ECE 7864 (Approved): Advanced Computer Design

Course Description

Parallel computer architectures, pipeline design, multiprocessor design, interprocessor communication, multi-core architectures, case studies and application examples.

Prior Course Number: 864, 694A
Transcript Abbreviation: Adv Comp Dsgn
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Graduate
Student Ranks: Masters, Doctoral
Course Offerings: Spring
Flex Scheduled Course: Never
Course Frequency: Odd Years
Course Length: 14 Week
Credits: 3.0
Repeatable: No
Time Distribution: 3.0 hr Lec
Expected out-of-class hours per week: 6.0
Graded Component: Lecture
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: Prereq: 5362 (662) or Grad standing.
Exclusions: Not open to students with credit for 864.
Cross-Listings:

Course Rationale: Existing course.

The course is required for this unit's degrees, majors, and/or minors: No
The course is a GEC: No
The course is an elective (for this or other units) or is a service course for other units: Yes

Subject/CIP Code: 14.0902
Subsidy Level: Doctoral Course

Course Goals

Learn various techniques for designing high performance, advanced computer systems making use of parallelism.
Be trained in independent or team research and will recognize the need for life-long learning through a term project.
Improve communication skills through term paper presentations.

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Parallel computer models: MIMD, SIMD models	2.0							
Performance metrics and measures	2.0							
Program partitioning and scheduling	4.0							

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Static interconnection networks: characteristics, topologies, hypercubes, meshes, k-ary n-cubes	5.0							
Dynamic interconnection networks: shuffle-exchange, omega, butterfly, indirect hypercubes	5.0							
Parallel processing applications	4.0							
Vector processors, pipelining, arithmetic pipelines	4.0							
Shared memory organization	2.0							
Multi-core chips, architectures	3.0							
Example systems	3.0							
Embedded systems	2.0							

Representative Assignments

Pencil & paper homework.
Computer problems.
Term paper projects: oral presentations and written reports.
Reviews of literature.

Grades

Aspect	Percent
Midterm	25%
Quiz	10%
Homework	10%
Term paper	25%
Final	30%

ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
***	a	An ability to apply knowledge of mathematics, science, and engineering.
*	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
**	c	An ability to design a system, component, or process to meet desired needs.
*	d	An ability to function on multi-disciplinary teams.
*	e	An ability to identify, formulate, and solve engineering problems.
*	f	An understanding of professional and ethical responsibility.
*	g	An ability to communicate effectively.
*	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
**	i	A recognition of the need for, and an ability to engage in life-long learning.
*	j	A knowledge of contemporary issues.
**	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Additional Notes or Comments

Updated prereqs, exclusions, goals and topics to match university format 3/20/12

Betty Lise,
ECE 7864 lists 5362 (or 662) as a prereq and grad students need my signature on a form to register. Is it possible to change it to "or graduate standing".
Also "not open ..... with credit for 863" should be " not open .....with credit for 864.
10/30/12

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