

# COMPUTER SCIENCE (CS)

## CS 102 Introduction to Python

Students learn the fundamentals of designing, developing, and testing computer programs using the Python programming language. Problem-solving, logic and critical reasoning skills are emphasized as you learn to create programs with Python. Covers the fundamentals of computer science as well as planning, coding and debugging computer programs. This is an introductory level course and previous programming experience is not necessary. NOTE: Computer Science and IT majors may substitute this course for DPR 101 - Introduction to Computer Science.

*Upon successful completion of this course, students should be able to:*

*Define basic computing and programming terms.*

*Navigate through the Python development environment.*

*Explain and use data, operations, functions and data types in a Python program.*

*Apply the correct control and iterative structures to a Python program.*

*Use mathematical equations in the creation of a Python program.*

*Design, write, test and debug a Python program to implement a working solution to a given problem specification.*

*Use Python documentation or a knowledge base to resolve technical issues.*

*Appropriately implement the major steps in the analysis, design and development of a Python computer program.*

*Explain how binary sequences are used to represent digital data.*

*Explore career opportunities in computer-science, personal computing and business applications programming.*

*College Academic Learning Goal Designation: Critical Reasoning (CR), Information Technology (TC)*

*Prerequisites: ((ENG 050 and REA 050) or ENG 099 or REA 075) and (MAT 050 or MAT 060). Appropriate placement test scores may be accepted.*

**3 Credits 3 Weekly Lecture Hours**

## CS 117 Fundamentals of Game Design Theory and Practice

This course introduces students to the theory and practical aspects of the computer game development process. Students brainstorm a game idea, establish focus, determine the storytelling mode, and document the design.

*Upon successful completion of this course, students should be able to:*

*Demonstrate an understanding of the vocabulary of game design theory and practice.*

*Identify the techniques of top game designers.*

*Analyze and identify the elements that make successful games.*

*Apply the computer game development process to create a design document.*

*Prerequisites: REA 050 or ENG 099 or REA 075. Appropriate placement test scores may be accepted.*

**3 Credits 3 Weekly Lecture Hours**

## CS 118 Game Creation Development

This course focuses on designing, developing and testing computer games using game creation development tools. Students use an icon-based system of events and actions to program computer games. Principles of successful game design and techniques of top game designers are also explored.

*Upon successful completion of this course, students should be able to:*

*List requirements for a game development studio.*

*Describe the basic elements of an image and how to manipulate it.*

*Identify and describe game genres.*

*Identify the elements of good game design.*

*Utilize the computer game development process to create games using a game engine and design tool.*

*Demonstrate the ability to use game creation development tools to develop games for inclusion in a portfolio.*

*Prerequisites: DPR 100 and (DPR 117 or CS 117 or DPR 238).*

**3 Credits 3 Weekly Lecture Hours**

## CS 119 Introduction to Computer Game Programming

This course introduces students to the concepts of programming using an object-oriented programming language and game development tools. Students will create 2D and 3D games using game development tools as well as program a full-featured role-playing game (RPG) using an object-oriented programming language.

*Upon successful completion of this course, students should be able to:*

*Describe the elements of game programming.*

*Create a 2D game using game development tools.*

*Create a 3D game using game development tools.*

*Use the basic programming constructs of an object-oriented programming language.*

*Create animations for a game.*

*Add sounds to a game.*

*Create a game using a HTML5 game-based creation engine.*

*Create an RPG using an object-oriented programming language*

*Prerequisites: DPR 101.*

*Corequisites: DPR 117 or CS 117 or DPR 238 or DPR 118 or CS 118 or DPR 232.*

**3 Credits 3 Weekly Lecture Hours**

## CS 121 Game Art and Animation

The focus of this course is to create 2D artwork, arrange U-V's, generate textures, and create a 3D model. Students create 3D models and animations using industry standard computer graphics software.

*Upon successful completion of this course, students should be able to:*

*Identify the requirements of 2D artwork.*

*Demonstrate the ability to design and develop 2D artwork.*

*Identify the requirements of a 3D model.*

*Use a 3D modeling software product to create models and animations.*

*Prerequisites: ((ENG 050 and REA 050) or ENG 099 or REA 075) and (MAT 050 or MAT 060). Appropriate placement test scores may be accepted.*

**3 Credits 3 Weekly Lecture Hours**

### **CS 131 Virtual Asset Production**

This course introduces students to the fundamentals of creating 2D and 3D assets for use in real-time, virtual environments and games using industry-standard software and hardware.

