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APPROVAL FORM

Rev: 5/82

Proposal Title: Operating System (MATH 150)

Sponsor(s): Robert S. ... Dept.: Math. Computer Science  
Patricia ...

Check one:  Course  Specialization  Concentration  Achievement Certificate  
 Minor Change  Major Program  
(please name: deletion or credit/title/catalog change)

Certification Program  Undergraduate  Graduate  Credit Hours

Step 1 (Department)

Approved 2/14/84  
date  
 Not Approved  
Donald R. ...  
Dept. CC Chairperson  
 Reviewed 2/14/84  
date

D. S. ...  
Chairperson, Dept.

Step 2 (Receipt)

SCC# 83-84-858  
Proposal Received 2/16/84  
date

Shirley A. O'Day  
Chairperson, SCC

Step 3 (Division CC)

Reviewed Feb 16 84  
date  
 Approved  
 Not Approved

Comments:  
Mal Moyz...  
Chairperson, Div. Curr. Comm.

Step 4 (Academic Dean)

Reviewed 2/17/84  
date

Comments:

Alan ...  
Signature, Dean of Division

Step 5 (SCC)

Open Hearing Date: 3/13/84  Approved by Senate Curriculum Committee 3/13/84 (date)

Returned to sponsor(s) for the following reasons:

Correct pg. 3 (his.)

Step 6 (Faculty Senate)

Presented to Faculty Senate (date): 4/13/84

Approved  
 Not Approved

Notification to Vice-President Academic Affairs (date): 4/13/84

Shirley A. O'Day  
Signature: SCC Chairperson

Step 7 (Vice-President for Academic Affairs)

Course received 4/25/84 (date)

Course approved Yes  No

If no, reasons are as follows:

Student credit hours 3

Faculty load hours 3

Equalized credit hours 3

Official copy and approval sheet filed 7/1/84 (date)

Signature [Signature]  
(Vice-President for Academic Affairs)

Registrar

Approved course description received \_\_\_\_\_ (date)

Hegis Taxonomy and Course Number assigned \_\_\_\_\_

Signature \_\_\_\_\_  
(Registrar) (Date)

Notification forwarded: Senate Curriculum Committee Chairperson, Department Chairperson(s),  
Academic Dean(s), Registrar, Sponsor(s)

COURSE PROPOSAL  
OPERATING SYSTEMS

1. Details

- a. Course Title: Operating Systems (Proposed number 0704.390) 3 54
- b. Sponsors: Robert Kotzen, Bahram Mohazzebi, Department of Mathematics and Computer Science
- c. Course Level: Undergraduate, primarily Junior or Senior
- d. Curricular effect: Computer Science Major elective.
- e. Prerequisite: Computer Architecture and Assembly Language Programming (0704.204) and Computer Data Structures & Algorithms (0704.322).
- f. If possible, one section of this course will be scheduled for Fall 1984, with at least one section to be offered each successive school year.
- g. There are currently 6 full-time faculty well-prepared to teach the course. Library requirements are minimal. The NJECN system and the assortment of microcomputers on campus provide an especially nice variety of equipment to work with.

2. Rationale

This course is needed to provide the Computer Science majors with an opportunity to learn about the theory and design of operating systems. It will fill an important role in the Computer Science curriculum, both making the major at Glassboro more comparable to that offered at other colleges and universities and also better preparing our graduates for careers in large computer facilities and for graduate school. The topics to be covered in this course cannot be adequately discussed in other courses and have ever increasing import in the computer field.

3. Essence

- a. The objectives of this course are as follows:

- I. The student will be able to identify and understand the functions of the operating systems of large multiuser systems and learn the Job Control Language (JCL) necessary for the execution of these functions. (We will concentrate on the Job Control Language of the IBM 3033 available to us on the NJECN network. However, we will emphasize the conceptual similarity between the IBM JCL we study and the JCL of other mainframe computers).
- II. The student will learn how a computer manages its resources to permit many users at the same time. In particular, the student will learn various strategies of main memory management, job scheduling, and peripheral device management.

- III. The student will gain an understanding of how file systems are organized and protected and how they are used by the operating system.
- IV. The student will gain some exposure to the operating systems of microcomputers, with "hands on" emphasis of one or more of the microcomputer operating systems available at Glassboro State, e.g., CP/M, TRSDOS, PCDOS, MSDOS, and UNIX.

b. Topical Outline

- I. Overview of an Operating System
  - A. Basic concepts and terminology.
  - B. The functions of an operating system.
  - C. Hierarchical operating system structure.
  - D. The "bare" machine vs. the "extended" machine.
  - E. Job Control Language.
  - F. The historical development of operating systems.
- II. I/O Programming and Interrupt Programming
  - A. Review of machine structure and assembly language.
  - B. I/O Programming and buffering.
  - C. Interrupt handling.
- III. Main Memory Management
  - A. Single contiguous allocation.
  - B. Multiprogramming.
  - C. Partitioned allocation.
  - D. Paged memory management.
  - E. Segmented memory management.
  - F. Swapping and overlays.
  - G. Future trends in memory management.
- IV. Processor Management
  - A. Job scheduling.
  - B. Process scheduling
  - C. Scheduling on multiprocessor systems.
  - D. Process synchronization and deadlocking.
- V. Device Management
  - A. Types of devices.
  - B. Channels and control units.
  - C. I/O Traffic controller and scheduler.
  - D. Virtual devices.

## VI. Information Management

- A. General model of a file system.
- B. Access control verification.
- C. Logical file system structure.
- D. Physical file system structure.
- E. Automatic and dynamic allocation of space.

## VII. Operating Systems for Microcomputers

- A. Single user systems.
- B. Multiuser systems.
- c. At the instructor's option, the course will be graded on the basis of one or more of the following: tests, homework problems, projects, and computer programs.
- d. The degree of success and effectiveness of the course may be determined and evaluated by several means, including alumni surveys, that portion of the SIR's dealing with course content, and the department's own subjective forms. Upon request, the instructor may provide written reevaluation of the course syllabus after the semester is over. Moreover, after two years, the department's Curriculum Committee intends to summarize past evaluations and recommend any needed revisions.

## 4. Consultations

The following professors have been consulted for opinions on this proposal:

Professor Guerard, Industrial Education and Technology  
 Professor Lynch, Administrative Studies  
 Professor Steven Minsker, Rutgers University and Computer Sciences Corporation

## 5. Additional Information

- a. Most likely, one of the two following texts would be used during course's initial offering:

Peterson and Silberschatz Operating Systems Concepts,  
 c. 1983 Addison-Wesley, Inc.

Madnick and Donovan Operating Systems, c. 1974  
 McGraw-Hill Book Company

- b. This course is offered at practically every college and university that has a computer program. A quick perusal of catalogs plus conversation with colleagues at other institutions turned up the following schools with an undergraduate operating systems course:

University of Pennsylvania  
 Temple University  
 MIT  
 Pennsylvania State University  
 Rutgers University (New Brunswick and Camden)

Columbia University  
 Princeton University  
 University of Delaware  
 Connecticut College

## 6. Catalog Description

### 0704.390 Operating Systems

The course would concentrate on the design and functions of the operating systems of multiuser computers. Topics would include time sharing, methods of memory allocation and protection, files, CPU scheduling, input-output management, interrupt handling, deadlocking and recovery, and design principles. One or more operating systems for small computers, such as CP/M and UNIX, will also be discussed.