

The Major in Information Systems Courses

Note on Course Numbers

Each Carnegie Mellon course number begins with a two-digit prefix which designates the department offering the course (76-xxx courses are offered by the Department of English, etc.). Although each department maintains its own course numbering practices, typically the first digit after the prefix indicates the class level: xx-1xx courses are freshmen-level, xx-2xx courses are sophomore level, etc. xx-6xx courses may be either undergraduate senior-level or graduate-level, depending on the department. xx-7xx courses and higher are graduate-level. Please consult the Schedule of Classes (<https://enr-apps.as.cmu.edu/open/SOC/SOCServlet>) each semester for course offerings and for any necessary pre-requisites or co-requisites.

67-100 Information Systems Freshman Workshop

Fall: 1 unit

This class provides an overview of the Information Systems Program for freshman students. The Program's academic advisor facilitates discussion of the field of IS, the curriculum, and careers, as well as co-curricular experiences such as internships and study abroad. Guest lecturers include the IS faculty, IS alumni, the IS career consultant, and various campus representatives. Discussions will include students' progress in their first semester, as well as guidance in course planning, for creating their Spring semester schedule of classes, and their overall four-year plan.

67-202 The Softer Side of Software

Intermittent: 6 units

Even the best technologist has to rely on soft skills in their lives and jobs—whether they want a team member to take their constructive feedback or an angel investor to understand why their product is better than the competition. Classes will cover delivering engaging presentations, writing emails co-workers want to read, conducting meetings and workshops, delivering criticism and more. This mini course requires students to participate in a combination of short readings, in-class simulations, theater exercises, individual and group projects to practice soft skills. This course has some space available to students outside of the Information Systems program.

67-211 Introduction to Business Systems Programming

Fall and Spring: 6 units

This course examines the fundamentals of business systems, particularly transaction processing systems. Topics include records processing, data representations, file structures, and basic algorithms common to business systems. The relationship of transaction processing and Big Data tools is covered. The course is a mix of lectures, which examine the history and current practices of business systems technology, and programming exercises that illustrate the core concepts. The programming exercises use the CoBOL programming language as an example of a language designed to be used to program business systems. Some minimal programming experience is necessary. Good listening skills and class interaction are required.

67-240 Mobile Web Design & Development

Fall and Spring: 9 units

The Mobile Web Design and Development course provides a solid web design and development foundation focusing on responsive and user-centered design, and client-side components. Students explore the current standards and best practices of web design. Throughout the course, students work with HTML5, CSS3, Twitter Bootstrap, and Javascript, and learn how the various web components function together. The course utilizes a hands-on approach to guide students through learning and understanding the design and development process. This course is primarily designed for students with minimal technical experience. By the end of the course, students will be able to plan, design, and implement a basic functioning mobile web site/ app.
Prerequisites: 15-112 Min. grade C or 15-104 Min. grade C

67-250 The Information Systems Milieux

Spring: 9 units

Information systems (IS) are changing work practices, reshaping organizations, transforming cultures, and giving new meaning to the ways we see the world. This course is designed to help students understand the role of IS in modern society and the means by which these systems are created. It provides not only a framework for understanding information and information systems, but also a language to identify their dynamic complexities and inter-dependencies. Topics include: current trends in IS, structured approaches to the creation of IS, corporate IS competitive advantage, business process improvements/re-engineering, eCommerce and the digital economy, knowledge management, decisions support systems, and the implications of IS for people, organizations and society. Classes will use a combination of lectures, class discussions, reading assignments, case studies, group projects, and "hands-on" work in database design. This course is a required professional core course for IS freshmen only.

67-261 Information Design Fundamentals

Fall and Spring: 9 units

Information Design Fundamentals builds from a foundation in visual composition and typographic layout, to visual/verbal communication through the interplay of images, text, and typeface. Students apply this core understanding to information design problems that consider both qualitative and quantitative data developed for descriptive and strategic purposes that take the form of timelines, maps, hierarchies, and networks. While exercises concentrate on mastery of the tools and usability testing, projects importantly incorporate user studies methods as the first design step in order to help users perform tasks that meet their goals in ways that minimize barriers

67-262 Database Design and Development

Fall: 9 units

Data driven decision making is a core process of organizations. In this class students will study the principles of database management systems, their design, and development. Recent alternatives to the classical relational model will also be examined. This course is a required professional core course and is open only to sophomores in the IS major who have completed 67-250 or equivalent.

