EDO UNIVERSITY IYAMHO

Department of Medical Laboratory Science

MLS 307 Medical Physics

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Lectures: Thursday, 8am – 12.10 pm, LT5, phone: (+234) 8061324564
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General overview of lecture: The course introduces some fundamental concepts in Kinematical and mathematical problems—circulation of pulse, blood pressure and volume changes. The heart and blood surface tension effect. Temperature and heat flow/electricity, electrocardiograms, general radiation linear energy transfer and radiation measurement, radiation damage-detection and safety, X-ray generation and application radioisotopes production, use and disposal.

Prerequisite: The students are expected to have a strong background in the fundamentals of kinematics, temperature and radiation. Some knowledge of radioisotopes, surface tension and pressure.

Learning outcomes: At the completion of this course, students are expected to:

i. to better understand the heart and blood surface tension,
ii. to gain experience with common kinematical and mathematical problems,
iii. to understand the concept of heat flow and temperature,
iv. to understand the topics of elcctrcardiograms, general radiation linear energy transfer and radiation measurement,
v. to gain an appreciation for X-ray generation and application radioisotopes production, use and disposal.

Assignments: We expect to have 3 homework assignments throughout the course in addition to a Mid-Term Test and a Final Exam. Term papers are given at the beginning of the class and submission will be on the due date. Home works in the form of individual assignments, and group assignments are organized and structured as preparation for the midterm and final exam, and are meant to be a studying material for both exams.

Grading: We will assign 10% of this class grade to homeworks, 20% for the mid-term test and 70% for the final exam. The Final exam is comprehensive.

Textbook: The recommended textbook for this class are as stated:
Title: *Introduction to Automata Theory, Languages, andComputation*
Authors: John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman
Publisher: Addison-Wesley, 3rd Edition
Year: 2006

Title: *Languages and Machines*
Author(s): Thomas A. Sudkamp
Publisher: Pearson Education, Inc., Third Edition
ISBN: 0-321-32221-5.
Year: 2006

Main Lecture: Below is a description of the contents. We may change the order to accommodate the materials you need for the projects.

Introduction to temperature

This is a nervous sensation. Our skin contains a large number of minute receptors (The organs of cold and the organs of warmth). They occur in all part of the skin and are especially densed around the mouth and within the oral cavity. With certain limits, we can dinstiguish between hotter and colder objects and order them in succession.

For reproducibility, we need instruments called thermometers to measure the temperature. Thermometers not only transfer the subjective nervous sensation of hot or cold into reproducible number, but they also extend the concept of temperature into ranges far outside the temperature receptors of the body. To measure the temperature, an adequate temperature dependent property of matter may be used. It is convenient to choose the thermal expansion of fluids especially alcohol and mercury.

Customary Temperature Scale

Most thermometers rely on the thermal expansion of mercury. A thin thread of mercury inside a glass capillary extends out of a storage container. The expansion or contraction of the mercury due to the changing temperature is reflected in the height of the visible thread. A graded scale subdivides the capillary into convenient intervals. For practicability, the difference between two fixed points is divided into intervals. The customary temperature is expressed in ®C. the two ixed points are the lower fixed point (0®C [temperature of melting ice]) and the upper fixed point (100®C [temperature of boiling water]). Both points are determined at atmospheric pressure 760mmHg. However, for the farengeit temperature scale, the fixed point are 32®F and 12®F.

Thermodynamic or Absolute Temperature Scale.

The thermodynamic temperature scale is measured in ®K. its fixed points are 0®K (-273.15®C) and 273®K (0®C).

Therefore: $t = T - T_1$

Where t is customary temperature

T is thermodynamic temperature

T_1 is the initial thermodynamic temperature