

# Welcome to Physics 120

*My name is **Neil Alberding***

**This course covers mechanics — things like  
kinematics: mathematical description of motion,  
dynamics: how forces affect motion,  
momentum and mechanical energy,  
solid body rotations,  
oscillations**

# Lectures and Tutorials

There are three lectures a week, 1 hr each  
and one tutorial, 1 hr

no lab in this course. Physics 131 is a separate  
lab course that you may take along with  
Physics 121.

If you like lab with course you can take Physics  
140/141 in Surrey

# Welcome to Physics 120

***Your required course material:***

**smartPhysics**

**[www.smartphysics.com](http://www.smartphysics.com)**

**by Gary Gladding, Mats Selen, and Tim Stelzer  
(W.H. Freeman & Company)**

# smartPhysics and Course Overview

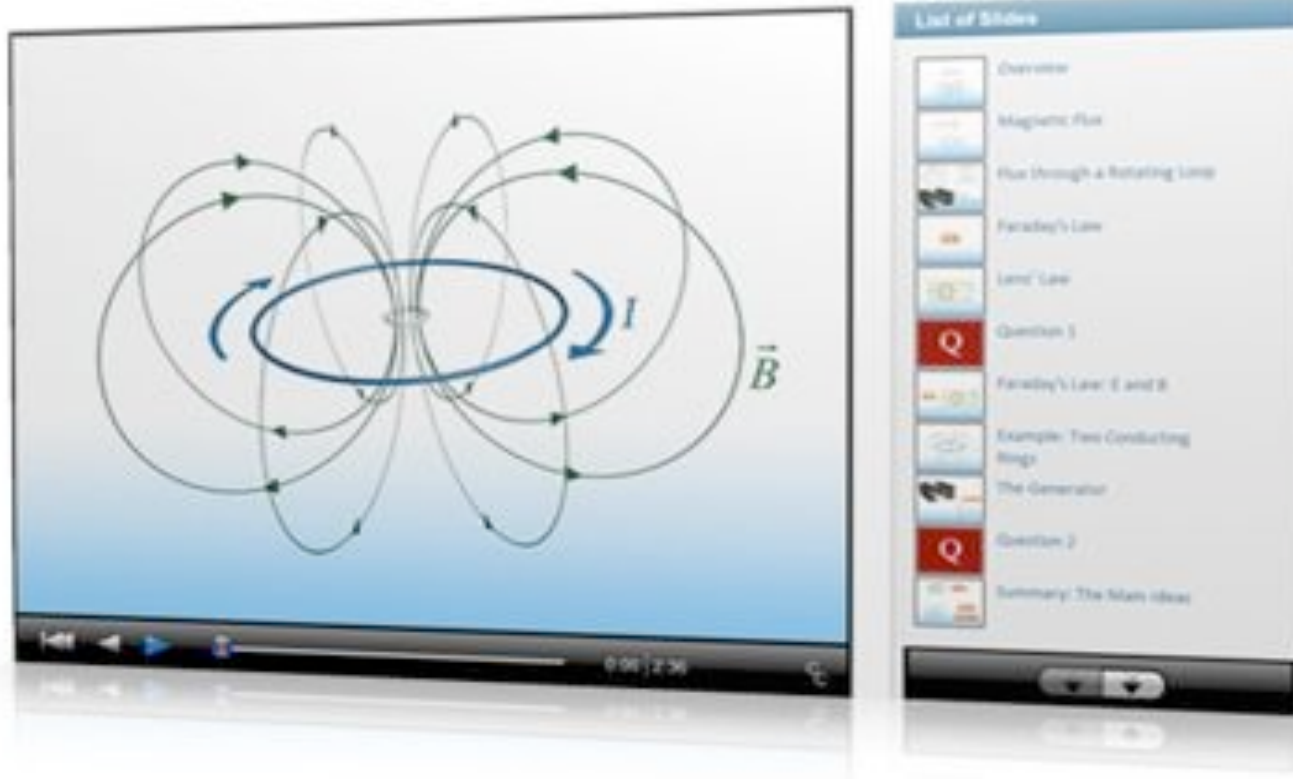
## ***smartPhysics includes:***

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

**Optional Textbook: Tipler & Mosca: *Physics for Scientists and Engineers*, 6th ed (or earlier)**

# How we'll use smartPhysics

You will **VIEW** PreLectures before class.

