Welcome to Physics 121

My name is Neil Alberding

This course covers electricity and magnetism — things like electric charges, magnets, DC and AC Circuits, electromagnetic waves and optics.

Lectures and Tutorials

There are three lectures a week, 1 hr each

and one tutorial, 1 hr

no lab in this course. Physics 133 is a separate lab course that you may take along with Physics 121.

If you like lab with course you can take Physics 141 in Surrey

Physics 121

- Electricity
- DC Circuits
- Magnetism
- AC Circuits
- Electromagnetic Waves
- Optics

Schedule

Physics 121 Schedule

Date 2019	week	topic
Mon May 6	1	Electrostatics
Wed May 8	1	Coulomb's Law
Fri May 10	1	Electric Fields
Mon May 13	2	Electric Flux and Field Lines
Wed May 15	2	Gauss' Law
Fri May 17	2	*Gauss' Law Calculations*
Mon May 20	3	Victoria Day
Wed May 22	3	Electric Potential Energy
Fri May 24	3	Electric Potential
Mon May 27	4	Conductors and Capacitance
Wed May 29	4	Capacitors
Fri May 31	4	Electric Current
Mon June 3	5	Kirchhoff's Rules
Wed June 5	5	Review
Fri June 7	5	Midterm 1
Mon June 10	6	RC Circuits
Wed June 12	6	Magnetism
Fri June 14	6	Forces and Torques on Currents
Mon June 17	7	Biot-Savart Law
Wed June 19	7	Ampere's Law
Fri June 21	7	Problems
Mon June 24	8	Motional EMF
Wed June 26	8	Faraday's Law
Fri June 28	8	Induction and RL Circuits
Mon July 1	9	Canada Day
Wed July 3	9	Review
Fri July 5	9	Midterm 2
Mon July 8	10	LRC Circuits
Wed July 10	10	AC Circuits
Fri July 12	10	AC Circuits: Resonance and Power
Mon July 15	11	Displacement Current and E-M Waves
Wed July 17	11	Properties of Electromagnetic Waves
Fri July 19	11	Problems
Mon July 22	12	Reflection and Refraction
Wed July 24	12	Lenses, Mirrors
Fri July 26	12	Polarization, Interference & Diffraction
Mon July 29	13	Wave particle Duality
Wed July 31	13	Particle Physics
Fri August 2	13	Review
Thu August 15		Final exam

Electrostatics

DC Circuits

Magnetism

AC Circuits

Electromagnetic Waves

Optics

Welcome to Physics 121

Your required course material:

FlipItPhysics

FlipItPhysics.com

by Gary Gladding, Mats Selen, and Tim Stelzer

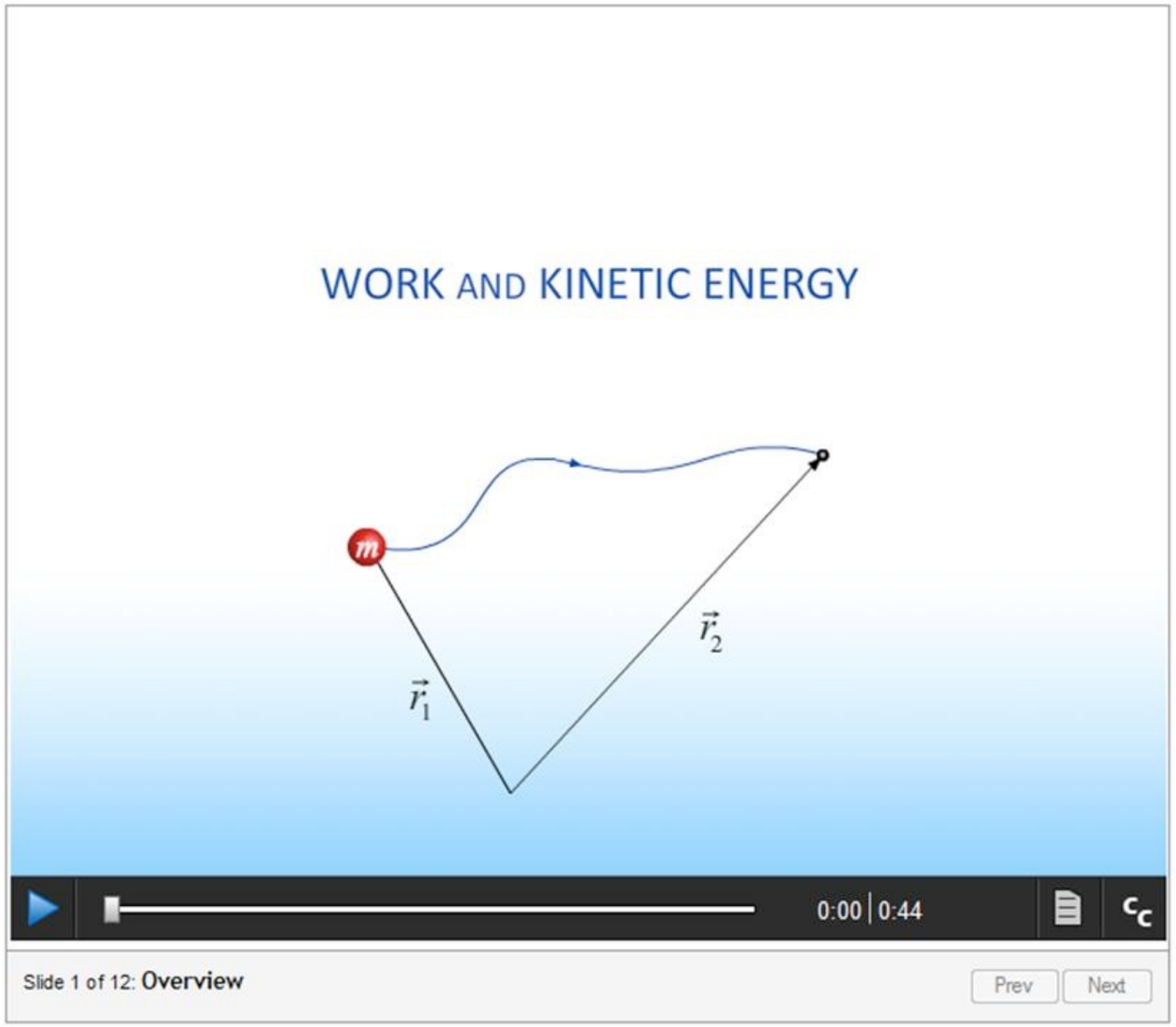
FlipItPhysics Course Overview

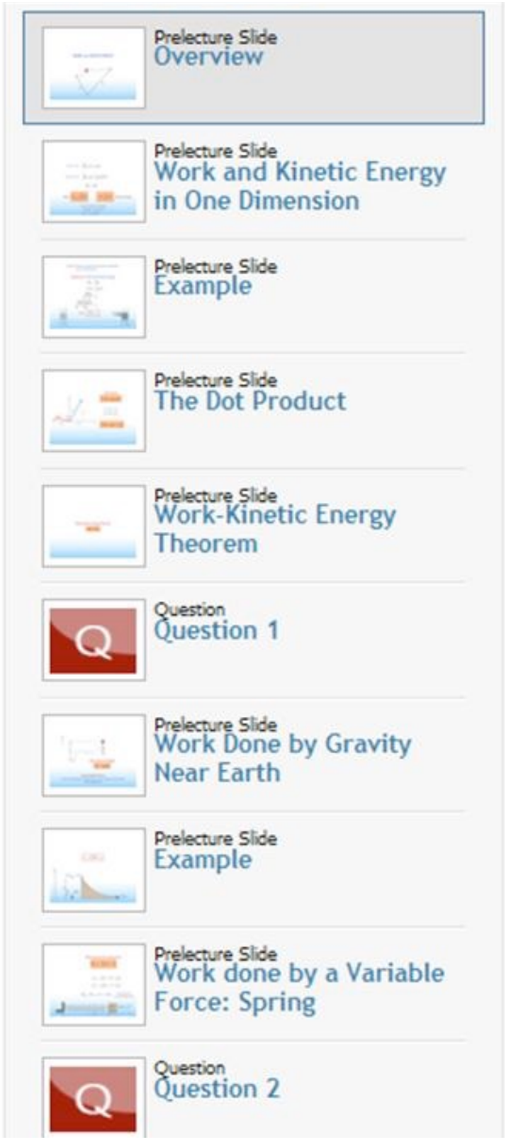
***includes*:**

1. **Online PreLectures (animated lessons, completed *before lecture*)**
2. **Online CheckPoints (quizzes to check knowledge, completed before lecture)**
3. **Lectures (interactive, with clicker activities)**
4. **Online homework exercises**
5. **Printed textbook (reference, problems)**

