



Course Specification

Course Name:[Operating Systems - 2]

Course Code:[CS342]

I. Basic Course Information

Major or minor element of program:[Both Major and Minor]
Department offering the course:[Computer Science Department]

Academic level:[300 Level]

Semester in which course is offered:[Second (Spring) semester]

Course pre-requisite(s): CS241 Operating Systems – 1

Credit Hours: 3

Contact Hours Through:

Lecture	Tutorial*	Practical*	Total
2.5	0.0	1.5	4.0

* 1.5 hours for **either** Tutorial or Practical

Approval date of course specification: January 2015

II. Overall Aims of Course

[This course covers the principles and the practice of advanced operating systems including: the different methods of deadlock handling and recovery, file system interface and implementation, mass storage structure, disk scheduling and management, operating system protection, distributed system structures, distributed file system, and case studies.
The rapid and the massive changes in the area of networking have created a wide spread applicability of distributed computing techniques. This has developed a number of challenges and increased the demand for more professionals in this field. Therefore, this course will provide an insight into the current state-of-the-art advanced operating systems.]

III. Program ILOs covered by course

Program Intended Learning Outcomes (By Code)			
Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
[K6,K10,K18,K19]	[I4,I8,I9,I11,I12]	[P1,P9,P11,P16]	[G2,G4,G6]



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IV. Intended Learning Outcomes of Course (ILOs)

a. Knowledge and Understanding

On completing the course, students should be able to:

- K.1 Recognize the principles and the foundations of advanced operating systems.
- K.2 Recognize the concepts of modern operating systems.
- K.3 Define a vital link between the theoretical concepts and the practical implementation of modern system design.
- K.4 Define the design principles and implementation issues of contemporary operating systems.
- K.5 Describe the principles of Windows NT, UNIX as examples to illustrate the concepts of the modern operating systems.]

b. Intellectual/Cognitive Skills

On completing the course, students should be able to:

- I.1 Analyze modern Operating system requirements and goals.
- I.2 Categorize the modern Operating system problems.
- I.3 Formulate examples and exercises that utilize advanced operating system features, including interprocess communication, synchronization, client-server communication, shared memory, threads, remote procedure calls, and device-level I/O.
- I.4 Examine the major trends in the networking of computer systems, include TCP/IP, client/server computing, and clusters.
- I.5 Describe some of the key design issues in the development of distributed Operating systems.]

c. Practical/Professional Skills

On completing the course, students should be able to:

- P.1 Design and implement an operating system kernel, using LINUX as an example.
- P.2 Develop the data structures and algorithms used in the kernel to handle interrupts, schedule processes, manage memory, access files, deal with network protocols, and perform device-level I/O.
- P.3 Construct Disk scheduling techniques using platform independent programming language.
- P.4 Develop components of an Operating system using some software packages through the implementation projects.]

d. General and Transferable Skills

On completing the course, students should be able to:

- G.1 Work in a team through collaborative projects.
- G.2 Make presentations effectively.
- G.3 Write reports.]

V. Course Matrix Contents

	Main Topics / Chapters	Duration (Weeks)	Course ILOs Covered by Topic (By ILO Code)			
			K & U	I.S.	P.S.	G.S.
1-	Deadlock Handling.]	2]	[K1,K2,K3]	[I1,I2,I4]	[P4]	[G1]
2-	File-System Interface and Implementation]	3]	[All]	[I1,I2,I3]	[P2,P3]	[G1]
3-	Mass-Storage Structure]	1]	[K1,K2,K4]	[I1,I2,I5]	[P2,P3]	[G1]



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4-	Disk Scheduling	[1]	[K1,K2,K4]	[I1,I2,I5]	[P2,P3]	[G1]
5-	Operating System Protection	[2]	[All]	[I1,I2,I4,I5]	[P2]	[G1]
6-	Distributed Operating Systems	[1]	[K1,K2,K4,K5]	[I1,I2,I4,I5]	[]	[]
7-	Distributed File Systems	[2]	[K1,K2,K4,K5]	[I1,I2,I4,I5]	[]	[]
8-	Case Studies (Windows NT, Linux, ...)	[1]	[]	[]	[P1]	[G2,G3]
	Net Teaching Weeks	13				