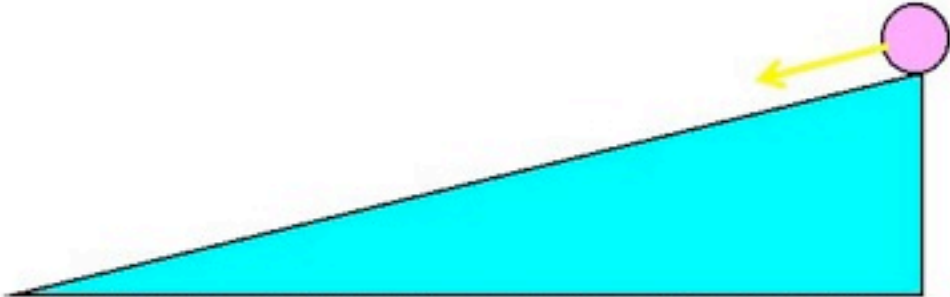


# How we'll use smartPhysics

Next,  
you'll complete  
a CheckPoint  
quiz before  
lecture to **CHECK**  
your  
understanding  
of the  
PreLecture.

**1-D Kinematics**  
Deadline: 100% until Tuesday, August 16 at 8:00 AM

**Rolling down a ramp**



At  $t=0$  a ball, initially at rest, starts to roll down a ramp with constant acceleration. You notice it moves 1 foot between  $t=0$  seconds and  $t = 1$  second.

1) How far does it move between  $t = 1$  second and  $t = 2$  seconds?

- ☐ 1 foot
- ☐ 2 feet
- ☐ 3 feet
- ☐ 4 feet
- ☐ 6 feet

submit

# How we'll use smartPhysics

## 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  $\neq 0$ , 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 smartPhysics

Next, you must **complete assigned homework problems.**

The screenshot shows a dark header bar with the assignment title 'Relative Motion & Newton's Laws' and a progress bar. Below the header, the deadline is listed as 'Past-Due as of Tuesday, February 8 at 8:00 AM'. The main content area is titled 'Train Ride' and contains a problem description: 'You are on a train traveling east at speed of 12 m/s with respect to the ground.' The first problem asks for the velocity with respect to the ground if you walk east at 3.8 m/s relative to the train. It includes a text input field, a 'submit' button, and a submission history box showing no previous attempts. The second problem asks for the velocity with respect to the ground if you walk west at 2.7 m/s relative to the train. It also includes a text input field, a 'submit' button, and a submission history box showing no previous attempts.

**Relative Motion & Newton's Laws**

Deadline: Past-Due as of Tuesday, February 8 at 8:00 AM

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**Train Ride**

You are on a train traveling east at speed of 12 m/s with respect to the ground.

1) If you walk east toward the front of the train, with a speed of 3.8 with respect to the train, what is your velocity with respect to the ground?  m/s east

Your submissions:

2) If you walk west toward the back of the train, with a speed of 2.7 with respect to the train, what is your velocity with respect to the ground?  m/s east