How we'll use FlipItPhysics

You will VIEW PreLectures before class.





How we'll use FlipItPhysics

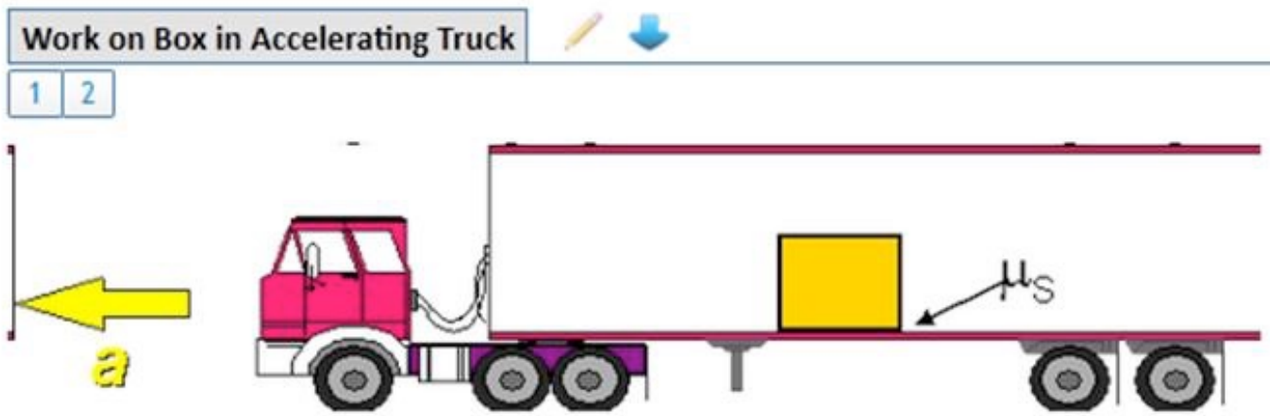
Next, you'll complete a CheckPoint quiz <u>before</u> lecture to CHECK your understanding of the PreLecture.

Checkpoint: Work And Kinetic Energy

Deadline: 100% until Tuesday, August 27 at 8:00 AM

Work on Box in Accelerating Truck

1 2



A box sits on the horizontal bed of a truck accelerating to the left as shown. Static friction between the box and the truck keeps the box from sliding around as the truck drives.

1) The work done on the box by the static frictional force as the accelerating truck moves a distance D to the left is?

- Positive
- Zero
- Negative
- Depends on the speed of the truck.

Submit Graph

How we'll use FlipItPhysics

COME to Lecture!

The lecture will be more interactive because of the work you've done before class.

Your comments:

- I would appreciate some discussion on the ties between calculus and the three laws
- I felt very confident during most of the time while doing the prelecture and preflight, you can go over whatever you want as far as I'm concerned.
- I don't quite understand how the change of momentum relates to net force and acceleration.
- I knew all of these surprisingly well. Or at least I think I do.
- Why (in physics terms) wouldn't an object like a wall move according to Newton's Third Law if it does not have balanced forces on it (net force =/=0, so shouldn't it accelerate per Newton's First Law?
- How does net force differ from other forces? Also, in relation to centripetal motion, in which directions are acceleration, momentum, and velocity.
- why the acceleration of the car is towards the center of the circle, yet the car's velocity is pointing directly forward from the car at any point in time.

How we'll use FlipItPhysics

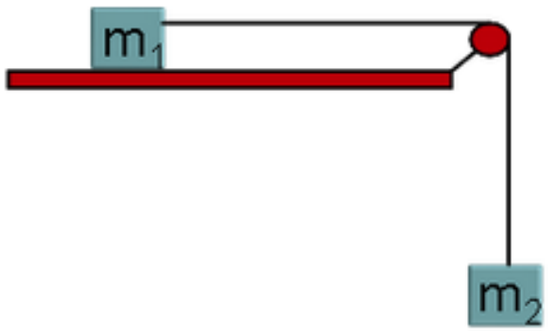
Next, you must complete assigned homework problems.

Homework: Work And Kinetic Energy

Deadline: 100% until Wednesday, August 28 at 8:00 AM

Work On Two Blocks

1 2 3 4 5 6 7 8



A mass m_1 = 5.6 kg rests on a frictionless table and connected by a massless string over a massless pulley to another mass m_2 = 3.1 kg which hangs freely from the string. When released, the hanging mass falls a distance d = 0.74 m.

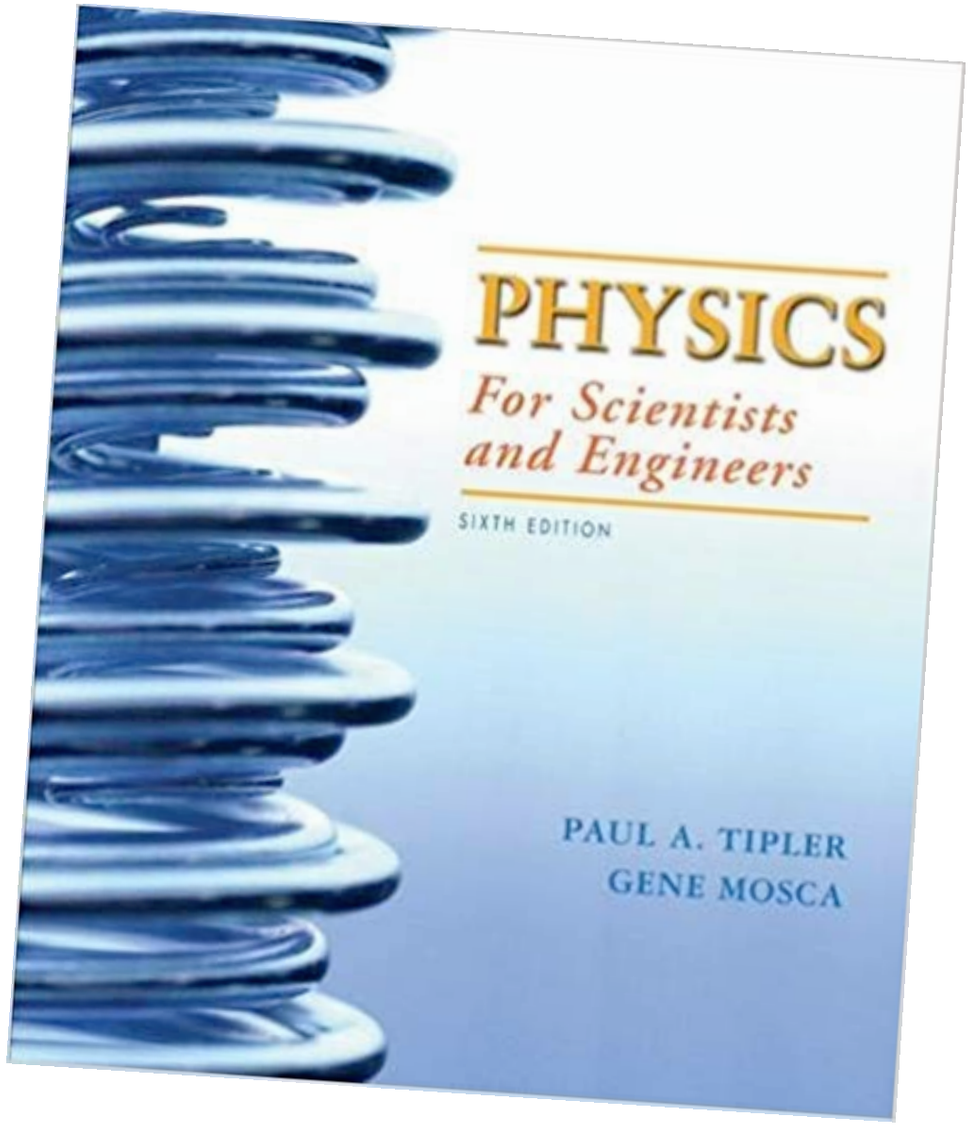
1) How much work is done by gravity on the two block system?