Prerequisites: (15-112 or 15-121 or 15-122) and 67-250

67-272 Application Design and Development

Spring: 9 units

This course provides students with the concepts and techniques to design and develop software applications, and to understand the design process. Students will learn the importance of user-centered design and will develop a prototype of a web application as a course project. In the process of developing the application, students will learn how to design and create relational databases, how to acquire competency in new programming languages quickly, how to use the Model-View-Controller pattern to develop software applications, how to ensure technical quality in software development, and how to apply principles of user-centered design. This course is a required professional core course and is open only to sophomores and juniors in the IS major who have completed 67-250 or equivalent.

Prerequisites: (15-122 or 15-121) and 67-262

67-276 Building Better Web Applications

Fall: 3 units

This class introduces students to new technologies that will help improve web application performance and responsiveness. Classes will begin with a time of instruction followed by hands-on activities to reinforce learning principles.

Prerequisite: 67-272

67-279 Introduction to Geographical Information Systems

Intermittent: 6 units

Geographical Information Systems (GIS) allow us to visualize information that uses location. Through displaying layers of information in computer generated maps, we can see, analyze, understand and explore spatial patterns and relationships in new and novel ways. People in many different fields use Geographical Information Systems in their work: for visualizing the environment, human development, demographics, traffic and transportation, public health and many more. In this course, students will learn the basics of GIS through hands-on experience with popular mapping tools. Sources of data, principles of coordinate and projection systems and elementary geo-analysis techniques will be included. Upon completion of the course, students will have the background to begin using GIS techniques in their own areas of interest and will be prepared for further study in advanced GIS courses.

67-306 Special Topics: Management of Computer and Information Systems

Intermittent: 6 units

The course will provide a thorough understanding of the many responsibilities for managing technology by the organization IT resource, executives, managers, and functional end users. Concentration on IT plan and budget development with associated management, IT roles and responsibilities, system development and operations best practices, security management, IT procurement with emphasis on service and product agreements, vendor relationships, project management, and business continuity/disaster recovery. Junior or senior class standing is required. Coursework in information systems, software design, project management, or related job experience is strongly preferred, but not required due to the managerial, rather than technical, nature of the course.

67-308 Innovation Studio: Health Care Information Systems

Intermittent: 9 units

Healthcare information systems are intended to improve patient outcomes while reducing the cost of clinical care. However, with the highest per person healthcare expenditures, the United States ranks low in healthcare quality compared to other countries. Although healthcare information systems are improving, challenges persist because information workflow, human interface design, and interoperability are not emphasized. In this course, students will learn to solve real-world healthcare information systems challenges in a team-based format. Juniors and Seniors

67-309 Special Topics: Information Assurance and Security

Intermittent: 6 units

Special Topics: Information Assurance and Security [Power to the Edge: Challenges to systems survivability in a net-centric world] This course is an overview of increasingly important aspects of systems development, operation and sustainment, namely information assurance, software assurance, survivability and security. As more and more functionality and dynamic decision-making are pushed down and out into the organization (power to the edge), assurance and security concerns, with their organizational and human dimensions, impact the fidelity of the data and the very survival of the organization. Topics include overview and definitions, defense in depth, legal and policy issues, principles of survivability and information assurance, risk management, insider threat, vendor and outsourcing issues, incident management and forensics. This class is a combination of lectures, readings, and discussion groups. Students will leave the course with an understanding of the various concepts and their impacts on systems and the organization itself.

Prerequisites: (15-112 or 15-110) and 67-250

67-317 Mobile Web Development and Usability Testing

Intermittent: 9 units

Designing for mobile web applications enables businesses to harness the explosive growth and new opportunities on the mobile internet, besides enabling innovation in many ways. This course emphasizes a 'mobile first' approach to responsive web design, development, and user experience. Students gain a deep understanding of the mobile web development process, the grammar of building mobile web sites, emerging web standards, and state-of-the-art mobile usability testing methods. They gain first-hand exposure to developing with HTML5 and CSS3 and applying heuristic methods and testing tools such as Morae and Tobii eye tracker, to achieve an enhanced mobile user experience. Recent reports state that 80 percent of mobile websites in the US get traffic from other regions of the world. The course will address the need for facilitating a 'global' user experience, through independent student projects that target a 'global or social' theme and deliver a complete solution involving design, development, and usability testing of a localized and responsive web site.

