

Leaders in the Making

College of Arts and Sciences – Natural Sciences – University Physics – Dr. Scott Schneider

# PHY3414 Analytical Mechanics Course Syllabus\*

### \*Students may want to **print** this syllabus in order to have all key course information available off-line. Rev 08/29/12

Course Information:	Course Number: / Course Name:       PHY3414 Analytical Mechanics         Classroom:       S223       CRN:       1600
Instructor Contact Information:	Name:Dr. Scott SchneiderTitle:Associate Professor of PhysicsTelephone:x3545Cell:248-880-7177E-mail:schneide@ltu.eduOffice Location / Hours:S234 - Office Hours TBD
Meeting Dates:	<i>Tuesday/Thursday 10:00AM-11:50AM – S223</i> Final exam day: Thursday Dec 20 <sup>th</sup> 10:30am-12:20pm
Course Prerequisites:	Undergraduate level MCS 2423 Minimum Grade of D- and Undergraduate level PHY 2423 Minimum Grade of D-
Course Text Books and Other Materials	Required Text(s): ANALYTICAL MECHANICS, Grant Fowles (7th Ed.) You might want to do some clever searching for the text – there might be paperback versions out there – far cheaper than hardback (check with former students!).
Course website:	http://vnatsci.ltu.edu/s schneider/analytical.shtml (In addition to BB course page)
Course Description	A study of Newton's laws of motion applied to particles and systems, with an emphasis on velocity-dependent forces, forced/free/damped oscillations, accelerated/rotating systems, gravitational forces, and Lagrangian.
<b>Course Objectives</b>	* Course Objectives are posted in the Bb course page
Technical Support:	For software, hardware or Blackboard issues, contact the LTU Help Desk Telephone: 248-204-2330 E-mail: <u>helpdesk@ltu.edu</u>
Academic Support:	My office hours (held in AAC) will be posted on Bb site Academic Achievement Center Telephone: 248-204-4120 E-mail: <u>aac@ltu.edu</u>
Student Services Support:	Office of Student Affairs Telephone: 248-204-4100 Website: <u>http://www.ltu.edu/student affairs/index.asp</u> <u>LTU Hotline</u> : To check for school closing, Blackboard/Banner availability, or other issues call the LTU Hotline at 248-204-2222. Campus Safety Services 248-204-3945
Course Policies	<ol> <li>Assistance - Students are encouraged to contact the instructor during office hours, after class or at home if they are having difficulties in the course.</li> <li>Conduct - Students are expected to conduct themselves in a professional manner at all times and to be courteous to their classmates. The use of objectionable language is strictly prohibited. Additionally, cell phones, pagers, and other personal electronics should be set to silent mode. Additional information covering the Student Code of Conduct can be accessed at <u>http://www.ltu.edu/student_affairs/student_conduct.asp</u></li> <li>Academic Integrity - Students are expected to do their own work at all times. While it is acceptable to discuss homework and case assignments with others, students should first attempt to solve assigned work themselves. In no case will copied work from another be considered acceptable. With respect to papers, students must submit original work done specifically for this course by the student. Any cheating on exams or papers will result in a score of zero and, potentially, a referral to the Dean. For more information visit Academic Honor Code at <u>http://www.ltu.edu/currentstudents/honor_code.asp</u></li> </ol>

<b>Student Evaluation</b>			_	Percentage	Letter Grade
	Assignments	Points		>=95	А
	Tests x3 $-$ 100 pts each	~300		>=90 <95	A-
	Homowork v7 10 pto coob	70	-	>=87 <90	B+
	Final event 400 pts each	~70		>=83 <87	В
	(60% in-class 40% take-home)	~100		>=80 <83	В-
	Total Points	~470		>=77 <80	C+
			1	>=73 <77	С
				>=70 <73	C-
				>=61 <70	D
				<61	F
Course Schedule	A detailed course schedule is posted on the Bb course page.				
Laptop usage	We will be using the laptops in class, nearly every period, for collaborative activities.				
Drop day with "W"	Wednesday November 28 <sup>th</sup> , 2012				
Daylight Savings	November 4th, 2012 ( <u>Click here</u> - check out the cool "nodes"!.)				
	http://www.webexhibits.org/daylig	htsaving/	b.html		

### Rough General Schedule (test due dates to be added):

<u>Week</u>		Dates Topics
1	08/30	Chapter 1 – Fundamentals [vector derivatives, plane polar coordinates]
2	09/04 + 09/06	Chapter 2 – Newtonian Mechanics [1D forces F(x) and F(v)] (Tutorials)
3	09/11 + 09/13	Chapter 3 – Oscillations [damped, forced, nonlinear/chaotic] (Tutorials)
Tes	t 1	
4	09/18 + 09/20	Chapter 4 – General Motion in 3D [air resistance, harm osc 2D/3D] (Tutorials)
5	09/25 + 09/27	Chapter 4 continued
6	10/02 + 10/04	Chapter 5 – Accelerated Coordinate systems [effect of Earth's rotation] (Tutorials)
7	10/09 + 10/11	Chapter 5 continued
Tes	st 2	
8	10/16 + 10/18	Chapter 6 – Gravitation and Central Forces [Kepler, orbits, stability] (Tutorials)
9	10/23 + 11/25	Chapter 6 continued
10	10/30 + 11/01	Chapter 7 – Dynamics of Systems of Particles [lin/ang mom, collisions]
11	11/06 + 11/08	Chapter 8 – Mechanics of Rigid Bodies - Planar motion
12	11/13 + 11/15	Chapter 10 – Lagrangian Mechanics [gen coords, ignorable coords] (Tutorials)
13	11/20	Chapter 10 continued
Tes	t 3	
14	11/26 + 11/28	Chapter 11 – Oscillating systems [coupled harmonic oscillators]
15	12/04 + 12/06	Chapter 3 – Fourier analysis (nonsinusoidal driving force) (Tutorials)
16	12/11 + 12/13	Chapter 3 – Nonlinear Chaos Oscillations

17 12/17-12/21 Finals Week

We will occasionally be working in-class with some Lecture Tutorials in Analytical Mechanics – these will be announced ahead of time – they are roughly indicated in the schedule above. There will also be "pretest" and "homework" parts to the tutorials – there will be a detailed schedule available where you find this syllabus.

# Description of Assignments/Responsibilities

#### Text Reading

It is important to be prepared for the class sessions (since there will be some activity-based sessions, as opposed to lecture).

#### In-class tutorials

I have a series of in-class analytical mechanics tutorials that we will work on during some of the class sessions.

#### Take-home Homework

Along with the in-class tutorials – there will be ungraded "pre-tests" – but there will be follow-up graded homework assignments (connected to the tutorials). *Homework assignments are worth 10 points and make up roughly 15% of your grade*.

#### Hour Exams

There are three exams during the term – they are split 60%/40% for inclass/takehome portions of the exams. The inclass portions will be open book, but obviously timed. *Tests are worth 100 points and make up roughly 65% of your grade*.

#### Final exam

The final exam questions should roughly align with the major topics of the course, and the relative time spent on the topics – it will also have a 60/40 split. *The final is worth 100 points and makes up roughly 20% of your grade*.