J Submit Graph

A single assignment may contain multiple problems.

How we'll use FlipItPhysics

READ the Textbook as needed for review.



So how do you get started?

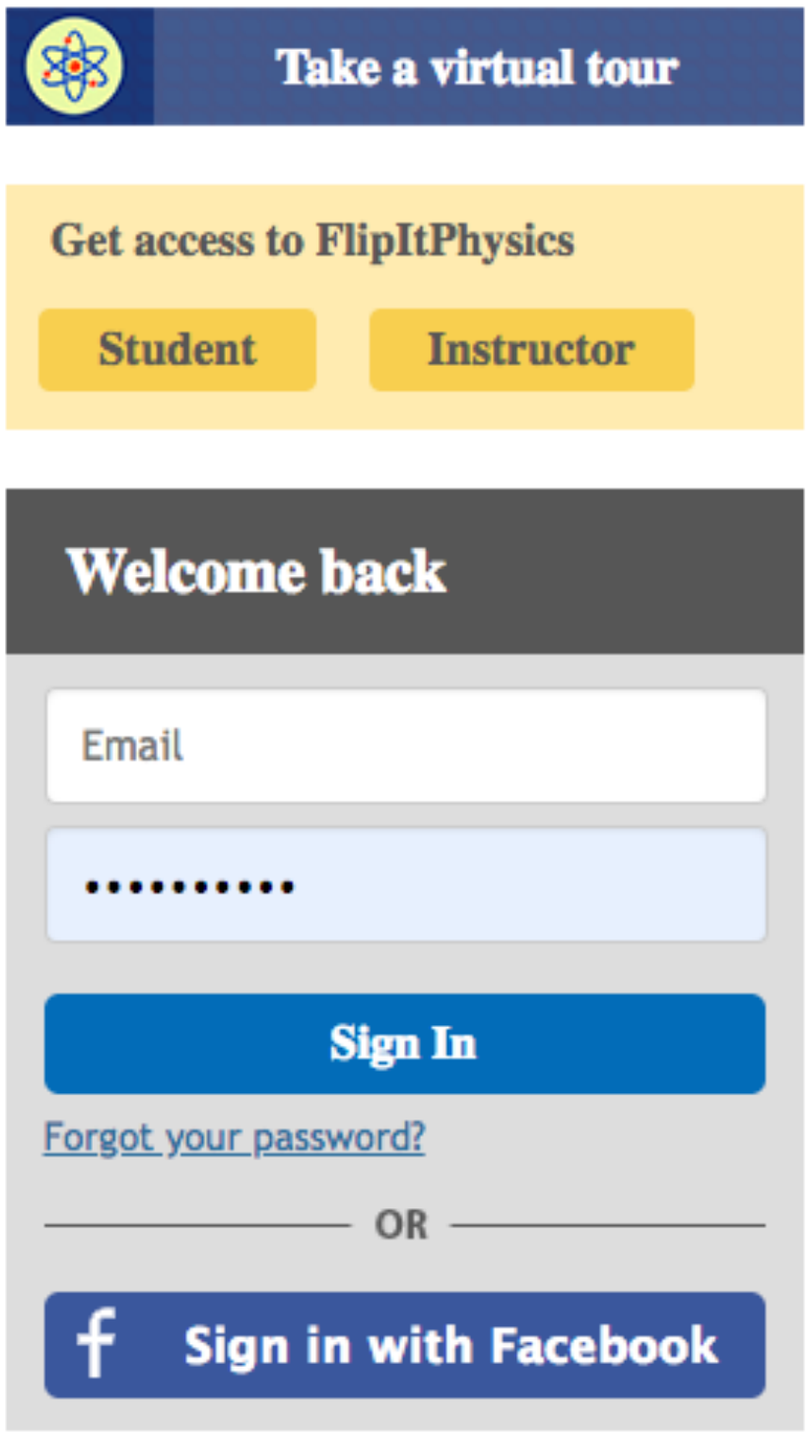
To access to FlipItPhysics:

- **Create an account**

- **Join my course so you can see my assignments and get credit for your work** **Course id: SFUPhys121A**

- **Purchase access (by activating a printed activation code purchased through the bookstore or purchased online)**

