# OPERATING SYSTEMS
# DCSA 2302

## SCHOOL OF SCIENCE AND TECHNOLOGY

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# Operating Systems
## Contents

# Preface to the Revised Edition

The present edition of the book is revised. The book is organized into 14 units. The contents of the unit-5 to unit-14 have been brought up-to date. The book is written according to the up date syllabus of the Operating Systems. Texts of the Unit-4 have been written by Mohammad Shamim Hossain; the Unit-5 to Unit-9 have been written by Prof. Dr. Md. Abul Kashem and the Unit-10 to Unit-14 have been written by Prof. Dr. Md. Nasim Akhter. Windows and Unix OS has been described in unit-5 to unit-14. Exercises at the end of the lessons have been brought up-to date. Useful commands in Linux are presented in the unit-14. The introduction to Operating Systems (unit-1 to unit-4) remains unchanged for better understanding in Operating Systems. At the end of each lesson, there are exercises and hands an practices for preparation of examination.

We are grateful to our tutors and learners for their favorable appreciation of the book. Suggestions for further improvement will be highly appreciated.

**Dean**
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# Preface to the First Edition

An operating system is an integrated set of programs that directs and manages the components and resources of a computer system. The basic resources of a computer system are provided by its hardware, software and data. In order to achieve that best possible performance operating system controls and coordinators resources such as the CPU, other processing units, both primary and secondary storage and all input/output devices.

Operating system theory have reached a considerable level of maturity and stability. Operating systems designers have the foundation, the tools and the opportunity innovative system to meet the challenges of these exciting times. This book is offered as a guide to the principles and practice of operating system design. It attempts to bridge the entrenched gap between the theory and practice of operating system design by relying on a thorough theoretical foundation. It covers all the fundamental principles in detail, including processes, inter-process communication, semaphores, monitors, message passing, remote procedure call, scheduling algorithms, input/output, deadlocks, device drivers, memory management's, paging algorithms, file system design, security and protection mechanisms.

The book is organized into 9 units. The coverage is modular in the sense that certain unit or group of units are self sufficient. Each unit is divided into several lessons.

Unit 1 provides an overview of the conceptual evaluation of operating systems. Different types of operating system, such as, serial batch processing, multiprogramming, time sharing and multiprocessing, real time and virtual storage operating system, read time and virtual storage operating system have been discussed. Some common classes of operating systems functions are also stated here.

Unit 2 Illustrates the interrupt method of a computer system. Once of the important function of operating system i.e. handling I/O operations has been discussed. Four different OS structures were discussed i.e. monolithic system, client server approach, virtual machine etc.

Unit 3 introduces the concept of process. A detailed discussion about process state and control block is provided. The unit also includes scheduling concept, different types of scheduling techniques and algorithms.

Unit 4 explains the problem of deadlocks arising from concurrent execution of processes. Along with this common techniques for dealing with it are presented. A system resource allocation graph illustrates the deadlock modeling. The strategies for deadlock avoidance and recovery from deadlock are described with several algorithm.

Unit 5 explains the issues involved in the management of primary memory and presents several memory management techniques based on contiguous allocation of memory. Hardware support for static and dynamic partitioning of memory as well as segmentation is discussed.

Unit 6 describes secondary storage management. Different disk scheduling algorithms are presented here. Efficient management techniques and allocation methods of free spaces of secondary storage are also stated.

Unit 7 deals with file organization, operation, access method, protection and security.

Unit 8 discusses the structure and process in MS-DOS. The memory management techniques, file system are also discussed. Various features of Windows are stated here.

Unit 9 describes the features of UNIX. Command and system call user's are presented before the implementation of UNIX is discussed. A listing of commands are also given at the end.