



## The Information Technology Studies Program (ITS)

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Information technology is used everywhere – in every type of organization and as part of our daily lives. It enables people, to work, live and play differently.

### ***What is Information Technology?***

Information technology is the analysis, design, development, implementation, and support of computer-based systems. IT deals with the software, databases, hardware, and networks to store, access, and use information. The key word is information – whenever we use technology, whether it be a cell phone, a car, a web site or a software application, we are either creating, retrieving, or updating information in some way shape or form.

### ***Is it for you?***

Information technology is about innovation through using problem-solving, creativity, people skills, and technical skills. Do you enjoy problem solving? Do you like to create and build things? Do you like working with people? If so, a career in information technology might be for you. Employers today recognize and seek out people who are technically savvy, and who appreciate how technology can help people and organizations.

As more and more jobs require higher levels of technical expertise, employees with a strong foundation in technology, combined with business skills, have the most competitive career advantage. The ITS program at The Women's College of the University of Denver is designed to provide you with this foundation. The faculty in the program are all working IT professionals, bringing years of experience and real world application to the classroom environment. These faculty have unique skills and areas of expertise to share with you.

### **Program Objectives**

The information technology studies program prepares you to recognize information technology opportunities, define solutions, and apply them to real-world problems. A major or minor in ITS can provide you with the skills to help organizations benefit from the potential that technology can provide – skills such as web design and development, programming, business analysis, and project management.

But it is not just about the technology. The intersection between technology and business is important. Organizations today look for technology solutions to improve service and productivity, and reduce costs and inefficiencies. The Women's College offers ITS courses such as systems analysis and project management that go beyond the technology. The list of approved elective courses includes classes to ensure that when you graduate, you are equipped with all the knowledge and competencies that organizations value.

## ***ITS Program Major***

Students complete their ITS major through a combination of required courses and electives. Since IT careers are specialized, students can, if desired, concentrate their studies in a specific area of IT through their choice of electives. These concentration areas align with specific IT careers:

<b>Analysis</b>	<b>Technology</b>	<b>Leadership</b>
<b>What:</b> Analyzing business problems and identifying opportunities to apply technology. The “what” an in What is the solution? What do we want to build?	<b>What:</b> Focused on design and development of a technology solution. The “how” as in how to build a solution that meets needs.	<b>What:</b> Turning the “what” and “how” into a project. Directing, leading and managing others to deliver a technical solution.
<b>Graduates Need:</b> General understanding of business and technology.	<b>Graduates Need:</b> Hands on experience in building software or databases, managing networks or security.	<b>Graduates Need:</b> Understanding of people, organizations, and business.
<b>Careers:</b> Business Analyst, Systems Analyst, Solutions Architect, Technical Analyst	<b>Careers:</b> Developer, Network Administrator, Data Base Administrator	<b>Careers:</b> Team Leader, Project Manager, Program Manager

## ***Web Design & Development Sequence***

If you are interested in web design and development, a sequence of three classes (one required plus two electives) is available. Dreamweaver, available on computers in the TWC’s Pioneer Resource Center, will be used in all three classes. You are encouraged to take these classes in the same academic year.

ITS 2410	Introduction to Web Development
ITS 3410	Advanced Web Design
ITS 3510	Usability Design for Web Sites

## ***The Senior Sequence***

During the senior year, as part of a sequence of three required courses, student teams design, develop and implement an IT project for a Denver-based non-profit organization under the advisement of their instructor. Teams will select a project based on their interests and skills. The three-course sequence below should be taken in the same academic year, ***after a student attains senior status and completes the prerequisites.***

ITS 3880	System Analysis and Design
ITS 3890	Management of IT Projects
ITS 3950	Integrated Seminar

***ITS Major Requirements***  
**Major Required Courses (32 quarter hours)**

<b>Course</b>	<b>Title</b>	<b>Prerequisites</b>
ITS 1670	Information Technology Today	
ITS 1671	Principles of Information Technology	ITS 1670 (or concurrently)
MATH 2200	Mathematical Reasoning & Proof	MATC 1100
ITS 1672	Introduction to Programming	ITS 1670, ITS 1671, MATC 1100, MATH 2200
ITS 3421	Database Organization & Management I	ITS 1671
ITS 3621	Computer Networking	ITS 1670, 1671, MATC 1100
ITS 3880	System Analysis and Design	Senior status, ADM 2510, WRIT 1122, WRIT 1133, CREX 1217, ITS 1670, ITS 1671, ITS 1672, ITS 3421, MATH 2200
ITS 3890	Management of IT Projects	ITS 3880
ITS 3950	Integrated Seminar	ITS 3880, ITS 3890

**Major Elective Courses (16 quarter hours)**

Students are encouraged, but not required, to take electives aligned within their area of concentration.

