Cover Sheet: Request 11429

EEL4761- Advanced Systems Programming

Info

Process	Course|New|Ugrad/Pro
Status	Pending
Submitter	Chillingworth,Shannon M schill@ece.ufl.edu
Created	1/27/2017 11:07:13 AM
Updated	3/13/2017 1:23:52 PM
Description of request	New Course Approval.

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	ENG - Electrical and Computer Engineering 011905000	Fox, Robert M		1/30/2017
Added 5XXX_Adv_Sys_Prog_UCC1_Syll_Update.docx					1/27/2017
College	Approved	ENG - College of Engineering	Caple, Elizabeth		2/10/2017
No document changes					
University Curriculum Committee	Comment	PV - University Curriculum Committee (UCC)	Case, Brandon	Added to the March agenda.	2/27/2017
No document changes					
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			2/27/2017
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
College Notified					
No document changes					

Course|New for request 11429

Info

Request: EEL4761- Advanced Systems Programming
Description of request: New Course Approval.
Submitter: Chillingworth,Shannon M schill@ece.ufl.edu
Created: 3/13/2017 1:25:12 PM
Form version: 2

Responses

Recommended PrefixEEL
Course Level 4
Number 761
Category of Instruction Advanced
Lab Code None
Course Title Advanced Systems Programming
Transcript TitleADV. SYSTEMS PROG.
Degree Type Baccalaureate

Delivery Method(s) On-Campus
Co-Listing Yes
Co-Listing Explanation This course is co-listed with the graduate class. The homework portion of the graduate section will involve additional work and more advanced concepts with respect to the undergraduate section. The exams will also involve more advanced concepts with respect to the undergraduate section. The syllabus for the graduate level course is also attached to the UCC request.
Effective Term Fall
Effective Year2017
Rotating Topic?No
Repeatable Credit?No

Amount of Credit3

S/U Only?No
Contact Type Regularly Scheduled
Weekly Contact Hours 3
Course Description Develop a deep understanding of operating system concepts and systems programming fundamentals and gain hands-on experience in systems programming by using Pthreads as well as implementing Linux device drivers and testing/verifying systems code for deadlock and race-freedom.
Prerequisites (EEL 3701C or equivalent) & (EEL3834 or equivalent) & (COP 4600 or equivalent)
Co-requisites None
Rationale and Placement in Curriculum This course builds on foundational programming topics and exposes students to operating systems concepts and systems programming fundamentals. Students will also gain hands-on experience in systems programming.
Course Objectives To learn the architecture and inner-workings of a real-world operating system and to learn how to write, test, and debug multi-threaded applications and device drivers in the face of a complicated concurrency model.
Course Textbook(s) and/or Other Assigned Reading Required Textbooks- None.

Recommended Readings-

1. Title: Linux System Programming

2. Author: Robert Love
3. Publication date and edition: 2013, 2nd
4. ISBN number: 978-1-449-33953-1

1. Title: Linux Device Drivers
2. Author: Corbet, Rubini, & Kroah-Hartman
3. Publication date and edition: 2005, 3rd
4. ISBN number: 978-0-596-00590-0

Weekly Schedule of Topics Course Outline –

Week 1: Introduction to Operating Systems Concepts/Yavuz/Ch.1 of Linux System Programming

Week 2: Inter-process communication mechanisms/Yavuz/Ch.s 7 and 10 of Linux System Programming

Week 3: Pthreads Library/Yavuz/Tutorial at https://computing.llnl.gov/tutorials/pthreads/

Week 4: Solving classical IPC problems using Pthreads/Yavuz/ Tutorial at https://computing.llnl.gov/tutorials/pthreads/

Week 5: Virtual Memory Management/Yavuz/Online document at http://www.tldp.org/LDP/tlk/mm/memory.html /Exam 1

Week 6: Mapping Memory/Yavuz/Ch.9 of Linux System Programming

Week 7: File System Management/Yavuz/Ch 4. of Linux System Programming and http://www.tldp.org/LDP/tlk/fs/filesystem.html

Week 8: Introduction to Device Drivers/Yavuz/Ch.s 1 and 2 of Linux Device Drivers

Week 9: Char Drivers/Yavuz/Ch. 3 of Linux Device Drivers

Week 10: Memory Mapping and DMA/Yavuz/Ch. 15 of Linux Device Drivers

Week 11: I/O Mechanisms/Yavuz/Ch.s 9 and 10 of Linux Device Drivers/Exam 2

Week 12: Concurrency and Race Conditions/Yavuz/Ch. 5 of Linux Device Drivers

Week 13: USB Device Drivers/Yavuz/Ch. 13 of Linux Device Drivers

Week 14: Testing a USB Keyboard Driver & Typical Device Driver Bugs/Yavuz/Representative bugs detected by Linux Driver Verification project http://linuxtesting.org/project/ldv

Week 15: USB Block Drivers/Yavuz/Ch. 16 of Linux Device Drivers

Week 16: Analyzing Device Drivers for Deadlocks and Race Conditions and Other Bugs & Wrap-up & Review/Yavuz/ Thorough Static Analysis of Device Drivers, Thomas Ball, Ella Bounimova, Vladimir Levin, Jakob Lichtenberg, Con McGarvey, Bohus Ondrusek, Sriram Rajamani, Byron Cook, Abdullah Ustuner, in EuroSys 2006, April 1, 2006./Exam3

Links and Policies Attendance and Expectations - Attendance is expected. Cell phones and other electronic devices are to be silenced. No text messaging during class or exams.

