Computer Applications

Keyboarding skills of 25 words per minute or enrollment in OFTECH 1A or 9 are recommended for computer applications classes.

CIS 1, Computer Concepts with Applications  3 units
Transfer: UC*, CSU
  *Prerequisite: None.
  *No UC credit for CIS 1 or 4 if taken after CS 3.

  This beginning course covers the broad use of personal computers. Topics include a description of microcomputer components, input and output devices, networking, and micro-processing concepts. Beginning word processing, spreadsheet, database, Internet, Windows, and programming concepts are introduced. Hands-on experience is provided in a microcomputer lab. Note: Programming, computer science or engineering students should enroll in Computer Science 3.
  *No UC credit will be granted if taken after CS 3. This course uses Microsoft Word 2010 and Windows 7.

CIS 4, Introduction to Computers, Business Applications  3 units
Transfer: *UC, CSU
  *Prerequisite: None.
  This is not a beginning computing course. It is recommended that students take CIS 1 prior to CIS 4. Ability to keyboard 25 words per minute is recommended. *No UC credit for CIS 1 or 4 if taken after CS 3.

  This course covers the broad use of microcomputers in business. Designed to familiarize students with the Microsoft Office Suite, it includes the study of word processing using Word, spreadsheet software using Excel, database software using Access, and presentation software using PowerPoint, as well as Windows and integration concepts.
**CIS 9A, Technology Project Management I** 3 units

Transfer: CSU
- **Prerequisite:** CS 3 or CIS 1.

This course covers the fundamentals of Project Management theory, implementation, and best practices. It is aimed at students who work mostly in the Technology sectors covering software and website development, and other areas of computer science or information systems. Students will learn the theory, as well as the use of Project Management software to plan, track and manage project resources. Topics covered include project life cycles, tasks, schedules, resources, and costs.

**CIS 9A is the same course as CS 9A. Credit may be earned for one, not both.**

---

**CIS 9B, Technology Project Management II** 3 units

Transfer: CSU
- **Prerequisite:** CIS 9A or CS 9A.

This course covers advanced topics of Project Management theory and practice. Students will learn how to manage projects with changing tasks and schedules, and to adjust their resources and budgets. Also covered are leadership and communication skills. Students will complement the theory with case studies and the use of Project Management software.

**CIS 9B is the same course as CS 9A. Credit may be earned for one, not both.**

---

**CIS 19, Geographic Information Systems for Business** 3 units

Transfer: CSU
- **Prerequisite:** None.

A working knowledge of Windows and the Internet or concurrent enrollment in CIS 20 or Geography 20 is recommended.

This introductory course focuses on understanding and utilizing Geographic Information Systems solutions in business and is not a substitute for the basic GIS course. Students will apply the use of ArcView GIS to identify and display retail markets, evaluate the suitability of sites for establishing or relocating a business or to expand sales territories. Emphasis will be on the marketing, insurance, retail, real estate, and transportation industries.

**CIS 19 is the same course as GIS 19 and Geography 19. Students may earn credit for one.**

---

**CIS 20, Introduction to Geographic Information Systems** 3 units

Transfer: UIC, CSU
- **Prerequisite:** None.

GIS are computer-based systems used to collect, store and analyze geographic information. This course will present the concepts and applications of Geographic Information Systems (GIS). Other related technologies, such as map reading, remote sensing and basic cartographic skills will also be explored.

**CIS 20 is the same course as Geography 20 and GIS 20. Students may receive credit for one course only.**

---

**CIS 21, Geographic Information Systems for Law Enforcement** 3 units

Transfer: CSU
- **Prerequisite:** None.

This introductory course will focus on understanding and utilizing GIS for law enforcement. Students will utilize Arc View GIS software in a hands-on computer setting to identify and display crime data, evaluate Part I and II crime activity, gang activity, etc., on maps. Emphasis will be on GPS locations of crime incidents, clustering of thefts, burglaries, rapes, bank robberies, and plot victim locational and demographic characteristics. Students will track and evaluate patrol assignments and fleet unit routing to create more effective utilization patterns. US Census, DOJ CRS and local governmental data shall be utilized in creating crime maps.

**CIS 21 is the same class as GIS 21. Students may earn credit for only one course.**

---

**CIS 23, Intermediate Geographic Information Systems** 3 units

Transfer: CSU
- **Prerequisite:** CIS 20.

This course emphasizes GIS principles and methodology used in both the private and public sectors. Hands-on applications using both raster and vector data and technology will expose students to more advanced understanding of GIS. Students will learn various methods of data acquisition, including Global Positioning Systems (GPS) as well as the World Wide Web. The add-on modules extend the analytical capabilities of GIS and allow input of map features and conversion of feature themes from raster to vector. This course will also provide an introduction to several of ArcView’s extension including Spatial Analyst and 3D Analyst. Students will complete a “Model Builder” to be used in siting new solar sites. Spatial Analysis will include slope and aspect maps, neighborhood and zone analysis. The course will present single and multi-layer statistical operations including classification, coordination, and modeling analysis.

**CIS 23 is the same course as Geog 23 and GIS 23. Students may receive credit for one.**

---

**CIS 27, Introduction to e-Commerce** 3 units

Transfer: CSU
- **Prerequisite:** None.

**Skills Advisory: A working knowledge of Windows and the Internet.**

Students will learn the technological and strategic aspects of electronic commerce essential to succeeding in today’s internet-based economy. No background in e-commerce is necessary. This is a lecture and theoretical course which covers the key technologies used in e-Commerce, the history of internet and web technologies infrastructure, and the economic forces behind e-Commerce. Business goals and constraints, technology and process tools, business strategies and tactics, and underlying economic theories relating to successful e-Commerce will be discussed.

**CIS 27 is the same course as Business 27. Students may receive credit for one, but not both.**
CIS 30, Microsoft Excel 3 units
Transfer: CSU
• Prerequisite: CIS 4.

