# COMPUTER INFORMATION SYSTEMS: SOFTWARE DEVELOPMENT CONCENTRATION, BACHELOR OF SCIENCE

The Bachelor of Science in Computer Information Systems with a software development concentration prepares students for a variety of programming and software development positions.

Students will learn foundational and advanced programming concepts in areas such as object-oriented programming, scripting languages, Android and iOS development, web application development, machine learning, artificial intelligence, and more. Through the curriculum, students are able to gain theoretical and practical knowledge and skills to build high-quality software products in their chosen career path.

## Program Objectives

The program seeks to develop a deeper understanding of the role of information systems within organizations and the processes that support technology-enabled business development.

At the conclusion of the CIS program, students will demonstrate the ability to:

1. Analyze, design, implement, and maintain an information system.
2. Communicate clearly and effectively in writing and speaking.
3. Work effectively as a team member for a common purpose.
4. Identify ethical issues and provide alternatives or solutions.

## Outcomes Assessment Activities

The CIS program primarily uses a direct-assessment approach. Artifacts of student work pertinent to a particular learning outcome are collected. These artifacts are then evaluated by faculty external to the course in which the artifact was collected to determine students' level of mastery. Each learning outcome has been separated into sub-skills, or "measurable objectives", that are components of the overall learning objectives. Students' level of mastery is assessed using rubrics which have been developed for this purpose. To ensure inter-rater reliability, we implement processes whereby raters meet before and after artifacts are assessed. In addition, for follow-up (loop-closing) activities on subsequent artifact evaluation, the same raters are utilized when possible, for consistency and reliability.

The CIS program includes a senior capstone project course required of all majors. This course requires students to apply the communication, problem solving, and technical skills they have learned during the completion of the CIS program. Each team of students is assigned a live project in the Pueblo community (or sometimes surrounding areas). The team is evaluated on not only the final IT product they develop, but the process they follow in completing the project.

Finally, the CIS program meets annually with the CIS Industrial Advisory Committee to get feedback on the effectiveness of the CIS curriculum in meeting the needs of the IT industry along the Colorado Front Range. The CIS program also requires CIS graduates to complete a survey to determine the effectiveness of the program and curriculum in preparing them for jobs in IT.

## Specific Program Requirements

CIS majors complete a total of 120 credits. These credits include 36 credit hours of general education, 52 credits in CIS major courses, 10 credits of quantitative analysis, 9 credits of required related non CIS courses and 13 credits of electives. CIS majors are encouraged to complete a minor in Business Administration or another Business-related minor. The minor may be completed within the 13 elective credits.

| Course | Title | Credits |
|---|---|---|
| **General Education** | | |
| See General Education below for specific requirements | | 36 |
| **Quantitative Analysis Requirement** | | |
| MATH 220 | QUANTITATIVE ANALYSIS FOR BUSINESS | 4 |
| BSAD 265 | INFERENTIAL STATISTICS & PROBLEM SOLVING | 3 |
| BSAD 360 | ADVANCED BUSINESS STATISTICS | 3.0 |
| **Required Related Courses** | | |
| BSAD 270 | BUSINESS COMMUNICATIONS | 3.0 |
| MGMT 201 | PRINCIPLES OF MANAGEMENT | 3 |
| MGMT 368 | PROJECT MANAGEMENT | 3 |
| Open Electives [1] | | 13 |
| **CIS Major Courses** | | |
| CIS 100 | INTRODUCTION TO WORD | 1 |
| CIS 103 | INTRODUCTION TO POWERPOINT | 1 |
| CIS 104 | INTRODUCTION TO EXCEL SPREADSHEETS | 1 |
| CIS 105 | INTRODUCTION TO ACCESS DBMS | 1 |
| CIS 150 | COMPUTER, ETHICS, AND SOCIETY | 3 |
| CIS 171 | INTRODUCTION TO JAVA PROGRAMMING | 4 |
| CIS 210 | INTRODUCTION TO CYBER SECURITY | 3 |
| CIS 240 | SYSTEMS ANALYSIS & DESIGN | 3 |
| CIS 271 | ADVANCED PROGRAM DESIGN WITH JAVA | 4 |
| CIS 289 | NETWORK CONCEPTS | 3 |
| CIS 311 | INTRODUCTION TO WEB DEVELOPMENT | 3 |
| CIS 315 | LINUX FUNDAMENTALS | 3 |
| CIS 350 | DATABASE MANAGEMENT | 3 |
| CIS 432 | SENIOR PROFESSIONAL PROJECT | 6 |
| CIS 493 | SENIOR SEMINAR | 1 |
| CIS 3/400 | Concentration Area Electives | 12 |
| Total Credits | | 120 |

[1] CIS majors may select one of the following concentration areas and complete the indicated required courses (12 credits of 3/400 upper division electives) within the chosen concentration.