Create a FlipItPhysics Account



1. Go to flipitphysics.com

2. Click the “Student” button to begin the registration process OR register using your Facebook account.

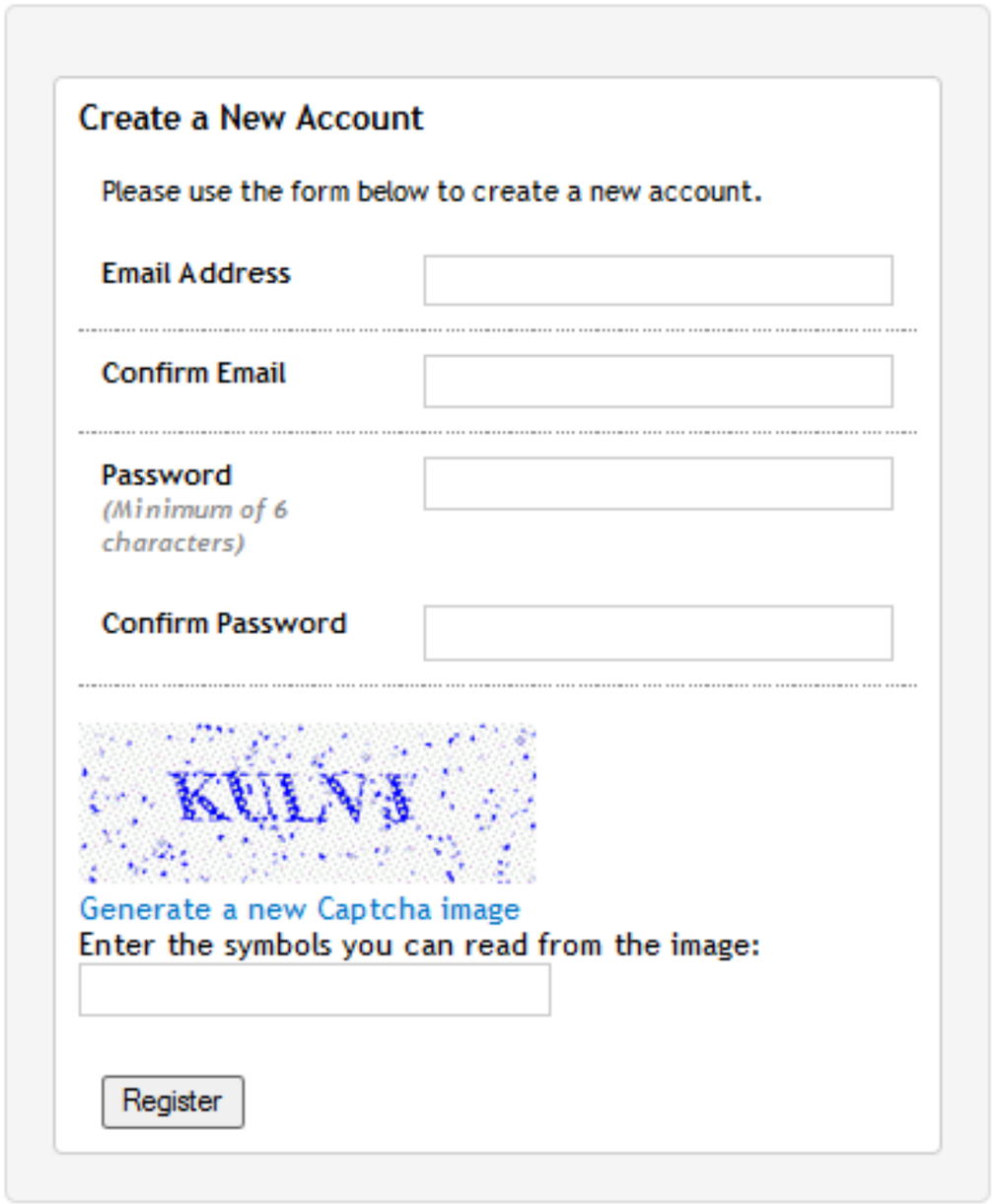
Create an account

3. Begin the process of registering for the site. Enter your email address (your SFU email address) and choose a password.

4. Complete the Captcha Image

5. Click “Register”

Account Creation Page

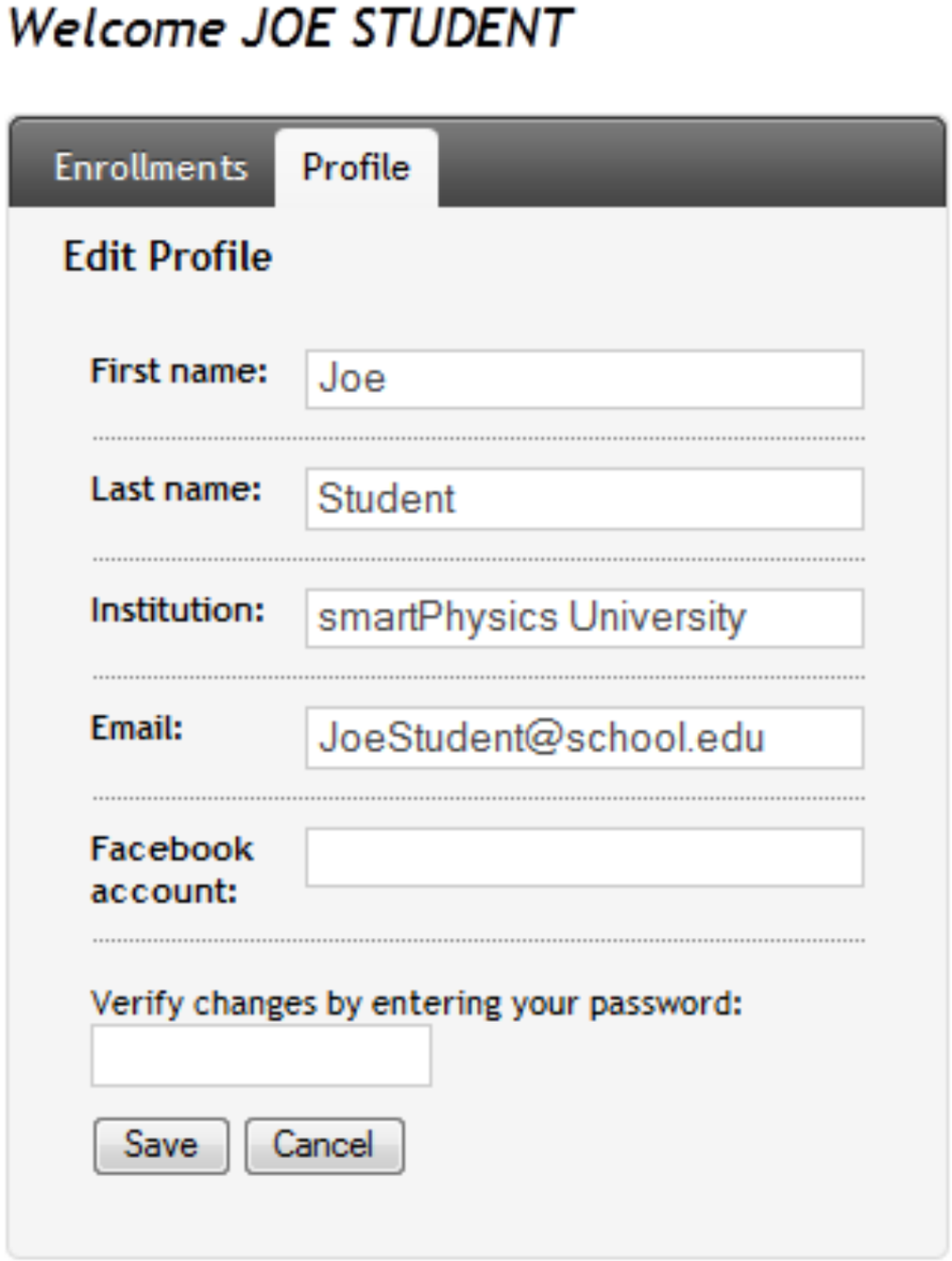


Create an account

6. Set up your profile (first name, last name, institution)

(Connect your Facebook Account if you want)