VI. Course Weekly Detailed Topics / hours / ILOs

Week No.	Sub-Topics	Total Hours	Contact Hours	
			Theoretical Hours	Practical Hours*
1	[The Deadlock Problem, System Model, Deadlock Characterization, Methods for Handling Deadlocks]	[2.5]	[2.5]	
2	[Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock]	[4]	[2.5]	[1.5]
3	[File System Interface I]	[4]	[2.5]	[1.5]
4	[File System Interface II]	[4]	[2.5]	[1.5]
5	[File System Implementation]	[4]	[2.5]	[1.5]
6	[Overview, Disk Structure, Disk Attachment, Disk Management, Swap-Space Management, Stable-Storage Implementation, Tertiary Storage Structure]	[4]	[2.5]	[1.5]
7	Midterm Exam			
8	[Disk Scheduling]	[4]	[2.5]	[4]
9	[Goals of Protection, Principles of Protection, Domain of Protection]	[4]	[2.5]	[4]
10	[Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights]	[4]	[2.5]	[4]
11	[Distributed Operating Systems, Motivation, Types, Design Issues]	[4]	[2.5]	[4]
12	[Distributed File Systems I: Background, Naming and Transparency, Remote File Access]	[4]	[2.5]	[4]
13	[Distributed File Systems II: Stateful versus Stateless Service, File Replication, An Example: AFS]	[4]	[2.5]	[4]
14	[Case Studies (Windows NT, Linux, ...)]	[4]	[2.5]	[4]
15	Final Exam			
Total Teaching Hours		51	33	18

* No Practical/Tutorial during the first week of the semester



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VII. Teaching and Learning Methods

Teaching/Learning Method	Selected Method	Course ILOs Covered by Method (By ILO Code)			
		K & U	Intellectual Skills	Professional Skills	General Skills
Lectures & Seminars	*	All	All		
Tutorials	*	All	All		
Computer lab Sessions	*			P1,P2,P3	
Practical lab Work	*			All	
Reading Materials	*	K1,K2,K3		P4	
Web-site Searches	*		I3,I4	P4	G3
Research & Reporting					G3
Problem Solving / Problem-based Learning	*			P1,P2,P3	G1,G2
Projects					
Independent Work					
Group Work	*			P4	G1
Case Studies					G3
Presentations					
Simulation Analysis					
Others (Specify):					

VIII. Assessment Methods, Schedule and Grade Distribution

Assessment Method	Selected Method	Course ILOs Covered by Method (By ILO Code)				Assessment Weight / Percentage	Week No.
		K & U	I.S.	P.S.	G.S.		
Midterm Exam	*					7	
Final Exam	*	All	All		60%	15	
Quizzes	*	All	All		10%		
Course Work	*			All	10%		
Report Writing							
Case Study Analysis					G3		
Oral Presentations							
Practical							
Group Project	*			P1,P2,P3	G1,G2	20%	
Individual Project							
Others (Specify):							



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IX. List of References

Essential Text Books	<ul style="list-style-type: none">• [A. Silberschatz, P. Galvin, and G. Gagne, "Operating System Concepts", John Wiley Publishing Company, Seventh Edition, 2005]
Course notes	<ul style="list-style-type: none">• [None]
Recommended books	<ul style="list-style-type: none">• [S. Tanenbaum, "Modern Operating Systems", Prentice Hall, Inc., Third Edition, 2008.• G. Coulouris, J. Dollimore, and T. Kindberg, Distributed Systems Concepts and Design, Addison-Wesley Publishing Company, Fourth Edition, 2006.• P. Hunter, Network Operating System: Making the Right Choices, Addison-Wesley Publishing Company, 1995.• G. J. Nutt, Centralized and Distributed Operating Systems, Prentice-Hall, Inc., 1992.]
Periodicals, Web sites, etc ...	<ul style="list-style-type: none">• [None]

X. Facilities required for teaching and learning

<p>List the facilities required</p> <ul style="list-style-type: none">• Data show• Internet connection• Computer's lab]
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Course coordinator:[Dr. Khadega El-Bedwehy]

Head of Department:[Prof. Abeer El Korany]

Date: January 2015