Requirements for class attendance and make-up exams, assignments, and other work are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Grading Scale –
A
93-100
A-
90-92
B+
87-89
B
83-86
B-
80-82
C+
77-79
C
73-76
C-
70-72
D+
67-69
D
63-66
D-
60-62
E
0-59

A C- will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better)." Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Make-Up Exam Policy - If you have a University-approved excuse and arrange for it in advance, or in case of documented emergency, a make-up exam will be allowed and arrangements can be made for making up missed work. University attendance policies can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Otherwise, make-up exams will be considered only in extraordinary cases, and must be taken before the scheduled exam. The student must submit a written petition to the instructor two weeks prior to the scheduled exam and the instructor must approve the petition.

Honesty Policy – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.
"...failure to comply with this commitment will result in disciplinary action compliant with the UF Student Honor Code Procedures
(http://www.dso.ufl.edu/sccr/procedures/honorcode.php)

Accommodation for Students with Disabilities – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course

instructor when requesting accommodation.

UF Counseling Services – Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
o · UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
o · Career Resource Center, Reitz Union, 392-1601, career and job search services.

Software Use – All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

Grading Scheme Programming Assignments (40%):
Assignment1: Advanced User-Space Programming
Assignment2: Pthreads
Assignment3: File Systems
Assignment4: A simple char device driver
Assignment5: A thread-safe char device driver
Assignment6: Testing the USB keyboard driver
Assignment7: Testing the USB mass-storage driver

Exams (60%): There will be 3 closed books and notes exams (each weighs 20%).
Exam1: Wednesday, February 10th (regular class time and place)
Exam2: Wednesday, March 23rd (regular class time and place)
Exam3: Wednesday, April 20th (regular class time and place)

Note: This course is co-listed with the graduate class. The homework portion of the graduate section will involve additional work and more advanced concepts with respect to the undergraduate section. The exams will also involve more advanced concepts with respect to the undergraduate section.

Instructor(s) Dr. Tuba Yavuz

EEL 4XXX Advanced Systems Programming

1. Catalog Description – (3 credits) Develop a deep understanding of operating system concepts and systems programming fundamentals and gain hands-on experience in systems programming by using Pthreads as well as implementing Linux device drivers and testing/verifying systems code for deadlock and race-freedom.
2. Pre-requisites:

    - EEL 3701C (or equivalent), EEL 3834 (or equivalent), and COP 4600 (or equivalent)

3. Course Objectives – To learn the architecture and inner-workings of a real-world operating system and to learn how to write, test, and debug multi-threaded applications and device drivers in the face of a complicated concurrency model.
4. Contribution of course to meeting the professional component (ABET only – undergraduate courses) 3 credits of Engineering Science.
5. Relationship of course to program outcomes: Skills student will develop in this course (ABET only undergraduate courses) Outcomes a and k.
6. Instructor –Dr. Tuba Yavuz
    1. Office location: 321 Benton Hall
    2. Telephone: 352-8460202
    3. E-mail address: tuba@ece.ufl.edu
    4. Class Web site: E-learning CANVAS.
    5. Office hours: M 5th, Th 5th periods
7. Teaching Assistant – Farhaan Fowze
    1. Office location: 320 Benton Hall
    2. Telephone:
    3. E-mail address: farhaan104@ufl.edu
8. Meeting times: MWF 3rd period.
9. Class/laboratory schedule - 3 class periods consisting of 50 minutes each
10. Meeting Location – NEB 202.
11. Material and Supply Fees - None
12. Textbooks and Software Required – None.
13. Recommended Reading –

    1. Title: Linux System Programming
    2. Author: Robert Love
    3. Publication date and edition: 2013, 2nd
    4. ISBN number: 978-1-449-33953-1

    1. Title: Linux Device Drivers

2. Author: Corbet, Rubini, & Kroah-Hartman
3. Publication date and edition: 2005, 3rd
4. ISBN number: 978-0-596-00590-0

14. Course Outline –

Week 1: Introduction to Operating Systems Concepts/Yavuz/Ch.1 of Linux System Programming