7. Re-enter your password, then click “Save”

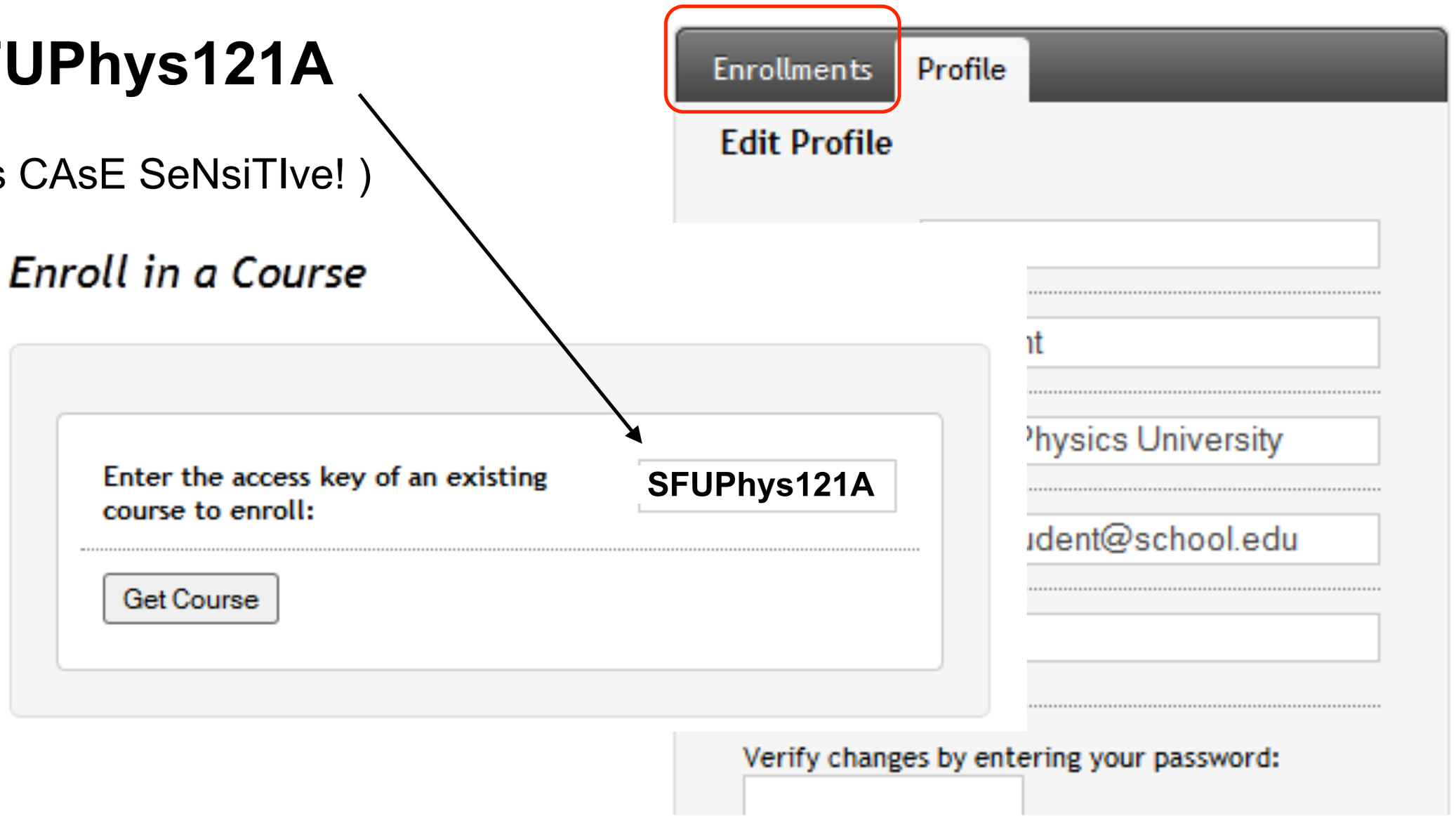


Enroll in this course

8. Choose the “Enrollments” tab and enter the access key of this course.

SFUPhys121A

(this is CAsE SeNsiTIve!)



Course Access Key

The COURSE ACCESS KEY for this course is:

SFUPhys121A

(Case sensitive. **sfuphys121a** won't work.)

Enroll in this course

9. Enter your Unique identifier:

Enroll in a Course

Enter the access key of an existing course to enroll: SFUPhys121A

You have selected the course: **SFU Phys121 Summer 2019**

Enter a Unique identifier: myid

Enroll Course

To be sure: Unique Identifier Format

The UNIQUE IDENTIFIER you should use for this course is:

Your SFU email address without @sfu.ca.

Access FlipItPhysics

Congratulations! You are now enrolled in your course!

You will be given 21 days before having to purchase access or redeem an access code. This will provide you with a grace period should you drop the course.

Welcome JOE STUDENT

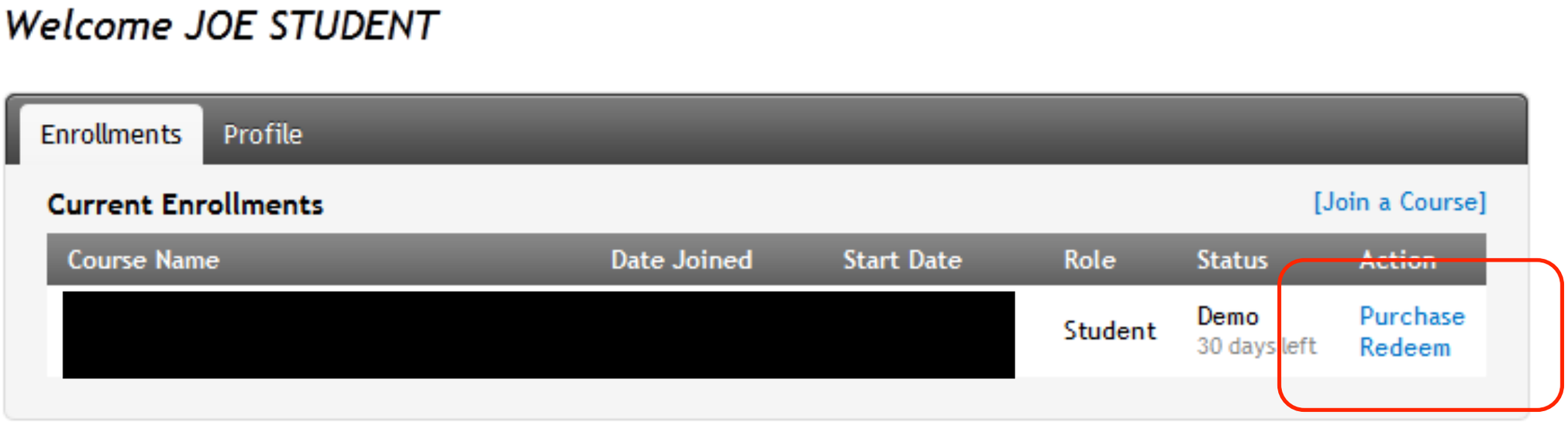
Enrollments | Profile

Current Enrollments [Join a Course]

Course Name	Date Joined	Start Date	Role	Status	Action
[redacted]			Student	Demo 30 days left	Purchase Redeem

