2019 SPRING – PHYS 8011 Classical mechanics I (as of Jan. 17/2019)

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

Course Description:	**The mechanics of particles and rigid bodies is developed using generalized coordinates, D'Alembert's principle and Hamilton's principle. Symmetry principles and conservation laws are emphasized.**
Athena Title:	CLASSICAL MECHAN I
Prerequisite:	PHYS 4102/6102
Corequisite	PHYS 8401
Grading System:	A-F (Traditional)
Instructor:	Dr. Andrei Galiautdinov
Office:	220
Email:	ag@physast.uga.edu
Sections:	**27362** 11:00a – 12:15p TR
Office hours:	12:05p – 01:05p MW
E-journals access:	*http://www.libs.uga.edu/ejournals/*
Academic Honesty:	*As a University of Georgia student, you have agreed to abide by the University's academic honesty policy, "A Culture of Honesty," and the Student Honor Code. All academic work must meet the standards described in "A Culture of Honesty" found at: www.uga.edu/honesty. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor.*
Attendance:	Mandatory
Text:	H. Goldstein, C. P. Poole, J. L. Safko, *Classical Mechanics*, 3rd edition (Pearson, 2002).
Instructional style:	Q&A concept discussion, Q&A problem-solving techniques, etc.
Homework rules:	1. By 3:00 p.m. on a Sunday prior to the corresponding week, submit by email your pre-class hand-written notes and three (3) questions you'd like to be answered in class. 2. At 11:00 a m. at start of class, submit your problem-solving HMWK. 3. No late submission allowed.
Homework grading method:	One HMWK problem chosen at random.
Grading policy:	**–1% FOR EACH ABSENCE** **20% Your hand-written pre-class notes** **30% Your pre-class questions** **50% Your problem-solving HMWK** ➢ FINAL EXAM: By request, to make up one (1) missed HMWK assignment. Format: problem-solving (of my choosing).
Cut-offs:	F: [0, 60) D: [60, 68) C-: [68, 70) C: [70, 75) C+: [75, 78) B-: [78, 80) B: [80, 85) B+: [85, 88) A-: [88, 90) A: [90, 100] *NOTE: No rounding; 89.99 = A-, etc.*
Grades:	Your grades will be posted on the eLC-New, http://elcnew.uga.edu

2019 SPRING Schedule (preliminary, including the number of the homework assignments; likely subject to change/adjustment):

Week	Day	Date	Topic
0	W	Jan. 09	
	R	Jan. 10	**Chapter 1: Survey of Elementary Principles** ➢ Intro to this course
	F	Jan. 11	

