CSC/CPE 569 Distributed Computing

1. CSC/CPE 569 Distributed Computing

2. **credit units** 4  **contact hours** 6

3. **Course Coordinator:** Chris Lupo


5. a. **Course Description:** Principles and practices in distributed computing: interprocess communications, group communications, client-server model, distributed objects, message queue system, distributed services, mobile agents, object space, Internet protocols. Distributed algorithms: consensus protocols, global state protocols. Fault tolerance: classification of faults, replication. Not open to students with credit in CSC/CPE 369 or CSC/CPE 469. 3 lectures, 1 laboratory.

   b. **Prerequisite:** CSC/CPE 357 and graduate standing, or consent of instructor.

   c. **Required/Elective/Selective Elective for CPE, CSC, EE, SE**

```
<table>
<thead>
<tr>
<th></th>
<th>CSC</th>
<th>CPE</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selective Elective</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
```

6. a. **Course Goals/Outcomes**
The student will be able to:
- Upon completion of the course, the student will have been introduced to (I) the characteristics of distributed programs, distributed protocols, and distributed algorithms, and (II) a hierarchy of distributed computing paradigms and a variety of application program interfaces (APIs) which support those programs.

   b. **How Student Outcomes addressed**
   (“B” = Basic level, “I” = Intermediate level, “A” = Advanced level)

```
<table>
<thead>
<tr>
<th></th>
<th>3a</th>
<th>3b</th>
<th>3c</th>
<th>3d</th>
<th>3e</th>
<th>3f</th>
<th>3g</th>
<th>3h</th>
<th>3i</th>
<th>3j</th>
<th>3k</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>I</td>
<td>I</td>
<td>B</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE/</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>CPE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

7. **Major Topics Covered:** (number of lecture hours each)
- Introduction (3)
- Threaded Programming (3)
- Interprocess Communications (IPC) (3)
- Scalability (1)
- Map/Reduce (2)
- Scatter/Gather (1)
- Data Integrity (1)
- Compute Topologies (1)
- Client-Server Design Patterns (1)
- Group Communications (1)
- Distributed Objects (3)
- The Service-Oriented Architecture (1)
- Fault Tolerance (2)
- Distributed Algorithms (2)