Access FlipItPhysics

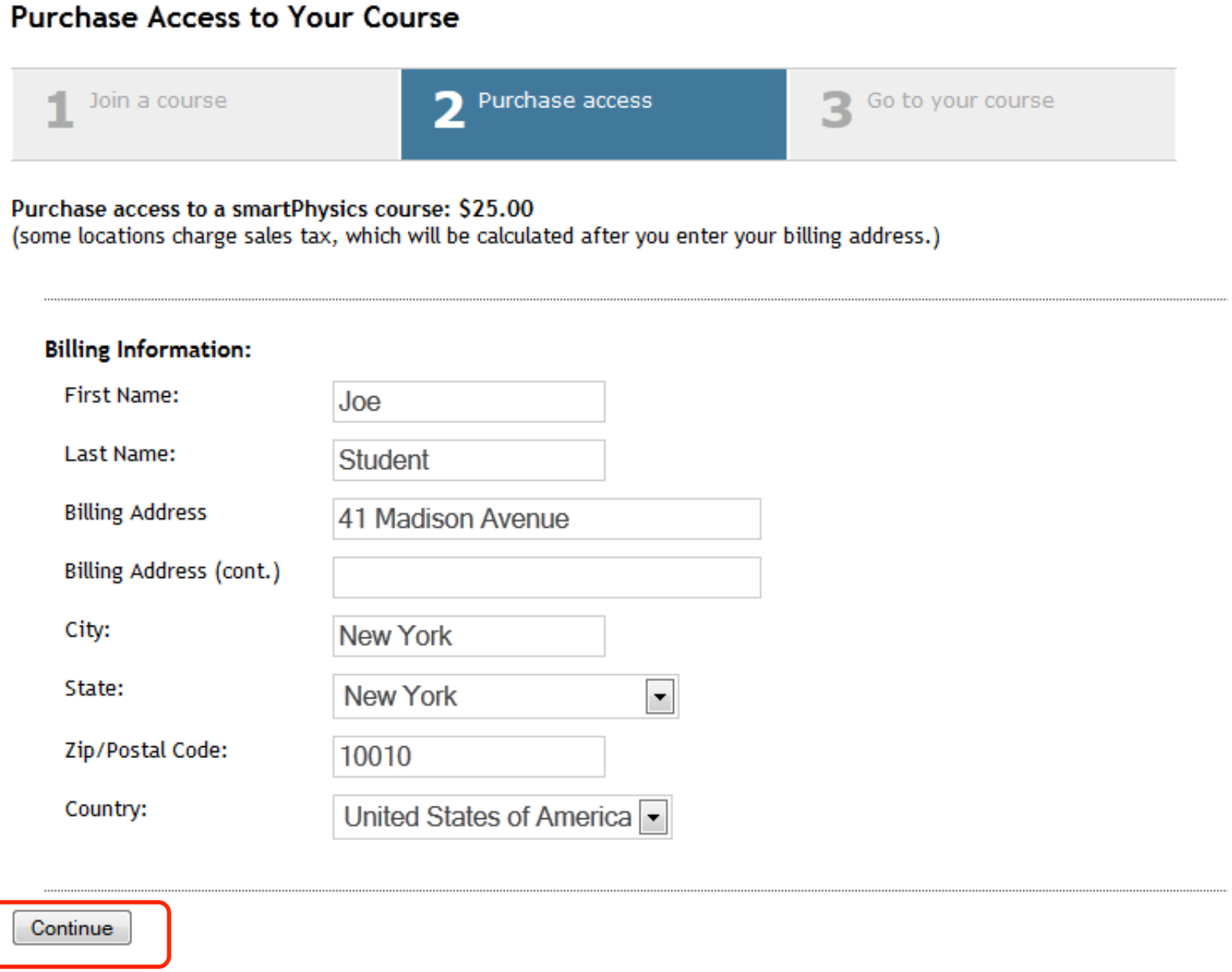
After the 21 days (or before, if you'd like), you must either buy access online with a credit card OR redeem an activation code (housed in a printed booklet purchased at the campus bookstore).



Purchase Access (Online)

From the “Purchase Access” link

1. **Complete the billing information and click “Continue.”**

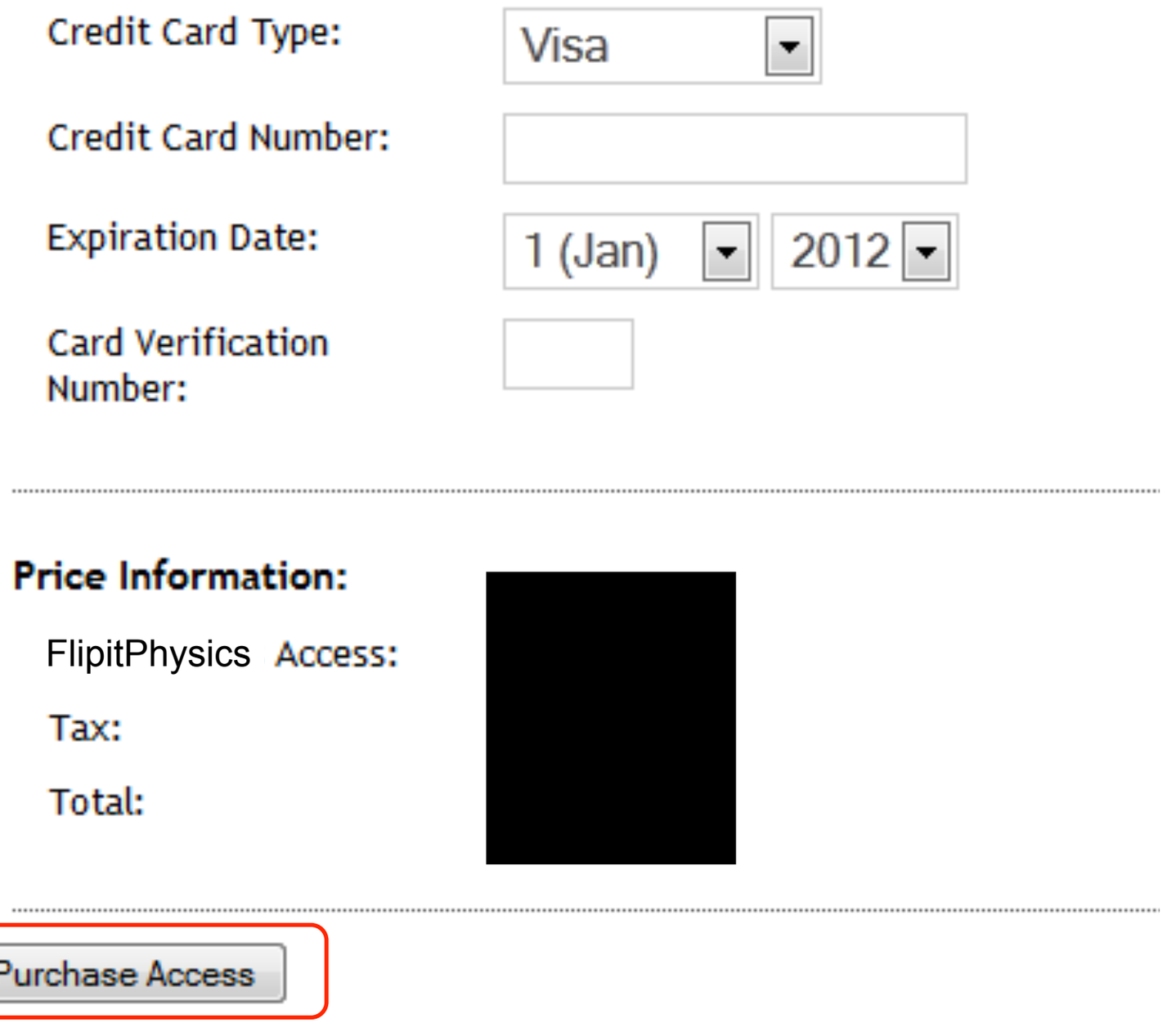


This is the address in which your credit card bill is sent each month. This is often different than your school address, so please check before entering that information.

Purchase Access (Online)

