

## Course Outline for CS 47

### CAPSTONE PROJECT

Effective: Spring 2016

#### I. CATALOG DESCRIPTION:

CS 47 — CAPSTONE PROJECT — 3.00 units

This is intended as a culminating experience within a degree or certificate sequence. Working individually or in a small team, you will develop a large-scale work-like project, driven by client needs, and requiring planning, implementation, documentation and presentation of the solution. Based on client requirements, each student or student team will design and implement a solution in a systematic and organized manner, breaking the project into logical sub-components and/or steps. Each student or student team will also prepare relevant written materials and give an oral presentation of the final product.

1.00 Units Lecture 2.00 Units Lab

#### **Strongly Recommended**

CS 1 - Computing Fundamentals I  
or

CS 31 - Java Programming

CNT 52 - Networking Fundamentals

CIS 43 - Professional Communications

CIS 9001 - Database Design Methodology

CIS 60 - Systems Analysis and Design

CIS 62 - Project Management

#### **Grading Methods:**

Letter or P/NP

#### **Discipline:**

	<b>MIN</b>
<b>Lecture Hours:</b>	18.00
<b>Lab Hours:</b>	108.00
<b>Total Hours:</b>	126.00

#### II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

#### III. PREREQUISITE AND/OR ADVISORY SKILLS:

**Before entering this course, it is strongly recommended that the student should be able to:**

##### A. CS1

1. Design, create and compile C++ programs within multiple development environments and operating systems, including the use of command-line tools in Unix/Linux.
2. Create and interpret expressions involving arithmetic and logical operators;
3. Modify and expand short programs that use standard conditional and iterative control structures and functions.
4. Analyze and explain the behavior of simple programs.
5. Discuss and apply the concept of algorithms in problem-solving processes.
6. Design, implement, test, and debug programs using basic computation, simple I/O, standard conditional and iterative structures, and the definition of functions.

##### B. CS31

1. Explain and apply basic principles of software engineering.
2. Write, compile, test and debug java programs and applets using both command line and integrated development environments;
3. Design and implement event-driven programs;
4. Create Java programs using JDBC and Relational Database Management Systems (RDBMS) such as MySQL, DB2 and/or Oracle.

##### C. CNT52

1. list and explain the layers of the OSI model and the TCP/IP Stack and describe the roles of protocol layers in data networks;
  2. describe and differentiate the devices, protocols, and services used to support communications in data networks and the Internet;
  3. draw typical network diagrams, using software tools such as Microsoft Visio;
- D. CIS43
1. Solve business communications problems through planning, problem solving, organizing, writing, listening, and presenting techniques;
  2. Illustrate sensitivity to audience needs and desire, including cross-cultural situations;
  3. Plan, organize, write and revise letters, memos, emails, and reports suitable for a variety of business situations, including quantitative (e.g., accounting and finance) and business legal contexts;
  4. Plan and deliver individual or team oral presentations for business meetings;
- E. CIS9001
- F. CIS60
1. Articulate the types of business needs that can be addressed using information technology-based solutions.
  2. Initiate, specify, and prioritize information systems projects and to determine various aspects of feasibility of these projects.
  3. Clearly define problems, opportunities, or mandates that initiate projects.
  4. Communicate effectively with various organizational stakeholders to collect information using a variety of techniques and to convey proposed solution characteristics to them.
  5. Design high-level logical system characteristics (user interface design, design of data and information requirements).
- G. CIS62
1. Articulate what project management means and how it improves the success of information technology projects.
  2. Produce a project plan to ensure successful delivery and stakeholder satisfaction
  3. Apply the principles of the Project Management Institutes (PMI) processes of project management
  4. Describe and apply the presentation and communication skills necessary to be an effective project manager

#### IV. MEASURABLE OBJECTIVES:

**Upon completion of this course, the student should be able to:**

- A. Identify the requirements and components of a large-scale project.
- B. Select appropriate software, and hardware (if relevant), for designing and developing solutions for a given project.
- C. If working in teams, identify members' strengths and weaknesses, and determine and assign roles accordingly.
- D. Decompose the overall solution to a given project into modular components and sequential steps.
- E. Develop an overall timeline and key milestones for a project.
- F. Evaluate the current state of a project and adjust timelines and goals appropriately.
- G. Perform consistent documentation and testing during the development of a project.
- H. Create appropriate documentation and other reports for a completed project.

#### V. CONTENT:

- A. Teams
  1. Team Roles
  2. Definition of Roles
  3. Types of Teams
- B. Creation of teams (if appropriate)
  1. Identifying members
  2. Identifying members strengths and weaknesses
- C. Selecting a project
  1. Recognizing and defining the problem
  2. Define the scope of the project
  3. Requirements analysis
  4. Software selection
  5. Hardware selection
- D. Designing the solution
  1. Identify the project parts
  2. Assigning project parts to members
- E. Project implementation
  1. Project timeline and milestones
  2. Evaluating the project at each milestone
  3. Milestone documentation and testing
- F. Project report and documentation
- G. Project presentation

#### VI. METHODS OF INSTRUCTION:

- A. **Discussion** -
- B. **Individualized Instruction** -
- C. **Demonstration** -
- D. **Research** -
- E. **Student Presentations** -
- F. **Projects** -

#### VII. TYPICAL ASSIGNMENTS:

- A. Develop a database system to capture needed data on customers, average deposit size, and other key characteristics.
- B. Develop a learning game application for an elementary school, based on specified topics and learning outcomes.
- C. Develop a tool to gather and analyze key data on global warming for the federal government.
- D. Design an appropriate network architecture, including recommended hardware and software procurement and configuration details, for a new business, based on its expected needs and activities.

#### VIII. EVALUATION:

##### A. **Methods**

1. Papers
2. Oral Presentation
3. Projects
4. Group Projects
5. Other: Progress Reports

##### B. **Frequency**

1. Progress Reports: Progress reports should be prepared weekly to give the instructor evidence of progress being made on each student or team's project.

2. Papers: A paper (written report and/or documentation) should be prepared by each student/team as part of the overall final product of the capstone project.
3. Projects / Group Projects: Each student or group is expected to work on one major project throughout the course of the entire course, with its size and scope commensurate to the number of credits.
4. Oral Presentation: Every project should include a final oral presentation once the project is complete.

IX. TYPICAL TEXTS:

1. There are no specific typical texts specified due to the nature of this course. Student/team projects will likely span a variety of topics, and a given project's primary focus may be software development, database design, network design, system design, or some combination thereof. Students and the instructor should jointly identify appropriate resources for the specific project at hand.

X. OTHER MATERIALS REQUIRED OF STUDENTS:

- A. It is strongly recommended that each student have a portable storage device (e.g, USB drive) and/or access to an individual account on a cloud-storage service.