

PURDUE UNIVERSITY

REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF A GRADUATE COURSE
(500-600 LEVEL)

Print Form

Office of the Registrar
FORM 40G REV. 9/06

1-07

DEPARTMENT ECE

EFFECTIVE SESSION Fall 2008/9

INSTRUCTIONS: Please check the items below which describe the purpose of this request.

- | | | | |
|--------------------------|--|-------------------------------------|--|
| <input type="checkbox"/> | 1. New course with supporting documents (complete proposal form) | <input type="checkbox"/> | 7. Change in course attributes |
| <input type="checkbox"/> | 2. Add existing course offered at another campus | <input type="checkbox"/> | 8. Change in instructional hours |
| <input type="checkbox"/> | 3. Expiration of a course | <input checked="" type="checkbox"/> | 9. Change in course description |
| <input type="checkbox"/> | 4. Change in course number | <input checked="" type="checkbox"/> | 10. Change in course requisites |
| <input type="checkbox"/> | 5. Change in course title | <input checked="" type="checkbox"/> | 11. Change in semesters offered <i>no change</i> |
| <input type="checkbox"/> | 6. Change in course credit/type | <input type="checkbox"/> | 12. Transfer from one department to another |

PROPOSED:

EXISTING:

TERMS OFFERED

Check All That Apply:

Subject Abbreviation _____ Subject Abbreviation ECE
 Course Number _____ Course Number 563
 Long Title Programming Parallel Machines
 Short Title Prog Parallel Machines

Summer Fall Spring

CAMPUS(ES) INVOLVED

Calumet N. Central
 Cont Ed Tech Statewide
 Ft. Wayne W. Lafayette
 Indianapolis

Abbreviated title will be entered by the Office of the Registrar if omitted. (22 CHARACTERS ONLY)

CREDIT TYPE

COURSE ATTRIBUTES: Check All That Apply

- | | | |
|---|--|---|
| 1. Fixed Credit: Cr. Hrs. <input type="text"/> | 1. Pass/Not Pass Only <input type="checkbox"/> | 7. Registration Approval Type Department <input type="checkbox"/> Instructor <input type="checkbox"/> |
| 2. Variable Credit Range: Minimum Cr. Hrs. <input type="text"/> To <input type="text"/> Or <input type="text"/> Maximum Cr. Hrs. <input type="text"/> | 2. Satisfactory/Unsatisfactory Only <input type="checkbox"/> | 8. Variable Title <input type="checkbox"/> |
| 3. Equivalent Credit: Yes <input type="checkbox"/> No <input type="checkbox"/> | 3. Repeatable <input type="checkbox"/> | 9. Remedial <input type="checkbox"/> |
| 4. Thesis Credit: Yes <input type="checkbox"/> No <input type="checkbox"/> | 4. Credit by Examination <input type="checkbox"/> | 10. Honors <input type="checkbox"/> |
| | 5. Designator Required <input type="checkbox"/> | 11. Full Time Privilege <input type="checkbox"/> |
| | 6. Special Fees <input type="checkbox"/> | 12. Off Campus Experience <input type="checkbox"/> |

Instructional Type	Minutes Per Mtg	Meetings Per Week	Weeks Offered	% of Credit Allocated	Delivery Method (Asyn. Or Syn.)	Delivery Medium (Audio, Internet, Live, Text-Based, Video)	Cross-Listed Courses
Lecture							
Recitation							
Presentation							
Laboratory							
Lab Prep							
Studio							
Distance							
Clinic							
Experiential							
Research							
Ind. Study							
Pract/Observ							

COURSE DESCRIPTION (INCLUDE REQUISITES):

See attachment.

