SUBJECT DESCRIPTION FORM

Subject Title: Operating Systems
Subject Code: COMP 304

Number of Credits: 3
Hours Assigned: Lecture 35 hours
               Tutorial/Lab 21 hours

Pre-requisite: COMP 201
Co-requisite: Nil
Exclusion: Nil

Objectives:
This subject provides students knowledge on:
• resource management provided by operating systems;
• concepts and theories of operating systems;
• implementation issues of operating systems.

Student Learning Outcomes:
After taking this subject, the students should be able to:
Professional/academic knowledge and skills
(1) identify the services provided by operating systems;
(2) understand the internal structure of an operating system and be able to write programs using
   system calls;
(3) understand and solve problems involving process control, mutual exclusion, deadlock and
   synchronization.

Attributes for all-roundedness
(4) develop skills in problem solving using systematic approaches;
(5) solve complex problems in groups and develop group work.

Alignment of Programme Outcomes:
Programme Outcome 1: This subject contributes to having students practice their writing skills
with project document and report writing.
Programme Outcome 4: This subject contributes to developing student critical thinking through
tutorial and lab exercises on solving problems. They will also practice more in written
assignments, programming exercises, and project.
Programme Outcome 5: This subject contributes to problem solving with programming skills
through lab exercise and project with proper design and implementation.
Programme Outcome 7: This subject contributes to team work with group-based project for
students to practice team spirit.

Syllabus:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration of Lectures</th>
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<tbody>
<tr>
<td>1. Introduction to operating systems</td>
<td>2.5</td>
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<tr>
<td>Types and functionalities of operating systems; system components and services; resource management.</td>
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</tbody>
</table>
2. **Unix and Linux**  
   Usage of Unix and Linux; shell and commands; scripts; system calls.  
   5

3. **Process management**  
   Process concepts; process manipulation; asynchronous concurrent processes; mutual exclusion; synchronization; deadlock; scheduling algorithms.  
   12.5

4. **Memory and secondary storage management**  
   Virtual memory; paging and segmentation system; secondary storage allocation; directory and file system structure.  
   10

5. **Protection and security**  
   Protection and access control; capabilities; security and cryptography.  
   2.5

6. **Case studies on operating systems**  
   Structure of Unix, Windows NT, etc.  
   2.5

| Total | 35 |

Laboratory Experiment:  
Unix environment, shell scripts, system calls.

Case Study:  
Contemporary OS like Unix, Linux, Windows.

Method of Assessment for Learning Outcomes:

<table>
<thead>
<tr>
<th>Assessment method / task</th>
<th>% weighting</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>Assignments</td>
<td>55</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Lab exercises</td>
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<tr>
<td>Examination</td>
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Textbooks:  

Reference Books:  