Carnegie Mellon

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Information Systems

Information Systems
Information Systems (IS), found within the College of Humanities and Social Sciences, is a program designed for students who want to understand and solve information problems for organizations. As the ability to store and access massive amounts of data has grown, the ability to process, manipulate and summarize information has become vitally important. Moreover, the ability to design information systems for the effective use of information has now become central for the support of organizations, decision makers, researchers and policy makers. The focus of the IS program is on giving students the knowledge and skills necessary to effectively accomplish these tasks. Graduates of the IS program are ideally situated to take a leading role in shaping our information-based economy.

Matching Your Interests
IS majors are a group of students with very diverse interests, reflecting the wide range of facets and uses of information systems. Many students have particular interests in business administration and the social sciences, including economics, organizational theory and policy analysis. Others are interested in problems of communication and design of systems with particular interests in multimedia production and the human-computer interface. A third group is interested in the use of information systems for knowledge discovery, data mining and data analysis. Finally, many students will be most interested in the uses of information systems to support decisions, and will want to study decision-making and rational choice. All IS majors must be technically oriented but should be more interested in the many dimensions of information problems and solutions than in the details of the hardware, software and networking of the systems themselves.

Curriculum
Along with completion of the H&SS General Education Requirements and basic prerequisites in mathematics, statistics and computer programming, students must complete a Professional Core, a Disciplinary Core and achieve expertise in an area of concentration. In the Professional Core (consisting of five courses), students learn the basic skills necessary to analyze, design and implement information systems using current organizational and technological practices. Two of the Professional Core courses are project-based experiences in which small teams of students must develop and communicate solutions to real information problems. In the Disciplinary Core (consisting of four courses), students develop expertise in four areas that are fundamental to understanding and solving problems in information systems: Organizations, Decision Sciences, Research Methods and Professional Communication. The organizations area emphasizes how groups of people can organize and coordinate their behavior to perform complex tasks. The Decision Science component focuses on the fundamentals of good decision making. The Research Methods course illuminates the process of gathering, summarizing, communicating and evaluating information and information systems. The fourth area, Professional Communication, builds students' skills in professional writing and multimedia production.

Concentration Areas
There are eight concentration areas. Students must must complete three courses in one of these areas. These areas include:

1. Organizations
2. Complex Models
3. Research Methods
4. Professional Communications
5. Business Economics
6. Computers and Cognition
7. Technology
8. Global Systems

Thus, the IS major provides students with a broad liberal education along with training in the essential aspects of the design and implementation of information systems.

Post-Graduation
IS students have experienced a very strong job market in past years, and national trends indicate that this is likely to continue.

IS majors often take jobs in:
- Consulting companies (Accenture, Goldman Sachs, Ernst Young)
- Major information companies (Microsoft, Google, Amazon)
- Large corporations (Mellon Financial, Boeing, Ford Motor)
- Start-ups

Internship opportunities closely parallel the job market. IS students meet an important need in the information-age workplace. Typically, a subset of the IS students goes on to receive master's-level degrees in information systems, for example the Master's of Information Systems Management (MISM) at Carnegie Mellon. One easy way to do this is through the accelerated master's program at Carnegie Mellon, in which some of the undergraduate coursework is allowed to count towards graduate work. The time required to earn the master's degree under the accelerated program is much less than that needed for a standard program. Because of the broad training received within the H&SS curriculum, it is natural for IS graduates to pursue professional degrees in law or business, or M.S. or Ph.D. programs in some disciplinary field of the social and behavioral sciences or in the humanities.

Because of the multidisciplinary basis of the major in Information Systems the "administrative home" of the program is in the H&SS Dean's office.

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Some frequently asked questions about the major in Information Systems

1. **What is the difference between Information Systems and Computer Science?**
Developing effective information solutions requires a broad set of skills. One set of skills is needed to support the selection, design, implementation and testing of the hardware, software and networks that form the backbone of an information system. Programming skills and technical training in computer science is needed to be effective in this area. Another set of skills involves illuminating and understanding the real information problems that confront individuals and organizations. Information problems are often easy to recognize, but hard to solve. To solve such problems, information system specialists need to understand how complex systems work, how organizations behave, what information should be gathered and how it can be analyzed, interpreted and effectively communicated. Information problems are often complex enough that the well-directed efforts of a multi-disciplinary team are needed if there is any hope of designing, implementing and communicating a real solution.

The main difference between Information Systems (IS) and Computer Science (CS) is in the relative emphasis on the above sets of skills. CS professionals tend to focus on the first set of skills, i.e. those related to the design, implementation and testing of the information system. IS professionals tend to focus on the second set of skills, i.e. those involved in the broader area of uncovering and illuminating information and creating general solutions to support organizations, research inquiries, policy formulation and decision making.

While the emphasis differs across the two fields, anyone wishing to excel in this broad area must have a foundation that includes both. Thus, IS students must know the current technology and have the ability to use it directly, and CS students need to be aware of the broader context in which their technological contributions are employed. Both groups need to know how to create and participate effective as members of teams.

2. **Why is the Information Systems program in the College of Humanities and Social Sciences (H&SS)?**
While IS programs are found typically in schools of computer science or business administration, here, it is based in H&SS. The common perception is that information solutions only require programming skills, but in reality this is simply not the case. The programming aspect, while obviously critical, is often only a very small part of a comprehensive information solution. The most difficult parts of solving information problems are often in the areas of problem identification, understanding how complex systems work, how organizations behave, how to effectively gather, interpret and communicate information, and how to allow individuals to productively interact as a team. Each of these areas are ones in which departments within H&SS have critical expertise. In fact, even some of the current technology trends, e.g. web-based intelligent agents and networked systems, tend to look more like artificial (or real) social systems than engineered systems.

While technological improvements are certain to continue to occur well into the future, the area of expertise encompassed by the IS program is not as easily surmounted by technological improvements. It is very difficult to create tools and technologies that can define information problems and orchestrate solutions. In fact, over time, the premium on people skilled in the areas that the IS program emphasizes will continue to increase.There is an additional advantage to studying Information Systems within H&SS. Information technology has brought about unprecedented changes in the ways individuals and organizations interact and in the scope of those interactions. It is vital that individuals be able to interact with other individuals including those from different countries and different cultures. The H&SS General Education Program provides students with a broad education, including coursework in world cultures, the humanities, economic, political and social science and languages. In addition, students can study many areas of the social sciences and humanities in great depth. Thus, the IS major provides students with a broad education along with training in the essential aspects of the design and implementation of information problem solutions.

In addition to the advantages of studying IS within the context of H&SS, the senior IS project course involves a multi-disciplinary team approach to solving an information problem arising from a real organization. Through H&SS we attempt to target local charitable or non-profit organizations and stress the potential societal benefits of information systems.

3. **Are there any special requirements that students need to know about?**
With careful planning, students should be able to explore a variety of interests during their experience at Carnegie Mellon. There is a set of general education requirements that most students complete during the first two years. Moreover, students will need to ensure that all prerequisites are met during this time. In particular, students must achieve a grade of C or better in the 15-200/211 requirement before advancing in the professional core during their junior year. By planning appropriately and taking any necessary steps (e.g., developing some prior knowledge of the programming language used in these courses) students should be able to achieve this requirement in a timely manner. While Information Systems is an area in which degree recipients are in great demand, students should remember that they should obtain an education that will provide for a broad prospective on society and world cultures and will also provide a solid foundation for later learning.

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