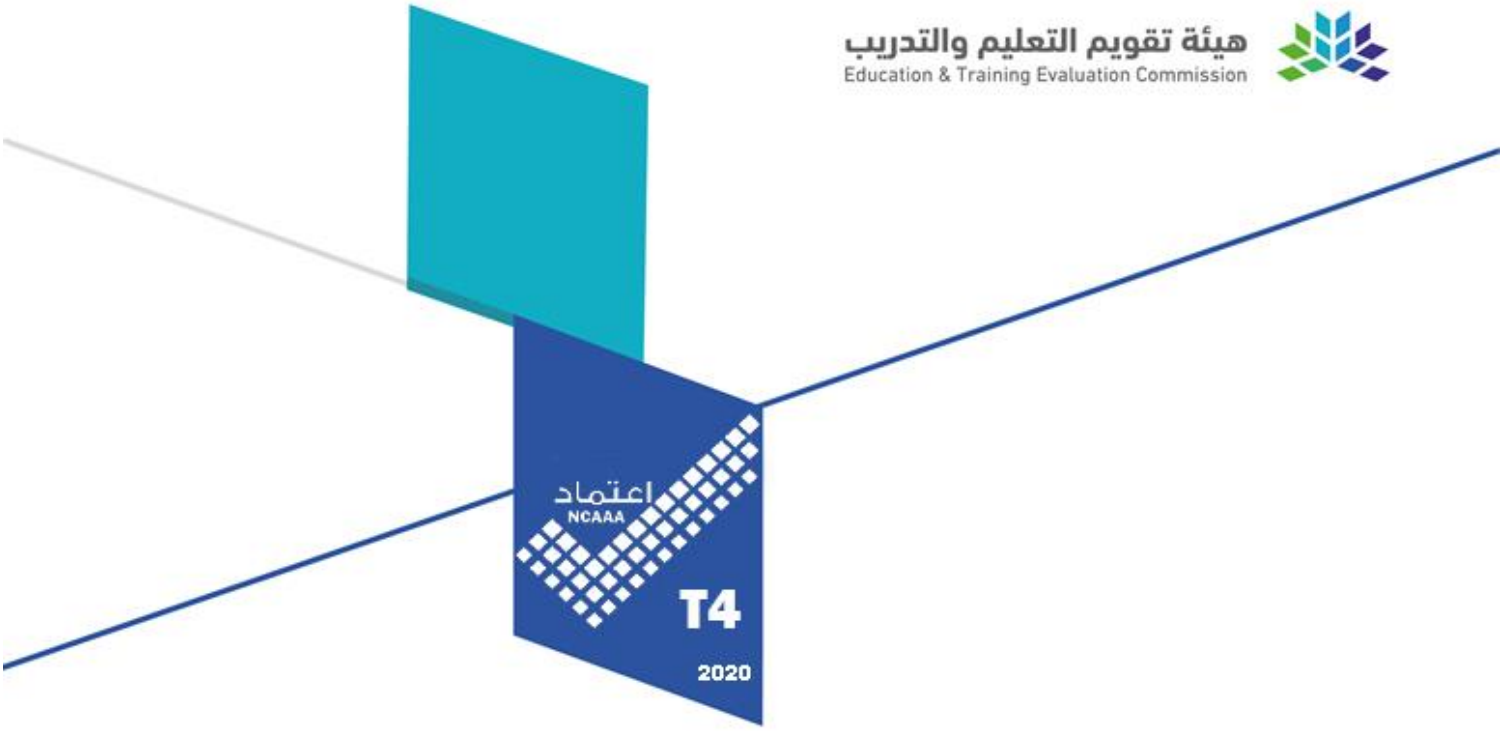
هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	**Operating Systems**
Course Code:	**332CCS-3**
Program:	**BSc in Computer Science**
Department:	**Computer Science**
College:	**Computer Science and Information Systems**
Institution:	**Najran University**