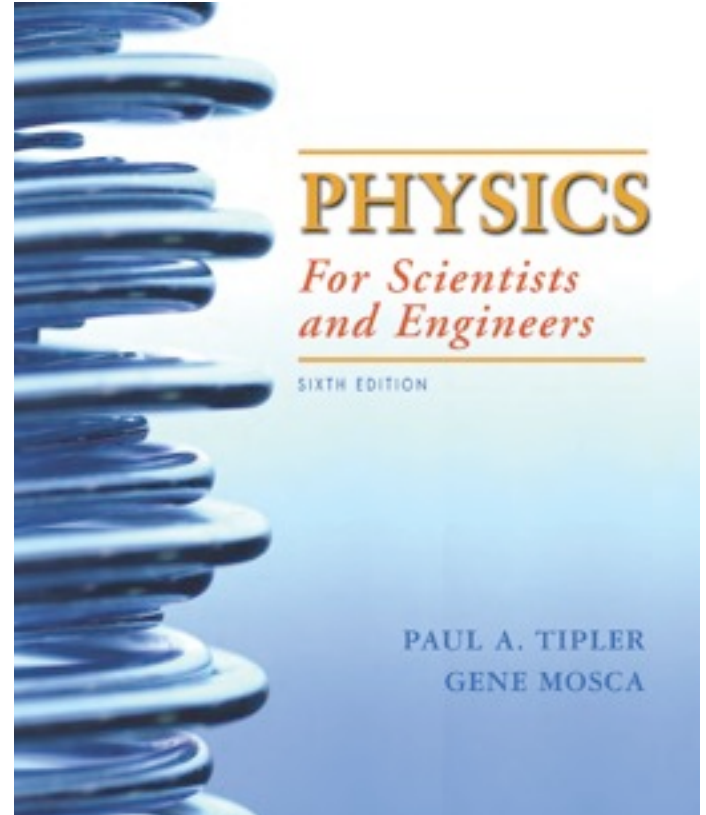
**A single assignment may contain multiple problems.**

# How we'll use the textbook

**READ** the Textbook as needed for review or better understanding. It presents the same material in a different way.

**STUDY** the Textbook problems, with solutions

**WORK** the Textbook end-of-chapter problems, odd ones have answers.



Not required. You may live without it, buy a used one, borrow one from a library, use wikipedia or any other resources

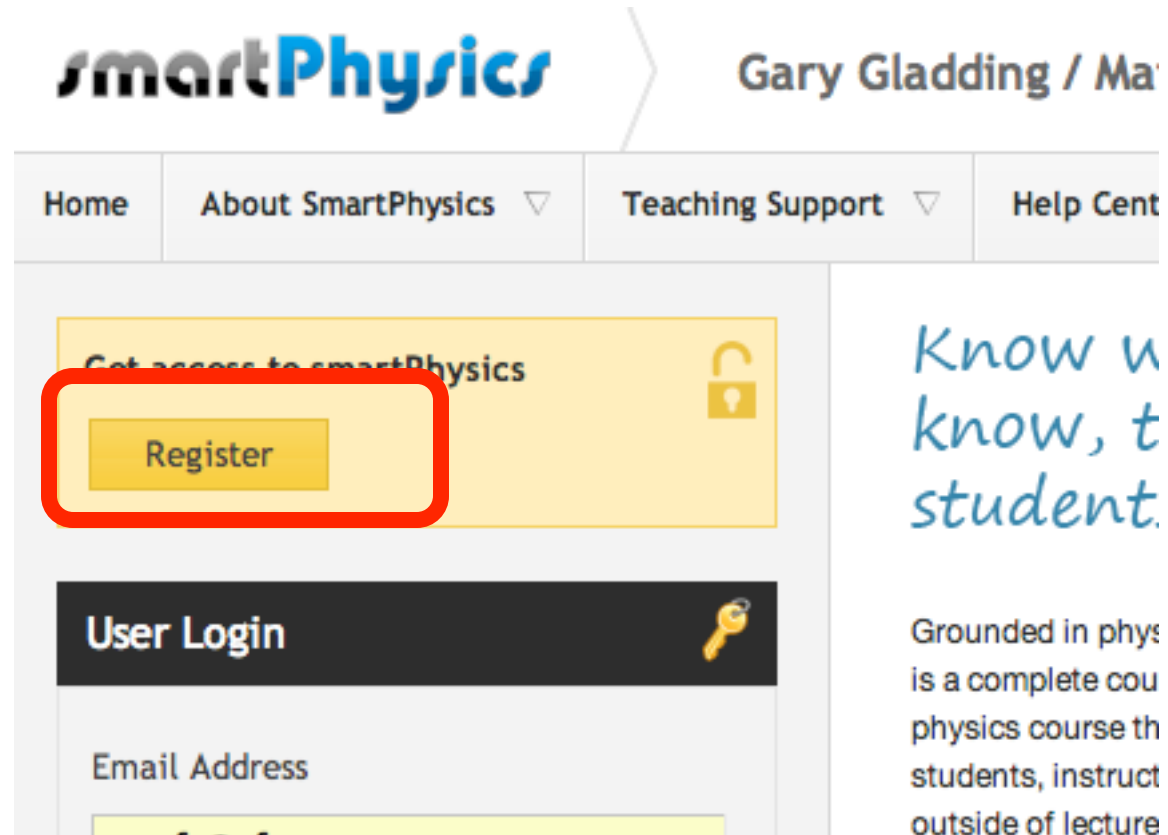
# So how do you get started?