*Upon successful completion of this course, students should be able to: Identify the requirements of 2D asset development.*

*Design and develop 2D assets.*

*Identify the requirements of 3D asset development.*

*Create and animate 3D assets.*

*Import and manage assets in Unity 3D game engine.*

*Apply the production pipeline to deploy assets for previsualization and presentation.*

*Prerequisites: CS 130.*

**3 Credits 3 Weekly Lecture Hours**

### **CS 190 Computer Programming Internship (1 credit)**

College-Sponsored Experiential Learning (CSEL) is designed to integrate on-the-job learning experiences with classroom studies. These experiences are structured either to explore career options or to prepare for a specific occupation. Students participating in the Cooperative Education and Internship Program gain college credit and are graded for their learning/work experience by the appropriate faculty. Students participating in this 60 hour internship will earn 1 college credit for this experience. Upon successful completion of this hands-on work experience, the student should be able to satisfy instructionally selected competencies from those below according to the number of credits to be awarded. NOTE To be eligible for an internship, students must: Have completed a minimum of 18 or more credits within the last 5 years. Have begun course work in their major (at least 9 credits). Have an overall grade point average (GPA) of 2.5. Obtain a written recommendation by a DCCC faculty within the discipline of the internship. Submit a current resume to the Office of Student Employment Services.

*Upon successful completion of this course, students should be able to: Explain three program-related concepts that have been applied during the work experience.*

*Describe the ways that technology is utilized in the work experience.*

*Analyze the culture of the host organization.*

*Analyze an operational process within the work experience.*

*Demonstrate how assigned tasks depend on successful communication.*

*Describe how time and activity are managed to meet work-imposed deadlines.*

*Describe an instance where problem-solving skills were needed to analyze a situation in the work experience.*

*Demonstrate specifically how job-related competence has improved.*

*Formulate a self-assessment for career growth and personal satisfaction.*

*Satisfy the competencies of the chosen CSEL placement (to be developed in consultation with the CSEL instructor).*

*Work closely with a faculty mentor in the student's program/major to complete a project which articulates how the experience helps the student achieve program outcomes.*

**1 Credit**

### **CS 194 Computer Programming Internship (2 credit)**

College-Sponsored Experiential Learning (CSEL) is designed to integrate on-the-job learning experiences with classroom studies. These experiences are structured either to explore career options or to prepare for a specific occupation. Students participating in the Cooperative Education and Internship Program gain college credit and are graded for their learning/work experience by the appropriate faculty. Students participating in this 120 hour internship will earn 2 college credit for this experience. Upon successful completion of this hands-on work experience, the student should be able to satisfy instructionally selected competencies from those below according to the number of credits to be awarded. NOTE To be eligible for an internship, students must: Have completed a minimum of 18 or more credits within the last 5 years. Have begun course work in their major (at least 9 credits). Have an overall grade point average (GPA) of 2.5. Obtain a written recommendation by a DCCC faculty within the discipline of the internship. Submit a current resume to the Office of Student Employment Services.

*Upon successful completion of this course, students should be able to: Explain three program-related concepts that have been applied during the work experience.*

*Describe the ways that technology is utilized in the work experience.*

*Analyze the culture of the host organization.*

*Analyze an operational process within the work experience.*

*Demonstrate how assigned tasks depend on successful communication.*

*Describe how time and activity are managed to meet work-imposed deadlines.*

*Describe an instance where problem-solving skills were needed to analyze a situation in the work experience.*

*Demonstrate specifically how job-related competence has improved.*

*Formulate a self-assessment for career growth and personal satisfaction.*

*Satisfy the competencies of the chosen CSEL placement (to be developed in consultation with the CSEL instructor).*

*Work closely with a faculty mentor in the student's program/major to complete a project which articulates how the experience helps the student achieve program outcomes.*

**2 Credits**

**CS 199 Computer Programming Intern**

College-Sponsored Experiential Learning (CSEL) is designed to integrate on-the-job learning experiences with classroom studies. These experiences are structured either to explore career options or to prepare for a specific occupation. Students participating in the Cooperative Education and Internship Program gain college credit and are graded for their learning/work experience by the appropriate faculty. Students participating in this 180 hour internship will earn 3 college credits for this experience. Upon successful completion of this hands-on work experience, the student should be able to satisfy instructionally selected competencies from those below according to the number of credits to be awarded. NOTE To be eligible for an internship, students must: Have completed a minimum of 18 or more credits within the last 5 years. Have begun course work in their major (at least 9 credits). Have an overall grade point average (GPA) of 2.5. Obtain a written recommendation by a DCCC faculty within the discipline of the internship. Submit a current resume to the Office of Student Employment Services.

