Office of the Registrar
FORM 40 REV. 7/08

FROM 3-4 CR HRS

PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF AN UNDERGRADUATE COURSE
(10000-40000 LEVEL)

Print Form

file

EFD 60-07

DEPARTMENT Electrical and Computer Engineering

EFFECTIVE SESSION Fall 2009

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

- [ ] 1. New course with supporting documents
- [ ] 2. Add existing course offered at another campus
- [ ] 3. Expiration of a course
- [ ] 4. Change in course number
- [ ] 5. Change in course title
- [x] 6. Change in course credit/type
- [ ] 7. Change in course attributes (department head signature only)
- [x] 8. Change in instructional hours
- [x] 9. Change in course description
- [ ] 10. Change in course requisites
- [ ] 11. Change in semesters offered (department head signature only)
- [ ] 12. Transfer from one department to another

PROPOSED:		EXISTING:	
Subject Abbreviation	ECE	Subject Abbreviation	ECE
Course Number	46800	Course Number	46800
Long Title	Introduction to Compilers and Translation Engineering		
Short Title	Intro to Cmplrs & Transl Engr		

Abbreviated title will be entered by the Office of the Registrar if omitted. (30 CHARACTERS ONLY)

TERMS OFFERED
Check All That Apply:
- [ ] Summer
- [x] Fall
- [ ] Spring

CAMPUS(ES) INVOLVED
- [✓] Calumet
- [ ] Cont Ed
- [ ] Ft. Wayne
- [✓] Indianapolis
- [ ] N. Central
- [ ] Tech Statewide
- [x] W. Lafayette

CREDIT TYPE
1. Fixed Credit: Cr. Hrs. 4
2. Variable Credit Range:
Minimum Cr. Hrs
(Check One) To [ ] Or [ ]
Maximum Cr. Hrs.
3. Equivalent Credit: Yes [ ] No [x]

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. Special Fees
- 6. Registration Approval Type: Department [x] Instructor [ ]
- [ ] 7. Variable Title
- [ ] 8. Honors
- [ ] 9. Full Time Privilege
- [ ] 10. Off Campus Experience

ScheduleType	Minutes Per Mtg	Meetings Per Week	Weeks Offered	% of Credit Allocated
Lecture	50	3	15	75
Recitation				
Presentation				
Laboratory	150	1	15	25
Lab Prep				
Studio				
Distance				
Clinic				
Experiential				
Research				
Ind. Study				
Pract/Observ				

Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):

The design and construction of compilers and other translators. Topics include compilation goals, organization of a translator, grammars and languages, symbol tables, lexical analysis, syntax analysis (parsing), error handling, intermediate and final code generation, assemblers, interpreters, and an introduction to optimization. Emphasis is on engineering a compiler or interpreter for a small programming language – typically a C or Pascal subset. Projects involve the stepwise implementation (and documentation) of such a system.
Prerequisites: ECE 36200 and ECE 36800

	Date		Date
Calumet Department Head		Calumet School Dean	
Fort Wayne Department Head	Date	Fort Wayne School Dean	Date
Indianapolis Department Head	4/2/09 Date	Indianapolis School Dean	4-6-09 Date
North Central Department Head	Date	North Central Chancellor	Date
West Lafayette Department Head	3/5/09 Date	West Lafayette College/School Dean	3/5/09 Date
		West Lafayette Registrar	4/2/09 Date

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3. Repeatable [ ]
Maximum Repeatable Credit:
4. Credit by Examination [ ]
5. Special Fees [ ]
6. Registration Approval Type
Department [x] Instructor [ ]
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Prerequisites: ECE 36200 and ECE 36800

	Date		Date
Calumet Department Head		Calumet School Dean	
Fort Wayne Department Head		Fort Wayne School Dean	
Indianapolis Department Head		Indianapolis School Dean	
North Central Department Head		North Central Chancellor	
West Lafayette Department Head	3/5/09	West Lafayette College/School Dean	3/5/09
		West Lafayette Registrar	

OFFICE OF THE REGISTRAR

Engineering Faculty Document No. 60-07
February 6, 2008

TO: The Faculty of the College of Engineering
FROM: The Faculty of the School of Electrical and Computer Engineering
RE: ECE 468 Changes in Credit, Description and Content

The faculty of the School of Electrical and Computer Engineering has approved the following changes in ECE 468. This action is now submitted to the Engineering Faculty with a recommendation for approval.

From: **ECE 468 – Introduction to Compilers and Translation Engineering**
Sem. 1. Class 3, cr. 3.
Prerequisite(s): EE 362, EE 368. Authorized equivalent courses or consent of instructor may be used in satisfying course pre- and co-requisites.

The design and construction of compilers and other translators. Topics include compilation goals, organization of a translator, grammars and languages, symbol tables, lexical analysis, syntax analysis (parsing), error handling, intermediate and final code generation, assemblers, interpreters, and an introduction to optimization/parallelization. Emphasis is on engineering, from scratch, a compiler or interpreter for a small programming language - typically a C or Pascal subset. Projects involve the stepwise implementation (and documentation) of such a system using C on ECN UNIX.

