



## Course Specification

**Course Name:**[Operating Systems -1 ]

**Course Code:**[CS241]

### I. Basic Course Information

Major or minor element of program:[General]

Department offering the course:Computer Science Department

Academic level:[200 Level]

Semester in which course is offered:First (fall)Semester

Course pre-requisite(s): [File organization CS 215 ]

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:[September 2014]

### II. Overall Aims of Course

This course involves study of concepts and components of general purpose operating systems. It provides the frame of reference of how an operating system works involves an understanding of hardware structures (devices, networks, memory organisation) and software structures (scheduling, concurrency). LINUX is a general purpose operating system used as examples when studying these concepts. Laboratory assignments of process/thread synchronization, process communication, and memory management are given.

### III. Program ILOs covered by course

Program Intended Learning Outcomes (By Code)			
Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
[K1,K6 ]	[I2,I7 ]	[P1,P2,P3 ]	[G2,G4,G6,G8 ]



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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 Describe the structure of an operating system and know the major parts of an OS.
- K.2 Describe most important hardware structures upon which an OS is based.
- K.3 Differentiate between processes and threads.
- K.4 Explain the operations of memory management and virtual memory
- K.5 Demonstrate various scheduling algorithms and OS schedules tasks. ]

#### b. Intellectual/Cognitive Skills

On completing the course, students should be able to:

- I.1 Specify the design of computer systems.
- I.2 Develop scheduling algorithms and OS schedules tasks.
- I.3 Design multithreaded & concurrent programs
- I.4 Simulate memory management.
- I.5 Simulate virtual memory. ]

#### c. Practical/Professional Skills

On completing the course, students should be able to:

- P.1 Write programs that create processes and threads.
- P.2 Write multithreaded programs.
- P.3 Apply different Synchronization mechanism to solve Synchronization problems.
- P.4 Use basic Linux commands and utilities.
- P.5 Program in Linux environment.
- P.6 Assess the usage of API for S/W development. ]

#### d. General and Transferable Skills

On completing the course, students should be able to:

- G.1 Work as a part of a team to produce reports.
- G.2 Work as a part of a team to find a solution for practical problems and projects.
- G.3 Write structural reports.
- G.4 Develop oral communication skills by making report presentation.
- G.5 Appreciate the need for life-long learning of different operating systems. ]

### V. Course MatrixContents

	Main Topics / Chapters	Duration (Weeks)	Course ILOs Covered by Topic (By ILO Code)			
			K & U	I.S.	P.S.	G.S.
1-	Introduction to computer system and Structures ]	[1 ]	[K1,K2 ]	[I1 ]	[P4 ]	[ ]
2-	Operating System Structures ]	[1 ]	[ ]	[ ]	[P5 ]	[G5 ]
3-	Processes ]	[1 ]	[ ]	[ ]	[P1 ]	[G1,G2 ]
4-	Threads ]	[1 ]	[K3 ]	[I3 ]	[P1,P2 ]	[G1,G2 ]
5-	CPU Scheduling ]	[2 ]	[K5 ]	[I2 ]	[P6 ]	[G4,G5 ]
6-	Synchronization ]	[3 ]	[ ]	[ ]	[P3 ]	[G5 ]
7-	Memory Management ]	[2 ]	[K4 ]	[I4 ]	[ ]	[G3G5 ]
8-	Virtual Memory ]	[2 ]	[K4 ]	[I5 ]	[ ]	[ ]
	<b>Net Teaching Weeks</b>	<b>13</b>				



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VI. Course Weekly Detailed Topics / hours / ILOs

Week No.	Sub-Topics	Total Hours	Contact Hours	
			Theoretical Hours	Practical Hours*
1	Introduction to computer system and Structures	[2.5 ]	[2.5 ]	
2	Operating System Structures	[4 ]	[2.5 ]	[1.5 ]
3	Processes	[4 ]	[2.5 ]	[1.5 ]
4	Threads	[4 ]	[2.5 ]	[1.5 ]
5	CPU Scheduling -1	[4 ]	[2.5 ]	[1.5 ]
6	CPU Scheduling -2	[4 ]	[2.5 ]	[1.5 ]
7	<b>Midterm Exam</b>			
8	Synchronization -1	[4 ]	[2.5 ]	[1.5 ]
9	Synchronization -2	[4 ]	[2.5 ]	[1.5 ]
10	Synchronization -3	[4 ]	[2.5 ]	[1.5 ]
11	Memory Management -1	[4 ]	[2.5 ]	[1.5 ]
12	Memory Management -2	[4 ]	[2.5 ]	[1.5 ]
13	Virtual Memory -1	[4 ]	[2.5 ]	[1.5 ]
14	Virtual Memory -2	[4 ]	[2.5 ]	[1.5 ]
15	<b>Final Exam</b>			
<b>Total Teaching Hours</b>		<b>51</b>	<b>33</b>	<b>18</b>