Calumet Department Head _____ Date _____	Calumet School Dean _____ Date _____	Calumet Undergrad Curriculum Committee _____ Date _____
Fort Wayne Department Head _____ Date _____	Fort Wayne School Dean _____ Date _____	Fort Wayne Chancellor _____ Date _____
Indianapolis Department Head _____ Date _____	Indianapolis School Dean _____ Date _____	<i>R. Cipra</i> _____ Date <i>11/19/08</i>
North Central Department Head _____ Date _____	North Central Chancellor _____ Date _____	Date Approved by Graduate Council _____
<i>Michael R. McCall</i> _____ Date <i>11/3/08</i>	<i>Michael T. Harris</i> _____ Date <i>11/19/08</i>	<i>Marilyn D. West</i> _____ Date <i>3/2/09</i>
West Lafayette Department Head _____ Date _____	West Lafayette College/School Dean _____ Date _____	Graduate Council Secretary _____ Date _____
Graduate Area Committee Convener _____ Date _____	Graduate Dean _____ Date <i>3/2/09</i>	<i>Sandra Schaeffer</i> _____ Date <i>3/14/09</i>
		West Lafayette Registrar _____ Date _____

OFFICE OF THE REGISTRAR

dlr 3-12-09

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DEPARTMENT ECE

EFFECTIVE SESSION Fall 2008

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Check All That Apply:

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 Ft. Wayne W. Lafayette
 Indianapolis

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CREDIT TYPE

1. Fixed Credit: Cr. Hrs. _____
 2. Variable Credit Range: _____
 Minimum Cr. Hrs. _____
 (Check One) To Or
 Maximum Cr. Hrs. _____
 3. Equivalent Credit: Yes No
 4. Thesis Credit: Yes No

COURSE ATTRIBUTES: Check All That Apply

1. Pass/Not Pass Only
 2. Satisfactory/Unsatisfactory Only
 3. Repeatable
 Maximum Repeatable Credit: _____
 4. Credit by Examination
 5. Designator Required
 6. Special Fees
 7. Registration Approval Type Department Instructor
 8. Variable Title
 9. Remedial
 10. Honors
 11. Full Time Privilege
 12. Off Campus Experience

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Recitation						
Presentation						
Laboratory						
Lab Prep						
Studio						
Distance						
Clinic						
Experiential						
Research						
Ind. Study						
Pract/Observ						

Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES):

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Calumet Department Head _____ Date _____	Calumet School Dean _____ Date _____	Calumet Undergrad Curriculum Committee _____ Date _____
Fort Wayne Department Head _____ Date _____	Fort Wayne School Dean _____ Date _____	Fort Wayne Chancellor _____ Date _____
Indianapolis Department Head _____ Date _____	Indianapolis School Dean _____ Date _____	<i>R. Cipra</i> 11/19/08 Undergrad Curriculum Committee _____ Date _____
North Central Department Head _____ Date _____	North Central Chancellor _____ Date _____	Date Approved by Graduate Council _____
<i>M. R. McCall</i> 11/3/08 West Lafayette Department Head _____ Date _____	<i>Michael T. Harris</i> 11/19/08 West Lafayette College/School Dean _____ Date _____	Graduate Council Secretary _____ Date _____
Graduate Area Committee Convener _____ Date _____	Graduate Dean _____ Date _____	West Lafayette Registrar _____ Date _____

OFFICE OF THE REGISTRAR

COURSE DESCRIPTION (INCLUDE REQUISITES):

Terms Offered: Sem. 2, odd years. Prerequisite: ECE 565 or equivalent.

Description: This course presents methods and techniques for programming parallel computers, such as multicore and high-end parallel architectures. Various parallel algorithms will be presented to demonstrate different techniques for identifying parallel tasks and mapping them onto parallel machines. Realistic science/engineering applications and their characteristics will be discussed. Parallel architectures to be considered are shared-memory and distributed-memory multiprocessor systems. Programming paradigms for these machines will be compared, including directive-based (OpenMP), message passing (MPI) and thread-based (Posix threads) methods. Methodologies for analyzing and improving the performance of parallel programs will be discussed. There will be a class project in which each student parallelizes and tunes the performance of a large computational application or develops/improves a tool that helps this process. Each student will prepare one lecture for a selected topic.