1	M	Jan. 14	**5:00pm – Secs. 1.1, 1.2 Notes& Questions Due**
	T	Jan. 15	➢ 1.1 Mechanics of a particle ➢ 1.2 Mechanics of a system of particles **D r o p/A d d e n d s**
	W	Jan. 16	**5:00pm – Sec. 1.3 Notes& Questions Due**
	R	Jan. 17	**11:00am – HMWK 01 Due** ➢ 1.3 Constraints
	F	Jan. 18	**Sunday, 3:00pm – Secs. 1.4, 1.5, 1.6 Notes & Questions Due**
2	M	Jan. 21	M L K D a y
	T	Jan. 22	➢ 1.4 D'Alembert's Principle and Lagrange's Equations
	W	Jan. 23	
	R	Jan. 24	**11:00am – HMWK 02 Due** ➢ 1.5 Velocity-Dependent Potentials and the Dissipation Function ➢ 1.6 Simple Applications of the Lagrangian Formulation
	F	Jan. 25	**Sunday, 3:00pm – Secs. 2.1, 2.2, 2.3 Notes & Questions Due**
3	M	Jan. 28	
	T	Jan. 29	**Chapter 2: Variational Principles and Lagrange's Equations** ➢ 2.1 Hamilton's Principle ➢ 2.2 Some Techniques of the Calculus of Variations
	W	Jan. 30	
	R	Jan. 31	➢ 2.3 Derivation of Lagrange's Equations from Hamilton's Principle
	F	Feb. 01	**Sunday, 3:00pm – Secs. 2.4, 2.6, 2.7 Notes & Questions Due**
4	M	Feb. 04	
	T	Feb. 05	➢ 2.4 Extending Hamilton's Principle to Systems with Constraints
	W	Feb. 06	
	R	Feb. 07	**11:00am – HMWK 03 Due** ➢ 2.6 Conservation Theorems and Symmetry Properties ➢ 2.7 Energy Function and the Conservation of Energy
	F	Feb. 08	**Sunday, 3:00pm – Secs. 4.1, 4.2 Notes & Questions Due**
5	M	Feb. 11	
	T	Feb. 12	**Chapter 4: The Kinematics of Rigid Body Motion** ➢ 4.1 The Independent Coordinates of a Rigid Body
	W	Feb. 13	
	R	Feb. 14	➢ 4.2 Orthogonal Transformations
	F	Feb. 15	**Sunday, 3:00pm – Secs. 4.3, 4.4, 4.5 Notes & Questions Due**
6	M	Feb. 18	
	T	Feb. 19	➢ 4.3 Formal Properties of the Transformation Matrix
	W	Feb. 20	
	R	Feb. 21	**11:00am – HMWK 04 Due** ➢ 4.4 The Euler Angles ➢ 4.5 The Cayley-Klein Parameters and Related Quantities
	F	Feb. 22	**Sunday, 3:00pm – Secs. 4.6, 4.7 Notes & Questions Due**
7	M	Feb. 25	
	T	Feb. 26	➢ 4.6 Euler's Theorem on the Motion of the Rigid Body
	W	Feb. 27	
	R	Feb. 28	➢ 4.7 Finite Rotations
	F	Mar. 01	**Sunday, 3:00pm – Secs. 4.8, 4.9, 4.10 Notes & Questions Due**
8	M	Mar. 04	
	T	Mar. 05	➢ 4.8 Infinitesimal Rotations ➢ 4.9 Rate of Change of a Vector

	W	Mar. 06	
	R	Mar. 07	**11:00am – HMWK 05 Due** ➢ 4.10 The Coriolis Effect
	F	Mar. 08	
9	M	Mar. 11	
	T	Mar. 12	
	W	Mar. 13	Spring Break
	R	Mar. 14	
	F	Mar. 15	**Sunday, 3:00pm – Secs. 5.1, 5.2 Notes & Questions Due**
10	M	Mar. 18	
	T	Mar. 19	**Chapter 5: The Rigid Body Equations of Motion** ➢ 5.1 Angular Momentum and Kinetic Energy of Motion about a Point
	W	Mar. 20	
	R	Mar. 21	**11:00am – HMWK 06 Due** ➢ 5.2 Tensors **Withdrawal deadline**
	F	Mar. 22	**Sunday, 3:00pm – Secs. 5.3, 5.4 Notes & Questions Due**
11	M	Mar. 25	
	T	Mar. 26	➢ 5.3 The Inertia Tensor and the Moment of Inertia
	W	Mar. 27	
	R	Mar. 28	➢ 5.4 The Eigenvalues of the Inertia Tensor and the Principal Axis Transformation
	F	Mar. 29	**Sunday, 3:00pm – Secs. 5.5, 5.6 Notes & Questions Due**
12	M	Apr. 01	
	T	Apr. 02	➢ 5.5 Solving Rigid Body Problems and the Euler Equations of Motion
	W	Apr. 03	
	R	Apr. 04	**11:00am – HMWK 07 Due** ➢ 5.6 Torque-Free Motion of a Rigid Body
	F	Apr. 05	**Sunday, 3:00pm – Secs. 5.7, 5.9 Notes & Questions Due**
13	M	Apr. 08	
	T	Apr. 09	➢ 5.7 The Heavy Symmetrical Top with One Point Fixed
	W	Apr. 10	
	R	Apr. 11	➢ 5.9 Precession of Systems of Charges in a Magnetic Field
	F	Apr. 12	**Sunday, 3:00pm – Secs. 8.1, 8.2 Notes & Questions Due**
14	M	Apr. 15	
	T	Apr. 16	**Chapter 8: The Hamilton Equations of Motion** ➢ 8.1 Legendre Transformations and the Hamilton Equations of Motion
	W	Apr. 17	
	R	Apr. 18	**11:00am – HMWK 08 Due** ➢ 8.2 Cyclic coordinates and Conservation Theorems
	F	Apr. 19	**Sunday, 3:00pm – Secs. 8.3, 8.5 Notes & Questions Due**
15	M	Apr. 22	
	T	Apr. 23	➢ 8.3 Routh's Procedure
	W	Apr. 24	
	R	Apr. 25	**11:00am – HMWK 09 Due** ➢ 8.5 Derivation of Hamilton's Equations from a Variational Principle
	F	Apr. 26	**Sunday, 3:00pm – Secs. 8.6 Notes & Questions Due**
16	M	Apr. 29	
	T	Apr. 30	➢ 8.6 The Principle of Least Action **Classes End**
	W	May 01	**Reading Day**
	R	May 02	**FINAL EXAM: 12:00 – 03:00pm**