## **To access to smartPhysics:**

- Create a smartPhysics account
- Join my course so you can see my assignments and get credit for your work.
- Purchase access (by activating a printed activation code purchased through the bookstore or purchased online)

# Create a smartPhysics account


1. Go to smartphysics.com



2. Locate and select “Register”

# Create a smartPhysics account

3. Begin the process of registering for the site. Enter your email address (your institutional email address) and choose a password.
4. Read and agree to the site terms and conditions.
5. Click “Register”



Create a New Account

Use the form below to create a new account.  
Passwords are required to be a minimum of 6 characters in length.

Email address

Password

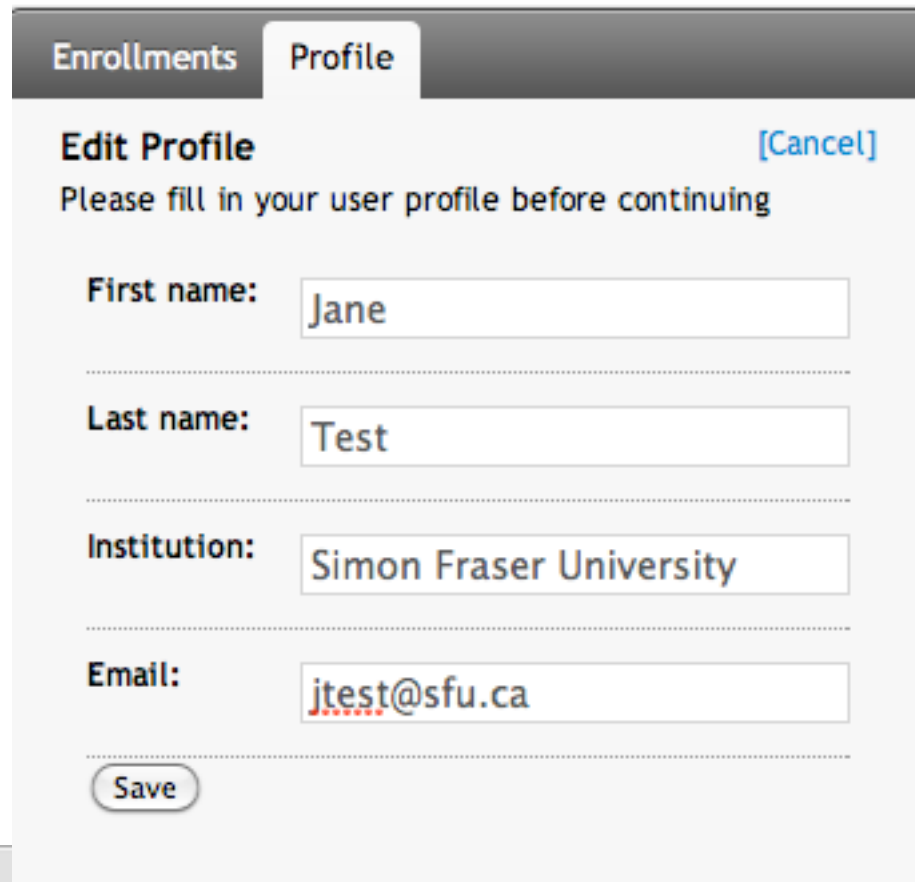
Confirm password

# Create a smartPhysics account

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

7. Click “Save”

*Welcome*



The image shows a web form titled "Edit Profile" with a "[Cancel]" link. The form has two tabs: "Enrollments" and "Profile", with "Profile" being the active tab. Below the tabs, a message says "Please fill in your user profile before continuing". There are four input fields: "First name:" with the value "Jane", "Last name:" with the value "Test", "Institution:" with the value "Simon Fraser University", and "Email:" with the value "jtest@sfu.ca". At the bottom of the form is a "Save" button.

