Educational information systems and networks

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**Description:** From a foundation of computer networks and systems, this course expands to cover instructional technology infrastructure: file systems, users, wired and wireless networks, email, web servers, computer labs, and common educational software services. This course focuses on Free Software; where the source code is free to use, study, or modify. To explore these topics in this hands on class all students will be configuring their own Raspberry Pi computers and using them to complete a software/hardware project.

**Keywords:** linux, bash, systems, networks, lamp, free software, trouble shooting, technical project management, rasberry pi, physical computing, debian, ubuntu

## Goals & Objectives

This course introduces students to the key concepts in current networked computing in order to develop a conceptual framework for configuring and troubleshooting computing systems. Upon completing this course they will be able to:

* set up a secure, network computing environment
* effectively use the basic tools of Unix/Linux computing environments
* implement techniques for administering group and user permissions
* install and troubleshoot hardware and software infrastructure for networked and internet computing
* configure a client/user computer for specific purposes
* configure various server-side applications to support teaching and learning
* identify the ethical and legal concerns surrounding educational information systems

## Class Information

**Instructors:**

[Matthew X. Curinga](http://matt.curinga.com), [mcuringa@adelphi.edu](mailto:mcuringa@adelphi.edu)

Tom Jennings, [tjennings@adelphi.edu](mailto:tjennings@adelphi.edu)

**Class dates:**

Thursday, May 26 - Tuesday, June 28

**Class meetings:**

Tuesday & Thursday, 5pm-8pm

Adelphi Swirbul Library, Gallagher Lab (2cnd floor)

**Online tools:**

**Moodle** will be used lightly to post this syllabus and share other file resources, links, etc.

**Slack** will be our main channel for online communications. Please [Join our Slack team with your Adelphi email](https://auedtech.slack.com/signup). If you run into trouble or have a question, post it here to our channel, #raspberrypi, or send a message to @mxc or @tomjennings. During the weeks of the class, we recommend running the Slack app for you pnone.

**Flex Ed:** This course (and all Ed Tech courses going forward), will be available via *Flex* where you can join via video conference if you can’t meet us in person. I will also post any class lectures (there will be some mini-lectures) to Moodle after class. Because of the hands-on nature of the class, we recommend that you make an effort to attend at least one session a week in person.

**mail.adelphi.edu email:** we will use your official adelphi student email for class email communications as well as the associated google account for video/audio chats and calendar events. Please check this email regularly.

## Required Books

*None*

## Required Materials

Every student *must* purchase a Raspberry Pi (RPI) computer and accessories for use in this course. They will keep their own hardware.

The core setup **required** for all students (~$50):

* Raspberry Pi model 3
* 16GB Micro SD Card (2 recommended)

*You must bring your Raspberry Pi and SD Card to our first class meeting.*

In the spirit of Raspberry Pi and DIY, we encourage you to re-use any of these items that you might already have or might be able to buy second hand. You will need these items, but don’t need to buy them new. If you are unsure, you can wait until after the first class to make your purchase.

* USB Keyboard and Mouse
* Micro USB charger (you can use a phone charger)
* HDMI Cable
* Computer Monitor or TV with HDMI input (or you may need an HDMI to VGA adapter)
* USB Card reader for your MicroSD card

If you purchased everything except the monitor it would cost another $35-$50.

In addition to these core materials, you will also need to purchase/acquire materials to complete your final project (see below). Costs may range from $20-$50.

We have a list of RPI components here on Amazon. <http://amzn.com/w/L2DZRVG7BQ0M>

## Bibliography

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Peterson, Larry L. 2011. *Computer Networks, Fifth Edition: A Systems Approach.* Morgan Kaufmann. ISBN 0123850592.

Tanenbaum, Andrew S. 2002. *Computer Networks.* Prentice Hall. ISBN 0130661023.

## Class sessions

|  |  |  |  |
| --- | --- | --- | --- |
| Session | Date | Workshop | Lecture/Discussion |
| 1 | Thu May 26 | Installing the OS | Computers and Operating Systems |
| 2 | Tue May 31 | 3D Printing Cases |  |
| 3 | Thu Jun 2 | RPI as a server | File System, Users, Groups, & Permissions |
| 4 | Tue Jun 7 | Pi Project |  |
| 5 | Thu Jun 9 | Programming Pi (1) | Networks |
| 6 | Tue Jun 14 | Programming Pi (2) |  |
| 7 | Thu Jun 16 | Networked Data | Media Files |
| 8 | Tue Jun 21 | Using Sensors |  |
| 9 | Thu Jun 23 | Controlling Motors | Ethics |
| 10 | Tue Jun 28 | Project Showcase |  |

## Grades & Assignments

|  |  |  |
| --- | --- | --- |
| Assignment | Pct | Due |
| Participation | 10% | ongoing |
| RPI Client or Server Setup | 30% | 6/7 (Session 4) |
| Final RPI Project | 40% | 6/28 (Final Session) |

### Participation

Because this is a short summer course (3 credits in 5 weeks), we expect everyone to make every effort to attend every class meeting. If you cannot make it to class in-person, you will be able to join us via our FlexEd video conferencing. Because of the hands-on nature of the course, we recommend that you make your best effort to attend at least one weekly session in person. Your participation grade will be based on your ability to work in group projects, positive attitude in class, and preparedness for class meetings.

### RPI Client or Server Setup

For our first project you will configure your Raspberry Pi for a specific educational scenario: a general computer for 4th grade classroom computer station, a setup to teach computer programming for kids, a development server for the Canvas LMS, a managed computer lab setup, etc.

You will present your configuration in class. In addition to demonstrating the software, you should report on:

* a description of the target audience and how you envision they would use the RPI
* the process you used to find, test, and configure the RPI
* key features of the software installed
* advantages, disadvantages, and other implications of your design

You will be evaluated on:

* demonstration of your understanding of RPI hardware and software
* suitability of your solution for your stated audience/problem
* risk/complexity of the task undertaken
* reflection on the process

This is an individual project.

### DIY Project

One of the key technical tasks of an educational technologist or instructional designer is to research and evaluate possible solutions to a problem and then implement a plan to test a possible solution. Real world problems often require the combination of several systems in a new way, suffer from incomplete or inaccurate documentation, and are hindered by time or resources/financial constraints.

With this in mind, you will choose an RPI project that you find interesting and engaging to pursue for your final project. You will be responsible for gathering/purchasing the materials to complete the project. You *must* submit a project plan include a timeline and all list of all materials by the end of week 2.

You will present your project on the last day of class.

You will be evaluated on:

* skill with RPI hardware
* skill with RPI software
* creativity of the project chosen
* risk/scope of the project
* reflection on the process

It’s suggested that you complete this project working in pairs. With permission you can complete it individually.