	F	May 03	
17	M	May 06	
	T	May 07	
	W	May 08	
	R	May 09	
	F	May 10	Commencement
18	**M**	**May 13**	**Grades due (5 PM)**
	T	May 14	
	W	May 15	
	R	May 16	
	F	May 17	
19	M	May 20	
	T	May 21	

Spring Semester 2019
Based on 50 minutes classes (MWF), 75 minutes classes (TTH), 15 weeks of classes + Exams

Orientation/Advisement	January 7	Monday
Registration	January 8	Tuesday
Classes Begin	January 9	Wednesday
Drop/Add	January 9-15	Wednesday - Tuesday
Holiday: Martin Luther King Jr. Day	January 21	Monday
Midterm	March 1	Friday
Last Day of Classes Prior to Spring Break	March 8	Friday
Spring Break - No Classes	March 11-15	Monday – Friday
Classes Resume	March 18	Monday
Withdrawal Deadline	March 21	Thursday
Classes End	April 30	Tuesday
Reading Day	May 1	Wednesday
Final Exams	May 2-8	Thursday - Wednesday
Commencement	May 10	Friday
Grades Due	May 13	Monday, 12:00 PM

Spring 2019 – Regular Final Exam Schedule

Monday/Wednesday/Friday Classes		**Tuesday/Thursday Classes**	
Meeting Time	**Exam**	**Meeting Time**	**Exam**
8:00 am	Mon., May 6 8:00 - 11:00 am	8:00 am	Thur., May 2 8:00 - 11:00 am
9:05 am	Wed., May 8 8:00 - 11:00 am	9:30 am	Tues., May 7 8:00 - 11:00 am
10:10 am	Fri., May 3 8:00 - 11:00 am	**11:00 am**	**Thur., May 2 12:00 - 3:00 pm**

Monday/Wednesday/Friday Classes		Tuesday/Thursday Classes	
Meeting Time	**Exam**	**Meeting Time**	**Exam**
11:15 am	Mon., May 6 12:00 - 3:00 pm	12:30 pm	Tues., May 7 12:00 - 3:00 pm
12:20 pm	Wed., May 8 12:00 - 3:00 pm	2:00 pm	Thur., May 2 3:30 - 6:30 pm
1:25 pm	Fri., May 3 12:00 - 3:00 pm	3:30 pm	Tues., May 7 3:30 - 6:30 pm
2:30 pm	Mon., May 6 3:30 - 6:30 pm	5:00 pm	Mon., May 6 7:00 - 10:00 pm
3:35 pm	Wed., May 8 3:30 – 6:30 pm	6:30 pm	Wed., May 8 7:00 - 10:00 pm
4:40 pm	Fri., May 3 3:30 - 6:30 pm	8:00 pm	Mon., May 6 7:00 - 10:00 pm
5:45 pm	Fri., May 3 7:00 - 10:00 pm	9:30 pm	Wed., May 8 7:00 - 10:00 pm
6:50 pm	Tues., May 7 7:00 - 10:00 pm		
7:55 pm	Tues., May 7 7:00 - 10:00 pm		
9:00 pm	Thur., May 2 7:00 - 10:00 pm		