Syllabus

Course Phy.261-101 math Enhancement for Physics 1

Catalog Course Description:
Additional aspects in mechanics (calculus, array vectors and matrices, distributions) to make College Physics 1 equivalent to University Physics 1. 1 hour lecture.

Credits 1 Credit (undergraduate)

Pre-req: PHY 201 and PHY 202 with "C" or better, MTH 229 with "C" or better.

Term/Year 2022 Fall

Class Meets: M__ , 3:30-4:30pm, Aug.22 till Dec.02 + Dec.05 @3^{30} in Science 179

MU's Academic Calendar lists other important dates (at http://www.marshall.edu/academic-calendar/)

Instructor: Curt W. Foltz , office Sci.159 , email foltzc@marshall.edu , phone (304) 696-2519
office hours: M_W_F 9:30–10:30 ; _T_R_ 10–12 & 1–3pm ; _W_F 3:30–5pm ; __F 11:30–1pm

Required Text and Materials *University Physics*, 14th ed, by Young & Freedman, © Pearson, 2016 ,
or other comparable University Physics textbook (*e.g*, with "Scientists" or "Engineers" in title)
non-programmable scientific calculator (not cell phone app!) … with x^2 , $\sqrt{x}$, $\sin^{-1}(x)$ buttons
internet access: to send & receive emails; read course topic pages & browse to links beyond them;
that course web-page is at **www.science.marshall.edu/foltzc/261_22f.htm**
time & effort: outside of class, 2 or 3 effective hours/week to do assignments & practice problems.

Student Learning Outcomes Students will:	Practiced	Assessed
know basic facts and theories about mechanical strength & motion, wave & thermal phenomena	classwork & homework	exams
identify molecule stress & strain, and rotations	classwork & homework	exams
relate concepts & explanations by math & logic	classwork & homework	exams
read & interpret verbal descriptions accurately	classwork & homework	exams
recognize and use physics vocabulary correctly	classwork & homework	exams
predict Forces, times, Energies, and momenta for simplified model scenarios at many size scales	classwork & homework	exams
compare measured observables with predictions	classwork & homework	exams
synthesize rolling and wave descriptions	classwork & homework	exams
estimate some corrections to classical theory	classwork & homework	exams
judge the validity of model approximations	classwork & homework	exams
show how corrected measurements lead to different numerical predictions for observables	classwork & homework	exams

Course Requirements homework (50%) will be assignd each week, due at the next meeting**.**
Students will explain their solutions to hw, and participate (via discussion) amid the instructor's lectures.
Exam 1 (25%) will be Oct.10, Exam 2 (25%) will be Dec.05

Letter Grades: 100% > **A** > 90% > **B** > 80% > **C** > 70% > **D** > 60% > **F**

The instructor may **slightly lower** (but not raise) any letter-grade boundary at semester's end.

Attendance & active **participation** at all class meetings is required.

Students in quarantine or isolation will attend remotely *via Teams* with USB web-cam & microphone.

Missing several classes in a row will require extra effort afterward, to make up for the classes missed.

Policies - <u>valid for ALL Classes at Marshall</u>

By enrolling in this course, you agree to Marshall University policies.

Please read the full text of each policy listed below, at www.marshall.edu/academic-affairs/policies/

- Academic Dishonesty Policy
- Academic Dismissal Policy
- Academic Forgiveness Policy
- Academic Probation and Suspension Policy
- Affirmative Action Policy
- Dead Week Policy
- D/F Repeat Rule
- Excused Absence Policy for Undergraduates
- Inclement Weather Policy
- Sexual Harassment Policy
- Students with Disabilities (Policies and Procedures)
- University Computing Services Acceptable Use Policy

MU's official COVID-19 protocols and other updated info is at http://www.marshall.edu/coronavirus/

Course Schedule:

week 1	**i,j,k** unit vectors, column & row vectors, cross-product determinant method for Torque	4%
week 2	3-d static Force & Torque situations with posts, beams, ropes & springs ; internal stresses	4%
week 3	derivatives of object-quantity time functions for $\boldsymbol{x}$, $m\boldsymbol{x}$; $\boldsymbol{v}$, $\boldsymbol{p}$; $\boldsymbol{a}$ …	4%
week 4	multiple objects & subjects for system & subsystem options; dry friction, drag, & viscosity	4%
week 5	integrate location functions for Action & Work ; PE's for gravity, spring, pressure, Gravity	4%
week 6	derivatives of $U(x)$ functions to find Force, equilibrium, & orbits (Lenard-Jones, Yukawa)	4%
week 7	oscillation from $U(x)$ curvature; frequency, angular frequency, phase; diff eq ; add solutions	4%
week 8	Exam 1 …	25%
week 9	integration to find & normalize M , MR , MR^2 internal … and M , U_G , $\boldsymbol{g}$ external	4%
week A	coupled oscillators & normal modes ; resonance ; damped & driven oscillators	4%
week B	stress & strain moduli , deformations as wave displacement amplitudes (trig multipliers)	4%
week C	wave function arguments ; stress & energy density amplitudes ; wave power flow	4%
week D	molecule heat capacity & latent heats ; KT pressure, ideal gas & Van der Waal corrections	4%
week E	Works done on PV in isobar, isochor, isotherm, adiabat ; TS for Rankine & Carnot	4%
finals week	Exam 2	25%