General Course Information

- Instructor: Liwei Lin
  lwlin@me.berkeley.edu
- Office: 621E Sutardja Dai Hall
- Office Hours:
  - Monday 4-5pm
  - Tuesday 10-11pm
- Course Website:
  http://www.me.berkeley.edu/~lwlin/me102B/2016s.html
- GSI: Akhbari  
  sina.akhbari68@gmail.com

- GSI: Eric Sweet  
  ericsweet2@gmail.com

- GSI: Ilbey Karakurt  
  ilbeykarakurt@berkeley.edu
Other Key Personal

- Machine Shop (Sign Up Now!!!!)
  - Mick Fransen
  - Gordon Long
  - Dennis Lee
  - Scott McCormick

- Electronics/Motors
  - Tom Clark
## Grading

<table>
<thead>
<tr>
<th>PROJECT GRADE</th>
<th>COURSE WORK GRADE</th>
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<tbody>
<tr>
<td>- 5% Design Review I</td>
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<td>- Project Specifications</td>
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<td>- Conceptual Design</td>
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<td>- 15% Design Review II</td>
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<td>- Parameterized Design</td>
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<td>- 50% Design Expo</td>
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<td>- Prototype 30%</td>
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<td>- Final Report 20%</td>
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<td>- 25% HW &amp; Exam</td>
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<td>- HW 5%</td>
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<td>- Exam 20%</td>
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<td>- 5% labs &amp; participation</td>
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<td>- attendance</td>
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<td>- group evaluation</td>
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How Labs Work

- 4 Labs
  - [http://me.berkeley.edu/ME102B/labs.html](http://me.berkeley.edu/ME102B/labs.html)

- No Lab Reports

- Labs must be checked off by GSI during lab hours

- You may take the hardware home and finish all the labs

- All labs must be finished and Check Off by 8\textsuperscript{th} week of the semester
More Course Information

- **Lecture**
  - Mondays & Wednesdays, 9:00 - 10:00pm
  - 105 North Gate

- **Laboratory**
  - Monday 11-2pm, 2-5pm & Tuesday 2-5pm
  - GSI’s will be available during these time to assist
  - Hesse Hall Room 50
What can you build that you couldn’t do as a freshman

Group Size
- 4 - 5 Ideal (6 Max)
- Please Fill and Return Information Sheet (Due: In Class)
  - Groups Must Staple together Info sheets for members
  - People unable to find groups will be assigned groups by instructor

Some Past Projects
- Chalk Jet: [http://www.youtube.com/watch?feature=player_embedded&v=-roAPmxsBoU#t=122s](http://www.youtube.com/watch?feature=player_embedded&v=-roAPmxsBoU#t=122s)
- Korexina IV (Skyscraper cleaning) [http://www.youtube.com/watch?v=rgczlH8YzFA&feature=player_detailpage](http://www.youtube.com/watch?v=rgczlH8YzFA&feature=player_detailpage)

Class votes on Best Project of the Semester
Lab 1: Introduction

- Introduction to Microcontrollers
  - How to setup your Arduino
    http://me.berkeley.edu/ME102B/lab1.html
ME102 Lab 1: Getting Started

This lab will teach you how to setup the IDE (Integrated Development Environment) for the Arduino. These instruction have been tested for the computers available in lab. However, it is just as easy to setup the IDE on your own laptop. You may wish to do this for future lab assignments.

1. Introduction to the Arduino
   - Kit contents check
   - Arduino IDE and some terminology
   - Hello Worlds
   - Anatomy of a sketch
2. Setting up your hardware buffers
   - Digital input buffering with the 74LS14
   - Digital output buffering with the 7417
   - ADC setup with the 4342
3. Clean up and check off
   - Blinking LED with the buffered setup
4. References
Lab Kit

Kit contents check

Before we continue any further, please make sure that you have at least the following in your lab kit.

- 1 Arduino Duemilanove
- 1 USB A-B cord
- 1 breadboard
- 5 LED’s of assorted colors
- 2 tactile switches
- 1 DC motor
- 1 tiny RC servo
- 1 potentiometer
- 1 optical encoder ([datasheet](#))
- 1 pair of wire cutters
- 1 74LS14 ([datasheet](#))
- 1 DM7417 ([datasheet](#))
- 1 OPA4342([datasheet](#)) or TLV2374I ([datasheet](#))

If you have any problems identifying your parts, please notify a GSI
If you are missing any parts, please find Tom Clark
Arduino

- FTDI USB Chip
- Pin 13 LED
- Digital Pins
- USB Jack
- Power
- Reset Button
- Microcontroller
- Power Jack
- Power Pins
- Analog Input Pins
Arduino IDE

The largest benefit of the Arduino is the fact that you are not limited to programming in the lab. Instructions on how to install a copy of the Arduino IDE on your own machine can be found [here](#) (Mac, Windows and Linux).

Start the Arduino IDE by clicking the Arduino icon on the desktop.

For those of you who are familiar with microprocessor programming, the first thing you will notice is the Arduino’s minimalist approach.

Serial Monitor
Upload
Save
Open
New
Stop
Compile

There are 7 shortcut commands that you can use with the Arduino IDE:

- **Serial Monitor** opens the only debugging tool you have with the Arduino. The Serial Monitor displays information passed from the Duemilanove to the computer.
- **Upload** compiles your program (“sketch” in the parlance of the creators of the Arduino, and sends it to the board if there are no compile-time errors.
- **Save your sketch**
- **Open an existing sketch**
- **New** creates a new sketch
- **Stop** interrupts compilation of your code.
- **Compile** your sketch in order to check for compile-time errors. As your sketch grows in size, it’ll save time to verify that your code compiles before trying to upload it.
1. Tools → Board (select the right Arduino version)
2. Computer → Device Manager → Ports → USB Serial (COM3)
3. Tools → Serial Port → COM3
5. Files → Examples → Stubs → HelloWorld (load the program)
6. Verify the Screen (successful communication)
6. File $\rightarrow$ Examples $\rightarrow$ Digital $\rightarrow$ Blink (load a new program)
void setup() {
    Serial.begin(9600);
}

void loop() {
    Serial.println("Hello World!");
}

where to use the board
please find out this yourself
serial communication
never-ending loop
serial print on screen
Software Introduction – "Blink"

```c
int ledPin = 13;  // LED connected to digital pin 13

void setup() {
   pinMode(ledPin, OUTPUT);
}

void loop() {
   digitalWrite(ledPin, HIGH);
   delay(1000);
   digitalWrite(ledPin, LOW);
   delay(1000);
}
```

- `// LED connected to digital pin 13`
- `pinMode(ledPin, OUTPUT);`
- `pin 13 is outputs`
- `wait 1000 ms`