<b>Elective</b>	<b>Analysis</b>	<b>Technical</b>	<b>Leadership</b>
ITS 2210 – Creativity in Problem Solving	✓		✓
ITS 2410 – Introduction to Web Development	✓	✓	
ITS 3410 – Advanced Web Design		✓	
ITS 3422 – Database II		✓	
ITS 3651 – Computer Security		✓	
ITS 3700 – Topics - E-Communication	✓	✓	
ITS 3510 – Usability Design for Web Sites	✓		
ITS 3810 – IT Business Analysis	✓		
ENGL 2021 – Business Technical Writing	✓		
FIN 2805 – Financial Decision Making	✓		✓
COMN 3020 – Conflict Management	✓		✓
COMN 3245 / LDRS 2540 – Group / Team Effectiveness	✓		✓
COMN 3500 – Advanced Public Speaking			✓
LDRS 2517 – Leadership Process			✓
LDRS 2518 – Self as Leader			✓
MGMT 2150 – Organizational Behavior			✓
BU 1005 – Gateway to Business	✓		✓
MKTG 2805 – Intro to Marketing	✓		

### ***ITS Program Minor***

Students majoring in communication or law and society can add an ITS minor by completing 20 hours of ITS course work

<b>Course</b>	<b>Title</b>	<b>Hours</b>	<b>Prerequisites</b>
MATH 2200	Introduction to Discrete Structures	4	MATC 1100
ITS 1671	Principles of Information Technology	4	ITS 1670
ITS 1672	Introduction to Programming	4	ITS 1670, ITS 1671, MATH 2200
ITS XXXX	An elective beginning with the prefix ITS	4	
ITS XXXX	An elective beginning with the prefix ITS	4	

***ITS Certificate***  
**Available in Three Concentration Areas**

**Web Design & Development**

It takes more than knowing how to use the latest web development software. It takes an understanding of design principles and usability, and all the tools and techniques available to develop effective and compelling web sites. The ITS Certificate in Web Design and Development provides students with the knowledge and skills needed to do just this. An interview with the program director is required prior to admission to this certificate.

ITS 1671 – Principles of Information Technology  
ITS 1672 – Introduction to Programming  
ITS 2410 – Introduction to Web Development  
ITS 3410 – Advanced Web Development  
ITS 3510 – Web Design & Usability

**Business Analysis for IT Projects**

Business analysis is the set of tools, techniques and knowledge to effectively identify technology needs and recommend solutions. It is focused on the “what” of an IT project – what do the stakeholders need? What should we build? The ITS Certificate in Business Analysis takes a problem solving approach to focus on the role that a business analysis would play to help ensure successful IT projects. An interview with the program director is required prior to admission to this certificate.

ITS 1671 – Principles of Information Technology  
ITS 1672 – Introduction to Programming  
ITS 2210 – Creativity in Problem Solving  
ITS 3810 – IT Business Analysis  
ITS 3880 – Systems Analysis & Design

**IT Project Development**

The ITS Certificate in Project Development is for those students who want to experience an IT project from inception as an idea, through to implementation. Based on a need from a Denver based non-profit organization, students, working as teams, will design and develop an IT solution. Besides developing an IT solution, students will define the scope, develop a project plan, assign roles and responsibilities, create a risk management plan and track progress for their project. An interview with the program director is required prior to admission to this certificate.