Week 2: Inter-process communication mechanisms/Yavuz/Ch.s 7 and 10 of Linux System Programming

Week 3: Pthreads Library/Yavuz/Tutorial at https://computing.llnl.gov/tutorials/pthreads/

Week 4: Solving classical IPC problems using Pthreads/Yavuz/ Tutorial at https://computing.llnl.gov/tutorials/pthreads/

Week 5: Virtual Memory Management/Yavuz/Online document at http://www.tldp.org/LDP/tlk/mm/memory.html /Exam 1

Week 6: Mapping Memory/Yavuz/Ch.9 of Linux System Programming

Week 7: File System Management/Yavuz/Ch 4. of Linux System Programming and http://www.tldp.org/LDP/tlk/fs/filesystem.html

Week 8: Introduction to Device Drivers/Yavuz/Ch.s 1 and 2 of Linux Device Drivers

Week 9: Char Drivers/Yavuz/Ch. 3 of Linux Device Drivers

Week 10: Memory Mapping and DMA/Yavuz/Ch. 15 of Linux Device Drivers

Week 11: I/O Mechanisms/Yavuz/Ch.s 9 and 10 of Linux Device Drivers/Exam 2

Week 12: Concurrency and Race Conditions/Yavuz/Ch. 5 of Linux Device Drivers

Week 13: USB Device Drivers/Yavuz/Ch. 13 of Linux Device Drivers

Week 14: Testing a USB Keyboard Driver & Typical Device Driver Bugs/Yavuz/Representative bugs detected by Linux Driver Verification project http://linuxtesting.org/project/ldv

Week 15: USB Block Drivers/Yavuz/Ch. 16 of Linux Device Drivers

Week 16: Analyzing Device Drivers for Deadlocks and Race Conditions and Other Bugs & Wrap-up & Review/Yavuz/ Thorough Static Analysis of Device Drivers, Thomas Ball, Ella Bounimova, Vladimir Levin, Jakob Lichtenberg, Con McGarvey, Bohus Ondrusek, Sriram Rajamani, Byron Cook, Abdullah Ustuner, in EuroSys 2006, April 1, 2006./Exam3

15. Attendance and Expectations - Attendance is expected. Cell phones and other electronic devices are to be silenced. No text messaging during class or exams.

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16. Grading –

    Programming Assignments (40%):

    Assignment1: Advanced User-Space Programming
    Assignment2: Pthreads
    Assignment3: File Systems
    Assignment4: A simple char device driver
    Assignment5: A thread-safe char device driver
    Assignment6: Testing the USB keyboard driver
    Assignment7: Testing the USB mass-storage driver

    Exams (60%): There will be 3 closed books and notes exams (each weighs 20%).

    Exam1: Wednesday, February 10th (regular class time and place)
    Exam2: Wednesday, March 23rd (regular class time and place)
    Exam3: Wednesday, April 20th (regular class time and place)

Note: This course is co-listed with the graduate class. The homework portion of the graduate section will involve additional work and more advanced concepts with respect to the undergraduate section. The exams will also involve more advanced concepts with respect to the undergraduate section.

17. Grading Scale –

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
93-100	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	0-59

A C- will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better)." Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit:
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20. Accommodation for Students with Disabilities – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.
21. UF Counseling Services – Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
    - · UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
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EEL 5XXX Advanced Systems Programming

1. Catalog Description – (3 credits) Develop a deep understanding of operating system concepts and systems programming fundamentals and gain hands-on experience in systems programming by using Pthreads as well as implementing Linux device drivers and testing/verifying systems code for deadlock and race-freedom.
2. Pre-requisites: Operating Systems and Architecture
3. Course Objectives – To learn the architecture and inner-workings of a real-world operating system and to learn how to write, test, and debug multi-threaded applications and device drivers in the face of a complicated concurrency model.
4. Contribution of course to meeting the professional component (ABET only – undergraduate courses) NA.
5. Relationship of course to program outcomes: Skills student will develop in this course (ABET only undergraduate courses) NA.
6. Instructor –Dr. Tuba Yavuz
    1. Office location: 321 Benton Hall
    2. Telephone: 352-8460202
    3. E-mail address: tuba@ece.ufl.edu
    4. Class Web site: E-learning CANVAS.
    5. Office hours: M 5th, Th 5th periods
7. Teaching Assistant – Farhaan Fowze
    1. Office location: 320 Benton Hall
    2. Telephone:
    3. E-mail address: farhaan104@ufl.edu
8. Meeting times: MWF 3rd period.
9. Class/laboratory schedule - 3 class periods consisting of 50 minutes each
10. Meeting Location – NEB 202.
11. Material and Supply Fees - None
12. Textbooks and Software Required – None.
13. Recommended Reading –

    1. Title: Linux System Programming
    2. Author: Robert Love
    3. Publication date and edition: 2013, 2nd
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