The general elective courses must include the specific courses listed below.

| Course | Title | Credits |
|---|---|---|
| **Humanities** | | |
| COMR 103 | SPEAKING AND LISTENING (or equivalent) | 3 |
| **Social Science** | | |
| ECON 201 & ECON 202 | PRINCIPLES OF MACROECONOMICS and PRINCIPLES OF MICROECONOMICS | 6 |

| | | |
|---|---|---|
| **Mathematics** | | |
| MATH 101 | INTRODUCTORY COLLEGE MATHEMATICS | 3.0 |

## Software Development Concentration Area Electives

| Course | Title | Credits |
|---|---|---|
| CIS 356 | iOS Application Development | 3 |
| or CIS 386 | Android Application Development | |
| CIS 359 | Advanced Programming with C# | 3 |
| CIS 411 | Internet Server-Side Programming | 3 |
| CIS 410 | Data Analytics with Python | 3 |
| or CIS 450 | Advanced Data Analytics | |
| Total Credits | | 12 |

In addition to the requirement to complete (BSAD 265 Inferential Statistics & Problem Solving (3 c.h.), BSAD 270 Business Communications (3 c.h.), BSAD 360 Advanced Business Statistics (3 c.h.), ECON 201 Principles of Macroeconomics (GT-SS1) (3 c.h.), ECON 202 Principles of Microeconomics (GT-SS1) (3 c.h.), MGMT 201 Principles of Management (3 c.h.), MGMT 368 Project Management (3 c.h.), MATH 101 Introductory College Mathematics (GT-MA1) (3 c.h.) and MATH 220 Quantitative Analysis for Business (4 c.h.)), CIS majors are strongly encouraged to complete a minor in Business Administration.

# Specific Graduation Requirements

- Students majoring in computer information systems must maintain grades of C or higher in all CIS courses. In addition, all required CIS prerequisites must be completed with a grade of C or higher.
- Students must complete at least 120 semester hours in an approved program of study, including 52 hours in the major.
- Students must complete a minimum of 21 credits of CIS upper-division course work. At least 16 of these upper-division CIS credits must be taken in residence.
- Students must complete a course planning worksheet and participate in the advisement process with a CIS faculty advisor.

## Summary of Graduation Requirements (CIS)

General Education: 36
Quantitative Analysis Requirement: 10
Required Related: 9
Open Electives: 13
Major: 52

**TOTAL (minimum credits): 120**

# Planning Sheet

Disclaimer: The Planning Sheet is designed as a guide for student's planning their course selections. The information on this page provides only a suggested schedule. Actual course selections should be made with the advice and consent of an academic advisor. While accurately portraying the information contained in the college catalog, this form is not considered a legal substitute for that document. Students should become familiar with the catalog in effect at the time in which they entered the institution.

| Course | Title | Credits |
|---|---|---|
| **Year 1** | | |
| **Fall** | | |
| CIS 100 | Introduction to Word | 1 |
| CIS 103 | Introduction to PowerPoint | 1 |
| CIS 104 | Introduction to Excel Spreadsheets | 1 |
| CIS 105 | Introduction to Access DBMS | 1 |
| CIS 150 | Computer, Ethics, and Society | 3 |
| ENG 101 | Rhetoric & Writing I (GT-CO1) | 3 |
| MATH 101 | Introductory College Mathematics (GT-MA1) | 3 |
| | Credits | 13 |
| **Spring** | | |
| CIS 171 | Introduction to Java Programming | 4 |
| CIS 185 | PC Architecture | 3 |
| ENG 102 | Rhetoric & Writing II (GT-CO2) | 3 |
| MATH 220 | Quantitative Analysis for Business | 4 |
| | Credits | 14 |
| **Year 2** | | |
| **Fall** | | |
| CIS 240 | Systems Analysis & Design | 3 |
| CIS 315 | Linux Fundamentals | 3 |
| COMR 103 | Speaking and Listening | 3 |
| ECON 201 | Principles of Macroeconomics (GT-SS1) | 3 |
| General Education | | 4 |
| | Credits | 16 |
| **Spring** | | |
| BSAD 265 | Inferential Statistics & Problem Solving | 3 |
| CIS 271 | Advanced Program Design with Java | 4 |
| CIS 289 | Network Concepts | 3 |
| MGMT 201 | Principles of Management | 3 |
| General Education | | 3 |
| | Credits | 16 |
| **Year 3** | | |
| **Fall** | | |
| BSAD 360 | Advanced Business Statistics | 3 |
| CIS 311 | Introduction to Web Development | 3 |
| CIS 350 | Database Management | 3 |
| General Education | | 7 |
| | Credits | 16 |
| **Spring** | | |
| BSAD 270 | Business Communications | 3 |
| General Education | | 6 |
| Elective [3 credits must be upper division CIS course.] | | 6 |
| | Credits | 15 |
| **Year 4** | | |
| **Fall** | | |
| MGMT 368 | Project Management | 3 |
| Elective [6 credits must be upper division CIS course.] | | 13 |
| | Credits | 16 |
| **Spring** | | |
| CIS 432 | Senior Professional Project | 6 |
| CIS 493 | Senior Seminar | 1 |
| Elective [3 credits must be upper division CIS course.] | | 6 |
| | Credits | 13 |
| | Total Credits | 119 |