

CIS 6302 - Distributed and Internet Systems

PROFESSOR: Dr. Sanjay Ahuja **Fall 2007**
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OFFICE HOURS: Tuesday: 7.20 pm - 7.30 pm and 8.45 pm - 9.45 pm
Thursday: 3 pm - 5.40 pm, 7.20 pm - 7.30 pm, and 8.45 pm - 9.45 pm
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TEXTS:

Distributed Systems, Concepts and Design by George Coulouris et al., Addison-Wesley, 4th edition.
Java Enterprise in a Nutshell by David Flanagan, O'Reilly Publishing.

REFERENCES:

Selected papers from Journals and Conferences.

ABOUT THE COURSE: The course deals with the design of distributed systems, resource allocation, load balancing, security, reliability evaluation of distributed systems, and performance evaluation and comparison of distributed object architectures from a distributed application designer's viewpoint. Students will be exposed to graph-theoretic tools used to evaluate the reliability of distributed systems. The distributed object architecture will be studied using Java RMI and CORBA as case studies. Performance bottlenecks in the three-tier distributed system architecture will be studied and along with architectural enhancements to enhance the performance of distributed applications. The projects in this course will focus on performance evaluation and comparison of distributed object architectures from the application designer's point of view. Students will be required to provide demos of their projects to the instructor and write a research paper on their empirical findings. Students are also required to make a presentation on a topic to be decided in consultation with the professor. Such topics can include distributed security, distributed transactions, distributed file systems, distributed shared memory, web services, SOAP, JavaSpaces, enterprise computing APIs, protocols for distributed computing, and other advanced topics in distributed computing.

COURSE TOPICS:

Introduction to distributed computing systems
 Characterization of distributed systems
 Distributed system models
Resource allocation in Distributed Systems
 Task assignment approach
 The File Allocation Problem (FAP)
Load balancing on distributed systems
 Issues in designing load-balancing algorithms
 Case Study: Application of a specific load-balancing algorithm from the literature
Reliability evaluation of distributed systems
 The Source-Terminal Reliability (STR) estimation parameter
 The Computer Network Reliability (CNR) estimation parameter

Applicability of the STR and DPR to the topological assignment of links of the distributed system

The Distributed Program Reliability (DPR) estimation parameter

Applicability of DPR to the File Allocation Problem (FAP)

Operating System Support

Processes and threads

Performance gain using threads

Three-tier distributed system architecture

Performance bottlenecks

Architectural enhancements

Distributed Object architectures

Need for distributed objects

Object Serialization

Architecture Case Study I: Remote objects using Java RMI

Architecture Case Study II: A CORBA version of distributing objects

Comparison of the Java RMI and CORBA architectures

Overview of Distributed System Security

Peer-to-peer computing model

METHOD OF EVALUATION:

| | |
|--------------|------------|
| Exam | 130 points |
| Project 1 | 45 points |
| Project 2 | 45 points |
| Project 3 | 45 points |
| Paper | 50 points |
| Presentation | 50 points |
| Assignment | 50 points |

GRADING:

| | | | | | | | |
|---|-------|---|-----|---|-----|---|-----|
| A | 90% | B | 80% | C | 70% | D | 60% |
| F | < 60% | | | | | | |

Note:

A student's grade will be determined by the total points earned out of 415 points.

The last date to withdraw is Friday, November 9, 2007.

LATE ASSIGNMENTS:

There will be a penalty of five (5) points per day for late submission of assignments and projects (including weekends and holidays). **No credit will be given for work turned in more than one week late.**

ACADEMIC DISHONESTY:

No type of academic dishonesty will be tolerated. If you are caught cheating (on the assignments, exams, or project) the punishment will be the most severe penalty allowed by the university policy. The policy on academic integrity, and misuse of computer equipment and computer accounts found at the departmental web-site <http://www.unf.edu/cocse/cis/> applies to this course.

EXAM POLICY:

Each student is **required** to take the exam at the scheduled time. **All** exceptions must be cleared with the professor **prior** to the exam time. An exam missed for insufficient reason and without being cleared with the professor prior to the exam time will be assigned a score of zero.

OTHER REMARKS:

- A grade of incomplete will not be given except for catastrophic illness or calamity.**
- All university rules regarding classroom behavior and attendance apply.**
- Assignments for extra credit will not be assigned.
- Attendance is expected. If a student misses a class, the student is still responsible for the material that is covered and for completing any assignments by the due date that may have been handed out by the professor in class.
- Reminder: Please read the CIS Satisfactory Progress Policy at <http://www.unf.edu/cocse/cis/CIShtml/CIScourseRepeat.html> to review the "one repeat" rule for all CIS courses.**