Enrollments Profile

**Edit Profile** [Cancel]

Please fill in your user profile before continuing

First name:

.....

Last name:

.....

Institution:

.....

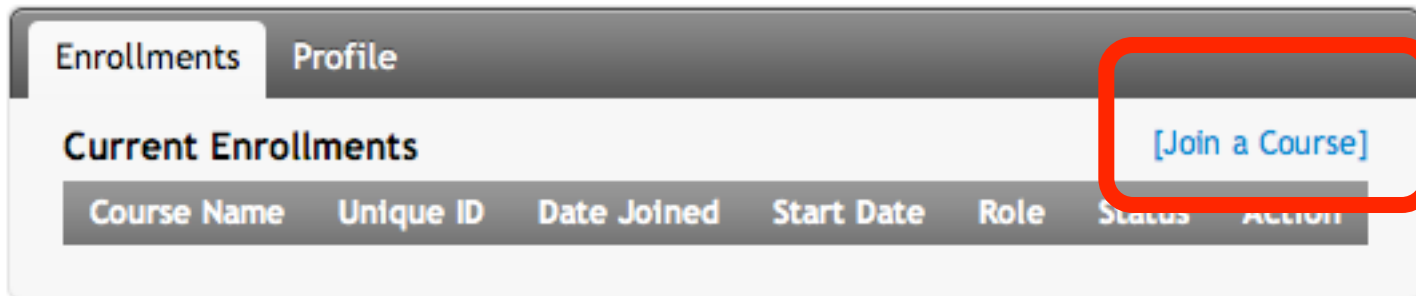
Email:

.....

# Enroll in this course

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

*Welcome JANE TEST*



The screenshot shows a user interface for a course management system. At the top, there is a header bar with two tabs: 'Enrollments' and 'Profile'. Below the tabs, the text 'Current Enrollments' is displayed. To the right of this text, a button labeled '[Join a Course]' is highlighted with a red rectangular box. Below the button, there is a table with the following columns: 'Course Name', 'Unique ID', 'Date Joined', 'Start Date', 'Role', 'Status', and 'Action'.

Course Name	Unique ID	Date Joined	Start Date	Role	Status	Action
-------------	-----------	-------------	------------	------	--------	--------

# Course Access Key

The COURSE ACCESS KEY for this course is:

P120-sp13

*Enroll in a Course*

Please enter the code associated  
with the course you wish to join:

*(This code is set by your instructor  
and is not the code printed in the  
textbook, or access card used to pay  
for access.)*

