

New York City College of Technology/CUNY Computer Systems Technology Department

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CST2406 Systems Analysis and Design

(2 Class Hours, 2 Lab Hours, 3 Credits)

Course Description:

An introduction to systems analysis and design concepts and tools. Detailed study of the Context of Systems Development Projects and System Design Methods. Introduction to the System Development Life Cycle and System Development Methodology.

Course Objectives:

Upon the completion of the class, the student should be able to:

- Define information system; identify the basic types of applications.
- Identify the stakeholders in an information system development project
- Define the role of a systems analyst and the skills required
- Describe a simple process for developing information systems and differentiate between the waterfall and the interactive/incremental approaches to systems development.
- Define information systems architecture and understand the role it plays in systems development.
- Understand the motivation for a standard system development methodology from a quality management perspective
- Define the essential phases of the system development methodology in terms of purposes, inputs, and outputs
- Understand why and how alternative “routes” through the system development phases may be constructed to handle the special requirements of different project goals
- Define and differentiate project, project management, and process management
- Understand the use of PERT and Gantt charts in managing a project
- Define system analysis in terms of purposes and goals and relate these to the phases of the system development methodology

- Describe different system analysis approaches including Model-Driven (Structured Analysis, Information Engineering and Object Oriented) and Accelerated Analysis Approaches (Discovery Prototyping and Rapid Architected Analysis) for solving business problems
- Describe the scope definition, problem analysis, requirements analysis, logical design, and decision analysis phases in terms of purposes, participants, inputs, outputs, techniques, and steps.
- Understand the activities in problem analysis and the use of tools like Ishikawa diagrams to aid in problem solving
- Identify the basic seven fact-finding techniques and characterize the advantages and disadvantages of each
- Describe the purpose of a Joint Requirements Planning (JRP) Session, the participants and their roles in the session
- Understand the basic concepts and constructs used in the Entity Relationship Diagram (ERD).
- Be able to describe the basic steps used in constructing a data model:
 1. Entity Discovery
 2. Construction of the Entity Context Data Model
 3. Construction of a Key-Based Model
 4. Develop the Fully-Attributed Model
 5. Normalization of the Data Model
- Use a Software tool such as VISIO to construct various data models used in the development of application system data requirements.
- Understand the purpose and use of the Process Model in system development
- Understand the basic concepts and constructs of the Process Model
- Describe the various steps and types of diagrams used to develop the Process Model for an application system
- Use VISIO or other Software tool to construct the various components of the Process Model for an application system.

General Education Outcomes:

- **SKILLS/Inquiry/Analysis:** Students will employ scientific reasoning and logical thinking. Students will use creativity to solve problems.
- **SKILLS/Communication:** Students will communicate in diverse settings and groups, using written (both reading and writing), oral (both speaking and listening), and visual means.

Prerequisites:

CST1201 and CST1204

Required Materials:

Text(s):

Essentials of System Analysis and Design (paperback Edition)
6th ED, by Joseph S. Valacich, Joey F. George, and Jeffrey Hoffer,
Pearson, 2015

Material to be covered: Part One: Foundations for Systems Development

Chapters 1,3

Part Two: Systems Planning and Selection.

Chapter 4

Part Three: System Analysis

Chapters 5,6,7

Part Four: Systems Design

Chapter 8,9

Software Tools: VISIO (Modeling Tool) and other CASE Tool

Academic Integrity Policy:

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

Course Requirements

Work Load:

For every **ONE-hour** of class time you are expected to do **Two and a Half to Three** hours of homework. (Reading lessons, doing written assignments, using the System Architect program, preparing for tests, etc.). College is a very demanding experience. This is the time in your life that you are training for a profession and it requires a very serious commitment and allotment of ample time to learn the material.

Tests:

There will be three tests during the term (the last one is the Final Exam).

Projects and Lab Work:

The projects will be assignments analyzing typical business cases where the goal is to develop information systems requirements to meet business needs. VISIO will be used to draw organizational charts and some system models (functional decomposition). Visio and/or other case tool will be used to produce data and process models that will help develop the requirements for these business case studies. Although VISIO and other case tool will be introduced in class, students are expected to supplement these class efforts by spending the necessary time in the computer lab to learn these and other applications necessary to complete their assignments.

Course Grade:

The course grade will be determined from the following formula:

TEST 1	20%
TEST 2	20%
FINAL	20%
HOMEWORK + Quizzes	20%
PROJECTS	20%
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TOTAL	100%

Course Outline:

Week	Material to be covered
1	CHAPTER 1 –Systems Development Environment-
2,3	CHAPTER 1 (continued) –Phases in the System Development Process. CHAPTER 3- Managing the Information System Project. Use of VISIO to produce organizational charts.
4	CHAPTER 3 –Systems Planning and Selection Identifying and Selecting Projects
5	TEST 1
6	CHAPTER 5 – Systems Analysis- Performing Requirements Determination; Traditional Methods for Determining Requirements, Modern Methods for determining Systems Requirements.
7&8	CHAPTER 6 –Process Modeling- Data Flow Diagrams DFDs
9 & 10	CHAPTER 7 –Data Modeling and Analysis- Concepts of data Modeling, Definition of Terms, Entity Relationship Diagrams; Process of Logical data Modeling; How to Construct Data Models, Entity Discovery, Context Data Model, Key-Based Data Model; Fully-Attributed Model; Normalization. Use of Visio or other tool for Data Modeling
11	Review Test 2
12-14	CHAPTER 8 & 9- Systems Design Designing Human Interface. Designing Databases
15	Review Final

Assessment Criteria:

Students will be assessed in exams, quizzes, homework, laboratory assignments, projects, and through class participation. The major areas include:

- The concept of an Information System, the components of an information system, the basic types of information systems, the stakeholders involved in the development effort
- The role of a systems analyst in the development effort, the other stakeholders and their roles
- The definition and examples of simple system development processes
- The phases, purposes, participants, inputs, and outputs of a formal system development methodology
- The concept of a project, project management, the Gantt and PERT chart tools
- The various methods of Fact Finding (Data Collection)
- Employing Fact Finding techniques in class sessions, lab sessions, and student projects on Case Studies to develop system requirements
- Data Modeling, drawing ERD diagrams with a CASE or Modeling tool
- Process Modeling, drawing Data Flow Diagrams and Decomposition Diagrams using a CASE or Modeling tool

General Education Outcomes and Assessment:

Learning Outcomes	Assessment Method
SKILLS/Inquiry/Analysis Students will employ scientific reasoning and logical thinking. Students will use creativity to solve problems.	Assignments, quizzes and exams.
SKILLS/Communication: Students will communicate in diverse settings and groups, using written (both reading and writing), oral (both speaking and listening), and visual means.	Case studies, projects and PowerPoint presentation.