

KARTA PRZEDMIOTU

Rok akademicki:

Nazwa przedmiotu: LINUX ADVANCED PROGRAMMING Kod/nr	
Kierunek: MAKROKIERUNEK	
Specjalność: AUTOMATIC CONTROL	
Tryb studiów: I STOPNIA	
Rodzaj przedmiotu:	<i>kierunkowy</i> Liczba pkt ECTS: 3
Instytut/ Katedra: INSTYTUT AUTOMATYKI	
Semestr: 7	
Prowadzący przedmiot: dr inż. Dariusz Bismor	
Prowadzący zajęcia:	Liczba godzin
Wykład:	Wykład: 30
Ćwiczenia:	Ćwiczenia:
Laboratorium:	Laboratorium: 15
Projekt:	Projekt:
Seminarium:	Seminarium:
Powiązanie ze standardami i cel kształcenia The course is connected with section A.3 „Kształcenie w zakresie informatyki” and section B.8 „Kształcenie w zakresie systemów czasu rzeczywistego” of Teaching Standards (Standardy Kształcenia). The course has two aims. The first is to present the basics as well as more advanced techniques used in Linux kernel programming. As there are (soft) real time versions of Linux kernel, this aim agrees with real time systems teaching requirement. The second aim is to demonstrate object oriented programming techniques with application to graphical user interface programming in KDE/Qt environment. This extends the information technology knowledge of course attendants.	

Treść wykładów:

The lecture discusses the following areas of Linux kernel programming: differences between user and kernel mode code, Linux kernel modular structure and design, what all modules must have; how to compile a simple module; devices in Linux system: block devices, character devices and network interfaces; character devices: numbering, file operations, talking to; memory issues: types of memory, caches, paging; ioctls, blocking, poll and select, asynchronous operations; race conditions, semaphores, mutexes and spin locks; scheduling tasks; interrupt handling basics; block devices: differences between character and block devices, buffer cache, virtual file system, structure inode, writing simple file system, second extended file system.

The lecture discusses the following areas of KDE programming: KDE 4.x architecture overview; 3-level structure of KDE/Qt programs; signals and slots; designing applications using XML GUI framework; design patterns in application config files and setting dialogs; layout management; composing GUI with KDE Designer and Qt Designer; graphical operations basics; writing new widgets.

The lecture is based on slides displayed with multimedia projector. Students are allowed to download outlines prior to lecture. All issues mentioned above are discussed by the lecturer, with emphasize on the issues selected by students. Many issues are illustrated by working program code.

Treść/Tematy: Ćw./L./P./Sem.

1. Writing a simple Linux kernel module.
2. Writing a character device driver, part 1: reading and writing from device file.
3. Writing a character device driver, part 2: more advanced operations.
4. Writing a block device driver.
5. Writing a simple KDE application.
6. Using QT Designer to compose GUI.

Forma egzaminu/zaliczenia przedmiotu

1. Wykład — na podstawie ćwiczeń laboratoryjnych.
2. Laboratorium – na podstawie zaliczenia każdego z ćwiczeń.

Minimalne wymagania do egzaminu /zaliczenia

Each of the laboratory exercises is evaluated by a tutor in a 0-5 points range. The mark depends on student's knowledge of the theory, efficiency in solving laboratory task and quality of the resulting code. Five out of six exercises must be awarded 3 or more points *and* the overall number of points must be greater than 18 to be graded a pass mark.

Literatura (podstawowa i specjalistyczna)

1. Lecture notes
2. M. Mitchell, J. Oldham and A. Samuel: *Advanced Linux Programming*, New Riders Publishing, 2001.
3. P. J. Salzman, M. Burian and O. Pomerantz: *The Linux Kernel Module Programming Guide*, Peter Jay Salzman, 2001
4. A. Rubini and J. Corbet: *Linux Device Drivers, 2nd Edition*, O'Reilly, 2001.
5. E. Raymond: *The Art of Unix Programming*, Eric Steven Raymond, 2003.
6. J. Thelin: *Foundations of Qt Development*, Apress, 2007.
7. KDE Developer Corner: <http://techbase.kde.org/Development>
8. Kdevelop Tutorials, <http://www.kdevelop.org/index.html?filename=tutorials.html>
9. [Qt Reference Documentation, http://doc.trolltech.com/4.5/index.html](http://doc.trolltech.com/4.5/index.html)

Zatwierdzono:

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(data i podpis prowadzącego)

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(data i podpis Dyrektora Instytutu/Kierownika Katedry)