Addis Ababa Science and Technology University						
1	College: Electrical and Mechanical Engineering			Department: Software Engineering		
2	Course Name	Operating Systems				
	Course Code:	SWEG3106				
3	Synopsis:	This course is a general introduction to the design and implementation of modern operating systems. Historical development of operating systems, synchronization, scheduling, deadlocks, paging, virtual memory, input/output devices, and files will be discussed.				
4	Name(s) of Academic Staff:	Abdi Mulatu				
5	Semester and Year offered:	Semester:	II	Year:	3	
6	Credit Hour:	4				
7	Prerequisite/ Co-requisite: (if any)	SWEG3105				

8 Course Learning Outcome (CLO): At the end of the course the student will be able to do:

CLO1	**Demonstrate** structure and functionality of modern Operating Systems.
CLO2	**Use** knowledge of process management and synchronization for software development
CLO3	**Explain** memory management, I/O, mass storage and file management issues
CLO4	**Compare and Contrast** the algorithms on which the core functions of the Operating Systems are built on
CLO5	**Describe** security and protection measures used in operating systems

9 Mapping of the course Learning Outcomes to the program Learning Outcomes, Teaching Methods and Assessment:

Course Learning Outcomes (CLO)	Program Learning Outcomes (PO)												Teaching Methods				Assessment				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	L	T	P	O	Test	Quiz	Assignment	Project	Lab-report
CLO1	√												√				√	√	√		
CLO2					√								√		√		√	√	√		√
CLO3		√											√		√		√	√	√		√
CLO4		√											√		√				√		√
CLO5	√												√		√				√		

Indicate the relevancy between the CLO and PO by ticking "√"on the appropriate relevant box

10 Transferable Skills (if applicable)
(Skills learned in the course of study which can be useful and utilized in other settings)

1	Be able to convey technical information to individuals of different levels of technical understanding.
2	Acquire problem solving skills
3	

11	Distribution of Student Learning Time (SLT)								
	Course Content Outline	CLO	Teaching and Learning Activities						Total (SLT)
			Guided learning (F2F)				Guided Learning (NF2F)	Independent Learning (NF2F)	
			L	T	P	O			
	Chapter 1: Introduction to Operating Systems 1.1 What is an Operating System? 1.2 History of Operating Systems 1.3 Operating System Services 1.4 Types of Operating Systems 1.5 Operating System Structure	1	3		2		0.5	4.5	10
	Chapter 2: Processes and Threads 2.1 The Process Concept 2.2 Process States 2.3 Process Control 2.4 Threads	2	4.5	0.5	5		1	10	21
	Chapter 3: Process Synchronization 3.1 Concurrency 3.2 The Critical-Section Problem 3.3 Mutual Exclusion with Busy Waiting 3.4 Sleep and Wakeup 3.5 Semaphores 3.6 Monitors 3.7 Classic Problems of Synchronization	2	4.5	1	4.5		1	9	20
	Chapter 4: Scheduling 4.1 Basic concepts 4.2 Scheduling Criteria 4.3 Scheduling Algorithms 4.4 Algorithm Evaluation	3, 4	4	1	5		1	10	21
	Chapter 5: Deadlocks 5.1 Introduction to Deadlocks 5.2 Deadlock Characterization	2	2	0.5	3			5.5	11

	5.3 Deadlock Detection and Recovery 5.4 Deadlock Avoidance 5.5 Deadlock Prevention								
	Chapter 6: Memory Management 6.1 Basic Memory Management 6.2 Swapping 6.3 Virtual Memory 6.4 Page Replacement 6.5 Algorithms 6.6 Segmentation	3	4	1	5		0.5	9.5	20
	Chapter 7: File Systems 7.1 Files 7.2 Directories 7.3 File system Implementation	3	3	1	4		1	8	17
	Chapter 8: Input/output Management 8.1 Principles of I/O Hardware 8.2 Principles of I/O Software	3	2	0.5	2		0.5	3	8
	Chapter 9: Storage Management 9.1 Disk structure 9.2 Disk scheduling 9.3 Disk management	3	2	0.5	2		0.5	3	8
	Chapter 10: Security 10.1 The security Environment 10.2 Operating System Security 10.3 Controlling Access to Resources	5	1.5		1.5		0.5	2.5	6
	Total		30.5	6	34		6.5	65	142

	Assessment					
	Continuous Assessment		Percentage Total-50(%)	F2F	NF2F	SLT
	1	Tests	20	1.5	2	3.5
	2	Quiz	5	0.5		0.5
	3	Assignments	15		3	3
	4	Lab-report	10	1	2	3
					Total	10
	Final Exam		Percentage 50 (%)	F2F	NF2F	SLT
	Final Exam		50	3	5	8
					Grand Total SLT	160
	L = Lecture, T = Tutorial, P = Practical, O = Others, F2F = Face to Face, NF2F = Non Face to Face Note: indicates the CLO based on the CLO's numbering in item 9.					
12	Special requirements and resources to deliver the course	1	Computer Lab			
		2	Software			
13	Text book		Abraham Silberschatz, P.B. Galvin and G. Gagne, Operating Systems Concepts, 10th Edition, John Wiley &Sons, 2018			
	References	1	Andrew Tanenbaum, Modern Operating Systems, 4th Edition, Prentice-Hall, 2015			
		2	William Stallings, Operating Systems: Internals and Design Principles, 9th Edition, Prentice-Hall, 2018			