ITS 1671 – Principles of Information Technology  
ITS 1672 – Introduction to Programming  
ITS 3880 – Systems Analysis & Design  
ITS 3890 – Management of IT Projects  
ITS 3950 – Integrated Seminar

## *ITS Schedule*

<b>ITS Class Schedule</b>				
Class	Fall	Winter	Spring	Interterm
<b>REQUIRED CLASSES</b>				
ITS 1670 - Information Technology Today	✓		✓	
ITS 1671 - Principles of Information Technology	✓			
MATH 2200 - Discrete Structures		✓		
ITS 1672 - Introduction to Programming			✓	
ITS 3421 - Database I	✓			
ITS 3621 - Computer Networking			✓	
<b>SENIOR SEQUENCE</b>				
ITS 3880 - System Analysis & Design	✓			
ITS 3890 - Management of IT Projects		✓		
ITS 3950 - Integrated Seminar			✓	
<b>ELECTIVE CLASSES</b>				
ITS 2410 - Intro to Web Developmnet	✓			
ITS 3410 - Advanced Web Development		✓		
ITS 3510 - Usability Design for Web			✓	
ITS 2210 - Creativity in Problem Solving		✓		✓
ITS 3810 - IT Business Analysis			✓	
ITS 3422 - Database II		✓		
ITS 3700 - Special Topics (can take many times)				✓
ITS 3651 - Computer Security				

## ***Description of ITS Required Classes***

### **MATH 2200 – Mathematical Reasoning & Proof**

This mathematics course introduces students to the theory of sets, relations and functions, logic, truth tables and propositional calculus, proof techniques, and combinatorial techniques. *Prerequisite: MATC 1100*

### **ITS 1670 – Information Technology Today**

The course is an overview of information technology and how it used today in organizations and every day life. Topics include: its history and impact on organizations, business and people; discussions on components of IT such as software, hardware, networks and databases; the use of technology as a tool in various disciplines; issues of security and the ethical use of technology.

### **ITS 1671 – Principles of Information Technology**

The objective of this course is to discuss and analyze information technology from a problem solving perspective and to recognize how technology can be applied to help organizations and people solve every day problems. This course presents an overview of the problem solving process, the system development life cycle and project management so that students gain an appreciation of the “what”, “why” and “how” technology applications are selected, developed and implemented. Students will analyze technologies of their choice to understand the objectives and benefits and be able to recognize potential risks and improvements. Students will also develop a computer script to reflect a capability of a technology application. *Prerequisites: ITS 1670.*

### **ITS 1672 – Introduction to Programming**

Students will learn how to design and implement computer programs using the Java programming language, a widely used language for development of applications in an online (web based) environment, as well as in object oriented development. The course will cover determining the requirements for the program, and translating these requirements into a design. A program will then be written, tested and implemented. *Prerequisites: ITS 1671, MATH 2200*

### **ITS 3421 – Database Organization and Management I**

This course presents the important considerations in organizing and storing an organization's data using database technology. Topics covered include effective design of databases and using these techniques to design databases using commonly used database management systems. The societal and organizational implications of accumulating these electronic data are critically discussed. *Prerequisites: ITS 1671*

### **ITS 3621 – Computer Networking**

The technology of networks that connect computers and other devices together is discussed and understood. Students learn to consider alternative technologies in architecting networks of computers. The impact on society and organizations of being connected to networks locally and globally is explored. *Prerequisites: ITS 1671, ITS 1672, MATH 2200.*



### **ITS 3880 – Systems Analysis and Design**

Students master the process of defining information technology and business process solutions to meet organizations needs in this course, the first of three courses making up the senior experience. Students learn about the systems development life cycle, the process of identifying problems, defining the scope of a project to solve problems, determining requirements, analyzing alternative approaches to meeting the requirements, and designing a solution to address the chosen alternative. The students, in teams, select an information technology project they will implement for an external customer during the next two courses of their senior experience. *Prerequisites: Senior status AND MATH 2200, ITS 1670, ITS 1671, ITS 1672, ITS 3421, WRIT 1122, WRIT 1133, CREX 1217, ADM 2510*

### **ITS 3890 – Managing IT Projects**

Successful design, development and deployment of technology solutions for business problems requires project management to plan, monitor and manage critical resources. Project management is the process of identifying, managing and focusing people and other resources to achieve project objectives within budget and time constraints. This course explores the role and responsibilities of the project manager, the principles and techniques of effective project management (particularly as related to information technology projects), and tools to enable more efficient management. Students develop a project plan for delivering their senior project, selected in ITS 3880. *Prerequisites: ITS 3880*

### **ITS 3950 – Information Technology Integrated Seminar**

This course is the culmination of the senior experience. Based on the solution they created and the project plan they developed in the previous two classes (ITS 3880 and 3890), teams of students complete their information technology project for an external client. At the conclusion of the course, the students formally present and demonstrate the results of their project to a panel of faculty and experts from the IT industry, who give them professional feedback on the quality of their project and the professional quality of their presentation. *Prerequisites: ITS 3890*