*Upon successful completion of this course, students should be able to:*

*Explain three program-related concepts that have been applied during the work experience.*

*Describe the ways that technology is utilized in the work experience.*

*Analyze the culture of the host organization.*

*Analyze an operational process within the work experience.*

*Demonstrate how assigned tasks depend on successful communication.*

*Describe how time and activity are managed to meet work-imposed deadlines.*

*Describe an instance where problem-solving skills were needed to analyze a situation in the work experience.*

*Demonstrate specifically how job-related competence has improved.*

*Formulate a self-assessment for career growth and personal satisfaction.*

*Satisfy the competencies of the chosen CSEL placement (to be developed in consultation with the CSEL instructor).*

*Work closely with a faculty mentor in the student's program/major to complete a project which articulates how the experience helps the student achieve program outcomes.*

**3 Credits 3 Weekly Lecture Hours**

**CS 200 UX Design**

User experience (UX) design is a discipline concerned with all the elements that together make up the user interface, including layout, visual design, text, brand, sound and interaction. (Source: User Experience Professionals Association). This course introduces multi-device design strategies for navigation, screen layout, and interactive content. Learn how to apply interaction design principles to your apps and web sites to create experiences that are engaging, accessible and usable. Follow a user-centered design process for analyzing, planning, and designing user experiences. Map user needs to your proposed UX design solution with scenarios, storyboards and prototypes. Gain insight on how to incorporate accessibility into your design process to increase accessibility to all people, including those with disabilities.

*Upon successful completion of this course, students should be able to:*

*Identify and apply an interactive design process model.*

*Design applications employing user-centered design techniques.*

*Analyze techniques for assuring compliance with accessibility guidelines.*

*Use rapid-prototyping tools to develop user interfaces that utilize interface design standards.*

*Apply visual principles such as layout, color, iconography, imagery and typography to maximize the UX experience.*

*Identify career paths, academic programs and training opportunities in the field of User Experience Design.*

*Prerequisites: IMM 110 and IMM 120.*

**3 Credits 3 Weekly Lecture Hours**

**CS 202 Intermediate Python**

This course teaches students the fundamentals of Object Oriented Programming (OOP) by designing, coding and testing simple applications using Python. The course is designed for students who have an understanding of programming design and logic but who need to understand object-oriented programming methods and techniques. NOTE: Prerequisite requires a grade of 'C' or higher.

*Upon successful completion of this course, students should be able to:*

*Use a Python IDE.*

*Use Python classes.*

*Create and use functions in a Python program.*

*Create and initialize classes.*

*Explain and use inheritance.*

*Use function overloading in a Python object-oriented program.*

*Use Object –Oriented programming techniques.*

*Prerequisites: CS 102.*

**3 Credits 3 Weekly Lecture Hours**

**CS 206 PHP/MySQL**

Students learn to develop fully functional dynamic websites using PHP and a MySQL database. Topics include: setting up a development environment, using PHP to validate and process form data, sending email, creating regular expressions, implementing user authentication and security. Students will apply these concepts in the design of a MySQL relational database system and use PHP to create, read, update, search and delete records.

*Upon successful completion of this course, students should be able to:*

*Identify the differences between static and dynamic Web design.*

*Write scripts to validate and process form submission data.*

*Build a relational MySQL database and write SQL queries to create, read, update, delete and search records.*

*Identify security issues and implement best practices and solutions.*

*Upload files to a web server and update and maintain web sites.*

*Identify career paths, academic programs and training opportunities in the field of Web Design and Development*

*Prerequisites: (DPR 101 or DPR 108) and DPR 207 and IMM 120.*

**3 Credits 3 Weekly Lecture Hours**

### **CS 250 Digital Portfolio Development**

The focus of the Digital Portfolio Development course is to design a portfolio that makes evident a student's knowledge and skills of their field of study. The portfolio is a collection of material that can be used as an interactive resume, an archive of work over time or a demonstration of proficiency. The contents of a student's portfolio can include work samples, letters of recommendation, references, transcripts, GPA, accomplishments/awards, competency lists, certifications, curricular standards, instructor assessments/evaluation, reflections, and work experiences/employer evaluations. Thus, a student's portfolio provides the ability to show work on demand and evidence of their preparation for a career or further education in their field of study. The objective of this course is for students to demonstrate the theoretical as well as the technical skills they have acquired throughout their program. Students will assess personal strengths to establish a career goal and decide how to organize their design and production work in a graduation portfolio. NOTE: Prerequisites: Depending on CS specialization, all required program courses.

*Upon successful completion of this course, students should be able to:*

*Identify the need for a digital portfolio.*

*Identify the target audience of a digital portfolio.*

*Demonstrate the ability to organize, collect and prepare material for a digital portfolio.*

*Explain copyright laws as it applies to acquiring and protecting intellectual property.*

*Demonstrate the ability to design and develop work samples using industry standard tools and/or programming languages.*

*Demonstrate the use of design and development tools to develop a digital portfolio.*

**3 Credits 3 Weekly Lecture Hours**