

# BACHELOR OF BUSINESS INFORMATION TECHNOLOGY

## Course Outline

### BBIT Operating Systems Concepts

**Lecturer:** Philip Neri

**Staffroom:** Shupavu

#### **Aim:**

The module aims to enable the students to:

To introduce the concepts of operating system and its underlying role and function in view of Multiprocessing and distributed environments.

#### **Course Learning Outcomes:**

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

Understand the concepts of multiprocessing and multitasking environments with the following specific problems:

Understand the basic concepts of process management which include threads, CPU scheduling, process synchronization and deadlocks.

Understand concepts of memory management such as main memory and virtual memory

Understand concepts of storage management such as, file system interface, file system implementations, mass storage structure and I/O devices

Write and simulate algorithms pertaining to process management, memory management, deadlock management and disk management.

#### **Contact Hours= 45**

#### **Prerequisite:**

#### **Content: From the course structure/description**

Overview: Introduction and operating system structures  
Process Management: Processes, Threads, multithreading models, libraries, CPU scheduling, criteria, algorithms, critical sections problems, semaphores, mutex and deadlock prevention and detection and recovery  
Memory Management: main memory architecture, swapping, paging, segmentations, virtual memory such as demand paging, page replacements, allocations of frames and trashing  
Storage Management: File concepts, allocation methods. Free space management, efficiency and performance, disk structure, disk scheduling and management, swap space management and RAID structure

<b>Week/Dates</b>	<b>Topic</b>	<b>Learning Outcomes</b>	<b>Activities</b>
<b>Week 1</b>	Introduce students to the course		Get student expectations about the course

	Course Outline and Course Overview	Enable students to have a clear overview of the course	Go through the course outline
	<b>Chapter 1: Introduction</b>	To provide an introduction to operating systems	Lectures and Class discussions Assignment on history of operating systems
<b>Week 2</b>	<b>Chapter 2: Operating-System Structures</b>	<p>To describe the services an operating system provides to users, processes, and other systems</p> <ul style="list-style-type: none"> <li>· To discuss the various ways of structuring an operating system</li> <li>· To explain how operating systems are installed and customized and how they boot</li> </ul>	Lectures and Class discussions
<b>Week 3</b>	<b>Chapter 2: Operating- System Structures...cont</b>	<ul style="list-style-type: none"> <li>· To describe the services an operating system provides to users, processes, and other systems</li> <li>· To discuss the various ways of structuring an operating system</li> <li>· To explain how operating systems are installed and customized and how they boot</li> </ul>	Lectures and Class discussions
<b>Week 4</b>	<b>Chapter 3: Processes</b>	<ul style="list-style-type: none"> <li>· To introduce the notion of a process</li> <li>· To describe the various features of processes, including scheduling, creation and termination, and communication</li> <li>· To describe</li> </ul>	Lectures and Class discussions

		communication in client-server systems	
<b>Week 5</b>	<b>CAT 1 (1hr class)</b>		
<b>Week 6</b>	<b>Chapter 4: Threads</b>	To introduce the notion of a thread To examine issues related to multithreaded programming	Lectures and Class discussions
<b>Week 7</b>	<b>Chapter 5: CPU Scheduling</b>	To introduce CPU scheduling To describe various CPU scheduling algorithms To discuss evaluation criteria for selecting a CPU-scheduling algorithm for a particular system	Lectures and Class discussions
<b>Week 8</b>	<b>Chapter 6: Process Synchronization</b>	To introduce the critical section problem, whose solutions can be used to ensure the consistency of shared data To present both software and hardware solutions of the critical-section problem To introduce the concept of an atomic transaction and describe mechanisms to ensure atomicity	Lectures and Class discussions
<b>Week 9</b>	<b>Chapter 7: Main Memory</b>	To provide a detailed description of various ways of organizing memory	Lectures and Class discussions
	<b>CAT 2 (1hr class)</b>		

		hardware To discuss various memory management techniques	
<b>Week 10</b>	<b>Chapter 8: Virtual Memory</b>	To describe the benefits of a virtual memory system To explain the concepts of demand paging, page replacement algorithms, and allocation of page frames	Lectures and Class discussions
<b>Week 11</b>	<b>Chapter 9: File-System Interface</b>	To explain the function of file systems To discuss file-system design tradeoffs, including access methods, file sharing, file locking, and directory structures	Lectures and Class discussions
<b>Week 12</b>	<b>Chapter 10: File System Implementation</b>	To describe the details of implementing local file systems and directory structures To describe the implementation of remote file systems	Lectures and Class discussions
<b>Week 13</b>	<b>CAT 3 (Group work)</b>		Students will in groups read and make presentations on The Linux system and windows xp

### **Course Delivery Methodology**

1. Lectures will be used to introduce material on the formal aspects of the unit.
2. E learning system will be used to upload notes and class slides
3. Discussions
4. Working out problems

### ***Academic Assessment***

<b><i>Type</i></b>	<b><i>Weighting (%)</i></b>
Examination	60
CATS & Assignments	40
<b>Total</b>	<b>100 %</b>

### **Course Reference Materials**

#### Books

Operating System Concepts 10th Edition. Avi Silberschatz, Peter Galvin and Greg Gagne. John Wiley and Sons. ISBN 0471694665.

Operating System Concepts with Java. Avi Silberschatz, Peter Galvin and Greg Gagne.

Journal Papers on a per topic basis

### **Course Delivery Methodology**

1. Lectures will be used to introduce material on the formal aspects of the unit.
2. E learning system will be used to upload notes and class slides
3. Discussions
4. Working out problems

### ***Academic Assessment***

<b><i>Type</i></b>	<b><i>Weighting (%)</i></b>
--------------------	-----------------------------

Examination	60
CATS & Assignments	40
<b>Total</b>	<b>100 %</b>

### **Websites**

<http://www.personal.kent.edu/~rmuhamma/OpSystems/os.htm>

### **Classes**

1. **Punctuality** is fundamental.
2. Active participation in class discussions is encouraged

### **Assignments and/or Course Work**

1. **Plagiarism** is a serious offence. If detected in any form in course work and assignments, the following will apply:
  - a. In partial or non-serious cases (such as not citing whole word-for-word quotes), half the total possible marks of the assignment are duly struck off.
  - b. In serious cases (such as whole duplication of a paper), a zero policy will apply i.e., all offending assignments will be awarded a mark of zero.

Note: The level of seriousness referred to above is at the discretion of the lecturer.

Appeals are certainly possible through the relevant channels

2. Notwithstanding the above, **collaboration** in course work is certainly encouraged as this promotes team spirit and group synergy as long provided originality is preserved.

### **Communication Channels**

- \_ E-mail
- \_ Module Leader
- \_ Elearning