

Vistula, IT Faculty, 2016

# **Operating Systems and Systems Programming**

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# Content I

1. An overview of Operating Systems Theory. Processes and Resources.
2. Programming in C using Linux System Calls. Input and output.
3. Creation of Processes in OS Linux. Inter Process Communication: Pipes.
4. Inter Process Communication: Messages and Semaphores.

# Content II

5. Virtual memory. Dynamic memory allocation and shared segments.
6. Work with Sockets of OS Linux.  
Communication in TCP/IP networks using sockets.
7. Organization of Linux kernel. Configuring, building and installing a new kernel.
8. Building kernel loadable modules. Case study: stack of networking protocols E6.

# Literature

- Tanenbaum A.S. Modern Operating Systems. Pearson, 2008, 1104 p.
- Bovet D.P., Cesati M. Understanding the Linux kernel. O'Reilly, 2000, 702 p.
- Kernigan B.W., Ritchie D.M. C Programming Language. Prentice Hall, 1988.
- Mitchell M., Oldham J., Samuel A. Advanced Linux Programming. New Riders Publishing, 2001, 332 p.

# Additional literature

- The GNU C Library Reference Manual / Loosemore S. et al
- Zaitsev D.A., Kharsun M.A. Implementing Stack E6 via OS Linux Sockets, Journal of Advanced Computer Science and Technology, 1 (3) (2012) 116-133.
- Zaitsev D.A., Bolshakov S.I. E6 Addressing Scheme and Network Architecture, Journal of Advanced Computer Science and Technology, 1 (1) (2012) 18-31.
- Zaitsev D.A., Doroshuk A.V. Summary of lectures on course Networking Operating Systems. Odessa: ONAT, 2007. - 68 p.
- Voronoy S.M., Zaitsev D.A., Shmeleva T.R. Tracing networking operating systems processes: textbook for laboratory training. Donetsk: IAIP, 2007. - 67 p.