This course includes a detailed study of business applications using Microsoft Excel spreadsheet package. Topics include the commands, formats, and functions of Excel with emphasis on its use as a problem solving and financial analysis tool. Students will also learn to create macros, customize toolbars and menus, and integrate Excel with other applications and the World Wide Web. Students will also have an introduction to writing Visual Basic code.

CIS 30 has replaced CIS 31 in all CSIS degree and certificate programs. This course uses Microsoft Excel 2010 Professional.

CIS 32, Microsoft Access 3 units
Transfer: CSU
• Prerequisite: CIS 4.

This course presents an introduction to relational database management systems using Microsoft Access. It is designed to familiarize the student with Microsoft Access and its application in the business world. Topics include: designing, maintaining and querying a database; creating forms, reports, and macros; and an introduction to writing Visual Basic code.

This course uses Microsoft Access 2010 and software is included in the course material.

CIS 34, Advanced Excel with Visual Basic for Applications 3 units
Transfer: CSU
• Prerequisite: CIS 30.

This course provides Excel users with the knowledge, skills and techniques needed to write macros using Visual Basic for Applications (VBA) within the Excel environment. The course helps users to automate repetitive tasks, customize Excel menus, buttons and screens, and create user friendly interface for input and output. The course covers basic programming techniques used in Visual Basic and VBA.

This course uses Microsoft Excel 2007.

CIS 35, QuickBooks 3 units
Transfer: CSU
• Prerequisite: CIS 1 or 4 and Accounting 1 or 21.

This course provides the student with a realistic approach to computerized, integrated accounting principles using QuickBooks Pro software package. Students will work with the various components of an accounting system in an ongoing business, as well as set up an accounting system for a new company. Topics include the creation of a QuickBooks company, and the analysis of financial statements, reports and graphs. Students will gain experience in the creation and use of invoices, purchase orders, inventory, bank accounts, and payroll. In addition, students will be able to complete the entire accounting cycle including recording adjusting entries and making corrections on the transactions as needed. Hands-on experience is provided in a microcomputer lab.

CIS 35 is the same class as Accounting 35. Student may earn credit for one, but not for both. This class uses QuickBooks Premier Accountant Edition 2011.

CIS 36C, Spreadsheet – Short Course 1 unit
Transfer: CSU
• Prerequisite: None.

This short introductory course in Excel spreadsheet software acquaints the student with basic features of the software including creating, editing, formatting, and printing of electronic worksheets. It is offered as a brief overview of the software.

CIS 36F, Introduction to Windows – Short Course 1 unit
Transfer: CSU
• Prerequisite: None.

This hands-on course covers the basic to intermediate features of the Microsoft Windows operating system - from personalizing your Windows environment to finding files and data. Students will learn how to organize files and search for information using Windows Explorer.

CIS 36G, Introduction to Internet – Short Course 1 unit
Transfer: CSU
• Prerequisite: None.

This hands-on course on the Internet provides students with the opportunity to learn basic and advanced features of the Internet. Topics include browsing, navigating, proper use of Favorites, effective searching for information, creating web pages and using e-mail. Students will learn about the development of the Internet, proper netiquette and social and ethical issues. Additional topics include finding and downloading graphics, freeware and shareware programs from the Internet.

CIS 36I, Microsoft Access – Short Course 1 unit
Transfer: CSU
• Prerequisite: None.

This short introductory course in Access software acquaints the student with basic features of the software, including creating, retrieving, and printing electronic databases. It is offered as a brief overview of the software.

CIS 36J, Word Processing – Short Course 1 unit
Transfer: CSU
• Prerequisite: None.

This short introductory course in word processing (Microsoft Word) acquaints the student with basic features of the software including creating, revising, storing, and printing documents. It is offered as a brief overview of the software.

CIS 36P, Microsoft PowerPoint 1 unit
Transfer: CSU
• Prerequisite: None.

This hands-on course on presentation software teaches the use of Microsoft PowerPoint for business applications. Presentations, handouts, and speaker notes are designed, created, and formatted, using PowerPoint. Students will use graphics, templates, and objects to enhance presentations. Hands-on experience is provided in a microcomputer lab.
CIS 36R, Microsoft Office Publisher 1 unit
Transfer: CSU
- Prerequisite: None.

This course introduces students to Microsoft Office Publisher, a popular desktop publishing software program. Students learn to create a wide variety of marketing and communication publications for desktop and commercial printing, e-mail distribution, and viewing on the Web. Publications include catalogues, brochures, newsletters, flyers, invitations, menus, certificates, labels, and web pages.

CIS 36T, Introduction to Turbo Tax 1 unit
Transfer: CSU
- Prerequisite: Accounting 15 or prior tax preparation experience.

This course will teach students how to prepare Federal income tax returns and California individual income tax returns using Turbo Tax software.

CIS 37A, Microsoft Word I 3 units
Transfer: CSU
- Prerequisite: CIS 1.
- Skills Advisory: Eligibility for English 1.

Through the use of Microsoft Word software, skills are developed in creating, revising, formatting, storing, and printing a variety of business documents. Skills are developed from basic functions through utilizing features such as AutoText, columns, custom tab settings, mail merge, envelopes, labels, templates, headers/footers, footnotes, and editing tools. Emphasis is placed on office-quality production of documents.
This course uses Microsoft Word 2010.

CIS 37B, Microsoft Word II 3 units
Transfer: CSU
- Prerequisite: CIS 37A.

Using Microsoft Word, with an emphasis on the production of professional quality business copy, students learn to increase productivity through the use of automated features and multiple windows. Students develop problem solving skills through the repetitive use of document revisions and troubleshooting assignments. Additionally, students develop advanced skills in areas of interest ranging from legal applications to graphics and brochures or newsletters.
This course uses Microsoft Word 2010.

