CS 6030 – Introduction to Multicore Programming  
Spring 2011  

Instructor: Dr. Zijiang James Yang  
Course Website: http://www.cs.wmich.edu/~zijiang/teach/cs6030

Description of CS6030  

Our ability to effectively harness the computational power of the next generation of multiprocessor and multicore architectures is predicated upon advances in programming languages and tools for developing parallel and concurrent software. This has resulted in a surge of concurrency-related research activity from different viewpoints, such as rethinking of programming abstractions for concurrency, and design of efficient data structures and algorithms for multiprocessor architectures. This course will focus on parallel and concurrent programming for modern multiprocessor architectures.  

It is a 3 credit hours course.

Prerequisites  
The course requires undergraduate coursework in Computer Architecture, Programming Languages, Algorithms, and Operating Systems If you need more information to decide, contact the instructor.

Objectives  

1. Learn the common modern parallel architectures  
2. Learn .NET parallel programming  
3. Learn parallel tasks and their coordination  
4. Learn common issues in sharing data and synchronization  
5. Learn common parallel algorithms  
6. Learn testing and debugging of parallel programs

Performance Objectives  

1. Student will understand the common modern parallel architectures  
2. Student will be able to perform .NET parallel programming  
3. Student will be able to design parallel tasks and their coordination  
4. Student will understand common issues in sharing data and synchronization  
5. Student will be able to design parallel algorithms  
6. Student will be able to test and debug parallel programs

Text
Parallel Programming with Microsoft .NET

**Course Topics**

- Imperative Data Parallelism
- Shared Memory
- Concurrent Components
- Functional Data Parallelism
- Scheduling and Synchronization
- Interactive/Reactive Systems
- Message Passing

**Grading**

The major component of the evaluation will be the homework and project. There will be no exams. Pop-quizzes may be given at anytime in lecture without prior notification. Presentations on relevant topics are required. Your grade will be computed from your performance on these components using the following weights:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework &amp; Project</td>
<td>50%</td>
</tr>
<tr>
<td>Presentation</td>
<td>30%</td>
</tr>
<tr>
<td>Participation</td>
<td>20%</td>
</tr>
</tbody>
</table>

**Incomplete Grades**

Please note that the incomplete grade - I - is intended for the student who has missed a relatively small portion of work due to circumstances beyond his/her control. In general, performance on work done must be at a level of C or better in order to qualify for an incomplete. An I grade will not be given to replace an otherwise low or failing grade in the class.

**Academic Honesty**

The following statement has been approved and distributed by the Western Michigan University Faculty Senate:

>You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate and Graduate Catalogs that pertain to Academic Honesty. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. [The policies can be found at http://catalog.wmich.edu under Academic Policies, Student Rights and Responsibilities.] If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Conduct. You will be given the opportunity to review the charge(s). If you believe you are not responsible, you will have the opportunity for a hearing. You should consult with your instructor if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test.
Submission of another person’s work in part or whole is not permitted. Learning can certainly occur with discussion of class material and assignments with other students, and we will be doing considerable collaborative activity, but at all times take care that you don’t represent the work of another as your own.

Easy availability of information, material, source codes, lecture notes etc on the Internet may make it possible to find solutions to your assignments on the Internet or elsewhere. It is okay to refer to those, understand them and use them to enhance your solutions, generate your own ideas etc. However, you must give proper and full credit to original authors of the work, if you include their ideas and/or solutions. Failing to do so is part of academic and professional dishonesty. It will not be tolerated in this class. Do not give in to temptations.

**If you are found responsible for violation of academic honesty in the course, you will receive a penalty up to and including an E grade in the class.**