

# PHYSICS 2302.1

## Mechanics I, Fall 2019

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Instructor:	David Clarke	AT 311, 420-5830, <a href="mailto:dclarke@ap.smu.ca">dclarke@ap.smu.ca</a>
Lectures:	LA 282	T, $\Theta$ : 4:00–5:15 pm
Office Hours:	AT 311	M, W: 2:30–5:30 pm
Required text:	Fowles & Cassiday's <i>Analytical Mechanics</i> (any edition)	
Course website:	<a href="http://www.ap.smu.ca/~dclarke/PHYS2302">www.ap.smu.ca/~dclarke/PHYS2302</a>	
Hand-outs:	various PDF files made available from the website	
Assignments:	Assigned on Tuesdays, due one week later; no late assignments accepted once solutions are posted on-line.	
Assessment:	eight assignments	15%
	two midterms	20% each
	final exam	45%

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## Outline

### Part I: Introduction and Review (Ch. 1 & 2; 6 classes)

- vectors, coordinates
- Newton's laws, free-body diagrams
- separable first order ODEs
- position- and velocity-dependent forces

### Part II: Oscillators (Chapter 3; 7 classes)

- second order ODEs, inhomogeneous ODEs
- simple harmonic motion

### Midterm I: Tuesday, October 15

- damped harmonic motion
- forced harmonic motion, resonance

### Part III: Motion of a particle in 3-D (Chapter 4; 5 classes)

- elements of vector calculus
- Work-Kinetic theorem, conservation of mechanical energy
- constrained motion,
- projectiles, multi-dimensional oscillators, electromagnetic forces

### Midterm II: Tuesday, November 19

### Part IV: Accelerating reference frames (Chapter 5; 4 classes)

- translational and rotational acceleration
- dynamics in accelerating frames
- effects of Earth's rotation