CIS 38, Microsoft PowerPoint 3 units
Transfer: CSU
- Prerequisite: CIS 1.

Through the use of PowerPoint software, skills are developed in planning, creating, formatting, enhancing and delivering presentations for business applications. Topics include audience analysis, selection of presentation media, and the creation and presentation of slides, transparencies, and posters. The use of animation, sound and other special effects, as well as Web publishing techniques, will be covered.
This course uses Microsoft PowerPoint 2007.

CIS 39, MS Outlook – Comprehensive Course 3 units
Transfer: CSU
- Prerequisite: CIS 1.

Microsoft Outlook has become a primary means of office communication and task management. In this course the student will learn to effectively use all features of Outlook e-mail, calendar, contacts, tasks, and notes; create and manage Outlook folders; collaborate with others for scheduling meetings and resources; configure and customize Outlook; integrate Outlook with Microsoft Word Mail Merge and Collaboration features; and convert e-mail attachments to Adobe Acrobat format.
This course uses Microsoft Outlook 2007.

CIS 40, InDesign 3 units
Transfer: CSU
- Prerequisite: CIS 4.
- Skills Advisory: English 1 or Business 31.

Desktop publishers design and produce everything from newsletters and brochures to books and magazines for their clients and employers. In this class, students will develop the skills to integrate text and graphics to design high-quality business publication documents and layouts. Students will create and edit graphics, scan text and images and prepare projects for print or for the Web. This class covers the objectives necessary for the Adobe InDesign certification.
This course uses Adobe InDesign CS 5.

CIS 50, Internet, HTML, and Web Design 3 units
Transfer: CSU
- Prerequisite: CIS 1.

This hands-on course provides all the skills necessary to navigate, create and manage content on the World Wide Web. Students will become familiar with the Internet and its underlying technology and security. The course also covers the principles of Web page design, the use of graphics and other media files, and the creation of linked documents. Students will use both HTML and a Web authoring program to create and edit Web pages and will have the opportunity to put their Web sites online by publishing to a Web server.

CIS 51, XHTML, CSS, and Accessibility 3 units
Transfer: CSU
- Prerequisite: CIS 50.
- Skills Advisory: Students should have a working knowledge of Windows.

XHTML is the next generation of HTML, a rewrite of HTML which adheres to XML standards. This hands-on course will explore the differences between HTML and XHTML, validating pages to current Web standards and using Cascading Style Sheets (CSS) exclusively to control the look and feel of a site. Students will create and enhance Web pages with links, graphics, tables, frames, and forms. Proper use of XHTML and CSS can provide true separation of content, structure, and presentation in Web pages, making them structurally sound, easier to maintain, and more consistent with legal requirements for accessibility.
CIS 53, Microsoft Expression Web 3 units
Transfer: CSU
• Prerequisite: CIS 50.

Microsoft Expression Web is a professional design tool used to build attractive, high-quality websites using HTML, DHTML, CSS, and XHTML. This hands-on course provides a complete coverage of Expression Web features—from the basic to the advanced—needed to tackle Web projects with confidence. Topics include Web site creation, management, and optimization. Students will learn how to build the most accessible, standards-conformant websites possible. Upon completing this course, students will be ready to plan, build, and maintain a professional website including selecting a Web host and uploading the site to a Web server. This course uses Expression Web 2 and software is included in the course materials.

CIS 54, Web Page Development and Scripting I 3 units
Transfer: CSU
• Prerequisite: CIS 51 or CIS 59A, or Graphic Design 66.

This course is for Web site designers who need to extend their skills beyond HTML in the development of Web sites through the use of scripting. The course covers both client and server side scripting. Topics include creating animated Web pages, client-side forms validation, browser detection, popup windows, processing forms data, and generating dynamically updated Web pages.

CIS 55, Advanced Web Page Development and Scripting 3 units
Transfer: CSU
• Prerequisite: CIS 54.

This course is for web designers who want to expand their knowledge of creating script-based Web pages. Students will learn the more advanced techniques used in today’s websites. This course assumes a good foundational knowledge of HTML 4, JavaScript and a server-side scripting language such as ASP, PHP, CFM, or ASP.NET. Students will learn how to extend JavaScript to create interactive, dynamic Web pages using Dynamic HTML, incorporate cookies, hidden fields, create animations, write search functions, and interface with databases. MySQL or Microsoft Access will be used to create data driven applications, such as a shopping cart, or a mailing list. At the completion of this course, students will be proficient in designing and developing interactive Web sites.

CIS 56, Web Media Production 3 units
Transfer: CSU
• Prerequisite: CIS 59A and CIS 60A.

Web media is a woven combination of text, graphics, sound, animation, and video elements. The course is designed to provide students who are familiar with creating Web experiences, the skills to add the dimensions of time, sound, motion, and interactivity to their experience designs, including Internet and mobile technologies, via a variety of authoring tools. Through lectures, demonstrations, and projects, students will complete solid portfolio Web experiences.

CIS 57, Website Planning and Production 3 units
Transfer: CSU
• Prerequisite: CIS 51 or CIS 59A.

This course provides the knowledge, skills, and hands-on experience needed to deliver successful commercial websites. Students will learn the many pitfalls of website planning and production and how to overcome them. This includes understanding what is wanted, and learning how to create the website in a speedy and efficient manner. Students will learn how to manage the project and the client, and perfect techniques in design. Learning how to design for the intended audience, obtain content, select a proper navigation, incorporate various media (graphics, database, animations, etc.), deploy and maintain the website are the key elements covered. This is a hands-on course and the students will utilize newly learned skills to build a website for a client which can be added to their portfolio.

CIS 58, Designing Accessible Websites 3 units
Transfer: CSU
• Prerequisite: CIS 51.

