SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

SAULT COLLEGE

COURSE OUTLINE

COURSE TITLE: Introduction to Robotics

CODE NO. :   CST103   **SEMESTER:**   11W

PROGRAM: Computer Programmer, Computer Engineering Technician – Networking

AUTHOR: Cindy Trainor

DATE: 10-Dec-2010   **PREVIOUS OUTLINE DATED:**

APPROVED: "Penny Perrier"   Dec 2010

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                              CHAIR   **DATE**

TOTAL CREDITS: 4

PREREQUISITE(S):   None

HOURS/WEEK: 4

I.   COURSE DESCRIPTION:

To introduce students, with little or no previous computer experience, to the scientific method in the context of building and programming Lego Mindstorm robots. Students will learn how to use feedback from sensors, applied mathematics and measurement to program their robot to navigate in its environment. They will complete numerous investigations involving problem solving, working in teams, and documenting what they have learned as they investigate how robots make decisions to navigate their environment.

II.   LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1.   Program Lego Mindstorm robots.
      Potential Elements of the Performance:
      - Create variables, loops, conditionals, blocks and subroutines in NXT
      - Create variables, loops, conditions in Not Quite C (NQC).
      - Write programs in NXT and NQC to interact with the environment via light, sonic, rotation and touch sensors.

2.   Apply the physics of translational motion, rotation motion, and forces as applied to the study of robots.
      Potential Elements of the Performance:
      - Control the distance a robot moves
      - Control the angle at which a robot turns
      - Demonstrate how sound sensors respond to sound.
      - Efficiently use the light sensor to make a robot follow a path.
      - Show how the robot uses the ultrasonic sensor.
      - Calculate the speed of a robot using different gear rations.

3.   Maintain an engineering journal.
      Potential Elements of the Performance:
      - Write coherent daily logs and notes.
      - Organize all class handouts and assignment sheets.
      - Organize all completed and returned assignments.

4.   Plan, complete and exhibit a robot design project.
      Potential Elements of the Performance:
      - Research the strengths and weaknesses of a robotic solution.
      - Plan and propose a robot solution including .
      - Create a working prototype.
      - Demonstrate the working robot.

III.   TOPICS:
1.   Program Lego Mindstorm robots
2.   Apply the physics of translational motion, rotation motion, and forces as applied to the study of robots.
3.   Maintain an engineering journal
4.   Plan, complete and exhibit a robot design project.

IV.   REQUIRED RESOURCES/TEXTS/MATERIALS:
Notes provided by instructor
Internet Resources and assigned Internet Readings
Lab Material and Study Notes will be posted on the instructor's web site

V.   EVALUATION PROCESS/GRADING SYSTEM:

Lab Reports	*40%*
Final Project	*40%*
Quizzes	*20%*

Some minor modifications to the above percentages may be necessary. The professor reserves the right to adjust the mark up or down 5% based on attendance, participation, leadership, creativity and whether there is an improving trend.

The following semester grades will be assigned to students:

Grade	**Definition**	*Grade Point Equivalent*
A+	90 – 100%	4.00
A	80 – 89%	
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00

CR (Credit)	Credit for diploma requirements has been awarded.
S	Satisfactory achievement in field /clinical placement or non-graded subject area.
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR	Grade not reported to Registrar's office.
W	Student has withdrawn from the course without academic penalty.

VI.   SPECIAL NOTES:

<u>Attendance:</u>
Absenteeism will affect a student's ability to succeed in this course.
Absences due to medical or other unavoidable circumstances should be
discussed with the professor. Students are required to be in class on time and
attendance will be taken within the first five minutes of class. A missed class will
result in a penalty in your marks unless you have discussed your absence with
the professor as described above. The penalty depends on course hours and
will be applied as follows:

Course Hours	Deduction
5 hrs/week (75 hrs)	1% / hr
4 hrs/week (60 hrs)	1.5% /hr
3 hrs/week (45 hrs)	2% /hr
2 hrs/week (30 hrs)	3%/hr

Absentee reports will be discussed with each student during regular meetings
with Faculty Mentors. Final penalties will be reviewed by the professor and will
be at the discretion of the professor.

VII.   COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located on the portal form part
of this course outline.