



ISDEV Option

Information Systems: Design and Development

1. **What campuses offer this option?** Not all options are available at all campuses, so be sure to [check for availability](#) at your campus.

2. **What specific knowledge and skills are the focus of this option?**

The ISDEV option focuses on developing a range of technical skills, including:

- Object Oriented Design and Programming (IST 311) *How to design and program a software system using the object oriented paradigm, e.g. UML, Java and/or .NET.*
- Software Development and Production Cycle (IST 412) *How do businesses produce software?*

Dividing up programming into teams, looking at communication issues and policies, and integrating components, documentation, etc.

- User-centric design and development (IST 413) *How to develop user-centric software?*

Looking into issues of user interface design and development, and society and organizational issues, with a focus on how to design software that meets users' needs given their environments and everyday lives.

- Design and development of software that runs on distributed platforms (IST 411) Most of you have probably played or heard of multi-player games (e.g., *Everquest*), or have done LAN parties playing *Doom* or *Unreal* among friends. In this option, you will learn how to design and build programs that connect different computers or users together.
- Working with development tools used in the software development market, e.g.:
 - Enterprise J2EE and/or .NET
 - Distributed objects, RMI, .NET remote objects
 - Network programming
 - Enterprise Java Beans (EJB)
 - Unified Modeling Language (UML)

3. **What other Penn State courses would you recommend to supplement this option?**

First of all, take as many IST courses as possible, in particular a broad selection of the **300-level** courses. Developing information systems involves understanding the range of factors that impact the form of the IS solution. Students should consider **CSE 103** and **120** if they are particularly interested in the technical dimensions of system development. Courses in **cognitive psychology** and **graphic design** are appropriate for students interested in designing for human-computer interaction. Students also should consider taking an **introductory financial accounting** course, as so many systems deal with financial transactions or have transactions as essential inputs and/or outputs.

Other courses to consider include those from: Instructional Systems (INSYS), Mathematics (MATH), Industrial Engineering (IE), Electrical Engineering (EE), Finance (FIN), Supply Chain and Information Systems (SCIS), Economics (ECON), and Technical Writing, and Communication Arts and Sciences (CAS).

Students in this option also should consider taking courses from IST's Security and Risk Analysis minor. It is strongly recommended that you consider one or more application areas that are of special interest and take courses to gain an understanding of the area(s). This can be any domain from music to forestry to physics; overall, you will find the greatest satisfaction applying your IST skills to problems in which you have a deep and lasting personal interest.

4. Students majoring in IST will be prepared to work in many different areas:

a. What are specific examples of the activities /work assignments that best illustrate this option?

Requirements analysis, business analysis, information system design, human-computer interface design, system documentation, programming, module and system testing, and test plan design.

b. What are some examples of job titles/careers that will be available after graduation?

- Application Programmer
- Information Architect
- Application Developer/Analyst
- Usability Engineer
- Technical Writer/Editor
- Systems Engineer
- Human Factors Specialist
- Software Engineer
- User Interface Designer
- Web Developer
- Project Manager

5. What related or additional information should students focus on outside of classes?

- Consider joining and getting involved in the student chapters of the *ACM* and *IEEE*.
- Consider joining the *AIS* (Association for Information Systems) and/or *SIM* (Society for Information Management). Neither of these has local student chapters; consider starting one.
- In addition, read industry magazines such as *CIO*, and *Wired* to keep pace with what is happening in the IT "world."
- Consider reading *Slashdot*: <http://slashdot.org/>
- Take a trip to *Borders* or *Barnes and Noble* every now and then and skim over the new books they have on enterprise software development. It will give you a good sense of what's currently state-of-the-art in the industry.
- Read books to broaden your horizons. Books on philosophy, literature, design, etc., can help expand your imagination.
- Perhaps most importantly, practice designing and building applications for yourself, your friends and family, your favorite charity, a sports team, your college, or a business.

6. Recommended Web sites that supplement this option and the IST major:

- The *ACM* and *IEEE* digital libraries: (see www.lias.psu.edu/alall.html)
- SEWORLD: www.cs.colorado.edu/serl/seworld/
- Software Engineering Institute: www.sei.cmu.edu/
- *ACM's* Special Interest Group on Computer-Human Interaction: www.sigchi.org

Follow and initiate technical discussions of interest at Web sites such as deja.com, whatis.com, and slashdot.org.

7. What are typical job descriptions for IST graduates in the Design and Development option? Please note: The following is a brief list containing some of the career positions an ISDEV graduate may encounter. It is not intended to serve as a comprehensive career guide, but rather to give students a sense of the general pathways to which this option may lead. Graduates from IST successfully apply their broad-based technology background in myriad professional settings. Some IST graduates also choose to continue their studies in graduate or professional schools.

- **Information Management Program:**
 - Academic excellence; strong analytical ability; proven leadership experience; team player, change orientation; demonstrated integrity; strong communication skills.
 - Understanding of business concepts/strategy, relevant intern co-op experience; business accounting coursework; multiple language skills; geographic mobility, global working/living experience.

- **Java Programmer:**
 - Must have proven application development experience for a large-scale, J2EE-based system, as well as practice troubleshooting production problems.
 - Experience with rule-based systems and knowledge of open-source frameworks (Struts/Spring/Hibernate) desirable.
 - Experience and demonstrated competence in systems development using Java, JavaScript, HTML, .NET, XML, and Web Service. Familiarity with WebLogic 6.1+ desirable.
 - Understanding of, and experience with, relational database concepts and use of SQL queries. Ability to design, develop, and implement high-quality code in a timely manner is essential.
 - Working knowledge of system development life cycle methodologies and UNIX/Windows operating systems.
 - MS Office proficiency (Word, Access, Excel, PowerPoint, Outlook).