Web accessibility benefits everyone - those with and those without disabilities, through increased usability and interoperability of Web-based materials. The law requires government Web sites to be accessible, and several states have adopted the standards (California included). The requirement will expand exponentially as the law continues to be defined. This class will prepare the developer to deliver legal and accessible Web sites. Topics will include Section 508 guidelines, assistive technologies, and universal design principles. This class is structured to allow learners to explore the area of Web accessibility using a hands-on, project-based approach.

CIS 59A, Dreamweaver I 3 units
Transfer: CSU
• Prerequisite: CIS 50.

This is an introductory course in learning Web page design with Dreamweaver. Students will learn techniques for designing Web pages and expand their knowledge of HTML, Dynamic HTML, and JavaScript. Students will learn to integrate images, sound, and other multimedia using Dreamweaver. This course covers Web site creation and management features including Web file management, navigation bars, formatting text styles, Cascading Style Sheets, and content management. Upon completing this course, students will be ready to plan, build, upload, and maintain a professional Web site.

CIS 59B, Dreamweaver II 3 units
Transfer: CSU
• Prerequisite: CIS 59A.

This course examines advanced Web development techniques and concepts utilizing the Dreamweaver toolset. Topics covered include site architecture, Web project management, integration with dynamic Web development tools, code management and site enhancements. Students will learn to enhance the development of Dreamweaver Web pages utilizing server-side includes, dynamic XHTML & XML, and intelligent use of graphics and color schemes. Additional topics will include the CSS toolset, site management utilizing cascading templates & libraries, including cutting edge technologies (RSS, podcasting).
and dynamic content design with XML and Dreamweaver’s database connection tools. Dreamweaver extension manager and use of extensions will also be covered.

*This course uses Adobe Dreamweaver CS 5.*

**CIS 60A, Photoshop I** 3 units

Transfer: CSU

- **Prerequisite:** CIS 1.

This course is for the non-design student interested in learning Photoshop using Personal Computers (PCs). Students will learn image creation and editing using Adobe Photoshop. Students learn to create, repair and modify images, scan photos, plan composite images and create special effects for use in a variety of applications.

*This class uses Adobe Photoshop CS 5.*

**CIS 60B, Photoshop II** 3 units

Transfer: CSU

- **Prerequisite:** CIS 60A.

This course is for non-design students who are experienced Photoshop users interested in learning the advanced techniques and new features in Photoshop using personal computers (PCs). Students will learn to apply advanced image creation and editing techniques using real-world assignments. Students will be able to create and modify images and photographs; create text using different filters and colors adjustments tools; create special effect by applying production tricks and techniques to Photoshop documents; create various components for the WEB as well as a variety of other applications.

*This class uses Adobe Photoshop CS 5.*

**CIS 61, Fireworks** 3 units

Transfer: CSU

- **Prerequisite:** CIS 50.

This hands-on course provides in-depth coverage of Fireworks features. Students will learn to create and understand graphics projects, Web Vector Objects. Topics include working with Web page objects using Vector Tools, importing, modifying and creating graphics, skinnig Flex components, building Web and RIA prototypes, and extending Fireworks. Students will learn how to modify pixels on a Bitmap and manipulate images. This course covers masks, color, interactivity, creating animation, and creating sophisticated Web page navigation. Upon completion of this course, students will be ready to plan, build, modify, and optimize graphics designed for Web and AIR deployment.

*This course uses Fireworks CS 4.*

**CIS 62A, Flash I** 3 units

Transfer: CSU

- **Prerequisite:** CIS 50.

In this course students who are not design majors will learn to use Flash. Topics will include the creation of graphic elements using Flash’s unique drawing tools, turning graphic elements into animation, and introduction to ActionScripting techniques for the creation of interactive movies.

*This course uses Adobe Flash CS 5.*

**CIS 62B, Flash II** 3 units

Transfer: CSU

- **Prerequisite:** CIS 62A.

In this course, students who are non-design majors will learn to take their Flash skills to the next level by taking advantage of its scripting language, ActionScript, which offers a more robust programming model and better object-oriented programming support. Topics will include learning how ActionScript can control graphic, sounds, and text. To create user-interface elements, and learn how Flash communicates with outside applications such as Web browsers.

*This course uses Adobe Flash CS 5.*

**CIS 64, Illustrator** 3 units

Transfer: CSU

- **Prerequisite:** CIS 60A.

This course is for the non-design students interested in learning Adobe Illustrator using Personal Computers for Windows. Students will develop the skills and use a variety of tools to create sophisticated illustrations, logos, advertisements, and other business media graphics for the Web. This class covers the objectives necessary for the Adobe Illustrator certification.

*This course uses Adobe Illustrator CS 5.*

**CIS 65, Flash Catalyst** 3 units

Transfer: CSU

- **Prerequisite:** CIS 51 and one of the following-- CIS 60A, CIS 64, or CIS 61.

This hands-on course provides students with the skills to create expressive interfaces using Adobe Flash Catalyst. Students will learn how to convert static artwork into interactive components, such as sliders, scroll panels, buttons, and input boxes. They will graphically edit and create animated transitions between pages or states of components. Other learning objectives include rapid prototyping, testing interactivity, choreographing motion, creating accessible SWF files, blending objects, creating widgets, and handling dynamic data, touch screen and mouse events.

**CIS 66, FLEX** 3 units

Transfer: CSU

- **Prerequisite:** CIS 53 or CIS 59A.

This hands-on course is an introduction to building expressive Web applications (Rich Internet Applications) written in FLEX using FlexBuilder. Students will learn how to create user interfaces that incorporate skins, controls for interactivity and graphical effects, smart components that resize based on available space. They will also learn to apply behaviors, transitions, and filters. Students will learn the basics of scripting using MXML and learn how to store data using various data transport techniques. Other learning objectives include creating popups, embedding fonts, implementing a customized look-and-feel and designing mouse-aware components.

**CIS 88A, Independent Studies in CIS** 1 unit

Transfer: CSU

Please see “Independent Studies” section.