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

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 ]	[ ]	[ ]	[ ]
Tutorials	[ ]	[ ]	[ ]	[ ]	[ ]
Computer lab Sessions	*	[ ]	[All ]	[ ]	[ ]
Practical lab Work	*	[ ]	[ ]	[All ]	[ ]
Reading Materials	[ ]	[ ]	[ ]	[ ]	[ ]
Web-site Searches	[ ]	[ ]	[ ]	[ ]	[ ]
Research & Reporting	[ ]	[ ]	[ ]	[ ]	[ ]
Problem Solving / Problem-based Learning	[ ]	[ ]	[ ]	[ ]	[ ]
Projects	[ ]	[ ]	[ ]	[ ]	[ ]
Independent Work	*	[ ]	[ ]	[All ]	[ ]
Group Work	*	[ ]	[ ]	[ ]	[G1,G2,G5 ]
Case Studies	[ ]	[ ]	[ ]	[ ]	[ ]
Presentations	*	[ ]	[ ]	[ ]	[G3,G4,G5 ]
Simulation Analysis	*	[ ]	[All ]	[P6 ]	[ ]
Others (Specify):	[ ]	[ ]	[ ]	[ ]	[ ]

VIII. Assessment Methods, Schedule and Grade Distribution



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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	[*]	[K1,K2,K3,K5]	[ ]	[ ]	[ ]	[10% ]	7
Final Exam	[*]	[All ]	[ ]	[ ]	[ ]	60%	15
Quizzes	[*]	[All ]	[ ]	[ ]	[ ]	[10% ]	[ ]
Course Work	[ ]	[ ]	[ ]	[ ]	[ ]	[5% ]	[ ]
Report Writing	[*]	[ ]	[ ]	[ ]	[G3,G5 ]	[5% ]	[ ]
Case Study Analysis	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Oral Presentations	[*]	[ ]	[ ]	[ ]	[G4,G5 ]	[2% ]	[ ]
Practical	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Group Project	[*]	[ ]	[All ]	[All ]	[G1,G2,G5]	[8% ]	[ ]
Individual Project	[ ]	[ ]	[All ]	[All ]	[ ]	[ ]	[ ]
Others (Specify):	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

IX. List of References

<b>Essential Text Books</b>	<ul style="list-style-type: none"> <li>[A. Silberschatz et. al.: Operating System Concepts (9th ed.), Addison Wesley, 2010.]</li> </ul>
<b>Course notes</b>	<ul style="list-style-type: none"> <li>[None ]</li> </ul>
<b>Recommended books</b>	<ul style="list-style-type: none"> <li>[Operating Systems: Internals and Design Principles, Fifth Edition, by William Stallings, Publisher: Prentice Hall,2005</li> <li>[Modern Operating Systems, second Edition, by Andrew S.Tanenbaum Publisher: Amazon: 2002 ]</li> </ul>
<b>Periodicals, Web sites, etc ...</b>	<ul style="list-style-type: none"> <li>[<a href="http://www.knoppix.net/">http://www.knoppix.net/</a></li> <li>[<a href="http://lowfatlinux.com/">http://lowfatlinux.com/</a></li> <li>[<a href="http://www.linux.org/lessons/beginner/toc.html">http://www.linux.org/lessons/beginner/toc.html</a></li> <li>[<a href="http://www.ee.surrey.ac.uk/Teaching/Unix/">http://www.ee.surrey.ac.uk/Teaching/Unix/</a></li> <li>[<a href="http://www.fsid.cvut.cz/cz/U201/LINUX.HTML">http://www.fsid.cvut.cz/cz/U201/LINUX.HTML</a> ]</li> </ul>

X. Facilities required for teaching and learning

[List the facilities required <ul style="list-style-type: none"> <li>• Computer Labs ]</li> </ul>
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Course coordinator:[Dr. Khaled Tawfeek]

Head of Department:[Prof. Abeer El Korany]

Date: [September 2014]