

Course name:	<b>OPERATING SYSTEMS I</b> <b>(SISTEMI OPERATIVI I)</b>		
Year:	<b>3<sup>rd</sup></b>	Semester:	<b>2<sup>nd</sup></b>
Course type:	<b>Compulsory</b>		
Teacher:	<b>Letizia LEONARDI</b>		

<b>Lectures</b>		<b>Laboratory</b>	
Total number of hours:	52	Total number of hours:	26
Duration:	6.5 weeks	Duration:	6.5 weeks
Hours per week:	8	Hours per week:	4
<i>Theory:</i>	6		
<i>Exercise:</i>	2		
<b>Assessment method</b>			
Written test + oral			

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### AIMS

The course aim is both to reach a good knowledge of the concepts at the basis of a generic Operating System and to study a specific Operating System (UNIX). In particular, the course faces the basic concepts from a system point of view, while w.r.t. UNIX, the course aims at both going over and deepening the knowledge of the external interface (command and shell language).

### PROGRAMME

- Operating System introduction:
  - historical evolution: from first Operating Systems to modern ones.
  - Operating Systems classification: mono- and multi-user systems, batch and interactive systems, time-sharing and real-time systems.
- Basic elements of an Operating System.
- Concurrent programming techniques: synchronisation and communication models for processes by using global and local scenarios. The deadlock problem. Mechanisms and policies of resources protection.
- Analysis of an existing Operating System: UNIX.  
Going over and deepening of the user interface:
  - main user commands: redirection and command piping;
  - programming by using different command languages: the Bourne shell example.

### BIBLIOGRAPHY

- J.PETERSON, A.SILBERSCHATZ: Operating System Concepts. ADDISON-WESLEY, 1990.
- M.MILENKOVIC: Sistemi Operativi. MCGRAW-HILL, 1990 (in Italian).
- P.ANCILOTTI, M.BOARI: Principi e Tecniche di Programmazione Concorrente. UTET, 1988 (in Italian).
- S.R.BOURNE: UNIX System V. ADDISON-WESLEY, 1990.
- A.S.TANENBAUM: Progettazione e sviluppo dei Sistemi Operativi. JACKSON, 1988 (in Italian).

### PRE-REQUISITES

Knowledge of the programme of the course "Foundations of Computer Science IV".

Course name:	<b>OPERATING SYSTEMS II</b> <b>(SISTEMI OPERATIVI II)</b>		
Year:	<b>3<sup>rd</sup></b>	Semester:	<b>2<sup>nd</sup></b>
Course type:	Optional (can be substituted with the stage activity)		
Teacher:	<b>Letizia LEONARDI</b>		

<b>Lectures</b>		<b>Laboratory</b>	
Total number of hours:	52	Total number of hours:	26
Duration:	6.5 weeks	Duration:	6.5 weeks
Hours per week:	8	Hours per week:	4
<i>Theory:</i>	6		
<i>Exercise:</i>	2		

<b>Assessment method</b>
Written test + evaluation of a laboratory project + oral
Final grade is given in conjunction with course "Operating Systems I"

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### AIMS

The course aims both to reach a good knowledge of each Operating System level and to deepen the study of the UNIX Operating System. To this purpose, the theoretic arguments are faced from a system point of view by using UNIX as a case of study. In particular, the course presents the basic UNIX primitives w.r.t the management of processes and their synchronisation/communication.

### PROGRAMME

- Operating System as resources manager, in particular:
  - a) CPU management: scheduling algorithms;
  - b) Memory management: swapping, paging, segmentation, virtual memory;
  - c) File System management: logic organisation and physical allocation.
- Analysis of an existing Operating Systems: UNIX.  
The system programming by using the programming language C: in particular, process handling and synchronisation by using the mechanisms of the different versions: Unix BSD 4.3 and Unix System V.
- Distributed systems and security issues.
- Communication primitives for UNIX-based distributed systems: the socket mechanism.

### BIBLIOGRAPHY

- J.PETERSON, A.SILBERSCHATZ: Operating System Concepts. ADDISON-WESLEY, 1990.
- M.MILENKOVIC: Sistemi Operativi. MCGRAW-HILL, 1990 (in Italian).
- K.HAVILAND, B.SALAMA: Unix System Programming. ADDISON-WESLEY, 1987.
- E.FOXLEY: Unix for Super Users. ADDISON-WESLEY, 1985.
- A.S.TANENBAUM: Progettazione e sviluppo dei Sistemi Operativi. JACKSON, 1988 (in Italian).

### PRE-REQUISITES

Knowledge of the programme of the course "Operating Systems I".