**CIS 88B, Independent Studies in CIS** 2 units

Transfer: CSU

Please see “Independent Studies” section.
CIS 88C, Independent Studies in CIS  3 units  
Transfer: CSU  
Please see “Independent Studies” section.

CIS 90A, Internship in Computer Applications  1 unit  
Transfer: CSU  
• Prerequisite: None.  
Students must arrange an approved internship prior to enrolling in this class. F-1 students must see the Immigration Coordinator at the International Education Center before enrolling.

The Internship Program is designed to provide the student with the opportunity of on-site work experience in a computer lab. Students spend time weekly in a supervised computer facility.

CIS 90B, Internship in Computer Applications  2 units  
Transfer: CSU  
• Prerequisite: None.  
Students must arrange an approved internship prior to enrolling in this class. F-1 students must see the Immigration Coordinator at the International Education Center before enrolling.

The Internship Program is designed to provide the student with the opportunity of on-site work experience in a computer lab. Students spend time weekly in a supervised computer facility.

Computer Science

Keyboarding skills of 25 words per minute or enrollment in OFTECH 1A or 9A are recommended for computer programming classes.

CS 3, Introduction to Computer Systems  3 units  
Transfer: UC*, CSU  
• Prerequisite: None.  
*No UC credit for CIS 1 or 4 if taken after CS 3.

This is a beginning course intended for students who plan to take additional computer programming or computer science courses. Emphasis in the course is divided between a broad survey of the field of computer information systems and the acquisition of computer skills necessary for more advanced classes. Such skills would involve use of the operating system, file management techniques, use of an editor, and an introduction to programming.

CS 5, Programming Logic  3 units  
Transfer: CSU  
• Prerequisite: None.

This course is designed to prepare the student for a programming course. It concentrates on problem solving using: Simple Sequence, Selection, Dowhile, Case, and Dountil Control Structure. It covers Structure chart, Flowchart and Pseudocode.

CS 6, Virtual Worlds and Game Programming  3 units  
Transfer: CSU  
• Prerequisite: CS 3.

Using Alice, an authoring tool, students will build interactive, animated 3-D virtual worlds. Virtual worlds are interactive, simulated environments that accept human input and provide output in the form of images, sounds, and forces. The software students create will enable them to move around in the virtual world and see it from different angles. Students will create interactive “virtual worlds,” games and simulations that can be viewed in a web page. By building these virtual worlds, students will learn the basics of Object-Oriented programming and basic programming logic.

CS 8, Systems Analysis and Design  3 units  
Transfer: UC, CSU  
• Prerequisite: Any computer programming course.

This advanced course requires students to be proficient in programming. Students with little programming experience are encouraged to take additional programming courses before enrolling in this course.

In this course students learn how to design a software system from data collection, analysis and design to final output including forms, flowcharts, and documentation. It covers the tools and techniques used in analysis, design, and project management, such as the preparation of systems specifications, detail system designs, Gantt charts, and data-flow diagrams. In this course students develop a complete system; however this course does not cover any programming concepts.

CS 9A, Technology Project Management I  3 units  
Transfer: CSU  
• Prerequisite: CS 3 or CIS 1.

This course covers the fundamentals of Project Management theory, implementation, and best practices. It is aimed at students who work mostly in the Technology sectors covering software and website development, and other areas of computer science or information systems. Students will learn the theory, as well as the use of Project Management software to plan, track and manage project resources. Topics covered include project life cycles, tasks, schedules, resources, and costs.  
CS 9A is the same course as CIS 9A. Credit may be earned for one, not both.

CS 9B, Technology Project Management II  3 units  
Transfer: CSU  
• Prerequisite: CS 9A or CIS 9A.

This course covers advanced topics of Project Management theory and practice. Students will learn how to manage projects with changing tasks and schedules, and to adjust their resources and budgets. Also covered are leadership and communication skills. Students will complement the theory with case studies and the use of Project Management software.

CS 9B is the same course as CIS 9B. Credit may be earned for one, not both.

CS 10, Discrete Structures  3 units  
Transfer: UC, CSU  
IGETC AREA 2 (Mathematical Concepts)
CS 15, Visual Basic Programming 3 units
Transfer: UC, CSU
Prerequisite: CS 3.
This introductory course covers basic programming constructs and techniques using VB.Net. Students will learn how to plan, create and debug code based on Object-Oriented Programming design and analysis techniques. Topics covered include Data Types, Variables, Decision Statements, Loops, Arrays Input/Output, and basics of Object-Oriented Programming using Classes and Objects. VB.Net compiler software is included in course material. This course helps students pass Microsoft Certification Exams.

CS 17, Assembly Language Programming 3 units
Transfer: UC, CSU
Prerequisite: CS 50.
Assembly Language allows the programmer to fully utilize all of the special features of the computer in the most efficient manner. It also aids the high-level language programmer in writing subroutines. The student will write Assembly Language programs that utilize the Intel Pentium chip architecture. Students must have access to a Pentium-chip compatible computer system. Software included in course material.

CS 18, Advanced Assembly Language Programming 3 units
Transfer: UC, CSU
Prerequisite: CS 17.
This course is a continuation of Assembly Language Programming. The student will write complex assembly programs utilizing the full range of the computer’s features. Problem solving through planning, coding, testing, and debugging will be emphasized. Students must have access to a Pentium-chip compatible computer system. Software included in course material.

CS 19, Advanced Visual Basic Programming 3 units
Transfer: UC, CSU
Prerequisite: CS 15.
This course covers advanced programming techniques using Visual Basic .NET. Topics include Structures, Classes, Events, Inheritance, and Polymorphism, Overloading, Dynamic Binding, Multiple Document Interface, Windows API, Collections, and Exception Handling. Students also learn how to interface to Databases and build Web forms. VB .NET compiler software is included in course material. This course helps students pass Microsoft Certification Exams.

