Course Outline

Systems Programming
SIT 333

First Semester 2017/2018 Academic Year
By
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Cyber and Information Security

Duration : 12 weeks
Lectures : 3 hours a week = 36 hours
Assignments/Laboratory/Base Group Work: 24 hours
Total = 60 hours

Evaluation

Laboratory = 40%
Attendance = 10%
Exams = 50%

Total = 100

Course Website: http://cuib-cameroon.org/ocr/
Lecture Meeting Times (BK1): Tuesday 1:30pm-3:00pm; **(BK2):** Wednesday 7:30am-9:00am
Laboratory Session: Wednesday 1:30pm-2:30pm
Office Hours (SIT Office): Wednesday 10:45-11:45am

Tentative Schedule for laboratory tasks

	Deadline
First laboratory tasks	27th October 2016
Second laboratory tasks	24th November 2016
Third laboratory tasks	12th January 2016
Forth laboratory tasks	26th January 2017

COURSE OBJECTIVES

This course introduces student to systems programming. Students are expected to have basic understanding of computer architecture and programming to better understand how their software makes judicious use of the hardware components. The course is divided into two parts: the theoretical section, which is characterized by a series of lectures; and the practical section which consists of four laboratory sessions.

The first chapter of the course addresses the basic understanding of programming for interacting with Input/Output subsystems. Chapter two explores device drivers as the primary interface between hardware and software. Processes and threads are at the core of the course since they are very pivotal to systems programming. The theoretical section of the course ends with computer network programming. The laboratory sessions are designed to give students a guided hands-on experience of writing systems software and to deepen their overall mastery of computer programming.

The use of an Integrated Development Environment (IDE) is paramount for this course. Students are expected to seize the opportunity and deepen their mastery of a particular IDE. For this course, the Eclipse IDE shall be used with Java.

CHAPTER 1: Input / Output Programming

1. The Concept of Interrupts
2. Keyboard
3. Mouse Events
4. Output Display Modes
5. Audio Output
6. File Handling

Week 1– Week 3

CHAPTER 2: Device Drivers

1. Types of Device Drivers
2. Interfacing Device Drivers with Kernel
3. Working with Dynamic Link Libraries
4. Java Native Interface (JNI) and Application Programming Interface (API)

Week 4 - Week 6

CHAPTER 3: Processes and Thread

1 The Concept of processes
1. Interprocess Communication
2. Multi-threading in Java
3. Introduction to Concurrent Programming.

Week7–Week 9

CHAPTER 4: Network Programming

1 The 7 layers of the OSI model
1. Sockets
2. Concepts in Client – Server
3. TCP/IP programming

Week 10 – Week 11

CHAPTER 5: Laboratory Sessions

1. Review of Java Programming Skills
2. Working with DLLs, API and JNI
3. Network Programming
4. Client-Server Programming

Recommended Textbooks

- Patrick Naughton and Herbert Schildt; (1999) Java 2: The Complete Reference ; ISBN: 0072119764
- The Linux Kernel. By David A Rusling; http://www.tldp.org/LDP/tlk accessed 10th January 2015
- Prabha.D Interprocess Communication(IPC) Programs in C in Ubuntu Linux http://developeriq.in/articles/2012/may/30/interprocess-communicationipc-programs-in-c-in-ubu/ accessed 10th January 2015
- Jan Graba (2013); An Introduction to Network Programming with Java; ISBN 978-1-4471-5253-8; DOI 10.1007/978-1-4471-5254-5; Springer
- Java tutorials http://www.tutorialspoint.com/java/java_networking.htm accessed 10th January 2015.