

Physics 432, Medical Physics Syllabus Winter 2015/2016

Location: ELL 161, 2:30 - 3:50 pm, Tue, Fri

| Date | Instr. | Lec. | Assign | Topic |
|--------|--------|------|---------------|---|
| Jan 5 | MB | 1 | | Review Atomic structure, characteristic x-rays |
| Jan 8 | MB | 2 | | Radioactivity Atomic mass, nuclear decay, radioactivity, half life, attenuation coefficients, uses in medical physics |
| Jan 12 | MB | 3 | | X-ray and γ interactions Photoelectric effect, Compton effect, pair production, interaction coefficients, uses in medical physics |
| Jan 15 | MB | 4 | | Charged particle interactions Electron and proton stopping power, bremsstrahlung production, LET, uses of charged particles |
| Jan 19 | MB | 5 | A1 due | Dosimetric quantities Exposure and dose, charged particle equilibrium |
| Jan 22 | MB | 6 | | Radiation generators, x-ray tubes Theory, design, and operation |
| Jan 26 | MB | 7 | | Dosimetry instrumentation Ionization chambers, TLD, diodes, film, chemical dosimetry, calorimetry, Bragg-Gray cavity theory |
| Jan 29 | MB | 8 | | Linear accelerators and isotope devices Design and operation, sources of RF, mechanical features, output spectra |
| Feb 2 | MB | 9 | A2 due | Biological effects of ionizing radiation Stochastic and non-stochastic effects, equivalent dose |
| Feb 5 | MB | 10 | | Radiation protection and safety Dose limits, exposure from natural and man-made sources, shielding |
| Feb 9 | MB | 11 | | Radiation treatment planning Dose calculations and distributions |
| Feb 12 | MB | 12 | | Midterm |
| Feb 16 | | 13 | A3 due | Tour of VIC (4-5pm) |
| Feb 23 | DW | 14 | | Computed tomography System configuration and evolution, x-ray source, scintillation detectors, image reconstruction |
| Feb 26 | DW | 15 | | Nuclear medicine 1 Isotope production: I-131, Tc-99, FDG; principles of measurement |
| Mar 1 | DW | 16 | | Nuclear medicine 2 Radionuclide imaging using gamma camera, SPECT, PET: isotopes, detectors, sampling, random and true coincidences |
| Mar 4 | DW | 17 | A4 due | Ultrasound Principles and operation |
| Mar 8 | WB | 18 | | Radiography 1 Image formation, image quality, film/screens |
| Mar 11 | WB | 19 | | Radiography 2 Mammography, angiography, digital imaging |
| Mar 15 | WB | 20 | | Magnetic resonance imaging NMR phenomenon, biological tissue discrimination, mapping of MR signals in 3-dimensions |
| Mar 18 | | 21 | A5 due | Current Research Topics |
| Mar 22 | | 22 | | Student presentations |
| Mar 29 | | 23 | | Student presentations |
| Apr 1 | MB | 24 | | Final exam |

Grading scheme

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|-------------------|-----|
| Assignments | 20% |
| Paper | 10% |
| Oral presentation | 10% |
| Mid-term exam | 20% |
| Final exam | 40% |

Textbooks and other information can be found here at <http://web.uvic.ca/~bazalova/teaching.html>.