2. Complete the second portion of the online form (credit card information) and click “Purchase Access.”

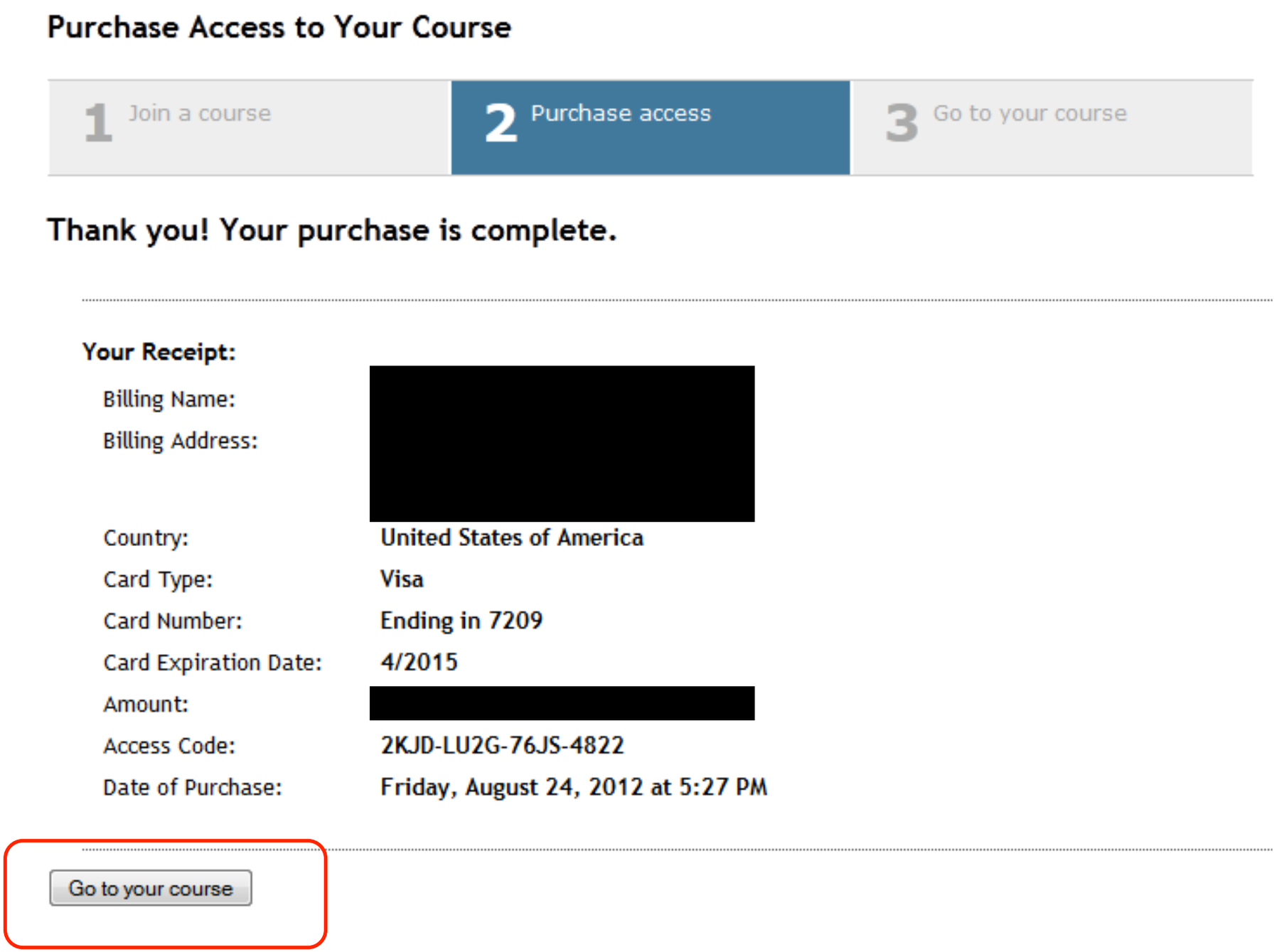
***Depending on your state of residence, you may be subjected to a tax for your online purchase. The system will determine your tax rate based on your billing address.*



Purchase Access (Online)

3. You'll be taken to a confirmation page with your purchase details.

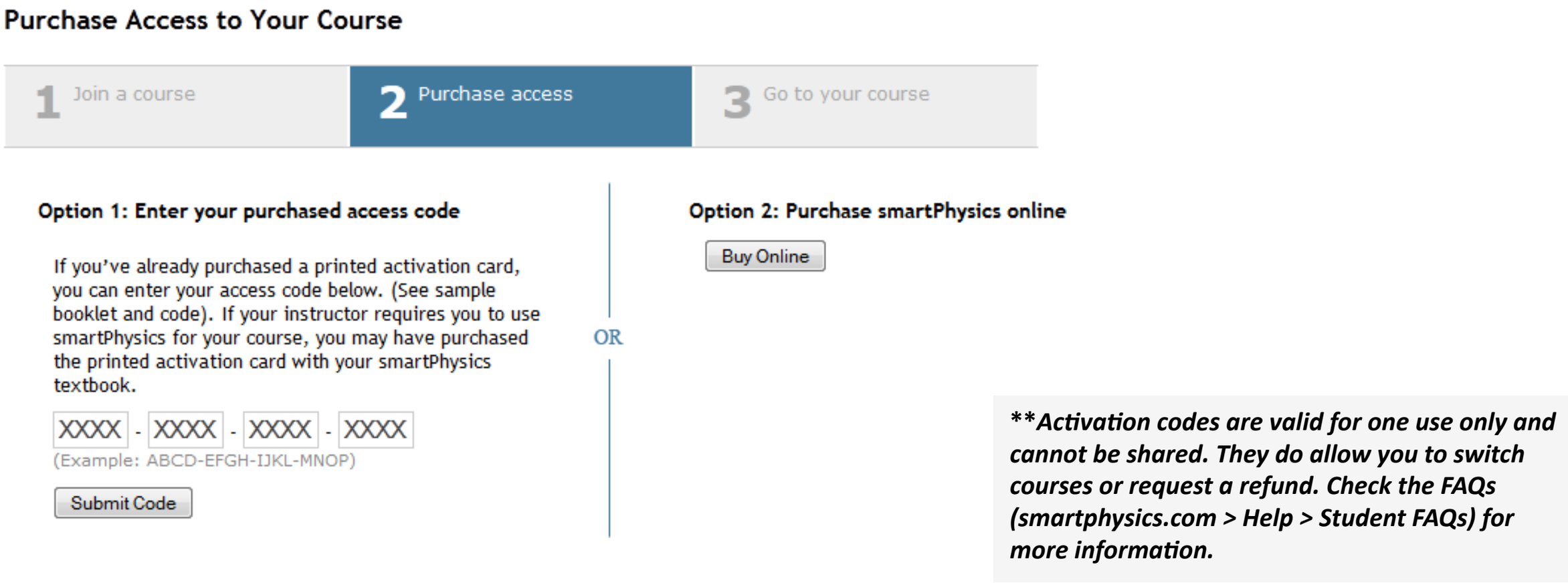
Click "Go to Course" to return to your course.



Redeem Access (Activation Code)

Your activation code is located inside the booklet.

1. **Scratch off your code (from your access card booklet) and enter it into the fields on the screen (Option 1 in image below)**
2. **Click "Submit Code" after you've entered the code. Once finished, you can return to your course.**



***Activation codes are valid for one use only and cannot be shared. They do allow you to switch courses or request a refund. Check the FAQs (smartphysics.com > Help > Student FAQs) for more information.**

Need live help?

The technical support team is ready and able to help you and is available 7 days a week by

phone and email.

https://macmillan.force.com/macmillanlearning/s/contactsupport

FlipIt
macmillan learning

SFU Phys121 Summer 2019

Simon Fraser University

Instructor Links

Month View

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
28	29	30	May 1	2	3	4
5	6	7	8 8:00 AM Coulomb's Law 8:00 AM Coulomb's Law	9 11:59 AM Coulomb's Law	10 8:00 AM Electric Fields 8:00 AM Electric Fields	11
12 11:59 AM Electric Fields	13 8:00 AM Electric Flux and Field 8:00 AM Electric Flux and Field	14 11:59 AM Electric Flux and Field	15 8:00 AM Gauss' Law 8:00 AM Gauss' Law	16 11:59 AM Gauss' Law	17	18
19	20 Victoria Day	21	22 8:00 AM Electric Potential Energy 8:00 AM Electric Potential Energy	23 11:59 AM Electric Potential Energy	24 8:00 AM Electric Potential 8:00 AM Electric Potential	25
26 11:59 AM Electric Potential	27 8:00 AM Conductors and	28 11:59 AM Conductors and	29 8:00 AM Capacitors 8:00 AM Capacitors	30 11:59 AM Capacitors	31 8:00 AM Electric Current	June 1

advice

You are encouraged to do the homework **well before** the due date and time.

Emails received by the instructors or TAs received just before the deadline will be ignored.

Keep a **notebook** of your homework solutions for review.