Prerequisites: (15-122 or 15-121) and 67-272

67-319 Global Technology Consulting Groundwork

Spring: 3 units

This course is by invitation only for participants in the Technology Consulting in the Global Community program. For information on the program and how to apply, see <http://cmu.edu/tcingc>.

67-324 Accelerating Innovation and Entrepreneurship

Fall: 9 units

Mastering innovation processes and incorporating entrepreneurial methods into one's career is a cornerstone of success. Whether one endeavors into a startup or large company, successfully incorporating innovation and entrepreneurship will propel a career in software development, consulting, financial services, and many others. Innovation and entrepreneurship is a discipline with established tools and methods that must be properly harnessed. This course will expose and educate students to the discipline of innovation and entrepreneurship that will be portable to most any career and industry focus. This course is open to Juniors and Seniors.

67-327 Web Application Security

Fall: 6 units

This is a technical course designed to help students learn how to exploit web applications and to be better able as developers to defend against such exploits. The course covers the process of hacking a web application, starting with initial mapping and analysis, followed by identifying common logic flaws in web apps, database and network exploits, command and SQL injections, and the like. This hands-on course requires students to be familiar with a popular web application framework or language (such as Ruby on Rails, PHP, Django/Python, ASP.NET or the like). Prerequisite: 67-272 or permission of instructor.

Prerequisite: 67-272

67-328 Mobile to Cloud: Building Distributed Applications

Fall: 9 units

Web 2.0, Mashups, Mobile Apps, and Cloud Computing are just a few of the new terms people are using to describe emerging technologies for building complex, distributed applications. Protocol standards, web services, open-APIs, increasingly more powerful mobile devices, and the Internet have enabled new possibilities for weaving complex applications using globally-distributed data and computing resources. Application development has largely left any single computer, and is distributed across a wide range of hardware and software platforms. This class will explore these developing technologies and models for structuring their complexity, while building projects that go from mobile to the cloud. Prerequisite: 67-272 (with "C" or higher) or permission of instructor.

Prerequisite: 67-272 Min. grade C

67-329 Contemporary Themes in Global Systems

Intermittent: 9 units

Globalization and outsourcing of information systems (IS) is a mainstay of the business environment. The decision to outsource software services to providers in distant places has many risks and thus careful management of critical success factors is essential. Likewise, products and services are being developed and delivered by teams of people in diverse locations working together. Management of these sourcing models and human capital relationships will be an increasingly important skill for students expecting to fully participate in the emerging IS marketplace of the 21st century. This course introduces the effective fundamentals of global project management and the mechanics of sourcing arrangements including offshore outsourcing. Students will also examine the effects of human diversity and cross-cultural considerations in the creation, use and management of information systems. A combination of readings, participation in class discussions, and non-technical collaborative projects will be expected of class participants. Students must have sophomore standing or higher.

67-330 Technology Consulting in the Community

Spring: 9 units

In this course, the student develops technical consulting and management skills while collaborating on-site with a community leader of a non-profit community organization or school. This service-learning course has students analyze a complex organization, then design and implement a work plan that will expand the organization's capacity to use information technology. Student consultants do not merely provide IT support, nor do they focus on system development. Rather they focus on solving organizational problems using IT solutions. In doing so, they may develop a system, or adapt open source or commercial tools as appropriate to the situation. Throughout the semester, students develop a consulting report. They learn how to use this working document to collaborate with others and to think through and communicate a strategic technology plan. Students also experience how urban community organizations function, seeing the valuable benefits these organizations provide to society. Prerequisites: 76101 and (15121 or 70451) At least sophomore standing.

Prerequisites: 15-121 or 70-451 or 15-122

67-331 Technology Consulting in the Global Community

Fall: 3 units

This course is by invitation only for participants in the Technology Consulting in the Global Community program. Admitted ONLY BY Permission of Instructor

67-344 Organizational Intelligence in the Information Age

Fall: 9 units

Across all organizations people find that the actions they take affect, and are affected by, the technology, norms, procedures, culture, and members of the organization. In order to navigate through this organizational world, agents need a better understanding of social and organizational intelligence. How do organizations (and the people who populate them) acquire and then process information? In what ways have new technologies affected the norms, procedures, and culture of organizations? How do leaders successfully guide their organizations through a world where new information and new technologies are constantly being produced? This course is about information assessment and analysis in organizations, and the way organizations are transformed by technology. This course is for Sophomores, Juniors, and Seniors.

