SU DEPARTMENT OF COMPUTER SCIENCE
SYLLABUS
COSC 451 Robotics

Description: introductory course focus on robotics topics that relate to modeling, dynamics, and control of robotic manipulators. During this course, students will be required to gradually complete the design and construction of a robot using 3D printing technologies.

Objective: to learn the design, build and engineer a 3D printed robots while learning AI, visual coding, and machine learning.

Prerequisite: COSC 120 or 117, Linear Algebra, Calculus I and II

Texts: Lecture Notes, available from the instructor.

Introduction to Robotics   *2 weeks*
Basic principles of robotics, engineering design and computer science.

Introduction to Robot Mechanics   *5 weeks*
Fundamental models of robotic design. (Power and torque. Acceleration and velocity. Design models for ground mobile robots. Design models for mechanic arms and lifting systems. Fundamentals of kinematics)

Introduction to Electric Circuits   *3 weeks*
Fundamental concepts of electricity, electric circuits and electronics. (Electricity, voltage and current. Fundamentals of electric circuits. Ideal sources and resistors. Ohm's law and Kirchhoff's law. Capacitors and RC circuits).

Early Robotic Topics, Sensors, Actuators and Manipulators   *2 weeks*
Basics of components used to design robots. Microcontrollers. Sensors and actuators. Manipulators. Gears and other mechanical systems. Arduino board control).

Advanced Topics on Robotics   *2 weeks*
Some of the more advanced techniques of engineering, mathematics and science currently used in robotics. (Sensing distance and direction. Line Following Algorithms. Feedback Systems

<u>EVALUATION</u>
Final Project 50%
Tests 50%

NOTE: ONCE A STUDENT HAS RECEIVED CREDIT, INCLUDING TRANSFER CREDIT, FOR A COURSE, CREDIT MAY NOT BE RECEIVED FOR ANY COURSE WITH MATERIAL THAT IS EQUIVALENT TO IT OR IS A PREREQUISITE FOR IT.