**Linux Device Driver Fundamentals**

**Course Outline**

**Duration: 2 days with Hands on**

**Trainer: Pranesh Krishnan, PhD**

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| **Day 1** | | | |
| 1 | Introduction to the world of Linux | |  |
|  | 1.1 | Basics of CPU Architectures |  |
|  | 1.2 | Understanding Windows and Linux Operating Systems |  |
|  | 1.3 | Windows and Linux Architecture and File System |  |
|  | 1.4 | Insight to the Linux Kernal Space |  |
|  | 1.5 | Linux User Space |  |
| 2 | Linux Kernel Modules | |  |
|  | 2.1 | Linux Device Drivers |  |
|  | 2.2 | Filesystem drivers |  |
|  | 2.3 | System calls |  |
|  | 2.4 | Linux Kernel Module |  |
|  | 2.5 | Differences Between Kernel Modules and User Programs |  |
|  | 2.6 | Difference Between Kernel Drivers and Kernel Modules |  |
| H1 | Hands On – Session 1 | |  |
|  | H1.1 | Accessing Linux using Putty / Visual Studio Code |  |
|  | H1.2 | Linux commands |  |
|  |  |  |  |
| **BREAK** | | | |
| 3 | Shell Programming | |  |
|  | 3.1 | Terminals and Shells |  |
|  | 3.2 | Types of Shells |  |
|  | 3.3 | Programming using VI and Nano |  |
|  | 3.4 | Basics of C Programming |  |
| 4 | Device Drivers | |  |
|  | 4.1 | Types of device drivers |  |
|  | 4.2 | Character device |  |
|  | 4.3 | Block device |  |
|  | 4.4 | Network device |  |
| H2 | Hands On – Session 2 | |  |
|  | H2.1 | Linux package management |  |
|  | H2.2 | Linux commands and command line editors |  |
|  |  |  |  |
|  | Debugging and Feedback Session | |  |

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| **Day 2** | | | | |
| 5 | Modules | | |  |
|  | 5.1 | Module information | |  |
|  | 5.2 | License, author | |  |
|  | 5.3 | Module description | |  |
|  | 5.4 | Module Version | |  |
| 6 | Kernel module programming | | |  |
|  | 6.1 | init function | |  |
|  | 6.2 | exit function | |  |
|  | 6.3 | printk() & printf | |  |
| H3 | Hands On – Session 3 | | |  |
|  | H3.1 | Creating modules | |  |
|  | H3.2 | Accessing modules through function calls | |  |
| **BREAK** | | | | |
| 7 | Simple Device Driver program | |  | |
|  | 7.1 | Understanding the device basics |  | |
|  | 7.2 | Compiling our driver |  | |
|  | 7.3 | Ubuntu and Raspberry Pi |  | |
| 8 | Loading and unloading the Linux Device driver | |  | |
|  | 8.1 | Loading |  | |
|  | 8.2 | Listing of modules |  | |
|  | 8.3 | Unloading |  | |
|  | 8.4 | Getting module details |  | |
| H4 | Hands On – Session 4 | | |  |
|  | H4.1 | Identifying and writing code for devices | |  |
|  | H4.2 | Compiling drivers | |  |
|  |  |  | |  |
|  | Debugging and Feedback Session | | |  |

Ref:

<https://embetronicx.com/tutorials/linux/device-drivers/linux-device-driver-part-1-introduction/>

<https://embetronicx.com/tutorials/linux/device-drivers/linux-device-driver-tutorial-part-2-first-device-driver/>