CS 20A, Data Structures with C++ 3 units
Transfer: UC, CSU
Prerequisite: CS 52.
This advanced programming course will use the C++ language to teach methods of representing and manipulating data within a computer. Topics include stacks, queues, trees, sorting, searching, modeling, and dynamically created storage spaces. Students will learn the problem-solving skills necessary to write complex computer programs and to make important software design and maintainability decisions. Software included in course material.

CS 20B, Data Structures with Java 3 units
Transfer: UC, CSU
Prerequisite: CS 56.
This course is an introduction into the study of computer algorithms and data structures. This advanced programming course will use the Java language to teach methods of representing and manipulating data within a computer. Topics include stacks, queues, trees, sorting, searching, modeling, and dynamically created storage spaces. Students will learn the problem-solving skills necessary to write complex computer programs and to make important software design and maintainability decisions.

CS 22, Introduction to Mobile Robots 3 units
Transfer: CSU
Prerequisite: CS 3.
This course describes the hardware, software, and operation of mobile robots that interact with changing environments. Hardware includes computers and other controllers, motors and artificial muscles, arms, grippers, ultrasonic sensors, whiskers, and cameras. Using a graphical interface on a PC, students will learn to program and operate a robot that can recognize objects and speech, talk back, and navigate around a cluttered room.

CS 25, Embedded Systems 3 units
Transfer: CSU
Prerequisite: CS 3.
This is an introductory course on embedded systems design-the use of computers in devices (cell phones, cars, wrist watches, home security systems, etc.) rather than as stand-alone units. Students are directed to design solutions for real-world applications using hardware and software. We will discuss the characteristics that define an embedded system and contrast those against that of a stand-alone computer. Students will also look at a variety of applications utilizing embedded processors (microcontrollers). Finally, students will write programs that interact directly with external hardware utilizing a Stamp microprocessor development board.

CS 32, Database Programming in Visual Basic.Net 3 units
Transfer: UC, CSU
Prerequisite: CS 15.
VB.Net is an object-oriented programming language that is part of the .NET Microsoft suite. It provides a graphical programming environment used to create applications for Microsoft Windows and the Web. This course covers advanced concepts for VB .NET that relate to interfaces to databases. Topics include
Object Oriented Programming, database interfaces programming, SQL query language, using LINQ and EM, and applying security measures in connections.

VB .NET compiler software is included in course material.

**CS 33, C# Programming** 3 units
Transfer: UC, CSU

- **Prerequisite:** CS 19 or CS 50.

  C# (read as C-Sharp) is a modern object-oriented language that enables programmers to quickly build solutions for the Microsoft.NET platform. In this class, programmers will learn to build C# components for use by Web and Windows-based applications. Students will generate MSIL (Microsoft Intermediate Language) code and PE (Portable Executable) files that utilize the services of the CLR (Common Language Runtime) which are all part of the Microsoft.NET platform. Software included in course material. This course helps students in passing Microsoft Certification Exams.

**CS 36, Fortran Programming** 3 units
Transfer: UC, CSU

- **Advisory:** CS 3.

  FORTRAN is a high level language used predominantly in mathematical and scientific applications. Upon completion of CS 36, students will understand the syntax and semantics of FORTRAN, be able to apply the fundamental principles of top-down algorithmic design (using pseudocode and flowcharts) to the solution of computer problems, and know how to code, test, and debug programs in this language.

**CS 37, Web Programming in VB .Net** 3 units
Transfer: UC, CSU

- **Prerequisite:** CS 15.

  VB.Net is an object-oriented programming language that is part of the .Net Microsoft suite. This course covers web application development, including the use of ASP and VB .NET. Topics include ASP .NET, Web forms and controls, web data access, state management, web services, using AJAX and security measures implementation.

**CS 40, Operating Systems** 3 units
Transfer: UC, CSU

- **Prerequisite:** CS 17.

  This course provides a functional understanding of operating systems. Topics include memory and process management under multiprogramming, devices and file systems, and user interfaces. Foundation concepts reviewed at the outset include hardware architecture, CPU instruction sets and machine language, number systems, and data structures. UNIX is used to demonstrate concepts, commands, and programming languages.

**CS 41, Linux Network Administration** 3 units
Transfer: CSU

- **Prerequisite:** CS 50.

  This is a foundation course in the Linux operating. Booting a Linux machine is dissected, from BIOS firmware to authenticated user shell. Use of shell commands, editors, programming tools, and GUIs are emphasized. Students learn to write shell script programs and install applications using the open source software distribution model. Unix process creation is detailed and a 20-line tutorial shell is developed. Local administration tasks are covered, including user account management, backup, task scheduling, logging, and clock time synchronization. As time allows recompilation of the kernel from source code will be performed.

**CS 42, Computer Architecture** 3 units
Transfer: UC, CSU

- **Prerequisite:** Math 20.

  This course provides an introduction to fundamental operations and components that make computers possible. Topics include: number systems; Boolean algebra and logic gates (AND, OR, NOT, XOR, and NAND); simplification of Boolean functions; combination logic; sequential logic; design of the adder, subtractor, ROM, decoder, and multiplexer; register transfer logic; and processor logic, control logic, and microcomputer system design.

**CS 43, Windows Network Administration** 3 units
Transfer: CSU

- **Prerequisite:** CS 70.

  This course provides students with the knowledge necessary to understand and identify the tasks involved in supporting Microsoft Windows Networking Operating Systems. It covers topics such as installing and configuring Windows Servers to create File, Print, Web, and Terminal servers, and manage and support a network infrastructure that uses the Microsoft Windows Server products. The course also focuses on Windows Active Directory services, implementing Group Policy and performing the Group Policy related tasks that are required to centrally manage users and computers.

**CS 50, C Programming** 3 units
Transfer: UC, CSU

- **Prerequisite:** CS 3.

