

**Kishwaukee College Syllabus**  
**CIS 270 - 5001**  
**Fundamentals of Linux Administration**  
**3 Credit Hours, Spring 2016**

**I. Course Description**

This course is intended for students who want to understand how a multi-user Linux server is administered. Topics include: user/group management, filesystem management, printer setup, mail setup, simple networking, web server configuration, various network daemon issues, Linux installation and booting, and a general overview of UNIX security issues. Successful completion of CIS 170 and 270 prepares the student to take the CompTIA Linux+ exam. Three hours lecture/discussion a week.

Prerequisite: CIS 170.

**II. Meeting Time and Place**

Lecture/Lab:	A-1373	
Time:	6:00 P.M. - 8:45 P.M.	Monday
Dates:	1/25/16 - 5/20/16	
MLK observance:	1/18/16	School closed
Spring break:	3/14/16 - 3/20/16	School closed
Good Friday:	3/25/16	School closed
Faculty development:	4/15/16	No classes
Midterm exam:	3/21/16	during class
Final exam:	5/16/16	6:00 P.M. - 7:50 P.M.

**III. Instructor Information**

Instructor:	David G. Klick
Office:	A-1342
Email:	David.Klick@kishwaukeecollege.edu
Phone:	815/825-2086 x 2320
Website:	<a href="http://kermit.kishwaukeecollege.edu/~dklick/">kermit.kishwaukeecollege.edu/~dklick/</a>
Backup website:	<a href="http://klickfamily.com/david/school/">klickfamily.com/david/school/</a>
Desire2Learn:	<a href="https://kish.desire2learn.com/">https://kish.desire2learn.com/</a>
Dept. Secretary:	815/825-2086 x2030 (Shelley Lawson)
Office hours:	M 1:45 P.M. - 2:45 P.M., 5:00 P.M. - 6:00 P.M. T 12:30 P.M. - 1:45 P.M., 5:00 P.M. - 6:00 P.M. W 1:45 P.M. - 2:45 P.M. R 10:45 A.M. - 11:15 A.M. other times by appointment

**IV. Expected Learner Outcomes**

Upon completion of this course, the student will be able to:

- A. install a Linux distribution
- B. add users and groups to a Linux install
- C. set up permissions for group collaboration on a Linux machine
- D. install and use a network daemon (http and/or samba)

- E. use Linux to access a printer
- F. use Linux to access e-mail on the Internet
- G. install, configure, and use a web server
- H. compile a Linux kernel

#### V. Required Text and Materials

- A. Soyinka, W. (2012). *Linux: Administration: A Beginner's Guide, 6th edition*. New York, New York: The McGraw-Hill Companies. [ISBN-10: 0-07-176758-4, ISBN-13: 978-0-07-176758-3]  
*The 7th edition is even better, but came out too late to order for this class.*
- B. Internet access

#### VI. Breakdown of Course Requirements

10 written assignments @ 25 points each	250 points
10 labs @ 25 points each	250 points
1 midterm exam @ 100 points	100 points
1 final exam @ 100 points	100 points
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Total	700 points

#### VII. Final Grade Determination

A = 90 - 100%	630 points or more
B = 80 - 89.9%	560 - 629 points
C = 70 - 79.9%	490 - 559 points
D = 60 - 69.9%	420 - 489 points
F = below 60%	less than 420 points

Grade reports will not be mailed out. Please check KishSOS, My Student Info, under Academic Profile, Grades, for grade reports.

#### VIII. Course Procedures

- A. Students are expected to attend class sessions on time and prepared (Note: CIS 123 class sessions are optional attendance). Students should bring whatever they need to take notes to every class.
- B. Students are expected to spend **time outside of class** completing assignments.
- C. Food and beverages are not permitted in the classrooms or labs. See a more detailed policy at <http://kermit.kishwaukeecollege.edu/~dklick/foodDrinkPolicy.html>
- D. A familiarity with computers and the Windows operating system is expected.
- E. Depending on the assignment, both digital and hardcopy versions of assignments may be required for submission. The procedure for submitting digital copies of assignments will be explained in class. Make sure you always keep a copy of all of your assignments. The instructor is NOT responsible for network failures, server failures, or student mistakes.
- F. The instructor answers many questions via email. Due to the high volume of requests, submissions, and questions received via email, the instructor must prioritize responses. Most questions will be answered (or at least acknowledged) within 48 hours. If you do not get a response when you expect one, please keep in mind that your email may have failed to reach the instructor, or may have automatically been rejected by an email client or server. Please try to contact the instructor again and possibly use the phone or an in-person visit if email is failing.