## ***Description of ITS Electives***

### **ITS 2410 – Introduction to Web Development**

Students will develop the basic skills required to create and maintain web sites. The Hypertext Markup language (HTML), the language of web pages, and important tools such as Dreamweaver, that facilitate the creation of web pages and websites, will be learned. Students will publish all work in this class to their own web space areas on the university's web server. *Prerequisite: ITS 1670.*

### **ITS 2210 - Creativity in Problem Solving**

This course is for those who want to improve their problem solving strategies and critical thinking skills. Students will focus on problem definition, and generating and evaluating solutions. Critical factors necessary for successful problem solving will be discussed, as will various techniques useful for analyzing problems and alternatives.

### **ITS 2510 – Visual Basic.Net Programming**

Students will learn to program in the Visual Basic (VB) programming language for the .NET environment, one of the most important languages for the creation of computer applications that run in the Microsoft Windows environment. At the conclusion of this course, the student will be able to design, implement and test VB programs using GUI interfaces. The object-oriented nature of the language will be employed in the creation of programs for the class. *Prerequisite: ITS 1670, ITS 1671, ITS 1672.*

### **ITS 3360 – Operating Systems**

Students will learn the UNIX operating system using Linux. Topics covered include manipulating UNIX commands, shell programming, Linux on personal computers, UNIX system administration, UNIX utility programs using UNIX related programming languages such as PERL. *Prerequisite: ITS 1670, ITS 1671.*

### **ITS 3410 – Advanced Web Development**

This course builds upon the student's knowledge of the hypertext markup language (HTML) and expands the ability to create advanced web pages that utilize cascading style sheets, forms, frames, JavaScript and Java applets. Emphasis will be placed on the development of web site management skills gained through the utilization of the university's web server where students will store their class web projects. *Prerequisite: ITS 1671, ITS 2410, ITS 1672*

### **ITS 3422 – Database Organization and Management II**

This course is designed to extend and implement the database design concepts learned in ITS 3421. Using, for example, the Oracle database management system, the course introduces SQL, PL/SQL, and programming language interfaces to databases. Students master software tools that enable the design and creation of database forms and reports. This class explains how to use a database management system to implement a database and access and manipulate its data. *Prerequisite: ITS 3421.*

### **ITS 3651 – Information Security**

This course introduces the important world of computer security. As information technology becomes more widespread, the opportunities for loss of information and the invasion of privacy become greater. Topics include the technological aspects of computer security, such as how systems can be designed and managed to limit unwanted intrusions, and the human aspects of security - how social engineering can be used to manipulate individuals to divulge information that permits security breaches. *Prerequisite: ITS 1670, ITS 1671.*

### **ITS 3810 – IT Business Analysis**

Information technology is an enabler of efficient and effective organizations. So what technology is needed? Business analysis is the set of tools, techniques and knowledge required to effectively identify technology needs and recommend solutions. Analysis of the "current state" of a particular area of an organization can point out issues with process, people or systems. Solutions can include new business processes, new or revised roles and responsibilities, or IT infrastructure such as hardware, networks and databases, as well as new or enhanced software applications. The objective of this course is to enable students to learn how to be business analysts. *Prerequisite: ITS 1670, ITS 1671.*

**ITS 3700 – Topics in Information Technology Studies**

Various topics in IT including E-communication and E-Commerce. Students may take this course multiple times, as long as the topic is different. *Prerequisite: ITS 1671.*

**ITS 3510 – Usability Design for Web Sites**

This course expands the student's basic knowledge of website development by providing in-depth understanding of how to design a website with the user in mind. Students will gain knowledge about how the fields of human factors engineering and psychology (e.g., visual perception, cognition, learning and memory, information processing) relate to usability design as well as how usability assessments are conducted. Usability guidelines (design problems, design strengths, and best practices) for common functions such as web navigation, search, menus, scrolling, links, text, page layout, etc. will be explored. The class will be a combination of lectures and hands-on learning by examining websites that support or violate these guidelines. *Prerequisite: ITS 2410, ITS 3410.*

**ITS 3980 – Internship**

With permission of the program director.

**ITS 3991 – Independent Study**

Students can elect to study a topic that is not currently offered as a required course or as an elective. Two to four credit hours can be awarded, based on the course of study and assignments agreed to by an instructor. *Prerequisite: permission of the program director.*