  This course will include a review of the concepts of structured programming, error checking, sorting, searching, data types, advanced array handling methods, pointers, and data structures. Applications in business, mathematics, and science will be discussed.

**CS 51, Visual C++ Programming** 3 units
Transfer: UC, CSU

- **Prerequisite:** CS 52.

  C++ handles large programs by packaging sections of interrelated code into discrete, independent parts named objects. Visual C++ adds the Microsoft Foundation Class library making it a powerful Windows programming tool. This course will cover Dynamic Link Libraries, advanced view handling, customizing status bars, operator overloading OLE containers and servers, the Microsoft Foundation class library, serialization, windows timers, graphics, metafiles, multiview programs, graphics display controls, and screen capture. Software included in course material.
This course is a continuation of C language programming using the C++ superset of C. C++ offers the following enhancements to C: operator and function overloading, information hiding, inheritance, and virtual functions. C++ will be used in the context of both traditional and object-oriented programming.

Software included in course material.

**CS 54, Object-Oriented Analysis and Design** 3 units

Transfer: UC, CSU
- Prerequisite: CS 19 or 52 or 55.

This course covers the major object-oriented modeling methodologies: UML, OMT and BOOCH. The course explores the use of these methodologies in the context of designing and implementing object-oriented software application.

Software included in course material.

**CS 55, Java Programming** 3 units

Transfer: UC, CSU
- Prerequisite: CS 19 or 50.

Java is a general-purpose language for writing platform-independent, robust, secure programs. This course is intended for students who have completed a course in C programming. Students will learn how to develop Java applications and applets. Topics covered include the Java programming language, object-oriented programming (OOP), the Java applications programming interface (API), and graphical user interfaces (GUI’s).

**CS 56 Advanced Java Programming** 3 units

Transfer: UC, CSU
- Prerequisite: CS 55.

Java is a general-purpose language for writing platform-independent robust, secure programs. This course continues where CS 55 leaves off in developing mastery of the use of Java programming language and its extensive APIs. Topics covered include exceptions, multithreading, multimedia, Input/Output, Java Database Connectivity (JDBC), Servlets, Remote Method Invocation (RMI), and networking.

**CS 60, Database Concepts and Applications** 3 units

Transfer: CSU
- Prerequisite: CS 3 and one programming course.

This course introduces modern database concepts while emphasizing the relational database model. Topics include design methodologies, normalization of tables to reduce redundancies, supertypes and subtypes to reduce nulls, data integrity, referential integrity, and using locks and other techniques for concurrency control in a multi-user database. Factors that should be balanced during the design of a database are described. To document databases, entity relationship diagrams, relational schemas, and data dictionaries are described. Principles are applied by performing exercises using MySQL or other database management system. SQL and other languages are used to create and fill tables, retrieve data, and manipulate it by stored programs.

**CS 61, Microsoft SQL Server Database** 3 units

Transfer: CSU
- Prerequisite: CS 3.

Microsoft SQL Server is a popular midrange relational database management system (DBMS) that is used in client/server systems and as a personal DBMS. It can be accessed through the Internet. Topics covered in this course include installing the software, principles of relational databases; creating databases, tables, indexes, and views; inserting, deleting, and updating raw data; updating transactions; and querying the database. With the Transact-SQL extensions, topics include creating functions, procedures, and triggers stored in the database.

**CS 65, Oracle Programming** 3 units

Transfer: CSU
- Prerequisite: CS 3 and one programming class.

This course is a practical, hands-on overview of the Oracle Database Management System to store, retrieve, and manipulate data. Oracle is a widely used database that runs on PC’s, minicomputers, and mainframes, and Oracle programmers and developers are very much in demand. Oracle’s SQL is used to create and alter tables with various constraints. Data is retrieved and manipulated by using SELECTS that can group data and retrieve data from several tables by joining them or by using set operations. Views are created. PL/SQL, with its variables, symbolic constants, IF statements, and loops is used to program stored functions, stored procedures, and triggers. Cursors and error handling (exceptions) are introduced.

**CS 66, Advanced Oracle** 3 units

Transfer: CSU
- Prerequisite: CS 65.

This course expands on topics covered in the basic Oracle course. The topics include SQL, SQL*Plus, Developer 2000, and DBA tasks. In addition, it will cover in detail the varied aspects of Designer 2000, a software suite instrumental in analyzing, designing, and building large scale Oracle applications.

**CS 68, Oracle Database Administrator** 3 units

Transfer: CSU
- Prerequisite: CS 65.

This course offers hands-on experience as a Database Administrator (DBA) using an Oracle server. Topics include a DBA’s responsibilities, Oracle architecture, installing Oracle software, configurational options, managing RAM and disk space, managing database changes, managing transactions, tuning and monitoring database resources such as space, transactions, memory, and file usage.

**CS 70, Network Fundamentals and Architecture** 3 units

Transfer: CSU
- Prerequisite: One programming course.

This course offers a broad introduction to networking concepts and analyzes different network architectures. Introductory topics include network topologies, media and signaling, protocols, addressing, and distributed networks. The varied ways to connect computers are explored as are the resulting architectures. The course explores subnetting, both physical and virtual and internetworks are constructed in the lab. Server programs are introduced to demonstrate their signature socket-API struc-
ture. Specific real-world services such as the apache web server, BIND name server, NFS and Samba file system servers, DHCP address server, and others are discussed.

**CS 71, Introduction to Windows NT Workstation**  
Transfer: CSU  
• **Prerequisite:** CS 70.

This course is an introduction to the Windows NT Operating System. Topics include installation and configuration of the Windows NT Workstation, files and directories, security structures, TCP/IP and NetWare connectivity, printing, performance tuning, and troubleshooting.