## **IX. Make-up Policy**

- A. Assignments are to be turned in on time. Assignments which are not turned in on time will not be accepted unless individual arrangements are made **in advance** with the instructor. In unusual cases where late assignments are accepted, the cost of being late is ten percent of the total possible points for every portion of a day late, up to a maximum of three days late. For example, an assignment received twenty-five hours past its due date will lose twenty percent of its total possible point value (because it is two days late). Assignments which are received more than three days (seventy-two hours) late will not be accepted and are not worth any points. Exceptions may be made to this rule if the student contacts the instructor before the due date and makes special arrangements **in advance** with the instructor. All late acceptance decisions of this nature are left solely to the discretion of the instructor. This rule does not apply once answers to an assignment have been distributed or posted. Assignments submitted after answers have been released are worth zero points even if the answers are posted one minute past the due date.
- B. Answers to assignments may be posted online, handed out in class, or sent via email by the instructor. Once an answer to an assignment has been released, no further submissions for the assignment will be allowed. This rule supersedes all other rules about when late assignments may be accepted. In general, the instructor will try to wait at least forty-eight hours before posting or distributing solutions, but there is no guarantee, so get your assignments in on time.
- C. Tests are to be taken at the day and time scheduled. Failure to take a test at the scheduled time may result in a grade of 0 for that test. In the case of an excusable absence or a genuine emergency, the instructor must be contacted as soon as possible, preferably before the scheduled test, to reschedule the makeup of that test in the Learning Skills Center on the day the student returns to campus.

## **X. Attendance Policy**

Class attendance is strongly encouraged. You are responsible for whatever was covered in class, whether you are there or not. If you must miss a class, it is your responsibility to contact the instructor and make arrangements for notes, handouts, or announcements that were missed. Although attendance is not counted toward the final grade, there may be coursework which is done during class time which may count toward the final grade and may not be able to be taken outside of class time.

## **XI. Class Withdrawal**

A "W" cannot be given as a final grade. The student is responsible for officially withdrawing from the class according to procedures described in the college catalog. Any student that does not officially withdraw from the class will receive a letter grade. The last date for withdrawal for this course can be found at "My Class Schedule" on KishSOS. Kishwaukee College reserves the right to administratively withdraw at midterm those students who are not actively pursuing course objectives or who are in violation of standards of behavior as outlined in the Student Code of Conduct and Discipline. For a copy of the student conduct policy, contact the Vice President of Student Services Office or refer to the Kishwaukee College catalog.

## **XII. Incomplete Grade**

All course requirements must be completed by the end date for the course. In the event that extremely difficult circumstances merit granting a student more time to finish course requirements, an "Incomplete" (I) grade may be given. Taking an Incomplete is possible only at the instructor's discretion. To receive an Incomplete, a contract between the student and the instructor must be completed and approved regarding the completion of all remaining work within a strictly defined period of time. If the

conditions of the contract are not met, an "I" grade may revert to an "F".

### **XIII. Class Cancellations**

Class cancellations due to inclement weather will be announced on local radio stations or posted on the College web site: [www.kishwaukeecollege.edu](http://www.kishwaukeecollege.edu). Students may also call the College at (815) 825-2086. Class cancellations due to instructor absence will be posted on the classroom door and posted at [www.kishwaukeecollege.edu/class\\_cancellations/](http://www.kishwaukeecollege.edu/class_cancellations/). Room changes will be announced in advance whenever possible and posted on the classroom door.

*Note: Although the text in this section is required by Kishwaukee College, the link to class cancellations no longer works.*

### **XIV. Academic Dishonesty**

In order to evaluate student work, faculty must be able to trust that the work is original with a student and not the work of someone else. Cheating, falsifying information, forgery, plagiarism, and other dishonest actions will not be tolerated. Sanctions for academic dishonesty are at the discretion of the instructor and subject to appeal as provided in the Student Code of Conduct and Discipline. A complete explanation of the policy and procedures surrounding academic dishonesty are outlined in the Kishwaukee College Catalog.

### **XV. Copyright**

As a Kishwaukee College Student, you may have copyrighted materials or software made available to you by the college for course use. Please understand that copyright law may prohibit copying these materials. Violation of copyright laws can lead to prosecution for a criminal offense. You are required to abide by the specific copyright and licensing agreements that apply to each particular piece of software.

### **XVI. Recording of Classes/Presentations**

Kishwaukee College prohibits students from electronically recording class lectures and presentations (either by audio, video, picture, or otherwise) unless certain qualifying conditions are met. For more information about this College procedure and the qualifying conditions, please visit: [www.kishwaukeecollege.edu/go/recordingclasses](http://www.kishwaukeecollege.edu/go/recordingclasses).