P120-sp13

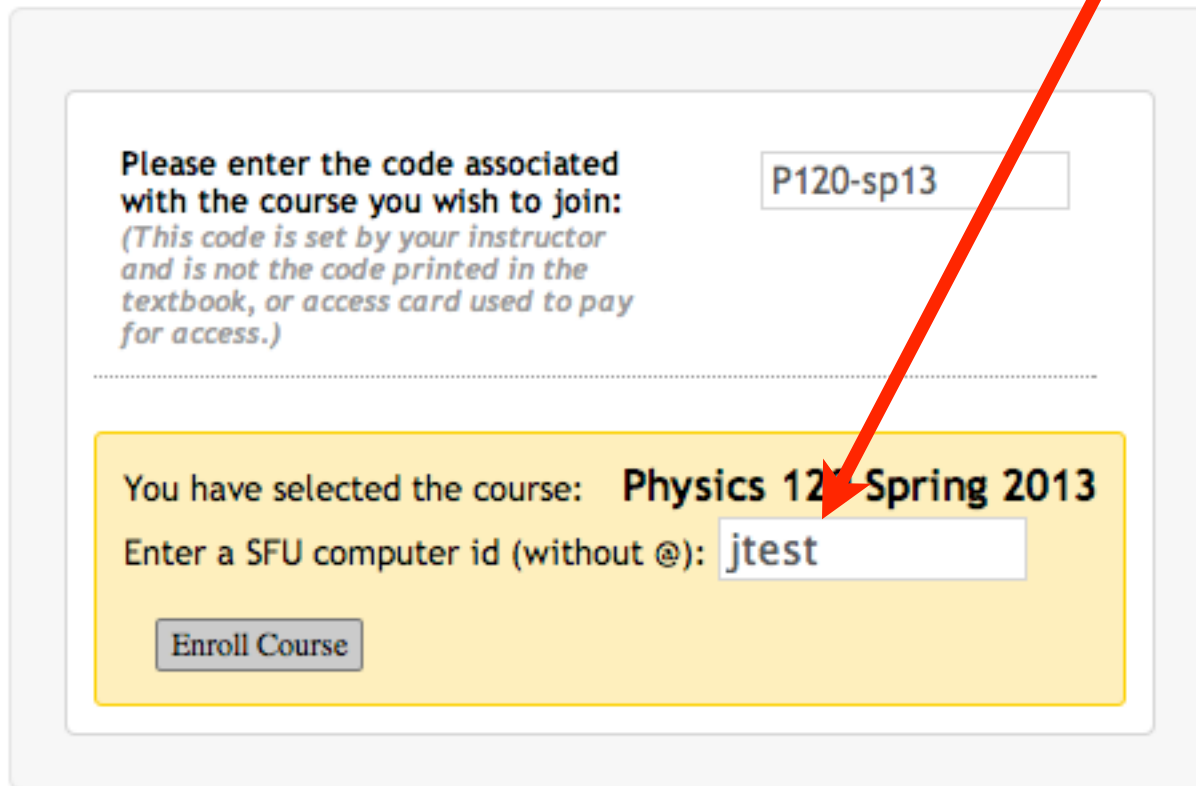
Get Course

# Enroll in this course

9. Enter your sfu computer id, for example: jtest

Do not enter your student number, hotmail address, etc

*Enroll in a Course*



Please enter the code associated with the course you wish to join:  
*(This code is set by your instructor and is not the code printed in the textbook, or access card used to pay for access.)*

P120-sp13

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You have selected the course: **Physics 120 Spring 2013**

Enter a SFU computer id (without @):

A red arrow points from the top right towards the "jtest" input field.

# Access smartPhysics

**Congratulations! You are now enrolled in your course!**

**You will be given **30 days** in which to access smartPhysics before having to purchase access or redeem an access code. This will provide you with a nice grace period should you drop the course.**

*Welcome JANE TEST*

Enrollments

Profile

## Current Enrollments

[\[Join a Course\]](#)

Course Name	Unique ID	Date Joined	Start Date	Role	Status	Action
Physics 120 Spring 2013 Simon Fraser University	jtest <a href="#">Edit</a>	Jan. 5, 2013	Jan. 7, 2013	Student	Demo 30 days left	<a href="#">Purchase</a> <a href="#">Redeem</a> <a href="#">Withdraw</a>

# Access smartPhysics

After the 30 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)

*Welcome JANE TEST*

Enrollments

Profile

## Current Enrollments

[\[Join a Course\]](#)

Course Name	Unique ID	Date Joined	Start Date	Role	Status	Action
Physics 120 Spring 2013 Simon Fraser University	jtest <a href="#">Edit</a>	Jan. 5, 2013	Jan. 7, 2013	Student	Demo 30 days left	<a href="#">Purchase</a> <a href="#">Redeem</a> <a href="#">Withdraw</a>

# enter the course

Welcome JANE TEST

Enrollments

Profile

## Current Enrollments

[\[Join a Course\]](#)

