

**King Saud University**  
**College of Computer and Information Sciences**  
**Department of Computer Science**  
**CSC 320 –Systems Programming (3-0-1) - Elective Course**

**Instructor:** Dr. Safwan Qasem ([sqasem@ksu.edu.sa](mailto:sqasem@ksu.edu.sa))

**Web site:** <https://fac.ksu.edu.sa/sqasem>

**Office hours:** Check the Blackboard

**Semester:** Fall 2018-19

**Course description:**

The course aims to give the students an understanding of the practical utilization and power of all the notions introduced in the Operating Systems course using an open source OS: Linux.

The course will focus on the programming interface of a Linux/Unix system, starting by an introduction to shell programming, before moving to using OS functionalities in programming through the system call interface and many of the functions provided in the standard C library. Topics covered include an overview of the basic Unix programming concepts, an introduction to shell programming, unbuffered I/O, the standard I/O library, the environment of a Unix process, process control, signals, and inter-process communication.

**Prerequisite:** Operating Systems (CSC 227)

**Prerequisite to:** None.

**Co-requisite to:** None.

**Textbook:**

Advanced programming in the UNIX environment, Last Edition, by W. Richard Stevens, Stephen A. Rago. Addison Wesley  
Learning the bash Shell, Unix Shell Programming, 3rd Edition, By Cameron Newham, Publisher: O'Reilly Media, 2009.

Other material: [Bash Programming Introduction: HOWTO](#)

**Course Learning Outcomes:**

After completing this course successfully, student should have the following capabilities:

1. The students will be able to understand the internal operation of a Unix system including command language interpreters.
  2. The students will be able to use the programming interface to a Unix system by writing and explaining C programs, using system calls and shell scripts.
  3. The students will be able to design and write short system utilities.
  4. The students will be able to identify the central role of concurrency in systems programming and produce programs which generate, link, and control multiple processes.
  5. The students will be able to write a more sophisticated programs by making an efficient use of the OS services and reusing the existing system utilities.
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**Topics:**

1. Unix/Linux OS Overview (1 lecture)
2. Shell Programming (2 weeks)
3. Buffered / Un-buffered File I/O (2 weeks)
4. Properties of files and directories (2 weeks)
5. Standard I/O Library (2 weeks)
6. Process Control (2 weeks)
7. Signals (2 weeks)
8. Interprocess Communication (2 weeks)

**Schedule:**

14 weeks of three 50-minute lectures/week and one 50-minute tutorial per week.

**Evaluation:**

Midterm exam	20%
Final exam	40%
Group programming project	15%
Lab assignments	15%
Quizzes	10%

**Exam Date**

Mid-1: TBD

Mid-2: TBD

Final: 24 Dec. 2018, 1:00 PM to 16:00 PM (1440-04-17)

**Notes for email communication**

Your email header must start with \*CSC227\*

Send your email to sqasem@KSU.edu.sa email address.

Please write your name and your ID at the end of the email

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