IA based Embedded Curriculum Sharing

Huabiao Qin
School of electronic and information engineering
South Chin University of technology

Abstract

Based on the embedded Linux, this course introduced the theory and method of embedded communication system, the contents include: The Hardware platform of Embedded system and Intel Architecture .Structure and theory of Linux kernel, Advanced programming , Device driver, Network communication ,Tools chain and developing flow. Besides lecture, the enrolled students are required to complete 3 to 4 experiments and a design project on wireless communication system.

Huabiao Qin,

Professor, Ph.D

School of electronic and information engineering

South Chin University of technology

Email: eehbqin@scut.edu.cn

Research area: Embedded system, Visual Perception , Wireless sensor network, FPGA and SOC design.

IA based Embedded Curriculum Summary

Course Name: Linux and Embedded Communication System

Course Type: (presentation/PPT)

Target Student/Semester: Senior student /Graduate student

Student Number (per year):100

Course Duration: 48 periods

Prerequisite Courses: Principle of Microcomputer, Single-chip microcomputer principle and interface technology , C Language Programming , Computer network

IA based Embedded Curriculum Characteristic

Curriculum/Course Characteristic:

1. Integrated curriculum, refer to computer, electronic ,communication etc. many different curricula.
2. High combination of theory and Practice , theory is much enough, but still need many hands-on.
3. Fast Changing, had better update the content every month if possible.

IA based Embedded Curriculum Key Points

Curriculum/Course Key Points:

1) Linux kernel customizing
2) Network programming
3) Multi-Process programming

IA based Embedded Curriculum Difficult Points

Curriculum/Course Difficult Points:

1) The development of device driver
2) The transplanting of Linux kernel
3) The construction of embedded Linux development environment

IA based Embedded Curriculum Experience Sharing

1. Embedded system is the high combination of hardware and software , so give student the comprehensive hardware knowledge of embedded system is prerequisite .
2. OS and software become more and more important fact ,so principle of OS and the advanced programming are the emphasis.
3. The construction of embedded Linux development environment and Driver are the Difficult Points.
4. Practice is absolutely necessarily for this curriculum.

IA based Embedded Curriculum Hands-on Practice Case Sharing (1)

Case Name: Create embedded Linux system on a CF card.

Case Attribution: Transplanting of Linux kernel

Case Objective: Study the system structure of embedded Linux kernel and its transplanting workflow.

Case Content: The construction of embedded Linux development environment, kernel clipping, kernel compiling

IA based Embedded Curriculum Hands-on Practice Case Sharing (2)

Case Name: Development of device driver.

Case Attribution: Device driver

Case Objective: Study the framework of device driver and its development workflow.

Case Content: Develop a network a device driver with a given framework , test it under the application.

IA based Embedded Curriculum Hands-on Practice Case Sharing (3)

Case Name: Linux network programming.

Case Attribution: Network Communication.

Case Objective: Study the Linux network programming method.

Case Content: Develop a communication program on the server and client with TCP/UDP protocol and compare their difference.