COMPUTER SCIENCE 255
INTRODUCTION TO BUSINESS DATA PROCESSING

I. Introduction

 A. Catalog Description

 Introduction to file organizations and techniques, and to data processing with emphasis on the design, implementation, testing, and maintenance of business data processing systems. Advanced file organization and extensive programming in the COBOL language. *Prerequisite: CSci 161*

 B. Objectives

 CSci 255 introduces the student to advanced file organizations, to file management techniques using sequential, relative, and indexed files, to the basic algorithms of business data processing, and to the software engineering process applied to the design, implementation, and maintenance of business data processing systems. The programming language COBOL is used for exercises in report writing, maintaining sequential files, using tables, and in the algorithms for sequential, indexed, and relative files. Additional exercises will explore tools (primarily entity-relationship diagrams and data flow diagrams) for system design and the use of control scripts for multi-step jobs.

 The course fits in the middle of the Computer Science/Business curriculum. It assumes experience with a programming language and prepares the student for CSci 455: Database Management Systems.

 By the end of the course, students will:
 be familiar with the problems of business data processing
 be able to program using the COBOL programming language
 understand with sequential, relative and indexed file organizations
 understand fundamental algorithms for processing files
 be able to prepare, execute and test control scripts for multi-step jobs
 be prepared for CSci 455: Database Management Systems

 C. Prerequisites

 Computer Science: CSci 161
 A grade of C- or better is required in the prerequisite course.

II. Required Topics

 A. Programming Issues

 A substantial introduction to the programming language COBOL with lectures and class exercises on the following features of structured programs in COBOL:

 1. Record structure
 2. Edited moves
 3. Calculations (with and without COMPUTE)
 4. PERFORM with variants
 5. Other control structures
 6. Tables and SEARCH verb
 7. File specification and manipulation statements for sequential, direct, and indexed file organizations.
 8. Report writing (including the COBOL report writer)
 9. Control scripts and multi-step jobs

II. Required Topics (cont.)

    B. File issues:

        1. Review of file basics, with further emphasis on hardware, file organizations, and time/space tradeoffs

        2. File organizations and access methods

        3. Sequential file processing
            a. Level break processing
            b. File merge and the COBOL MERGE verb
            c. External sorting and the COBOL SORT verb
            d. Sequential master file update

        4. Advanced file topics
            a. Indexed files, including queries involving several inverted files (navigation)
            b. Direct (relative) files--hashing, binary searching, and linked structures

    C. Software Engineering Issues

        1. Requirements specification and analysis

        2. Design
            a. System
            b. Detailed design (including structured design methods, entity-relationship diagrams, dataflow diagrams)
            c. Test plan

        3. Implementation

        4. Testing
            a. Module validation testing
            b. Intermodule compatibility testing
            c. System validation testing

        5. Program maintenance and the modification of existing programs

III. Optional topics

    A. Subroutines.

    B. Implementation of relative and indexed files: B-trees.

    C. Introduction to Data Base Management Systems (a lead-in to the next course).