Gradebook of Jane Test

Unit ○ Score Bar ◉ Number ○ Both	PreLectures	CheckPoints	Homework
1) 1-D Kinematics	0%	0%	0%
2) Vectors and 2-D Kinematics	0%	0%	0%
3) Relative and Circular Motion	0%	0%	0%
4) Newton's Laws	0%	0%	0%
5) Forces and Free-Body Diagrams	0%	0%	0%
6) Friction	0%	0%	0%
7) Work and Energy	0%	0%	0%
8) Conservative Forces and Potential Energy	0%	0%	0%
9) Work and Potential Energy: Part II	0%	0%	0%
10) Center of Mass	0%	0%	0%
11) Conservation of Momentum	0%	0%	0%
12) Elastic Collisions	0%	0%	0%
13) Collisions, Impulse, & Reference Frames	0%	0%	0%
14) Rotational Kinematics & Moment of Inertia	0%	0%	0%
15) Parallel-Axis Theorem and Torque	0%	0%	0%
16) Rotational Dynamics	0%	0%	0%
17) Rotational Statics	0%	0%	0%
18) Rotational Statics: Part II	0%	0%	0%
19) Angular Momentum	0%	0%	0%
20) Angular Momentum Vector and Precession	0%	0%	0%

Deadlines

Prelectures

8 am day of lecture
up to 7 days late: 80%

Checkpoints

8 am day of lecture
no late credit

Homework

Midnight day after lecture
up to 7 days late: 95%
up to 14 days late: 80%

Prelectures

Open each assignment:	14 days before deadline
Default due time:	8:00 AM
Make delayed feedback available:	On the day of the deadline at 10:00 AM
Additional deadlines:	Deadline #2: 7 days, 0 hours, and 0 minutes after the previous deadline worth 80% credit.

Checkpoints

Open each assignment:	14 days before deadline
Default due time:	8:00 AM
Make delayed feedback available:	On the day of the deadline at 10:00 AM
Additional deadlines:	None

Homework

Open each assignment:	14 days before deadline
Default due time:	11:59 PM
Make delayed feedback available:	On the day of the deadline at 1:59 PM
Additional deadlines:	Deadline #2: 7 days, 0 hours, and 0 minutes after the previous deadline worth 95% credit. Deadline #3: 14 days, 0 hours, and 0 minutes after the previous deadline worth 80% credit.

Tutorials

Wednesday or Thursday

There are 6 sections: D101–D104, D105-D107

Start **this week.** (AQ 5037 or AQ 5008)

Tutorial Activities (problems etc.) count 8% of your mark.

TAs are Cristina Cordoba and Ali Nezhadasafavi.
Office hours in P9416, W 14:30 – 15:20, Th 16:30 – 17:20

Lectures

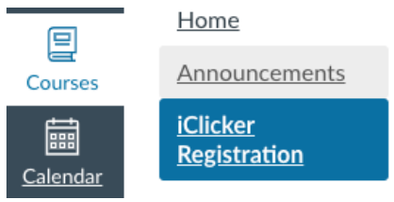
50 min of uninterrupted excitement

Mon, Wed, Fri.

Bring an iClicker: any model, a used one is ok

An extra set of batteries is a good idea.

Register yours in Canvas with its serial number.



registration is retroactive – you'll get the marks you earned from before you registered.

You can also use a smartphone app: iClicker REEF

android, iOS

Midterms

2 of them (June 7, July 5)

90 min long

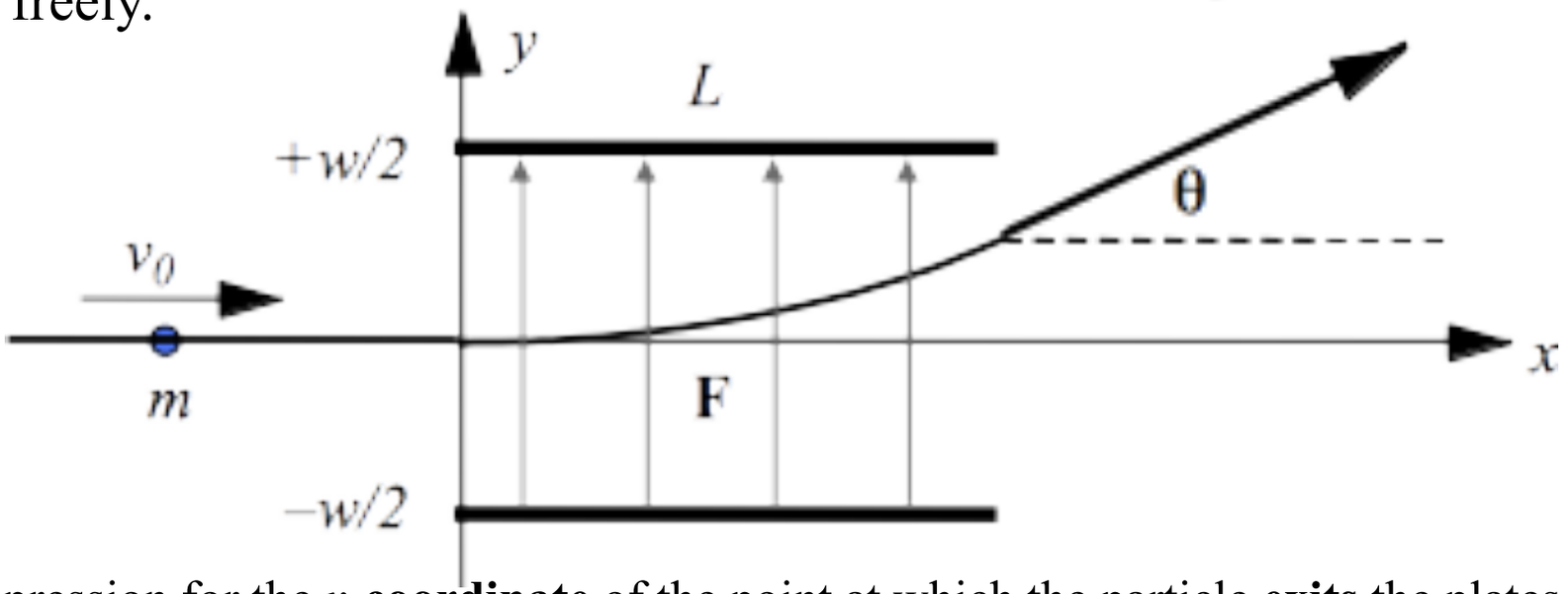
combo of multiple choice (10) & problems (3)

cumulative (ie, stuff we did before midterm 1 might be needed for midterm 2—don't wipe your brain after each midterm!)

Grading Scheme

WHAT	HOW MUCH
Tutorials	8%
FlipIt (pre lectures/homework)	10%
inclass iClicker questions	2%
Midterm Exams (20% each)	40%
Final Exam	40%
TOTAL	100%

A point particle of mass m travels freely in the x-direction with uniform velocity v_0. At $x = 0$, it enters a region between two plates oriented perpendicular to the y-axis; the plate spacing is w, and then plate length in the x-direction is L. The particle enters on the mid-plane $y = 0$. While between the plates, it experiences a constant, spatially uniform force F in the $+y$-direction. After exiting the plates the particle again moves freely.



Obtain an expression for the ***y*-coordinate** of the point at which the particle **exits** the plates. We will assume that the plate spacing is wide enough that the particle never strikes either plate. But before we start, consider these possible solutions:

A) $y = \dfrac{F}{m(v_0 + L)}$ B) $y = \dfrac{FL}{mv_0}$ C) $y = \dfrac{Fw^2}{mv_0^2}$

Could any of them be correct? Why or why not?
Remember, **units** and **limiting behavior** !