67-353 IT & Environmental Sustainability

Intermittent: 6 units

Sustainable living and sustainable development are serious challenges facing individuals, communities, organizations and countries around the world. Addressing these challenges is a multidisciplinary effort. In particular, while Information and Communications Technologies have been among the most transformative developments in recent decades, they have the potential to address some of society's most urgent needs. For examples, intelligent use of IS/IT can help enable smarter cities, more efficient transportation systems, smarter energy systems, more efficient logistics and 'greener' product life cycle design. In this course, students will reflect on the challenges of sustainability and the potential role IS/IT may play in enabling adaptation and mitigation of these challenges.

67-364 Practical Data Science

Spring: 9 units

From empirical, to theoretical, to computational science, we are at the dawn of a new revolution—a fourth paradigm of science driven by data. Like archaeological remnants, data, by its very nature, is a marker of what happened in the past. How can data be used to better understand this past and what is happening in the present? How can data be leveraged to forecast what will happen in the future? Better still, how can data be used to mold what should happen in the future? In this course we will study descriptive, predictive, and prescriptive methods by which data can be used to gain insight and inform actions of people and organizations. The real excitement of data science is in the doing. This is an application oriented course requiring skill in algorithmic problem solving. We will use Python based data science tools. While prior programming experience with Python will be helpful the course will strive to be self-contained. If you have not programmed in Python before, you need to be comfortable programming in some language (e.g., Ruby, R, Java, C++) and will need to come up to speed with the Pythonic way of problem solving.

Prerequisites: 36-201 Min. grade C and 15-112 Min. grade C

67-373 Information Systems Consulting Project

Spring: 12 units

In this course, students design and implement a usable information system for a client. The client may be affiliated with the university, government, business, or non-profit agency. Students will be assigned to teams to work on these projects, and will produce operational, fully documented and tested, computer-based information systems. The projects will be supervised by CMU faculty and, when possible, by project clients.

Prerequisite: 67-272

67-390 Independent Study in Information Systems

Fall and Spring

Independent studies are opportunities to engage in research with an IS faculty member to advance your learning in certain areas of interest. Information Systems students may enroll in independent study for 3, 6, 9, or 12 units of academic credit by obtaining an IS faculty sponsor who will oversee the academic component of the coursework, monitor progress, and assign a final grade.

67-391 Independent Study in Information Systems

Fall and Spring

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67-440 IDEATe Mobile Application Design & Development

Spring: 9 units

TBD

67-442 Mobile Application Development in iOS

Fall: 9 units

This course provides students with the concepts and techniques to design and develop mobile applications with iOS and to understand the design and development process involved. Students will develop a series of smaller iOS applications in weekly lab sessions as well as larger application as part of a course project. In the process of developing these applications, students will develop a strong understanding of the Swift programming language, iOS application development, mobile-centered design, and how to ensure technical quality in software development. This course is open only to juniors and seniors in the IS major who have completed 67-272.

Prerequisite: 67-373

67-475 Innovation in Information Systems

Fall: 12 units

In this capstone team-based course, IS seniors design and implement an information systems solution to meet a real-world need or opportunity. Innovation, entrepreneurship, planning, project management, and risk taking will all be emphasized. Students will be challenged to produce "proof of concept" systems or prototypes that are fully documented, tested, and ready to present for external evaluation. This course is a required professional core course and is open only to seniors in the IS major who have completed 67-373.

Prerequisite: 67-373

67-490 Practicum in Information Systems

Intermittent

This course is offered only at Carnegie Mellon's campus in Qatar. The practicum in information systems allows students interested in applying skills acquired in the field of information systems in the context of a working environment. Students will complete a project and be accountable to a stakeholder that is external to their program of study. They may shadow and observe practices in the field of information systems, and also perform tasks as assigned. A hands-on experience is expected. By completing this course, students practice desirable skills for employability, such as time management, project management, team work, and professional development.