BROOKLYN COLLEGE / CITY UNIVERSITY OF NEW YORK

**Syllabus (8/27/2019): Phys 1005 – fall 2019**

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| Instructor: | Prof. Kai Shum | Phone: | 718-951-5000 Ext. 1227 |
| Lec. Room: | IA-234 (sec. ME); 3143N (sec. MT) | Time: | Mon/Wed (ME:11:00-11:50am); (MT, 12:50-1:40pm) |
| Reference Books: | 1. ***Physics Matters*** by J. Trefil & R. Hazen, 2007 J. Wiley & Sons 2. Chapters by OpenStax College (Rice University)   http://userhome.brooklyn.cuny.edu/kshum | Office Hours: | 2:30 – 3:30 pm on Tues. |
| Department: | Physics | Office: | 2156f-N |
| Lab.  Assignment: | <http://depthome.brooklyn.cuny.edu/physics/phylabs_new.html> | Instructor’s e-mail: | [kshum@brooklyn.cuny.edu](mailto:kshum@brooklyn.cuny.edu) |

**Planned work:**

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| **Week of** | **Topics** | **Exp. #** | **Exp. Description** | **Problems & Exercises** |
| 8/28-**9/5** | Kinematics of 1D/2D motion (Point-mass concept,  coordinates, distance, displacement, speed/velocity, &inertial frames) | 1 | Intro: theory/verification  (L = pi\*D) | Assigned in class |
| 9/4,9 | Newton’s 1st law, two-object problems, Acceleration, and de-accretion | 2 | Average speed:  v = ∆x/∆t | Assigned in class |
| 9/11,16 | Vertical motions with gravitational acceleration *a* = ± g  (g = 9.8 m/s^2) | 3 | v^2 ~ ∆x | Assigned in class |
| 9/18,23 | 2D projectile motions | 4 | Range = v0x × ∆t | Assigned in class |
| 9/25-10/7 | 2D projectile motions, Dynamics of motion: Newton’s 2nd (**F**net = m***a***) and 3rd law (action/reaction forces) | 5 | Newton’s 2nd law | Assigned in class |
| 10/2,**16** | Review | 6 | Kinetic and potential energy |  |
| 10/21,23 | **Exam#1 (10/21**), Solutions of exam#1 | 7 | Simple pendulum | Assigned in class |
| 10/28,30 | Gravitational force/normal force/friction force/tension,  Action/reaction force, concepts of systems/sub-systems | 8 | Heat & temperature  (Q = m c ∆T; Q = Rh ∆t) | Assigned in class |
| 11/4,6 | Energetics of motion: kinetic energy, gravitational potential energy, thermodynamics (1st law, heat, heat-capacity, temperature) | 9 | Latent-heat of evaporation  (Q = Lv ∆m) | Assigned in class |
| 11/11,13 | Thermodynamics (2nd law, latent-heat of evaporation/fusion), Ray-optics (mirrors) | 10 | Imaging  by a flat mirror (Ɵ = Ɵ’) | Assigned in class |
| 11/18,20 | Review, Ray-optics, **Exam#2 (11/18)** | 11 | Index of refraction |  |
| 11/25,27 | Solutions of exam#2, Coulomb’s law/Electric field/potential, electric current/power, ohm’s law | 12 | Ohm’s law (V = IR); P=IV | Assigned in class |
| 12/2,4 | Resistors in series and in parallel, nuclear physics | 13 | Radioactivity | Assigned in class |
| 12/9,11 | Ray-optics (spherical mirror imaging) | 14 | Lab exam (or spherical mirror imaging) |  |
|  | Final review |  |  |  |
|  | Reading day/final-exam |  |  |  |
|  | **Grades: Lec.-exams 40%, lab. 28%, and final 32%** |  |  |  |