هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

Course Title: **Operating Systems**
Course Code: **IS1508**
Program: **Computer Information Systems**
Department: **Computer Information Systems**
College: **College of Computer Science & Information Technology**
Institution: **Al-Baha University**
Version: **T-104-2022**
Last Revision Date:**28/02/2023**

Table of Contents:

A. General information about the course:

Course Identification					
1. Credit hours:	3 Credit Hours (2, 2, 0) (Lecture, Lab, Tutorial) (4 Contact Hours)				
2. Course type					
a.	University ☐	College ☐	Department☒	Track☐	Others☐
b.	Required ☒	Elective☐			
3. Level/year at which this course is offered:	8th level/ 3rd Year				

4. Course general Description

Lecture:

This course is a general introduction to the design and implementation of modern operating systems. An operating system such as Windows, Linux, or Mac OS X is a fundamental part of any computing system. It is responsible for managing all the running processes as well as allowing the processes to safely share system resources such as the hard drive and network. So, the student will study the basic concepts of operating systems (OS) and will learn how it works.

This is a first course in operating system theory and design. After successfully completing this course, students understand the core concepts of operating systems, such as processes and threads, scheduling, synchronization, memory management, file systems, input and output. Device memory management.

Lab:

The lab of this course implements concepts learned in the operating system course using Linux (Ubuntu) operating system. The labs of this course provide an opportunity for students to have hands-on experience on Linux operating systems by learning, its installation, shell commands and scripting.

5. Pre-requirements for this course (if any): **CS1256 – Data Structures**

6. Co- requirements for this course (if any): None

7. Course Main Objective(s)

At the end of the course, students will be able to:

1. Understand the basic concepts underlying operating systems and how a typical operating system works.
2. Describe the functions and design of operating systems.
3. Understand the main concept behind traditional (non-distributed) operating systems.
4. Analyze and explain the Algorithms used in Virtual Memory Management.
5. Discuss the algorithms used in I/O and File Management.

1. Teaching mode(mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	20	50%
2.	E-learning		
3.	Hybrid • Traditional classroom • E-learning	20	50%
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	20
2.	Laboratory/Studio	20
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	40

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Understand the various components and functions of an operating system.	K1	Lectures Assignments	Homework Midterm Final exam
1.2	Demonstrate an understanding on the principles of operating systems	K2		
1.3	Describe memory management, including main memory and virtual memory	K3		
2.0	Skills			
2.1	Apply suitable Process Scheduling Algorithm and Memory Partition Techniques	S1	Lectures Assignments	Homework Midterm Final exam
2.2	Compare appropriate process scheduling, memory management algorithm and CPU scheduling techniques.	S2		
2.3	Implement and evaluate operating system components in Windows and Unix environments	S3		
2.4	Demonstrate hands-on expertise on Linux operating system	S4		
3.0	Values, autonomy, and responsibility			
3.1	Show leadership and willingness to cooperate fully with others in joint projects and initiatives.	V1	-Small Groups	Oral Presentation
3.2	Develop an understanding of ethical, legal, and social issues related to operating system	V2	-Small Groups	Oral Presentation

Course Content

No	List of Topics (Lecture)	Contact Hours
1	OS overview (objectives, functions, evolution of OS, characteristics of modern OS)	3
2	Process description and control (process definition, process states, process description and process control)	3
3	Threads (definition, why use thread, relationship between processes and threads)	3
5	Uni-processor scheduling (types of scheduling, short term scheduling criteria, scheduling algorithms)	3
6	Memory management (memory management requirements, loading programs into main memory -fixed partitioning, dynamic partitioning, simple paging, simple segmentation-)	3
7	Virtual memory (paging, segmentation, combined paging and segmentation)	3
8	I/O management and disk scheduling (I/O devices, organization of I/O function, I/O buffering, disk I/O)	2
Total		20

No	List of Topics (Lab)	Contact Hours
1	Linux/Ubuntu Installation and Introduction to Linux	3
2	Basic Linux shell commands	3
3	More Linux Shell Commands with Examples	2
5	Basic scrip building	2
6	Using structured commands in shell scripting	4
7	More structured commands in shell scripting	4
8	TCSH: Process system calls	2
Total		20

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1	Homework exercises and/or programming Assignments	5	20%
2	Midterm	6	15%
3	Oral Presentation and Participation	9	5%
4	Lab Exam	10	20%
5	Final Exam	12	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1.References and Learning Resources

Essential References	• Silberschatz, A., Galvin, P. B., & Gagne, G. (2022). Operating System Concepts (11th ed.). Wiley.
Supportive References	• Anderson, T., & Dahlin, M. (2014). Operating Systems: Principles and Practice (2nd ed.). Recursive Books.
Electronic Materials	1. Access to the Saudi Digital Library (SDL). https://sdl.edu.sa/SDLPortal/en/Publishers.aspx 2. Using the learning management system of the university (Rafid) https://rafid.bu.edu.sa/webapps/login/
Other Learning Materials	CDs accompanied with the textbook, PowerPoint lectures and essential references, Rafid

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• Standard classroom, size depends upon number of students registered. • Computer lab: A computer lab with enough computers for each student is essential for the module. The lab should have a reliable internet connection and sufficient power outlets.
Technology equipment (projector, smart board, software)	. Computing resources (AV, data show, Smart Board, software, etc.) Smart Board, projector, internet, and whiteboard.
Other equipment (depending on the nature of the specialty)	• Virtual machines: In addition to physical computers, it may be necessary to use virtual machines to simulate different operating systems or environments. This would require access to virtualization software such as VirtualBox or VMware. • Development tools: Depending on the focus of the course, students may need access to development tools such as compilers, debuggers, and IDEs. These could be provided through the operating system itself, or additional software may need to be installed.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	•Students •Faculty	•Surveys(indirect). •Direct feedback from students. •Course evaluation by Peer Reviewers(indirect). •Class visit by Program

Assessment Areas/Issues	Assessor	Assessment Methods
	•Peer Reviewers •Program Leader •Course Coordinator	Leader(indirect) •Comprehensive Course report(where we can find information about teaching difficulties and action plan, …)
Effectiveness of students assessment	•Students •Faculty •Peer Reviewers •Program Leader •Exam Evaluation Committee •Course Coordinator	•Surveys(indirect). •Direct feedback from students. •Course evaluation by Peer Reviewers(indirect). •Class visit by Program Leader(indirect) •Exam evaluation by the Exam Evaluation Committee (indirect)
Quality of learning resources	•Faculty •Program Leader •Course Coordinator	•Student Results(direct) •Comprehensive Course report(where we can find the CLO assessment results)
The extent to which CLOs have been achieved	•Students •Faculty •Peer Reviewers •Course Coordinator	•Surveys(indirect) •Course evaluation by Peer Reviewers(indirect). •ComprehensiveCoursereport(wherewecanfindinformationaboutdifficultiesandchallengesaboutlearningresourcesaswellas Consequences and action plan,…)
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods(Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Curriculum Committee Meeting
REFERENCE NO.	
DATE	March 23, 2023