*SYLLABUS*

# Physics 6C -- Physics for Life Science Majors: Light, Fluid, Thermodynamics, Modern Physics

## Winter 2015, Lecture 1 & 2

**Lectures:** Mon/Wed/Fri — Kinsey Pavilion 1220B
Lecture 1: 10:00-10:50 am — Lecture 2: 11:00-11:50 am

**Home Page:** https://ccle.ucla.edu/course/view/15W-PHYSICS6C-1 (UCLA CCLE)

**Instructor:** **Katsushi Arisaka**, Professor of Physics and Astronomy
**Office:** Knudsen Hall 4-146 — Phone: (310) 825-4925
E-mail: arisaka.6b@gmail.com
Homepage: http://home.physics.ucla.edu/~arisaka/home/

**Administrator:** Elaine Dolalas, Student Affairs Officer
PAB 1-707D — Phone: (310) 206-1447
E-mail: edolalas@physics.ucla.edu

**Secretary:** Nickie Ng, Assistant to Prof. Arisaka
Knudsen Hall 4-140A — Phone (310) 825-3441
E-mail: nickie@physics.ucla.edu

**Text Book:** Giancoli (9780558824518) Forth edition
Physics for Scientists & Engineers: Volume 1, 2 and 3

**Supplement:** Mastering Physics

**Grading:**

| | | |
|---|---|---|
| 1st Midterm | (Mon, 1/26 in class) | 10% |
| 2nd Midterm | (Wed, 2/18 in class) | 15% |
| Final | (Lec.1: Fri, 3/20, Lec.2: Thu 3/19) | 45% |
| Lab | | 15% |
| Homework | | 15% |

**Exams:** There are no make-up exams. The exams will contain only material presented in class by the instructor. At least, 50% of questions will be very similar to Quiz/Homework.

**Homework:** There will be web-based quiz (prior to the lecture) and homework for each lecture from Mastering Physics. (Course ID = ARISAKA6C2015)
Quiz is due at 10 am on the day of the new lecture. (Each question is 1 point.)
Homework is due at the beginning of the following week. (Each question is 5 points.)
Late Quiz/HW has 20% penalty per day of delay (up to 50% penalty).

# *Course Outline*

| Date | | Lecture | Chapter | Volume | Contents | Biologcal System | Applications | Lab |
|---|---|---|---|---|---|---|---|---|
| | | ***Review of E&M*** | | | | | | |
| Mon | *1/5* | 1 | 21-26 | 2 | Origin of Ourselves, Electric force | Structure, DNA, Brain | Computer, Cell phone | *(No meeting)* |
| Wed | *1/7* | 2 | 27-30 | 2 | Magnetism, Applications | | MRI, Mass Spec. | |
| | | ***Light and Optics*** | | | | | | |
| Fri | *1/9* | 3 | 31 | 2 | Electromgnetic Waves | Sunshine, Photosynthesis | TV, Radio, WiFi | |
| Mon | *1/12* | 4 | 32 | 2 | Light: Reflecton and Refraction | | | (1) Microwave Optics |
| Wed | *1/14* | 5 | 33 | 2 | Lens and Optical Instruments | Eyes and Vision | Telescope, Microscope | |
| Fri | *1/16* | 6 | 34 | 2 | Wave Nature of Light, Interference | | | |
| Mon | *1/19* | * | | | *(Holiday)* | | | (2) Geometrical Optics |
| Wed | *1/21* | 7 | 35 | 2 | Difraction and Polarization | | X-ray, spectroscopy | |
| Fri | *1/23* | 8 | * | 2 | Vision and Bio Imaging | Evolution of Brian/Eyes | Optical Imaging | |
| Mon | *1/26* | ***First Midterm*** | | | in class | | | (3) Physical Optics |
| | | ***Review of Mechanics*** | | | | | | |
| Wed | *1/28* | 9 | 1-6, 9-12 | 1 | Clasical Mechanics - Newton's Law | Muscles and Motions | | |
| Fri | *1/30* | 10 | 7-8, 14-16 | 1 | Energy, Oscillation, Waves, Sound | Metabolism, Hearing | Ultrasound, Music | |
| | | ***Thermodynamics*** | | | | | | |
| Mon | *2/2* | 11 | 13 | 1 | Atomic View, Fluid | Blood Flow, Heart | | *(C. Elegans Lab)* |
| Wed | *2/4* | 12 | 17 | 1 | Temperature, Ideal Gas | | | |
| Fri | *2/6* | 13 | 18 | 1 | Kinetic Theory of Gas | Diffusion, Molecular Motion | | |
| Mon | *2/9* | 14 | 19 | 1 | Heat, First Law of Thermodynamics | | Heating System | (4) Thermodynamics |
| Wed | *2/11* | 15 | 20 | 1 | The Second Law of Thermodynamics | Entropy and Life | Engine, Refrigenetors | |
| Fri | *2/13* | 16 | * | 1 | Thermodynamics and Origin of Life | Evolution of Life | | |
| Mon | *2/16* | * | | | *(Holiday)* | | | *(No meeting)* |
| Wed | *2/18* | ***Second Midterm*** | | | in class | | | |
| | | ***Quantum Mechanics*** | | | | | | |
| Fri | *2/20* | 17 | 36 | 3 | Special Relativety | Space - Time | | |
| Mon | *2/23* | 18 | 37 | 3 | Early Quantum Theory | | Electron Microscope | (5) Photoelectric Effects |
| Wed | *2/25* | 19 | 38 | 3 | Quantum Mechanics | | | |
| Fri | *2/27* | 20 | 39 | 3 | Quantum Mechanics of Atoms | Hydrogen Atom | Laser, Holography | |
| Mon | *3/2* | 21 | 40 | 3 | Molecules and Solids | Molecules, DNA | Transistor | (6) Radioactivities |
| | | ***Particle Physics*** | | | | | | |
| Wed | *3/4* | 22 | 41 | 3 | Nuclear Physics and Radioactivity | | | |
| Fri | *3/6* | 23 | 42 | 3 | Nuclear Energy | Sun, Supernova | CT Scan, MRI | |
| Mon | *3/9* | 24 | 43 | 3 | Elemantary Particles | | Accerelator | *(No meeting)* |
| Wed | *3/11* | 25 | 44 | 3 | Astrophysics and Cosmology | Universe | | |
| Fri | *3/13* | 26 | * | | Origin of the Universe and Ourselves | | | |
| Thu | *3/19* | ***Lecture 2 - Final*** | | | 11:30 am - 2:30 pm | | | |
| Fri | *3/20* | ***Lecture 1 - Final*** | | | 8:00 am - 11:00 am | | | |