Course Name	Unique ID	Date Joined	Start Date	Role	Status	Action
Physics 120 Spring 2013 Simon Fraser University	jtest <a href="#">Edit</a>	Jan. 5, 2013	Jan. 7, 2013	Student	Demo 30 days left	<a href="#">Purchase</a> <a href="#">Redeem</a> <a href="#">Withdraw</a>

# you're in

The screenshot shows a web browser window with the URL <https://www.smartphysics.com/Course?enrollmentID=12968>. The page title is "Physics 120 Spring 2013" and the institution is "Simon Fraser University". The smartPhysics logo is in the top left. A navigation bar contains icons for home, calendar, and a red 'A' icon. The main content area is titled "Linear Dynamics" and features a sidebar with a list of topics: 1. 1-D Kinematics (selected), 2. Vectors and 2-D Kinematics, 3. Relative and Circular Motion, 4. Newton's Laws, 5. Forces and Free-Body Diagrams, and 6. Friction. Below this list are expandable sections for "Conservation Laws", "Rotational Dynamics", and "Applications". The "1. 1-D Kinematics" section is expanded, showing a table with assignments: PreLecture, Checkpoint, and Homework, each with a due date of Jan. 9 at 8:00 AM. The Homework entry also includes a start date of Jan. 6 at 11:59 PM and a due date of Jan. 13 at 11:59 PM. On the right side, there is a "Daily Planner" section showing a schedule for Wednesday, January 9 (8:00 am PreLecture - 1-D Kinematics, 8:00 am Checkpoint - 1-D Kinematics), Sunday, January 13 (11:59 pm Homework - 1-D Kinematics), Monday, January 14 (8:00 am PreLecture - 2-D Kinematics, 8:00 am Checkpoint - Vectors And 2-D Kinematics), and Wednesday, January 16 (8:00 am PreLecture - Relative And Circular Motion, 8:00 am Checkpoint - Relative And Circular Motion). Below the planner is an "Announcements" section.

Physics 120 Spring 2013

smartPhysics

Physics 120 Spring 2013  
Simon Fraser University

Linear Dynamics

1. 1-D Kinematics

PreLecture	<input type="text"/>	Due: Jan. 9 at 8:00 AM
Checkpoint	<input type="text"/>	Due: Jan. 9 at 8:00 AM
Homework	<input type="text"/>	Start: Jan. 6 at 11:59 PM / Due: Jan. 13 at 11:59 PM

2. Vectors and 2-D Kinematics

3. Relative and Circular Motion

4. Newton's Laws

5. Forces and Free-Body Diagrams

6. Friction

+ Conservation Laws

+ Rotational Dynamics

+ Applications

Daily Planner

Wednesday, January 9

8:00 am PreLecture - 1-D Kinematics

8:00 am Checkpoint - 1-D Kinematics

Sunday, January 13

11:59 pm Homework - 1-D Kinematics

Monday, January 14

8:00 am PreLecture - 2-D Kinematics

8:00 am Checkpoint - Vectors And 2-D Kinematics

Wednesday, January 16

8:00 am PreLecture - Relative And Circular Motion

8:00 am Checkpoint - Relative And Circular Motion

Announcements

# Need live help?

**The smartPhysics technical support team is ready and able to help you and is available 7 days a week by phone and email.**



Instant Technical Support  
1.800.936.6899

**[techsupport@bfpwpub.com](mailto:techsupport@bfpwpub.com)**

# January 2013

[Show All](#)
[Download Calendar](#)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30	31	January 1	2	3	4	5
6	7 9:30 AM First Lecture	8	9 8:00 AM 1-D Kinematics 8:00 AM 1-D Kinematics	10	11	12
13 11:59 PM 1-D Kinematics	14 8:00 AM 2-D Kinematics 8:00 AM Vectors and 2-D Kinematics	15	16 8:00 AM Relative and Circular Motion 8:00 AM Relative and Circular Motion	17	18	19
20 11:59 PM Vectors and 2-D Kinematics 11:59 PM Relative and Circular Motion	21 8:00 AM Newton's Laws 8:00 AM Newton's Laws	22	23 8:00 AM Forces and Free-Body Diagrams 8:00 AM Forces and Free-Body Diagrams	24	25	26
27	28	29	30	31	February 1	2

# 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.

## 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%

# Tutorials

Tuesday or Thursday

There are 9 sections: D101–D106, D109–D111

Start **tomorrow**

Tutorial Activities (problems etc.) count 5% of your mark.

