DEPARTMENT ELEC

ELEC 255 – INTEGRATION OF ROBOTICS SYSTEMS

4 credit hours, 3 hours lecture, 3 hours laboratory

I. Description

Building on the basic principles covered in ELEC XXX, the course includes the topics of cooperative/swarming robotic behavior, robot vision concepts, inertial measurement techniques, global positioning systems (GPS), and telemetry techniques. Emphasis will be placed on more complex robotic applications including unmanned ground, sea and aerial vehicles and other contemporary topics.

Prerequisite: ELEC 245

II. Text


III. Objectives

The student will be able to

A. Explain the basic operating principles of robotic vision hardware.
B. Describe the operation of micro electromechanical systems based accelerometers and gyroscopes.
C. Use a microcontroller to process inertial data from accelerometers and gyroscopes.
D. Explain the use of inertial measurements in robotic control applications.
E. Implement a simple telemetry link between an autonomous robot and a base station.
F. Program multiple robotic vehicles to perform simple cooperative tasks.

IV. Content

A. Principles of robotic vision systems.
B. Color recognition.
C. Inertial measurements, accelerometers and gyroscopes.
D. Numerical techniques for differentiation, integration and filtering.
E. Radio frequency telemetry techniques.
F. GPS robot navigation.
G. Cooperative and swarming behavior of robots.

V. Evaluation

The final grade will be based upon test scores, laboratory reports, and class participation.
VI. Bibliography


VII. Original Approval

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VP for Academic Affairs  Date

Fall 2009 (new)