

SYLLABUS COURSE DESCRIPTION

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| COURSE TITLE | Computer Systems |
| COURSE CODE | 76200 |
| SCIENTIFIC SECTOR | ING-INF/05 |
| DEGREE | Bachelor in Computer Science |
| SEMESTER | 1 st and 2 nd semester |
| YEAR | 1 st |
| CREDITS | 12 |
| MODULAR | Yes |

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| TOTAL LECTURING HOURS | 80 |
| TOTAL LAB HOURS | 40 |
| PREREQUISITES | |
| COURSE PAGE | https://ole.unibz.it/ |

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| SPECIFIC EDUCATIONAL OBJECTIVES | <ul style="list-style-type: none"> • Type of course: "di base" for L-31 • Scientific area: "Formazione informatica di base" for L-31 <p>The goal of this course is to give students an understanding of :</p> <ul style="list-style-type: none"> • the architecture and organization of modern computers; • the basic of the circuit logic involved in their construction; • the foundation of their programming in assembly language; • the operating systems and their components/functionalities; • the foundation of their programming in C. |
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| MODULE 1 | Computer Systems Architecture |
| MODULE CODE | 76200A |
| MODULE SCIENTIFIC SECTOR | ING-INF/05 |
| SEMESTER | 1st |
| CREDITS | 6 |
| LECTURER | Tammam Tillo |

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| SCIENTIFIC SECTOR OF THE LECTURER | ING-INF/05 |
| TEACHING LANGUAGE | English |
| OFFICE HOURS | It is recommended to make an appointment by email, Tammam.Tillo@unibz.it Piazza Domenicani, 3 – Office 1.17 |
| TEACHING ASSISTANT | Tammam Tillo, Rizvi Syed Mehdi Abbas , Piazza Domenicani, 3 – Office 1.10, Syed.Rizvi@inf.unibz.it Vella Flavio |
| OFFICE HOURS | TBA |
| LIST OF TOPICS COVERED | <ul style="list-style-type: none"> • Computer systems organization: processors, primary memory, secondary memory, input/output. • Boolean algebra and gates: Boolean algebra, gates, implementation of Boolean functions, circuit equivalence. • Digital circuits: arithmetic circuits, clocks, memory, CPU chips, buses. • Microarchitecture: design of the microarchitecture level, performance optimization. • Instruction sets: data types, instruction formats, addressing, instruction types, flow of control. • Assembly language programming. |
| TEACHING FORMAT | This course will be delivered through a combination of formal lectures and exercises in the lab. |

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| MODULE 2 | Operating Systems |
| MODULE CODE | 76200B |
| MODULE SCIENTIFIC SECTOR | ING-INF/05 |
| CREDITS | 6 |
| LECTURER | Fabio Persia Office POS 2.11, Faculty of CS, POS Building, Piazza Domenicani 3 http://www.inf.unibz.it/~fpersia/ Fabio.Persia@unibz.it |
| SCIENTIFIC SECTOR OF THE LECTURER | ING-INF/05 |
| TEACHING LANGUAGE | English |
| OFFICE HOURS | Thursdays, 15:00 – 17:00 Office POS 2.11, Faculty of CS, POS Building, Piazza Domenicani 3 Fabio.Persia@unibz.it |

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| TEACHING ASSISTANT | Fabio Perisa and TBA |
| OFFICE HOURS | TBA |
| LIST OF TOPICS COVERED | <ul style="list-style-type: none"> • Programming in C • Resources • Scheduling and concurrency • Processes and synchronization • File systems and memory management • Security and protection |
| TEACHING FORMAT | Frontal lectures and labs. |

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| LEARNING OUTCOMES | <p>Knowledge and understanding</p> <ul style="list-style-type: none"> • understand the key principles, the structures and the organization of computer systems; • know the fundamental principles of programming (low-level language programming and C); • have a solid knowledge of the theoretical foundations of computer science; <p>Applying knowledge and understanding</p> <ul style="list-style-type: none"> • be able to develop programs to interact with microcontrollers and the operating system of modern computers. <p>Making judgments</p> <ul style="list-style-type: none"> • Be able to work autonomously according to the own level of knowledge and understanding • be able to judge the use of microcontrollers and operating systems and their applicability; <p>Ability to learn</p> <ul style="list-style-type: none"> • Have developed learning capabilities to pursue further studies with a some degree of autonomy; • be able to learn the innovative features of state-of-the-art microcontrollers and operating systems. |
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| ASSESSMENT | <p>Module 1 – Computer Systems Architecture: the assessment consists of two parts:</p> <ul style="list-style-type: none"> • two lab reports ; • written exam. <p>The aim of the two lab reports and the written exam are to check to which degree students have mastered the following learning outcomes: 1) Knowledge and understanding, 2) applying knowledge and understanding, 3) making judgment.</p> <p>Module 2 – Operating Systems: the assessment consists of:</p> <ul style="list-style-type: none"> • written exam, which also includes some exercises related to what was explained during the Lab <p>The aim of the written exam is to check the understanding of fundamental operating system concepts and checks whether the candidates have also</p> |
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| | <p>acquired detailed knowledge about operating systems. This is done through open questions about both the theoretical content and the lab exercises.</p> <p>Both modules must be positive to pass the course.</p> <p>A positive evaluation of one module remains valid for all three regular exam sessions of the academic year.</p> |
| ASSESSMENT LANGUAGE | English |
| EVALUATION CRITERIA AND CRITERIA FOR AWARDING MARKS | <p>Module 1 – Computer Systems Architecture: marks are distributed as follows:</p> <ul style="list-style-type: none"> • 30% for the two lab reports (Attending the lab is not required but recommended); • 70% for the written exam. <p>The written exam and the lab reports will be evaluated in terms of correctness and clarity.</p> <p>Module 2 – Operating Systems: marks are distributed as follows:</p> <ul style="list-style-type: none"> • written exam: theoretical questions (70%) and exercises related to what has been explained during the lab (30 %). <p>The written exam questions will be evaluated in terms of correctness and clarity.</p> |
| REQUIRED READINGS | <p>Module 1 :</p> <ul style="list-style-type: none"> • Students should refer primarily to their notes taken in class (lectures and exercise classes) and consult the suggested textbooks. <p>Module 2 :</p> <ul style="list-style-type: none"> • Operating System Concepts, Abraham Silberschatz et al; 2012, Ninth Edition. • C: How to Program, Seventh Edition, Paul Deitel, Harvey Deitel. |
| SUPPLEMENTARY READINGS | <p>Module 1 :</p> <ul style="list-style-type: none"> • S. Tanenbaum, Todd Austin, Structured Computer Organization (6th Edition) <p>Module 2 :</p> <ul style="list-style-type: none"> • Modern operating systems, Andrew S. Tanenbaum; 2008 • Operating systems: internals and design principles, William Stallings; 2001 |
| SOFTWARE USED | <p>Module 1 :</p> <ul style="list-style-type: none"> • Mplab. <p>Module 2 :</p> <ul style="list-style-type: none"> • Dev-C++ |