

12.1.7. OPERATING SYSTEMS (100 HOURS)

12.1.7.01: INTRODUCTION

This module unit is intended to equip the trainee with knowledge, skills and attitudes to enable him/her use operating system in a computing environment.

12.1.7.02: GENERAL OBJECTIVES

By the end of the module unit the trainee should be able to:

- a) understand the principles of operating systems
- b) appreciate the functions of operating systems
- c) use operating systems in a computer environment

12.1.7.03: COURSE SUMMARY AND TIME ALLOCATION (100 HRS)

CODE	TOPIC	SUB TOPIC	HOURS	
12.1.7.1	INTRODUCTION TO OPERATING SYSTEM	<ul style="list-style-type: none">• meaning and importance of operating systems• historical development of operating systems• operating systems structure• types of operating systems• job control	10	
12.1.7.2	PROCESS MANAGEMENT	<ul style="list-style-type: none">• meaning and importance• inter-process communication• process scheduling• deadlocks• error diagnosis	16	4
12.1.7.3	MEMORY MANAGEMENT	<ul style="list-style-type: none">• meaning and importance• memory allocation techniques• virtual memory	10	10
12.1.7.4	DEVICE (I/O) MANAGEMENT	<ul style="list-style-type: none">• meaning and importance• principles of I/O hardware• principles of I/O software• disks• clocks• terminals• virtual device	18	10

CODE	TOPIC	SUB TOPIC	HOURS
12.1.7.5	FILE MANAGEMENT	<ul style="list-style-type: none"> • meaning and importance • file systems • file management techniques • file protection and security 	18 4
TOTAL			100

12.1.7.1T INTRODUCTION OPERATING SYSTEMS

THEORY

12.1.7.1.T0 Specific Objectives

By the end of this topic, the trainee should be able to:

- a) explain the meaning and importance of an operating systems
- b) define operating systems terminologies
- c) describe the historical development of operating systems
- d) describe the types of operating systems
- e) explain job control.

CONTENT

12.1.7.1.T1 Meaning and importance of operating systems

12.1.7.1.T2 Definition of the operating systems Terminology's

processes
files
system calls
shell
virtual Machines

12.1.7.1.T3 The History of Operating Systems

1st Generation Operating Systems
2nd Generation Operating Systems
3rd Generation Operating Systems
4th Generation Operating Systems
5th generation Operating Systems

12.1.7.1.T4 Description of Operating Systems Structure

monolithic system
layered system

client-server model

12.1.7.1.T5 Explanation of types of Operating System

Traditional Operating system
Multiprocessor Operating System
Distributed Operating System

12.1.7.1.T6 Explanation of Job Control

command languages
job control languages
system messages

12.1.7.2 PROCESS MANAGEMENT

THEORY

12.1.7.2.T0 Specific Objectives

By the end of this topic, the trainee should be able to:

- a) describe the process model
- b) explain inter process communication
- c) explain process scheduling
- d) explain deadlocks
- e) describe error diagnosis

CONTENT

12.1.7.2.T1 Process models

process levels
process states/models

12.1.7.2.T2 Inter process communication

race conditions
critical sections
mutual exclusion with busy waiting
sleep and wake up
semaphores
event counters
monitors
message passing
equivalent of primitives

12.1.7.2.T3 Process scheduling

- job scheduling
- process scheduling
- scheduling algorithms
 - SJF
 - FCFS
 - round – robin
 - priority scheduling
 - pre-emptive scheduling
 - multiple queues
 - evaluation of round robin in multiprogramming
 - synchronizing performance considerations

- 12.1.7.2.T4** Deadlocks
- deadlocks
 - deadlock detection and recovery
 - deadlock avoidance
 - deadlock prevention

- 12.1.7.2.T5** Description of Error Diagnosis

PRACTICE

- 12.1.7.2.T0** **Specific Objectives**

By the end of this topic, the trainee should be able to:

