<table>
<tr><td>1.</td><td>Name of Course</td><td colspan="6">Operating System</td></tr>
<tr><td>2.</td><td>Course Code</td><td colspan="6">CCPS2573</td></tr>
<tr><td>3.</td><td>Name(s) of academic staff</td><td colspan="6"></td></tr>
<tr><td>4.</td><td>Rationale for the inclusion of the course/module in the programme</td><td colspan="6">Faculty
The operating system is a central component in any general-purpose computer system. Understanding and optimising operating system performance is an essential requirement for computing students. Software developers, system support administrators, network and database administrators all require a good understanding of operating system concepts in order to function effectively and economically.
By taking this module students will have an understanding of factors that need to be considered in selecting, deploying, configuring, optimising and securing an operating system.</td></tr>
<tr><td>5.</td><td>Semester and Year offered</td><td colspan="6">2/2</td></tr>
<tr><td rowspan="3">6.</td><td rowspan="3">Total Student Learning Time (SLT)</td><td colspan="4">Face to Face</td><td colspan="2" rowspan="3">Total Guided and Independent Learning</td></tr>
<tr><td rowspan="2">L = Lecture
T = Tutorial
P = Practical
O= Others</td><td>L</td><td>T</td><td>P</td><td>O</td></tr>
<tr><td>28</td><td>14</td><td></td><td></td><td colspan="2">Independent = 84
Total =126</td></tr>
<tr><td>7.</td><td>Credit Value</td><td colspan="6">3</td></tr>
<tr><td>8.</td><td>Prerequisite (if any</td><td colspan="6">CCP0102 /Computer Architecture</td></tr>
<tr><td>9.</td><td colspan="7">Objectives: This subject is designed to introduce students to:
• The main components of a typical operating system and the services
• Processes, inter-process communication, concurrent programming, scheduling, memory management, file systems, and introduction to protection and security in general.
• The concept and structure of operating systems.
• Contemporary system software.
• The security mechanisms of operating system.</td></tr>
<tr><td>10.</td><td colspan="7">Learning outcomes:
By the end of the subject, students should be able to:
• demonstrate an understanding of the design of operating system
• Explain the functions of contemporary operating systems;
• Explain about the functionalities of the various components of an operating system.
• Design a suitable and effective security policy.</td></tr>
<tr><td>11.</td><td colspan="7">Transferable Skills:
• Familiarity with contemporary system software.
• Evaluate operating system platforms and systems software.</td></tr>
</table>

12. **Teaching-learning and assessment strategy**

A variety of teaching and learning strategies are used throughout the course, including:

- Classroom lessons. Lectures and Power Point presentations
- Tutorial sessions: Practice exercises
- brainstorming;
- student-Lecturer discussion
- collaborative and co-operative learning;
- Independent study.

Assessment strategies include the following:

- Ongoing quizzes
- Midterm tests
- Performance Assessment (mini-project, Assigned exercises, Presentation and final project)
- Lecturer Observation

13. **Synopsis:**

The aim of this Subject is to provide students with a solid background in the principles that underlie the design and function of modern operating systems with reference to some currently available operating systems. The Subject deals with the important aspects of a computer operating system, including processes, scheduling algorithms, and memory management. Concepts such as deadlocks, memory management, and file management are detailed

14. **Mode of Delivery:**

- Classroom lessons. Lectures and Power Point presentations
- Laboratory sessions: Practice exercises

15. **Assessment Methods and Types:**

The assessment for this course will be based on the following:

Coursework **50%**

- Quizzes 10%
- Project and assignments 20%
- Mid-Semester Exam 20%

Final Examination **50%**

100%

16. **Mapping of the course/module to the Programme Aims**

A1	A2	A3	A4	A5	A6	A7	A8	A9
3	1	0	1	1	1	2	1	0

17. **Mapping of the course/module to the Programme Learning Outcomes**

LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12
3	2	0	0	2	1	1	1	0	0	1	0

18.	Content outline of the course/module and the SLT per topic					
		Details	SLT			
			L	T	Indep.	Total
	Topic 1	**INTRODUCTION** • Historical Development of Operating Systems • Program loading and Bootstrapping • Single stream batch processing • Multiprogramming • Spooling • Process, Memory, File and I/O Management • Real-time Systems • Virtual machines	2	1	6	9
	Topic 2	**Contemporary Operating Systems** • Comparison of Linux and Microsoft's Windows • Operating system command language • Batch files • POSIX standard • APIs • System Calls • Monolithic and Microkernel designs	2	1	6	9
	Topic 3	**STRUCTURES** • I/O Structure. • Storage Structure • Hardware Protection and General Systems. • System Components, Operating – Systems Services. • System Call, System Programs, Systems Structure. • Virtual Machines, System Design and Implementation and System Generation.	4	2	12	18
	Topic 4	**PROCESSES** • Process Concept, Process Scheduling, • Operation on a Process, Cooperating Processes. • Threads and Inter-process Communication	2	1	6	9
	Topic 5	**CPU SCHEDULING** • Basic Concepts, Scheduling Criteria. • Scheduling Algorithms, Multiple–Processor Scheduling. • Real–Time Scheduling and Algorithm. • Evaluation	4	2	12	18
	Topic 7	**DEADLOCKS** • System Model, Deadlock Characterization, • Methods for Handling Deadlocks . • Prevention, Avoidance, Detection, Recovery and the Combined Approach. • Prevention, Avoidance, Detection, Recovery and the Combined Approach.	4	2	12	18

	Topic 9	**MEMORY MANAGEMENT** • Address Space, Swapping , Contiguous allocation, • Paging, segmentation and Paged Segmentation. • Paging, segmentation and Paged Segmentation. • Demand Paging, Page Replacement, Page replacement Algorithms **VIRTUAL MEMORY** • Frame Allocation and Thrashing	4	2	12	18
	Topic 10	**FILE SYSTEMS** • Free Space Management, Directory. • Implementation, efficiency and Performance and Recovery.	2	1	6	9
	Topic 11	**Security Issues** • Directory and File Permissions • Disaster Prevention • Data Compression **Network and distributed operating systems** • Advantages of distributed systems over centralized systems • File servers and workstations • Client/Server configurations	4	2	12	18
		Total	**28**	14	84	126

19. **Main references supporting the course:**

1. Abraham Silberschatz, Greg Gagne, and Peter Baer Galvin, **Operating System Concept**s 8th Edition Binder Ready Version (2008)
2. Richard Schlesinger and Jose Garrido, **Principles of Modern Operating Systems** (2007)

Additional references supporting the course:

1. William Stallings**," *Operating systems*"**'5th Edition, Prentice Hall, 2005.
2. Andrew S. Tanenbaum, **Modern Operating Systems** (3rd Edition) (GOAL Series) by (2007)

20. **Other additional information**

All materials will be available to the students online.