*Note: Although the text in this section is required by Kishwaukee College, the link to the recording policy no longer works.*

### **XVII. Graduation Requirements for Transfer Degree Students**

All students intending to graduate with an A.A., A.S, A.E.S., or A.F.A. are required to submit a Degree Portfolio. The Degree Portfolio is a way for the institution to measure its effectiveness in preparing students for successful completion of a degree at the transferring institution. Save your college-level work throughout your academic career in order to facilitate the portfolio compilation. Also, submit a completed application for graduation from the college the semester that you plan on graduating prior to submitting the complete Degree Portfolio. Guidelines and the specific requirements (along with the rubrics used for assessment) for the Degree Portfolio can be found at [www.kishwaukeecollege.edu/portfolio/](http://www.kishwaukeecollege.edu/portfolio/).

*Note: Although the text in this section is required by Kishwaukee College, the link to the portfolio information no longer works. That information is available through the password protected (it must be important to protect it from the public) school portal.*

### **XVIII. Assistive Resources Center/Disability Services**

Any student having a documented disability or special learning need and wanting to request accommodations, should contact the Coordinator in A-1317 or at (815) 825-2086 Ext 3960, (815) 825-9106 (TTY), or send an email to [awilson@kishwaukeecollege.edu](mailto:awilson@kishwaukeecollege.edu). The student's disability must impact their ability to participate in the educational environment and be documented by an appropriate

professional prior to accommodations being approved.

#### XIX. Learning Skills Center (A-1300)

Students must present their Kishwaukee College student ID when using any Learning Skills Center services. For more information on the Learning Skills Center go to [www.kishwaukeecollege.edu/go/lsc/](http://www.kishwaukeecollege.edu/go/lsc/). Tutoring is available to all Kishwaukee students free of charge. The Writing Center (Learning Skills Center, A-1306) answers your writing-related questions regardless of the class or assignment. Students are expected to bring all material related to the assignment, including textbooks, paper prompts, etc. Make-up tests, online tests, and placement tests are available through Testing Services, also located in the Learning Skills Center.

#### XX. Emergency Procedures/Safety

Yellow and red Emergency Information flipcharts are located in each classroom. These are quick reference sheets with telephone numbers to reach emergency assistance and a brief description of the correct actions to take in the event of a tornado, fire or other emergency on campus.

#### XXI. Religious Observances

Students faced with schedule conflicts related to a religious observance should make prior arrangements with the instructor a minimum of seven (7) school days in advance of the examination or other activity involved.

#### XXII. Student E-mail

Your Kishwaukee College e-mail account will be the only way to receive official notices from the college. If you choose to forward your e-mail to another account, please be advised that all communication from and within the college will use your Kishwaukee student e-mail. When communicating with instructors or employees of the college, you are required to use your Kishwaukee e-mail address.

#### XXIII. Community Resources

There are numerous community resources that are available to assist students in addressing a variety of personal needs. A listing and description of community resources can be found at [www.kishwaukeecollege.edu/go/communityresources](http://www.kishwaukeecollege.edu/go/communityresources).

*Note: Although the text in this section is required by Kishwaukee College, the link to the list of community resources no longer works.*

## Tentative Weekly Schedule

Please note that this schedule and the topics covered are likely to change. Changes will be announced in class. If you are not able to attend class, it is your responsibility to find out what was covered. A more detailed schedule is provided on the course website. Assignment descriptions and due dates will also be posted on the course web site.

Week	Date	Topics	Reading
1	1/18	<b>School closed on 1/18 for MLK observance - class starts on 1/25/16</b>	
2	1/25	Linux distributions and installation <ul style="list-style-type: none"><li>• Review syllabus</li><li>• Open source vs. proprietary software</li></ul>	Syllabus Chapters 1, 2

		<ul style="list-style-type: none"> <li>• Differences between operating systems</li> <li>• Differences between Linux distributions</li> <li>• Server considerations</li> <li>• Installing Linux as a server</li> </ul>	
3	2/1	<p>Managing software</p> <ul style="list-style-type: none"> <li>• The RPM and DNF package managers (Red Hat, Fedora)</li> <li>• The apt package manager (Debian, Ubuntu)</li> <li>• Finding, installing, and removing software</li> <li>• Using a GUI package manager</li> <li>• Compiling and installing a package from source</li> </ul>	Chapter 3
4	2/8	<p>Managing users, and groups</p> <ul style="list-style-type: none"> <li>• Managing users (creating, modifying, deleting)</li> <li>• Managing groups (creating, modifying, deleting)</li> <li>• PAM (Pluggable Authentication Modules)</li> <li>• SetUID and SetGID</li> </ul>	Chapter 4
5	2/15	<p>The command line, booting up, shutting down</p> <ul style="list-style-type: none"> <li>• A brief review of CIS 170 CLI commands (Chapter 5)</li> <li>• Bootstrapping</li> <li>• Boot loaders: GRUB and LILO</li> <li>• The init process</li> <li>• rc scripts</li> <li>• Enabling and disabling services</li> <li>• GUI service managers</li> </ul>	Chapters 5, 6
6	2/22	<p>File systems</p> <ul style="list-style-type: none"> <li>• File system basics (i-nodes, blocks, etc.)</li> <li>• Mounting and unmounting local disks</li> <li>• Adding a new disk</li> <li>• Volume management</li> <li>• Creating file systems</li> </ul>	Chapter 7
7	2/29	<p>Core system services, the kernel</p> <ul style="list-style-type: none"> <li>• The init daemon</li> <li>• The xinetd and inetd daemons</li> <li>• Logging</li> <li>• Scheduling tasks with cron</li> <li>• Obtaining the kernel source</li> <li>• Building the kernel</li> <li>• Patching the kernel</li> </ul>	Chapters 8, 9