- a) handle inter process communication
- b) process scheduling
- c) deadlocks

CONTENT

- 12.1.7.2.T1** Handling of inter process communication

12.1.7.3T **MEMORY MANAGEMENT**

THEORY

- 12.1.7.3.T0** **Specific Objectives**

By the end of this topic, the trainee should be able to:

- a) explain the function of memory management
- b) explain memory allocation techniques
- c) explain virtual memory

CONTENT

- 12.1.7.3.T1** Memory management
- definition of memory management

functions of memory management

12.1.7.3.T2 Memory allocation technique

paging
swapping
segmentation
partitioned allocations
overlays

13.1.7.3.T3 Virtual memory

basic concepts
paging
segmentation
associative memory

PRACTICE

12.1.7.3.P0 **Specific Objectives**

By the end of this topic, the trainee should be able to:

- a) handle memory allocation techniques
- b) handle virtual memory

CONTENT

12.1.7.3.P1 Handling memory allocation

12.1.7.3.P2 Handling of virtual memory

12.1.7.4T **DEVICE I/O MANAGEMENT**

THEORY

12.1.7.4.T0 **Specific Objectives**

By the end of this topic, the trainee should be able to:

- a) explain the objectives of device (I/O) management
- b) explain the principles of I/O hardware
- c) explain the principles of I/O software
- d) explain the disks and disk operations
- e) describe the computer clocking systems
- f) explain computer terminals

CONTENT

- 12.1.7.4.T1** Objectives of device (I/O) management
character code independence
device independence
efficiency
uniform treatment of devices
- 12.1.7.4.T2** Principles of device (I/O) Hardware
I/O devices
device controllers
direct memory access
- 12.1.7.4.T3** Principles of I/O Software
Goals of I/O software
Interrupt handlers
Device drivers
Device – independent I/O software
User – specific I/O software
- 12.1.7.4.T4** Disks and disk operations
disk hardware
disk arm scheduling algorithms
error handling
track at a time caching
RAM disks
- 12.1.7.4.T5** Computer clocking system
clock hardware
clock software
- 12.1.7.4.T6** Exploration of computer terminals
terminal hardware
memory-mapped terminals
input software
output software
- 12.1.7.4.T7** Virtual devices
objectives of virtual devices

history of virtual devices
spooling
buffering
caching

PRACTICE

13.1.7.4.P0 Specific Objectives

By the end of this topic, the trainee should be able to:

- a) handle I/O hardware and software
- b) disks and disk operation
- c) computer clocking systems
- d) handle computer terminal
- e) handle virtual devices

CONTENT

13.1.7.4.T8 Handling I/O hardware and software

13.1.7.4.T9 Handling disks and disk operations

13.1.7.4.T10 Handling clock systems

13.1.7.4.T11 Handling computer terminals

13.1.7.4.T12 Handling virtual devices

13.1.7.5T FILE MANAGEMENT

THEORY

13.1.7.5.T0 Specific Objective

By the end of this topic, the trainee should be able to:

- a) explain the functions of file management
- b) explain file systems
- c) explain file management techniques
- d) explain file protection and security

CONTENT

13.1.7.5.T1 12.1.5.T1 File management
definition of file management
objectives of file management

13.1.7.5.T2 12.1.5.T2 File systems
naming
structure
types

attributes
operations

13.1.7.5.T3 File management techniques
file implementation
directory implementation
sharing
disk space management
file system management
file system reliability
file system performance
logical file system
physical file system
file allocation

13.1.7.5.T4 File protection and security
meaning and importance
access control verification
audit trail

PRACTICE

13.1.7.5.T0 **Specific Objectives**

By the end of this topic, the trainee should be able to:

- a) to be able to implement access control
- b) implement audit trail

CONTENT

13.1.7.5.T1 Implementing access control

13.1.7.5.T2 Implementing audit trail

TEACHING/LEARNING RESOURCES

Relevant text books and free e-books
Online content (www.wikipedia.com...)
Whiteboard
Linux Operating system
Ms Windows Operating system
Resource persons

ASSESSMENT MODE

Written tests

Practical tests
Orals tests
Projects

easytvvet.com