DESCRIPTION & OBJECTIVES:

This course provides a graduate-level introduction to the wide area in *Cooperative Distributed Computing*. The course emphasizes both the theoretical and practical aspects. The learning approach will be hands-on project-based. The theoretical component includes lectures, discussion sessions, and literature review and technical reaction based on reference books and papers within the context of the project. This component will focus on the foundation of *Cooperative Distributed Systems* engineering and the supporting computational models and technologies with a special attention to *agent-oriented* or *smart-objects* computing paradigm. The practical component includes the application of the principles and technologies to design and build a solution for the problem identified in the project. In addition to the hands-on experience, students will examine how theoretical concepts are actually realized by studying several applications of cooperative distributed systems in various domains.

PREREQUISITES:

- Computer Science Fundamentals, with emphasis on Object-Oriented
- Algorithms & Data Structures
- Software Systems Design
- Introductory Artificial Intelligence

COURSE SCHEDULE:

Lectures 3 hrs/week

TOPICS

- **The Evolution of Computation Platforms**
  - Closed Environment Computing
  - Distributed Environment Computing
  - Open & Decentralized Environment Computing
- **Cooperative Distributed systems (CDS)**
  - CDS Model for Open & Decentralized Environment
  - Coordination & Cooperation as Computational Concepts
  - Architecture and Design Concepts for CDS
- **Smart-being**
  - Rationality: Autonomy & Decision Making
  - Semantics: Ontological-views of Conceptualization
  - Intelligence: Data, Information & Knowledge
- **Technologies**
  - Agent-Oriented (AO) Computing
  - Smart-Object (SO) Paradigm
  - Supporting Technologies
- **Application Areas/Projects**
  - The specific applications may vary based on the students’ area of interest, but are directly related to
    - Smart Space & Universe
    - Internet of Things
    - Mobile and Ubiquitous Computing
- **Future Directions for**
  - Smart-Objects & Cooperative Distributed Systems
**SPECIFIC LEARNING OBJECTIVES**

Upon the completion of the course, student should:

- gain a picture of contemporary thinking about new form of computation and especially AO and SO including principles and theory, common practices, and application areas, current and emerging;
- develop some concrete accomplishments in the CDS arena through a project;
- gain experience and confidence in understanding a new and rapidly evolving technology.

**REFERENCE TEXTS:**

[1] Course notes,
[2] Papers and supplementary Reading list of recent research publications

**EVALUATION:**

The approximate weight for each component is shown below. Note that these are maxim; if less than the stated number is given, the rest of the marks will be pro-rated.

Project-based Deliverables:

- (20%) Team (3-members) formation, Project Description & Literature Review
  - Problem description
    - Domain Application: Motivation & Analysis
    - Technical challenges within the context of CDS
  - Literature Review
    - Application based solutions
    - Technical solutions for the identified challenges identified in the proposal.
- (30%) Proposed Solution of Domain Application as CDS
  - Technical Analysis & Design Report
- (30%) Solution Implementation & Demo
- (10%) Final Project Report
- (10%) Peer-Review of other Team(s) Projects

In accordance with the policy of the University, the grade assigned to all written and oral work presented in English shall take into account syntax, diction, grammar and spelling. In addition, in the professional life of an engineer, the manner in which oral and written communications are presented is extremely important. An engineering student must develop these skills as an integral part of the undergraduate program. To encourage the student to do so, the grades assigned to all written and oral work will take into account all aspects of presentation including conciseness, organization, neatness, use of headings, and the preparation and use of tables and figures.
ATTENDANCE:

Any student who, in the opinion of the instructor is absent too frequently from class or laboratory periods in any course, will be reported to the Dean (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean, the student will be debarred from taking the regular examination in the course.

CHEATING:

University policy states that cheating is a scholastic offence. The commission of a scholastic offence is attended by academic penalties, which may include expulsion from the program. If you are caught cheating, there will be no second warning.

PLAGIARISM:

Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage of text from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

PLAGIARISM CHECKING:

The University of Western Ontario uses software for plagiarism checking. Students may be required to submit their written work in electronic form for plagiarism checking.

COURSE INSTRUCTOR:

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