

Approval Form

0702.566

Proposal Title: Design and Implementation of Operating Systems

Sponsor(s) Harold Kollmeier Dept.: Math/Computer Science Ext. 6047

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

Undergraduate Graduate Credit Hours

<p>Step 1 (Department)</p> <p><input checked="" type="checkbox"/> Approved <u>10/19/87</u> <small>Date</small></p> <p><input type="checkbox"/> Not Approved</p> <p><u>Ronald J. Zacher</u> <small>Dept. CC Chairperson</small></p> <p><input checked="" type="checkbox"/> Reviewed <u>10/21/87</u> <small>Date</small></p> <p><u>[Signature]</u> <small>Dept. Chairperson</small></p>	<p>Step 2 (Receipt)</p> <p><input type="checkbox"/> SCC# <u>87-88-27</u></p> <p>Proposal Received <u>11/18/87</u> <small>Date</small></p> <p><u>Brenda A. Bolay</u> <small>SCC Chairperson</small></p>	<p>Step 3 (School CC)</p> <p>Reviewed <u>2/15/89</u></p> <p><input checked="" type="checkbox"/> Approved <input type="checkbox"/> Not Approved</p> <p>Comments:</p> <p><u>Ronald J. Zacher</u> <small>School Curr. Comm. Chairperson</small></p>
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Step 4 (Academic Dean) **Comments:**

Recommend
 Not Recommend
 Conditionally Recommend (see comments)

Reviewed 3-16-89
Date

[Signature]
Signature, Dean of School

Step 5 (SCC)

Open Hearing 3/16/89 Approved by Senate Curriculum Committee 3/16/89
Date Date

Returned to sponsor(s) for the following reasons:
Pre-req. clarified - add to cat desc. Ok. DMS

Step 6 (Senate)

Presented to Senate 3/17/89 Approved Not Approved
Date

Notification to Vice-President for Academic Affairs 3/31/89 Brenda A. Bolay
Date Signature, SCC Chairperson

Step 6 (Senate)

Received 4/3/09
Date

Approved YES No

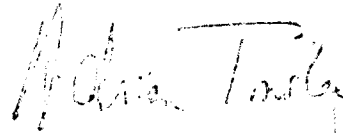
If no, reasons are as follows:

Student credit hours 3

Faculty load hours 3

Equalized credit hours 3

Official copy and approval sheet filed 4/2/09
Date



Signature, Vice-President for Academic Affairs

Registrar

Approved course description received _____
Date

Hegis Taxonomy and Course Number assigned 0702.560 Rec KNC 4/11/09

Signature, Registrar

Date

Notification forwarded:

- Senate Curriculum Committee Chairperson
- Department Chairperson(s)
- Academic Dean(s)
- Registrar
- Sponsor(s)

GLASSBORO STATE COLLEGE
Department of Mathematics and Computer Science

Course Proposal

Design and Implementation of Operating Systems

1. Details

- a. Course Title: Design and Implementation of Operating Systems
- b. Sponsor: Harold Kollmeier, Department of Mathematics and Computer Science
- c. Credit Hours: 3
- d. Course Level: Graduate
- e. Curricular Effect: M.A. in Community College Education Compute Science Teaching. Elective under Academic Specialization
- f. Prerequisites: Computer Data Structures and Algorithms (0704.322) and Computer Architecture and Assembly Language (0704.204) or equivalent
- g. Suggested time and scale of implementation: Spring, 1990, with one section per year
- h. Adequacy of resources: Three full-time faculty in the department are capable of and interested in teaching this course, and have had experience in teaching a version of it. Computer resources needed for the course are available in the department. Library resources are adequate.

2. Rationale

The operating system is at the heart of all software development and of any computer environment, and an understanding of its workings is necessary for anyone wishes to be knowledgeable in the field and who wishes to teach courses in computer science. The course will be useful for anyone teaching programming languages in the community college, and will also be helpful if those who teach in community colleges are interested in expanding their own curricula. The course is a necessary addition to the master's program, and will make the program more competitive with the programs of other institutions.

This graduate course assumes student ability and maturity to do sophisticated work in computer science. Undergraduates taking a reduced version of the course may occasionally meet with the graduate students, but the course presentation, assignments, and exams will remain graduate level in strength.

3. Essence of the Course

a. Student outcomes. Students will have a strong understanding of the issues involved in all operating systems. The course will expose students to the larger issues in software development, including resource allocation, scheduling, virtual memory, and processor management. Through individual research they will have applied this general knowledge to an investigation of a specific operating system. Thus, the course will provide them with both theoretical and practical knowledge.

b. Topical Outline.

1. Introduction

- a. Early history of operating systems
- b. The hardware/software connection
- c. Timesharing, batch processing, and microcomputers
- d. The VAX/VMS user interface
- e. Future trends, mainly parallel processing, and their impact on operating systems.

2. Processes

- a. The concept of "process"
- b. Process and state
- c. Operations on processes, including interrupts
- d. Asynchronous concurrent processing, including mutual exclusion, critical sections, and software and hardware control algorithms
- e. Concurrent programming and monitors
- f. Deadlock

3. Storage

- a. Real storage
- b. Storage allocation
- c. Virtual storage, including paging and segmentation
- d. Storage policy

4. Processor management

- a. Scheduling, including priorities and interrupts
- b. A survey of scheduling policies
- c. Multiprocessing

5. Auxiliary storage management

- a. Moving-head Disk Storage
- b. Scheduling, seek and rotational optimization
- c. Communication

6. Performance

- a. Measurement and evaluation
- b. Analytic modeling
- c. Queueing theory and Markov processes

c. Evaluation and grading procedure. There will be tests during the semester in addition to a final exam. The tests and the final will evaluate the overall comprehension of the concepts in operating systems, as well as giving them problems to solve on operating system issues. (Given a model of concurrent processing, for example, the student will be asked to evaluate it as feasible and as to whether or not it prevents deadlock.) Students will also be given homework assignments during the semester which address some of the harder problem-solving aspects of the material. Students will also be expected to do in-depth research on a specific operating system, which will culminate in a final paper and a final presentation. This project will be quite valuable, in that the concepts of operating systems learned in the course will be reinforced when applied to a fully developed operating system. In order to do this

project, students will have to analyze the documentation of an operating system, as well as doing hands-on testing of it.

d. Course evaluation. We will use student evaluations in the course. We will also allow for peer evaluation through classroom observation. Syllabus and course materials will also be available for departmental review. Formal reviews of the program in which the course is used will include evaluations of the course.

4. Consultations - Dr. Richard R. Smith, Program Coordinator of the M.A. in Community College Education

POSSIBLE TEXTS:

Harvey M. Dietel, An Introduction to Operating Systems, Addison-Wesley Publishing Company, 1984.

James L. Peterson and Abraham Silbershatz, Operating System Concepts, alternate edition, Addison-Wesley Publishing Company, 1988.

6. Catalog Description

Operating Systems

The course concentrates on the design and functions of operating systems both in multiuser environments and in microcomputers. Topics include asynchronous concurrent processes and deadlock, real and virtual storage, paging and segmentation, scheduling, multiprocessing and parallelism, auxiliary storage management, and performance. In addition to general considerations of issues relevant to all operating systems, the course will focus on one or more specific operating systems, such as UNIX, VAX/VMS, and/or CP/M.

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