TO: The Faculty of the College of Engineering
FROM: The Faculty of the School of Electrical and Computer Engineering
RE: ECE 563 Changes in Terms Offered, Description, Text, and Content

The faculty of the School of Electrical and Computer Engineering has approved the following changes in ECE 563. This action is now submitted to the Engineering Faculty with a recommendation for approval.

From: **ECE 563 – Programming Parallel Machines**
Sem.2. Class 3, cr. 3.
Prerequisite: ECE 264, ECE 463. Authorized equivalent courses or consent of instructor may be used in satisfying course pre- and co-requisites. Departmental approval required.

Examines how to program parallel processing systems. Various parallel algorithms are presented to demonstrate different techniques for mapping tasks onto parallel machines. Parallel architectures to be considered are: SIMD (synchronous), MIMD (asynchronous), and mixed-mode (SIMD/MIMD hybrid). Machines that represent these classes to be used in the course are: the MasPar MP-1 (SIMD); nCUBE 2 (MIMD); and PASM (mixed-mode). There will be three programming projects, one on each machine. The similarities and differences among the machines and their languages will be discussed.

To: **ECE 563 – Programming Parallel Machines**
Sem. 2, odd years. Class 3, cr. 3
Prerequisite: ECE 565 or equivalent

This course presents methods and techniques for programming parallel computers, such as multicore and high-end parallel architectures. Various parallel algorithms will be presented to demonstrate different techniques for identifying parallel tasks and mapping them onto parallel machines. Realistic science/engineering applications and their characteristics will be discussed. Parallel architectures to be considered are shared-memory and distributed-memory multiprocessor systems. Programming paradigms for these machines will be compared, including directive-based (OpenMP), message passing (MPI) and thread-based (Posix threads) methods. Methodologies for analyzing and improving the performance of parallel programs will be discussed. There will be a class project in which each student parallelizes and tunes the performance of a large computational application or develops/improves a tool that helps this process. Each student will prepare one lecture for a selected topic.

Reason: The course description and content have been changed to reflect the updated content of the course.

Mark J. T. Smith, Head
School of Electrical & Computer Engineering

APPROVED FOR THE FACULTY
OF THE SCHOOLS OF ENGINEERING
BY THE ENGINEERING
CURRICULUM COMMITTEE

ECC Minutes #15

Date 2-6-08

Chairman ECC Michael J. Jettner

ECE 563 – Programming Parallel Machines

Required Text: Research papers and course handouts.

<i>Weeks</i>	<i>Principal Topics</i>
1	Introduction and Motivation
1	Efficiency and Speedup Measures
1	Automatic Parallelization
1	Tuning Automatically Parallelized Programs
2	Explicit Program Parallelization
1	Open MP
1	MPI
1	Pthreads
2	Programming Methodologies and Tools
2	Application Studies
2	Project Discussions

Course Outcomes: A student who successfully fulfills the course requirements will have demonstrated:

- 1) an understanding of the basic properties of parallel computer architectures and their relationship to parallel program design [3, j, k].
- 2) an ability to analyze a program for parallelism and express this parallelism for both shared-memory and distributed-memory machines [4, a, b, c, e, k].
- 3) an understanding of parallel models and programming constructs for OpenMP, MPI, and Posix threads [3,j,k].
- 4) an understanding of performance factors of parallel programs and their relationship to application characteristics and parallel programming constructs [3, 4, b, e, k].
- 5) an ability to use parallelizing compilers to parallelize and tune the performance of application programs [3, 4, b, e, j, k].

Outcome Assessment Method: Outcomes 1, 2, 3 and 4 will be assessed all, or in part, by tests. Outcomes 1, 2, 3, 4 and 5 will be measured all, or in part, by programming assignments.

