Physics 5103 – Advanced Mechanics – Fall 2018 – 1st Notice and Syllabus

The first class is scheduled for Tuesday Aug. 20 at 2:00-3:20 PM
The location is PHYS 241 (Computer Graphics Lab) for all Monday and Wednesday 12:30-1:50 PM classes

The 2018 Text *Classical Mechanics with a BANG!* is online as are 2018 lecture notes, apps, and class videos.
Units 1 through 8 will be printed for class as needed. Price for the whole semester will be free! Thanks to
TeleFees and Ray Hughes Graduate Fund.

2018 version of Units 1-8 text and lectures with Table of Contents and Preface are also available online.
Online site should be click-on access: click once, again on title page, and then on table(s) of contents.
LearnIt: http://www.uark.edu/ua/modphys/markup/CMwBang_TitlePage.html
LearnIt lets you stream or download download earlier lecture slides and text units. It also has class videos, web-apps, and related texts, lectures or papers. There are also some earlier exercises and exam material. Class video
link: Mechanics class videos This *You-Tube* site generally displays most recent class first.

Summary of Course and Text structure
A 15-page Preface in Unit 1 has a detailed pictorial thumbnail sketch of this course and Units 1-8. The rest of
Unit 1 is a review of undergraduate mechanics and mathematical physics with a number of novel twists. It also
previews the graduate mechanics in Unit 2 thru Unit 8 makes classical-quantum connections.
Unit 1 has 12 chapters that will occupy about 1/3 of the semester. The first 6 or 7 chapters will take 2 or 3 weeks.
In this time you should be able to see whether you need more remediation and may be better off first taking the
undergraduate mechanics class instead. That said, note that the reason for writing Unit 1 is to speed up graduate
progress and let you take this course and be ready sooner to begin PhD research.

Summary of Unit 1 topics
Unit 1 Chapters 1 thru 6 review basic momentum, kinetic energy, potential energy using mostly plane geometry,
analytic geometry, that is related to vector calculus and linear algebra.
Unit 1 Chapters 7 thru 12 review the basic use of potential fields and vector calculus again using mostly plane
geometry, analytic geometry, and linear algebra.
The longest Unit 1 chapter, Chapter 10, reviews complex variables and fields in a way that gives a new view of
vector calculus likely to be useful for your other classes.
Unit 1 Chapter 11 reviews rotation and oscillation in 2-dimensions in a way that sets the stage for several later
developments in Units 2 thru 8, and particularly Unit 4.
Unit 1 Chapter 12 is a geometric development based on Ch. 11 of the Lagrangian, Hamiltonian, and Poincare
functions that will occupy the rest of the book. Units 2, 3 and 7 are extensions of this chapter.
Be sure to read the 15-page Preface to Unit 1 and refer back to it as the course proceeds.
The key to this book and course is the logic, development, and physical intuition and connections of the
formulation, the best way I know to master the mathematical formalism and the physics it represents.

General course information
Office Hours will be before and after class (1:00-2:00 and 3:20-4:30) Monday and Wednesday or by appointment.
Generally I have an open door policy at the Computer Graphics Lab Rm 241 most afternoons when I don't have
to be elsewhere. The grading is a point system divided equally between weekly homework, 2 midterm exams, and
the final exam. 1st mid-term would be at end of Unit 1 around Oct. 29.

Student information
To help me be better acquainted, please provide personal information by filling out following form:

Name: _____ Name used in conversation: _____ State and/or Country of origin:_____

Undergraduate School and Major:

Area(s) of physics you plan to pursue and/or ones you find most interesting:

Hobbies, sports, skills, *(etc.)²,*:

What are some things you hope to get from this class?

We may need make-up times. So, please fill out your schedule and return to me as soon as you can.

	Monday	*Tuesday*	*Wednesday*	*Thursday*	*Friday*
7 am	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)
8 am	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)
9 am	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)
10 am	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)
11 am	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)
12	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)
1 pm	(___*office*___) (_____)	(_____) (_____)	(___*office*___) (_____)	(_____) (_____)	(_____) (_____)
2 pm	(___CM___) (___CM___)	(_____) (_____)	(___CM___) (___CM___)	(_____) (_____)	(_____) (_____)
3 pm	(___CM___) (___*office*___)	(_____) (_____)	(___CM___) (___*office*___)	(_____) (_____)	(_____) (_____)
4 pm	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)
5 pm	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)
6	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)
7 pm	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)	(_____) (_____)