8	3/7	<p>Virtual file systems, basic networking and configuration</p> <ul style="list-style-type: none"> <li>• The /proc directory</li> <li>• SysFS, cgroupfs, and tmpfs</li> <li>• The OSI model and TCP/IP</li> <li>• How TCP connections work</li> <li>• How ARP works</li> <li>• Subnetting</li> <li>• IPv6</li> <li>• Configuring network interfaces</li> <li>• Managing routes</li> </ul>	Chapters 10, 11, 12
	3/14-3/20	<b>School closed for Spring break</b>	
9	3/21	<p>Midterm, networking lab work</p> <ul style="list-style-type: none"> <li>• <b>Midterm exam during class</b></li> <li>• Linux networking lab work</li> <li>• <b>School closed 3/25 (Good Friday)</b></li> </ul>	
10	3/28	<p>Firewall, local security</p> <ul style="list-style-type: none"> <li>• Installing and configuring netfilter</li> <li>• Using iptables and nftables</li> <li>• Common sources of risks</li> <li>• Mitigating risks</li> <li>• Nonhuman user accounts</li> <li>• Monitoring a system</li> <li>• Using chroot</li> <li>• Using SELinux</li> <li>• Using AppArmor</li> <li>• Using ps and netstat</li> </ul>	Chapters 13, 14
11	4/4	<p>Network security, DNS</p> <ul style="list-style-type: none"> <li>• Port numbers</li> <li>• Tracking services using netstat</li> <li>• Shutting down services</li> <li>• Monitoring a system</li> <li>• Handling attacks</li> <li>• Using nmap, Snort, Nessus, Wireshark, tcpdump</li> <li>• How DNS works</li> <li>• Installing and configuring a DNS server</li> <li>• DNS record types</li> <li>• DNS tools: host, dig, nslookup, whois, nsupdate, rndc</li> <li>• Configuring a DNS client</li> </ul>	Chapters 15, 16
12	4/11	<p>FTP</p> <ul style="list-style-type: none"> <li>• How FTP works</li> </ul>	Chapter 17

		<ul style="list-style-type: none"> <li>• Installing and configuring an FTP server (vsftpd)</li> <li>• <b>No classes on Friday 4/15 (faculty development)</b></li> </ul>	
13	4/18	<p>Web server (Apache this semester)</p> <ul style="list-style-type: none"> <li>• How HTTP works</li> <li>• Installing a web server</li> <li>• Configuring a web server</li> <li>• Testing a web server</li> <li>• Starting up and shutting down a web server</li> </ul>	Chapter 18
14	4/25	<p>Email</p> <ul style="list-style-type: none"> <li>• SMTP basics</li> <li>• Installing the postfix server</li> <li>• Configuring the postfix server</li> <li>• Running and testing the postfix server</li> <li>• POP and IMAP basics</li> <li>• Installing the UW-IMAP and POP3 servers</li> <li>• Configuring the UW-IMAP and POP3 servers</li> <li>• Running and testing the UW-IMAP and POP3 servers</li> </ul>	Chapters 19, 20
15	5/2	<p>SSH, DHCP</p> <ul style="list-style-type: none"> <li>• How public key cryptography works</li> <li>• SSH versions</li> <li>• Installing and configuring OpenSSH</li> <li>• Using OpenSSH: ssh, scp, sftp</li> <li>• How DHCP works</li> <li>• Installing a DHCP server</li> <li>• Configuring a DHCP server</li> <li>• Configuring a DHCP client</li> </ul>	Chapters 21, 28
16	5/9	<p>Printing</p> <ul style="list-style-type: none"> <li>• Printing terminology</li> <li>• The CUPS system</li> <li>• Managing printers</li> <li>• Client-side printing tools</li> </ul>	Chapter 27
Finals	5/16/16	<b>Final exam: 6:00 P.M. - 7:50 P.M., Rm. A-1373</b>	