Distributed Computing Course Specifications

Faculty: Computer and Informatics
Department: Computer Science

Program(s) on which the course is given	**:**	Bachelor in Computer and Information Sciences
Major or Minor element of programs	**:**	Computer Science/Scientific Computing
Department offering the program	**:**	Computer Science
Department offering the course	**:**	Computer Science
Academic year / Level	**:**	4th Year / B.Sc.
Date of specification approval	:	10/3/2010

A. Basic Information

Title: Distributed Computing **Code:** CSC 448

Lecture: 3 hrs/week **Tutorial:** 2 hrs/week **Practical:** ---

Credit Hours: --- **Total:** 5 hrs/week

B. Professional Information

1. Overall Aims of Course:

The course aims to introduce students to the technologically important area of distributed and parallel computing. Students will come to appreciate that the general topic is an exciting mix of theory and practice, and that there is a number of very difficult fundamental problems to overcome, both technological and theoretical, in order to build efficient parallel and distributed machines. The course objectives are to ensure that students understand a number of different models of parallel and distributed computing and how there are different problems associated with the realization of these models, particularly with respect to communication and algorithm design.

2. Intended Learning Outcomes of Course (ILOs):

a. Knowledge and Understanding:

a1- Enumerate basics of Computational Geometry.
a2- Explain line segment intersection.

a3- Explain and illustrate segment-segment-segment intersection.
a4- Explain and illustrate visibility graph.
a5- Explain and illustrate voronoi-Diagrams.
a6- Explain and illustrate Delaunay triangulations.
a7- Explain motion planning.

b. Intellectual Skills:

b1- How to formulate Geometrical problems.
b2- Plan how to propose an efficient algorithm for the given problem.
b3- Interpret how to use systematic steps in the proof of the theories.

c. Professional and Practical Skills:

Knowledge of the concepts and material presented in this course will provide the students with practical knowledge of how to:

c1- Design an effective algorithm for the geometrical problem.
c2- Designing effective computer programs for the geometrical algorithm.

d. **General and Transferable Skills:**

Knowledge of the concepts and material presented in the course will provide the students with:

d1- Discuss the geometrical problem and how to deal with it as a data to be processed
d2- Write and present effective computer programs that employ efficient algorithms.
d3- Present and Implement algorithms for solving scientific problems related to other disciplines.

e. Attitude:

e1- A knowledge and respect of ethics and ethical standards in relation to a major area of study.
e2- Relationship Emphasis a successful with other students.
e3- Learn how to make relation with other, and the limit of this relation.
e4- Demonstrate an ethical behaviour toward software copyrights
e5- Explain the nature of privacy and how it is protected by the Data Protection.

Students will become more experienced in the application of discrete mathematics, especially graph theory, in computing, and will obtain a comprehensive grounding in the general area of parallel and distributed computing, a direction in which technology will proceed in future.

3. Contents:

Topic	No. of hours	Lecture	Tutorial/Practical
Introduction to parallel and distributed architectures. Models of computation: SISD, SIMD, MISD, and MIMD Computers. –I	**5**	**3**	**2**
Introduction to parallel and distributed architectures. Models of computation: SISD, SIMD, MISD, and MIMD Computers. – II	**5**	**3**	**2**
Introduction to parallel and distributed architectures. Models of computation: SISD, SIMD, MISD, and MIMD Computers – III	**5**	**3**	**2**
Shared-memory SIMD computers. Interconnection-network SIMD Computers: Linear array, two-dimensional array, tree connection, perfect shuffle connection, cube connection – I	**5**	**3**	**2**
Shared-memory SIMD computers. Interconnection-network SIMD Computers: Linear array, two-dimensional array, tree connection, perfect shuffle connection, cube connection – II	**5**	**3**	**2**
Shared-memory SIMD computers. Interconnection-network SIMD Computers: Linear array, two-dimensional array, tree connection, perfect shuffle connection, cube connection – III	**5**	**3**	**2**
Shared-memory SIMD computers. Interconnection-network SIMD Computers: Linear array, two-dimensional array, tree connection, perfect shuffle connection, cube connection – IV	**5**	**3**	**2**
Shared-memory SIMD computers. Interconnection-network SIMD Computers: Linear array, two-dimensional array, tree	**5**	**3**	**2**

connection, perfect shuffle connection, cube connection – V			
Analyzing algorithms. Some parallel computer algorithms: selection, merging, sorting and searching - I	**5**	**3**	**2**
Analyzing algorithms. Some parallel computer algorithms: selection, merging, sorting and searching – II	**5**	**3**	**2**
Analyzing algorithms. Some parallel computer algorithms: selection, merging, sorting and searching – III	**5**	**3**	**2**
Parallel programming languages. Parallel compilers. Parallel operating systems – I	**5**	**3**	**2**
Parallel programming languages. Parallel compilers. Parallel operating systems – II	**5**	**3**	**2**
Parallel programming languages. Parallel compilers. Parallel operating systems – III	**5**	**3**	**2**