UNIVERSITY OF SWAZILAND

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

SUPPLEMENTARY EXAMINATION, *JULY 2015*

Title of Paper	:	**Operating Systems**
Course Number	:	**CS 442**
Time Allowed	:	**Three (3) Hours**
Instruction	:	**Answer any FIVE questions**

This exam paper should not be opened until permission has been granted by the invigilator.

1.
   a)   Differentiate between multiprogramming and multiprocessing   **[6]**

   b)   What is the relationship between threads and processes?   **[8]**

   c)   What are the advantages of threading processes?   **[6]**

2.
   a)   Fully discuss the different process states including the suspend states.   **[12]**

   b)   Describe the different possible operations on a process.   **[8]**

3.
   a)   Describe the sequence of steps that take place during a context switch.   **[12]**

   b)   What does the kernel do during a context switch (interrupt handling)?   **[8]**

4.
   a)   Give an example of a deadlock in a business setting.   **[5]**

   b)   Spooling can result in a deadlock if not managed well. Describe two ways in which you could minimize deadlocks in a spooling system paying attention to the advantages and disadvantages of each solution.   **[7]**

   c)   Discuss the necessary conditions for a deadlock.   **[8]**

5.   Describe how a multi-threaded application can be supported by a *user-level threads package*. It may be helpful to consider (and draw) the components of such a package, and the function they perform..   **[20]**

6.   Discuss any four of the page replacement algorithms.   **[20]**