TAs are Shima Aghara, Mohammad Dehghani Ashkezari and Jamie Horton

# Lectures

50 min of uninterrupted excitement

Mon, Wed, Fri.

Mon & Wed introduce new material

Fri for demonstrations, problems and questions

Bring an iClicker: either iClicker1 or iClicker2

An extra set of batteries is a good idea.

Register yours online with its serial number  
and your sfu id: [iclicker.com](http://iclicker.com)

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



# Course Schedule on WebCT

Phys120-Spring 2013

Date	Unit	Topic	Tipler&Mosca
Mon, Jan 7, 13	LECTURE	First Lecture	Ch 1 (all)
Wed, Jan 9, 13	Unit 1 - Lecture	1-D Kinematics	Ch 2.1–2.4
Fri, Jan 11, 13	Problems,Demos,Discussion		
Mon, Jan 14, 13	Unit 2 - Lecture	2-D Kinematics	3.1,3.3
Wed, Jan 16, 13	Unit 3 - Lecture	Relative and Circular Motion	3.4
Fri, Jan 18, 13	Problems,Demos,Discussion		
Mon, Jan 21, 13	Unit 4 - Lecture	Newton's Laws	4.1–4.4,4.7
Wed, Jan 23, 13	Unit 5 - Lecture	Forces and Free-Body Diagrams	4.5
Fri, Jan 25, 13	Problems,Demos,Discussion		4.6,4.8
Mon, Jan 28, 13	Unit 6 - Lecture	Friction	5.1
Wed, Jan 30, 13	Unit 7 - Lecture	Work and Kinetic Energy	6.1–6.4
Fri, Feb 1, 13	Problems,Demos,Discussion		5.3
Mon, Feb 4, 13	Unit 8 - Lecture	Conservative Forces and Potential Energy	7.1
Wed, Feb 6, 13	Unit 9 - Lecture	Work and Potential Energy	7.2,7.3
Fri, Feb 8, 13	EXAM	Midterm 1	
Mon, Feb 11, 13	Family Day		
Wed, Feb 13, 13	Reading Break		
Fri, Feb 15, 13			
Mon, Feb 18, 13	Unit 10 - Lecture	Center of Mass	5.5
Wed, Feb 20, 13	Unit 11 - Lecture	Conservation of Momentum	8.1
Fri, Feb 22, 13	Problems,Demos,Discussion		
Mon, Feb 25, 13	Unit 12 - Lecture	Elastic Collisions	8.2–8.3
Wed, Feb 27, 13	Unit 13 - Lecture	Collisions, Impulse, and Ref. Frames	8.4
Fri, Mar 1, 13	Problems,Demos,Discussion		
Mon, Mar 4, 13	Unit 14 - Lecture	Kinematics and Moment of Inertia	9.1–9.3
Wed, Mar 6, 13	Unit 15 - Lecture	Parallel Axis Theorem and Torque	
Fri, Mar 8, 13	EXAM	Midterm 2	
Mon, Mar 11, 13	Unit 16 - Lecture	Rotational Dynamics	9.4–9.6
Wed, Mar 13, 13	Unit 17 - Lecture	Rotational Statics	12.1–12.3

# Midterms

2 of them

50 min long, in this room

combo of multiple choice (10) & problems (2)

cumulative (ie, stuff we did before midterm 1

might be needed for midterm 2—don't wipe  
your brain after each midterm!)

# Grading

smartPhysics: 10%

Prelectures, checkpoints, homework

iClicker Questions: 5%

1 pt if you answer a question, another 1 pt if you get it right

tutorials: 5%

problems worked in the tutorial in groups

Midterm I Exam: 15%, Midterm II Exam: 15%

Final Exam: 50%