Table of Contents

A. Course Identification

1. Credit hours:	3 (2, 2, 1) [**Theory, Lab, Tutorial**]
2. Course type	
a.	University ☐ College ☑ Department ☐ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level 8/Year 3
4. Pre-requisites for this course (if any)**:**	211CCS-6
5. Co-requisites for this course (if any)**:**	N/A

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	50	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity		Contact Hours
1	**Lecture**	[2 contact hours * 10 weeks]	20
2	**Laboratory/~~Studio~~**	[2 contact hours * 10 weeks]	20
3	**Tutorial**	[1 contact hours * 10 weeks]	10
4	**Others** (specify)		
	Total		**50**

B. Course Objectives and Learning Outcomes

1. Course Description

Introduction, history and evolution of operating systems, operating system structure. Introduction to basic UNIX Commands and vi editor, process management and scheduling, inter-process communication, process coordination and synchronization, threads (overview, multithreading model and threading issues), CPU scheduling (Basic concepts and scheduling algorithms), deadlocks (deadlock characterization, methods for handling deadlock), deadlock prevention, deadlock avoidance and detection, memory management and introduction to file management.

2. Course Main Objective

Upon the successful completion of this course, students will be able to:

- Describe operating system history, services, applications and types.
- Apply UNIX commands to perform essential operations.
- Illustrate various algorithms of processes, threads, scheduling, synchronization,

deadlock, memory management and file system.

- Explain operating system support for processes, threads, scheduling, synchronization, deadlock, memory management and file systems.
- Develop programs to make use of various systems calls and implement standard problems/algorithms related to operating systems concepts.
- Evaluate the different algorithms for CPU scheduling, synchronization, and deadlock.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Describe operating system history, services, applications and types.	K_1
1.2	Illustrate various algorithms of processes, threads, scheduling, synchronization, deadlock, memory management and file system.	K_1
1.3	Explain operating system support for processes, threads, scheduling, synchronization, deadlock, and virtual memory and file systems.	K_1
1...		
2	**Skills :**	
2.1	Develop programs to make use of various systems calls and implement standard problems/algorithms related to operating systems concepts.	S_1, S_4,
2.2	Apply UNIX commands to perform essential operations.	S_4
2.3	Evaluate the different algorithms for CPU scheduling, synchronization, and deadlock.	S_2
2...		
3	**Values:**	
3.1		
3.2		
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Introduction, History and Evolution of Operating Systems, Types of Operating Systems	5
2	Operating System Structure	5
3	Introduction to UNIX commands	5
4	Process Concept	5
5	Multithreaded Programming	5
6	Process Scheduling	5
7	Process Synchronization	5
8	Deadlocks	5
9	Memory Management Strategies	5
10	Virtual Memory Management	5
11	Implementing File Systems	5
Total		**50**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	Describe operating system history, services, applications and types.	TS: 1-Interactive Lectures using PowerPoint slides and explaining the essential points in more detail with the help of whiteboard. TS: 2- Encouraging the students to use the online links to know the concepts in detail. TS: 3 – Recall the topics discussed in the last lecture by asking questions to the students. TS: 4 – Motivating students to be active during class by asking questions regularly during the lecture. TS: 5 – Associating the topics in with the course learning outcomes (CLO).	**Indirect:** - Students CLO Survey **Direct:** - Quizzes. - Assignment. - Midterm exam (Exam consists of multiple-choice questions, true/false, fill in the blanks, and theoretical questions.) - Final Exam
1.2	Illustrate various algorithms of processes, threads, scheduling, synchronization, deadlock, memory management and file system.	TS: 1-Interactive Lectures using PowerPoint slides and using the whiteboard to explain the essential points in more detail. TS:2- Engaging the students in problem-based learning through Tutorials TS: 3- Encouraging the students to use the online links to know the concepts in detail. TS: 4 – Recall the topics discussed in the last lecture by asking questions to the students. TS: 5 – Motivating students to be active during class by asking questions regularly during the lecture. TS: 6 – Associating the topics in each chapter	**Indirect:** - Students CLO Survey **Direct:** - Quizzes. - Midterm exam (Each exam consists of multiple-choice questions, true/false, fill in the blanks, and theoretical questions.) Final Exam

