

# FUNDAMENTALS OF OPERATING SYSTEM

DCA-102

## COURSE DESIGN, PREPARATION AND REVIEW TEAM

---

Prof. T.K. Jain  
Director,  
CDOE SGVU Jaipur

Dr. Ankur Jain,  
Director,  
CIQA, SGVU Jaipur

Prof. P.K. Sharama  
Rtd. Professor  
VMOU Kota

Ms. Shikha Srivastava,\*  
Assistant Professor,  
Dept. of Computer Applications, SGVU

Dr. Ajay Vardhan  
Regional Director  
IGNOU Aligarh(UP)

Dr. Kriti Shrivastav  
Assistant Professor  
CIQA SGVU Jaipur

Dr. Aman Sharma,  
Assistant Professor,  
CDOE, SGVU

Ms. Isha Sharma,  
Assistant Professor,  
Dept. of Computer Applications, SGVU

Dr. Ranjan Upadhyaya, Professor,  
Department of Management Studies,  
Vivekananda Global University, Jaipur

Ms. Sonika Katta,  
Assistant Professor,  
Dept. of Computer Applications, SGVU

Dr. Vijay Sharma, HOD, Centre for Rural  
Empowerment and Development,  
Government Engineering College, Bikaner

Mr. Satyanand Gora,  
Assistant Professor,  
Dept. of Computer Applications, SGVU

Dr. Vishal Goar  
Dean Research  
Bikaner Technical University, Bikaner .

Dr. Lata Suresh,  
Director, Indian Institute of Corporate  
Affairs, (Ministry of Corporate Affairs)  
Gurugram

---

### Program Coordinator

Dr. Anil Pal ,  
Associate Professor  
CDOE, SGVU Jaipur

---

### Course Coordinator and editor

Dr. Sohit Agarwal\*,  
Associate Professor,  
CDOE, SGVU, Jaipur

---

**Acknowledgement :** The persons marked with (\*) are the authors

---

### PRINT PRODUCTION

---

Mahendra Sharma  
Assistant Registrar  
SGVU Jaipur

---

Published in: November, 2024

---

#### ISBN (Awaited)

©SGVU. All rights reserved. No part of this work may be reproduced in any form, by mimeograph or any other means, without permission in writing from the SGVU.

---

Published by:

S. B. Prakashan Pvt. Ltd.

WZ-6, Lajwanti Garden, New Delhi: 110046 Tel.: (011) 28520627 | Ph.: 9625993408

Email: info@sbprakashan.com | Web.: www.sbprakashan.com

---

|   |            |
|---|------------|
| <b>BLOCK 1</b><br><b>INTRODUCTION TO OPERATING SYSTEMS</b>            | <b>1</b>   |
| <hr/>   |            |
| <b>BLOCK 2</b><br><b>PROCESS AND MEMORY MANAGEMENT</b>                | <b>71</b>  |
| <hr/>   |            |
| <b>BLOCK 3</b><br><b>FILE SYSTEMS AND I/O MANAGEMENT</b>              | <b>127</b> |
| <hr/>   |            |
| <b>BLOCK 4</b><br><b>OPERATING SYSTEM SECURITY AND<br/>PROTECTION</b> | <b>191</b> |
| <hr/>   |            |
| <b>BLOCK 5</b><br><b>ADVANCED OPERATING SYSTEM CONCEPTS</b>           | <b>259</b> |

---

## Learning Map

### Course Credit- 4

| Content   | Course Credit | Page No    |
|---|---------------|------------|
| <b>BLOCK 1 INTRODUCTION TO OPERATING SYSTEMS</b>            | <b>0.8</b>    | <b>1</b>   |
| Unit 1: Basic Introduction to Operating System              |               | 2          |
| Unit 2: Functions and Types of Operating Systems            |               | 24         |
| Unit 3: Evolution of Operating Systems                      |               | 45         |
| <b>BLOCK 2 PROCESS AND MEMORY MANAGEMENT</b>                | <b>0.8</b>    | <b>71</b>  |
| Unit 4: Process Concept and Scheduling                      |               | 72         |
| Unit 5: Inter-process Communication and Synchronization     |               | 92         |
| Unit 6: Memory Management Techniques (paging, segmentation) |               | 112        |
| <b>BLOCK 3 FILE SYSTEMS AND I/O MANAGEMENT</b>              | <b>0.8</b>    | <b>127</b> |
| Unit 7: File System Concepts and Structure                  |               | 128        |
| Unit 8: File Allocation Methods                             |               | 152        |
| Unit 9: I/O Management and Device Drivers                   |               | 170        |
| <b>BLOCK 4 OPERATING SYSTEM SECURITY AND PROTECTION</b>     | <b>0.8</b>    | <b>191</b> |
| Unit 10: Security Issues in Operating Systems               |               | 192        |
| Unit 11: Access Control Mechanisms                          |               | 219        |
| Unit 12: Authentication and Authorization                   |               | 244        |
| <b>BLOCK 5 ADVANCED OPERATING SYSTEM CONCEPTS</b>           | <b>0.8</b>    | <b>259</b> |
| Unit 13: Distributed Operating Systems                      |               | 260        |
| Unit 14: Virtual Machines and Cloud Computing               |               | 285        |
| Unit 15: Case Study: UNIX and Windows Operating Systems     |               | 316        |