ENGR 3412: Biomedical Circuit Applications

3 Credit Hours

Prerequisite: Engineering Standing

This course will provide an overview of instrumentation systems used in clinical medicine and biomedical research. Some circuit theory and its application to bioinstrumentation will be reviewed. Systems for measuring biologic signals, such as biopotentials, stress and strain, pressure, temperature, and optical properties, will be discussed. Electrical hazards, safety, measuring instruments and techniques will also be discussed. There will be applications to engineering design such as transducer systems and sensing and driving circuits. There will also be discussion of ethical and regulatory issues related to bioinstrumentation as well as review of instrumentation such as CT Scan, MRI, EKG, and EEG sensors.

ENGR 3501: Fundamentals of Nuclear Engineering

3 Credit Hours

Prerequisite: MATH 2202 and Engineering Standing

Concurrent: PHYS 2212 and PHYS 2212L

This course provides an overview of the nuclear sciences field. Topics covered include: basic nuclear physics, radioactivity and radioactive decay process, nuclear reactions, radiation detection, basic health physics, radiation protection, fission and fusion processes, neutron interaction, nuclear energy conversion, different nuclear reactors, reactor operations, reactor control and basic nuclear fuel cycle.

ENGR 3502: Radiation Detection & Measurement

3 Credit Hours

Prerequisite: ENGR 3501 and Engineering Standing

The detection and measurement of radiation is an integral component of the nuclear sciences field. This course covers the sources and properties of nuclear radiation, mechanism of radiation interaction with matter, detection methods and in particular detection of ionizing radiation that are of primary interest in nuclear power generation as well as medical and industrial applications. Various types of radiation detectors, neutron detection techniques and counting statistics are also discussed.