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		with the CLO.	
1.3	Explain operating system support for processes, threads, scheduling, synchronization, deadlock, and virtual memory and file systems.	TS: 1-Interactive Lectures using PowerPoint slides and using the whiteboard to explain the essential points in more detail. TS: 2- Giving students tutorial related to scheduling algorithms, thread, deadlock and memory management. TS: 3- Encouraging the students to use the online links to know the concepts in detail. TS: 4 – Recall the topics discussed in the last lecture by asking questions to the students. TS: 5 – Motivating students to be active during class by asking questions regularly during the lecture. TS: 6 – Associating the topics in each chapter with the CLO.	**Indirect:** - Students CLO Survey **Direct:** - Quizzes. - Midterm exam (Each exam consists of multiple-choice questions, true/false, fill in the blanks, and theoretical questions.) Final Exam
2.0	**Skills**		
2.1	Develop programs to make use of various systems calls and implement standard problems/algorithms related to operating systems concepts.	TS: 1- Lab Demonstrations TS: 2- Implementation of system calls and scheduling algorithms in the UNIX environment. TS: 3- Fixing and explaining the problems faced by the student during the lab session. TS: 4- Group Discussions	Develop programs to make use of various systems calls and implement standard problems/algorithms related to operating systems concepts.
2.2	Apply UNIX commands to perform essential operations.	TS: 1- Lab Demonstrations TS: 2- Lab experiments. TS: 3- Fixing and explaining the problems faced by the student during the lab session.	Apply UNIX commands to perform essential operations.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		TS: 4- Homework TS: 5- Group Discussions	
2.3	Evaluate the different algorithms for CPU scheduling, synchronization, and deadlock.	TS: 1-Interactive Lectures using PowerPoint slides and using the whiteboard to explain the essential points in more detail. TS: 2 – Associating the topics in each chapter with the CLO. TS: 2- Giving students tutorial related to evaluating the scheduling algorithms and deadlock. TS: 3- Group Discussion. TS: 4 – Recall the topics discussed in the last lecture by asking questions to the students. TS: 5 – Motivating students to be active during class by asking questions regularly during the lecture.	Evaluate the different algorithms for CPU scheduling, synchronization, and deadlock.
3.0	**Values**		
3.1			
3.2			
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes	3rd week	10%
2	Assignments or mini project (presentation)	5th week	10%
3	Midterm Exam	6th week	20%
6	Mid Lab Exam and Lab Project/Quiz	9th week	10%
7	Final Lab Exam	11th week	10%
8	Final Exam	12th or 13th week	40%

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

During the whole semester, 10 hours/week are reserved for students to guide them, to help them and to explain the topic which is not clear to them during the lecture.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	"Operating System Concepts", A. Silberschatz, Galvin and Gagne, 10th Edition, John Willey & Sons
Essential References Materials	"Modern Operating Systems", Andrew S. Tanenbaum., Fourth Edition, Prentice-Hall Note: Handouts will be distributed in class, when appropriate, to cover some of the course topics.
Electronic Materials	N/A
Other Learning Materials	N/A

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Lecture Rooms with 20 seats and a whiteboard or a smartboard.
Technology Resources (AV, data show, Smart Board, software, etc.)	Desktop/ Laptop computer Multimedia Projector
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	A File cabinet to keep Class Stuff, Markers, papers and students Files, and a printer to print program screenshots.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Collecting students' suggestions to facilitate more during the class.	Students	Verbal discussion
Student's questioner once during the semester about course learning outcomes.	Students	Indirect Survey
Achievement percentage of course learning outcomes, direct evaluation using CLO assessment sheet	Course Instructor	Direct evaluation using CLO achievement calculation

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Computer Science Departmental Council
Reference No.	14440203-0185-00002
Date	1st Sep, 2022