

Systems Software – BINF31aa

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Systems Software Topic Outline

The Systems Software lecture, BINF31aa, covers the fundamental concepts of modern operating systems which include the basic principles of process, memory and resources management in multi-user and multi-tasking operating systems, as well as an introduction to parallel programming. The main parts of the lecture are covered in [SGG08]. Additional companion literature includes selected chapters from [GGKK03] and examples from [BS03], which are available online and as printed handout copies from the IFI library.

In the outline below, if not specified otherwise, the relevant reading for the indicated topics can be found in corresponding chapters in [SGG08]. The other extra material from the handouts is indicated with chapter and literature reference accordingly.

[SGG08] Abraham Silberschatz, Peter B. Galvin, and Greg Gagne. *Operating System Concepts*. John Wiley & Sons, 2008.

[GGKK03] Ananth Grama, Anshul Gupta, George Karypis, and Vipin Kumar. *Introduction to Parallel Computing: Design and Analysis of Algorithms*. Pearson/Addison Wesley, 2003.

[BS03] Lubomir F. Bic and Alan C. Shaw. *Principles of Operating Systems*. Prentice-Hall/Pearson Education, 2003.

Topic	Chapters
I. Introduction	1
1. What is an operating system?	
2. Computer system organization	
3. Operating system structure	
4. Resource management	
II. System structures	2
1. Process concept	3
2. Threads	4
III. Parallel programming	
1. Introduction to parallel computing	[GGKK03] 1-1.2
2. Parallel programming platforms	[GGKK03] 2-2.3, 2.4.1
3. Parallel algorithm design	[GGKK03] 3-3.2
4. Performance	[GGKK03] 5-5.2, 5.4-5.4.1
5. Shared memory programming	[GGKK03] 7

IV. Process coordination

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|-----------------------|---|
| 1. Synchronization | 6 |
| 2. Deadlocks | 7 |
| 3. Process scheduling | 5 |

V. Memory management

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| 1. Main memory | 8 |
| 2. Virtual memory | 9 |