**CS 73, Computer Security Concepts**  
Transfer: CSU  
• **Prerequisite:** CS 3 or CIS 1.

In this introductory course students will learn how to defend and protect critical computer assets from various security threats including computer worms and viruses. This course will describe fundamental techniques and principles for modeling and analyzing security. Students will learn how to express security requirements, translate requirements into policies, implement mechanisms that enforce policy, and ensure that these policies are effective. Current industry best practices for safeguarding computer resources will be discussed. Various case studies will outline the typical way that security failures get exploited by attackers and how these attacks can be discovered, understood, and countered.

**CS 74A, Security in VB.NET Applications**  
Transfer: CSU  
• **Prerequisite:** CS 15.

This course provides students with the tools needed to implement security in designing and developing applications written in Microsoft Visual Basic .NET. Topics include encryption, security practices, securing remote applications such as ASP and remote databases. Upon completion of this course, students will be able to develop applications that can handle threats and respond to them more securely.

**CS 74B, Security in J2EE Applications**  
Transfer: CSU  
• **Prerequisite:** CS 55.

This course provides students with the tools needed to implement security in designing and developing applications utilizing the Java 2 Platform. Topics include encryption, security practices, securing remote applications such as secure web servers and remote databases. Upon completion of this course, students will be able to develop applications that can handle threats and respond to them more securely.

**CS 75, Network Protocols and Analysis 2 units**  
Transfer: CSU  
• **Prerequisite:** CS 70.

This course introduces major protocols and their roles in protocol suites with emphasis on TCP/IP. Detailed coverage is given to at least one protocol at each layer, the main application level protocols and at least one security protocol. Analytic programs such as ping, traceroute, and packet capture are studied and applied as tools to protocol analysis. The Wireshark packet capture and protocol decoder program is centrally utilized.

**CS 78, Secure Server Installation and Administration**  
Transfer: CSU  
• **Prerequisite:** CS 70

In this course students will study network service administration. This course covers physical BIOS and bootloader security, password strength and cracking, file system permissions, authentication mechanisms, remote backup and logging, and installation strategies as machine-level security considerations. A variety of particular service applications like Apache (web service) and BIND (name service) are then studied, emphasizing their strengths, weaknesses, and how to configure them for security through wrappers, file system access jails, and other mechanisms.

**CS 80, Internet Programming**  
Transfer: CSU  
• **Prerequisite:** CS 3.

This course surveys the many technologies that are used to program multitiered, client/server, database-intensive, Web-based applications. Topics include: XHTML, Cascading Style Sheets (CSS), JavaScript, Extensible Markup Language (XML), RSS, Ajax, Rich Internet Applications, Web servers, databases, MySQL, PHP, Ruby on Rails, Active Server Pages (ASP), JavaServer Faces, and Web Services.

**CS 81, JavaScript and Dynamic HTML**  
Transfer: CSU  
• **Prerequisite:** CS 80.

This introductory programming course teaches the fundamentals of computer programming with the JavaScript language, the standard for client-side Web programming. It offers a thorough treatment of programming concepts with programs that yield visible or audible results in Web pages and Web-based applications. It shows how to use Core and Client-Side JavaScript and the Document Object Model to build interactive, high-performance Web sites.  
This course uses JavaScript which is open-source (free) software.

**CS 82, ASP.NET Programming in C#**  
Transfer: CSU  
• **Prerequisite:** CS 33.

Server-side Web programming allows programmers to create content and process data supplied in Web forms to create websites. These applications process data submitted from Web forms and access backend databases to dynamically generate Web pages. Students will design and write web pages using ASP 2.0 (Active Server Pages), Visual Studio. NET and the C# programming language.

**CS 83, Server-Side Java Web Programming**  
Transfer: CSU  
• **Prerequisite:** CS 55 and CS 81.

This course teaches how to design and write applications that extend Web servers. These applications process data submitted from Web forms and access backend databases to
dynamically generate Web pages. This course covers the Java Servlets and JavaServer Pages (JSP) server-side technologies.

**CS 84, Programming with XML**  
3 units  
Transfer: CSU  
- **Prerequisite:** CS 80 and CS 55 or CS 52 or CS 33.  
XML (Extensible Markup Language) is a flexible way to create "self-describing data" and to share both the format and content on the World Wide Web, intranets and elsewhere within an enterprise. In this advanced course, students will use XML and learn to tag and transform XML documents so that they can be processed by web browsers, databases and other XML processors. With the industry-standard SAX and DOM API standards, students will create XML applications that read, write and modify XML documents.  
*This course assists students in passing Microsoft Certification Exams.*

**CS 85 PHP Programming**  
3 units  
Transfer: CSU  
- **Prerequisite:** CS 81.  
This course teaches how to design and write applications that extend Web servers. These applications process data submitted from Web forms and access back-end databases to dynamically generate Web pages. This course covers the PHP server-side technology. PHP, which stands for “PHP: Hypertext Preprocessor” is a widely-used, Open Source, general-purpose scripting language that is especially suited for Web development and can be embedded into HTML.  
*This course uses PHP and MySQL which are open-source (free) software.*

**CS 86, Android Development**  
3 units  
Transfer: CSU  
- **Prerequisite:** CS 55  
- **Skills Advisory:** CS 56  
This course teaches how to design, develop, test, and debug applications that run on Android, a software stack for mobile devices that includes an operating system, middleware and key applications. Topics include the Android Software Development Kit (SDK), design principles, application structure, strings, graphics, user interfaces, animation, storage, networking, telephony, Location-Based Services (LBS), multimedia, 3D graphics, notifications, and services.

**CS 88A, Independent Studies in Computer Science**  
1 unit  
Transfer: CSU  
- Please see "Independent Studies" section.

**CS 88B, Independent Studies in Computer Science**  
2 units  
Transfer: CSU  
- Please see "Independent Studies" section.

**CS 88C, Independent Studies in Computer Science**  
3 units  
Transfer: CSU  
- Please see "Independent Studies" section.