To: **ECE 468 – Introduction to Compilers and Translation Engineering**
Sem. 1. Class 3, Lab 3, cr. 4.
Prerequisite(s): EE 362, EE 368. Authorized equivalent courses or consent of instructor may be used in satisfying course pre- and co-requisites.

The design and construction of compilers and other translators. Topics include compilation goals, organization of a translator, grammars and languages, symbol tables, lexical analysis, syntax analysis (parsing), error handling, intermediate and final code generation, assemblers, interpreters, and an introduction to optimization. Emphasis is on engineering a compiler or interpreter for a small programming language – typically a C or Pascal subset. Projects involve the stepwise implementation (and documentation) of such a system.

Reason: The addition of the lab component necessitates an increase in course credit hours from 3 to 4. The course description and content have also been changed to reflect the updated content of the course. This course has been offered in this form as ECE 495S in Fall 2006 and Fall 2007. It will be offered as ECE 495S in Fall 2008, as well.

M. J. T. Smith, Head
School of Electrical and Computer Engineering

APPROVED FOR THE FACULTY
OF THE SCHOOLS OF ENGINEERING
BY THE ENGINEERING
CURRICULUM COMMITTEE
ECC Minutes #11
Date 11-12-08
Chairman ECC R Cipra

ECE 468 – Introduction to Compilers and Translation Engineering
Required Text(s):

1. Fischer, C., & LeBlanc, R., (1991). Crafting a Compiler. Addison Wesley. ISBN No: ISBN-13: 978-0805321661
2. Various tutorial papers from ACM and IEEE Digital Libraries

Weeks	*Principal Topics*
1	Structure of a compiler
2	Scanning, scanner generation
2	Grammars, parsing, parser generation
1	Semantic processing
1	Symbol tables and declarations
2	Processing expressions and control structures
2	Procedures and functions
2	Code optimizations
1	Program analysis
1	Tests

ECE 468 Lab Schedule

The labs will consist of a descriptions of design details for a project step and one-on-one assistance in the design, implementation and debugging of the course project steps. Since some steps require more than one week for completion, some labs will be devoted to helping students locate and fix bugs in their code.

Week	Lab topic and activities
1	Introduction and project overview – describe the project steps and how they interact, turn-in procedures, academic honest policies.
	Overview and work on the use of the Lex and Antlr programs for developing a lexical analyzer (i.e. lexer) for the project language.
2	Debugging help and continuation of code development started in lab 2.
3	Overview and work on the use of the Yacc and Antlr tools for developing an LR or LL parser for the project language.
4	Debugging help and continuation of code development started in labs 2 and 3.
5	Overview of the data structures needed to develop a symbol table. Use of the parser developed in lab 2 to drive semantic actions for variables declarations.
6	Debugging help and continuation of code development started in lab 5.
7	Overview and implementation of semantic routines for expressions, assignment statements and read and write statements. This lab builds on the code created in the first six labs. Discussion of the proper IR for statements and expressions in the program.
8	Debugging help and continuation of code development started in lab 6.
9	Overview of function body code generation, including actual parameter handling, generating code for parameter references, and generating code for return values. The code developed will be integrated with the code developed in the first eight labs.
10	Overview of function call code generation, including passing arguments and code generation obtain the return value from a function call. The code developed will be integrated with the code developed in the first nine labs.
11	Debugging help and continuation of code development started in labs 9 and 10.
12	Overview of code generation with a limited number of register (i.e. register allocation.) This code will be integrated with the code developed in labs 1 through 11.
13	Overview of instruction scheduling, generating code from an instruction schedule. This code will be integrated with the code developed in labs 1 through 12.
14	Debugging help and continuation of code development started in labs 12 and 13.
15	Overall project integration and debugging.

Course Outcomes:

Each listed outcome is to be followed by a set of numbers and a set of letters enclosed in brackets that indicate respectively the Program Attributes and Program Outcomes that are being met by that outcome. The BSEE and BSCmpE Program Attributes and Objectives are listed on-line at the URL:

https://engineering.purdue.edu/ECE/Academics/Undergraduates/ProgramObjectivesandOutcomes

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

i) First outcome: an understanding of the terminology, representation and use of formal languages and grammars	[1, 2, a]
ii) Second outcome: an understanding of the terminology and techniques of lexical analysis, parsing, semantic processing, code generation, and optimization	[1, 3, a, e]
iii) Third outcome an ability to design and implement a compiler, translator or interpreter for a small language based on their knowledge of (i) and (ii)	[1, 3, 4,a, b, c, e, k]

Outcome Assessment Method:

A student who receives a passing grade must have satisfied all of the course outcomes to some minimum degree. By awarding the student a passing grade, the instructor confirms that all of the outcomes have been satisfied. Outcomes based on material covered only during the final week or two of the course should be avoided.

All course outcomes are covered on tests and in the course project, with outcome (iii) primarily tested by the project.