaming Club, UPE Honor Society
Where do alumni work?

For a variety of well-known and lesser known employers.

The well-known include:

- Allstate, AT&T, Comcast, DHS, DoD, ESPN, Facebook, FBI, Geisinger, Highmark, IBM, Intel, Johnson & Johnson, Lockheed Martin, Lucent, Merck, MetLife, Microsoft, Northrup Grumman, NSA, Prudential, Siemens, Tumblr, USPS, Verizon, Wells Fargo

The lesser known include:

Where do graduates continue their studies?

Students have earned PhD’s and Master’s Degrees at numerous institutions including:

- Carnegie Mellon
- Columbia
- Cornell
- Delaware
- Lehigh
- Harvard
- Iowa State
- Pace
- Rensselaer
- Scranton
- South Florida
- Syracuse
- UConn
- UPenn
- Yale