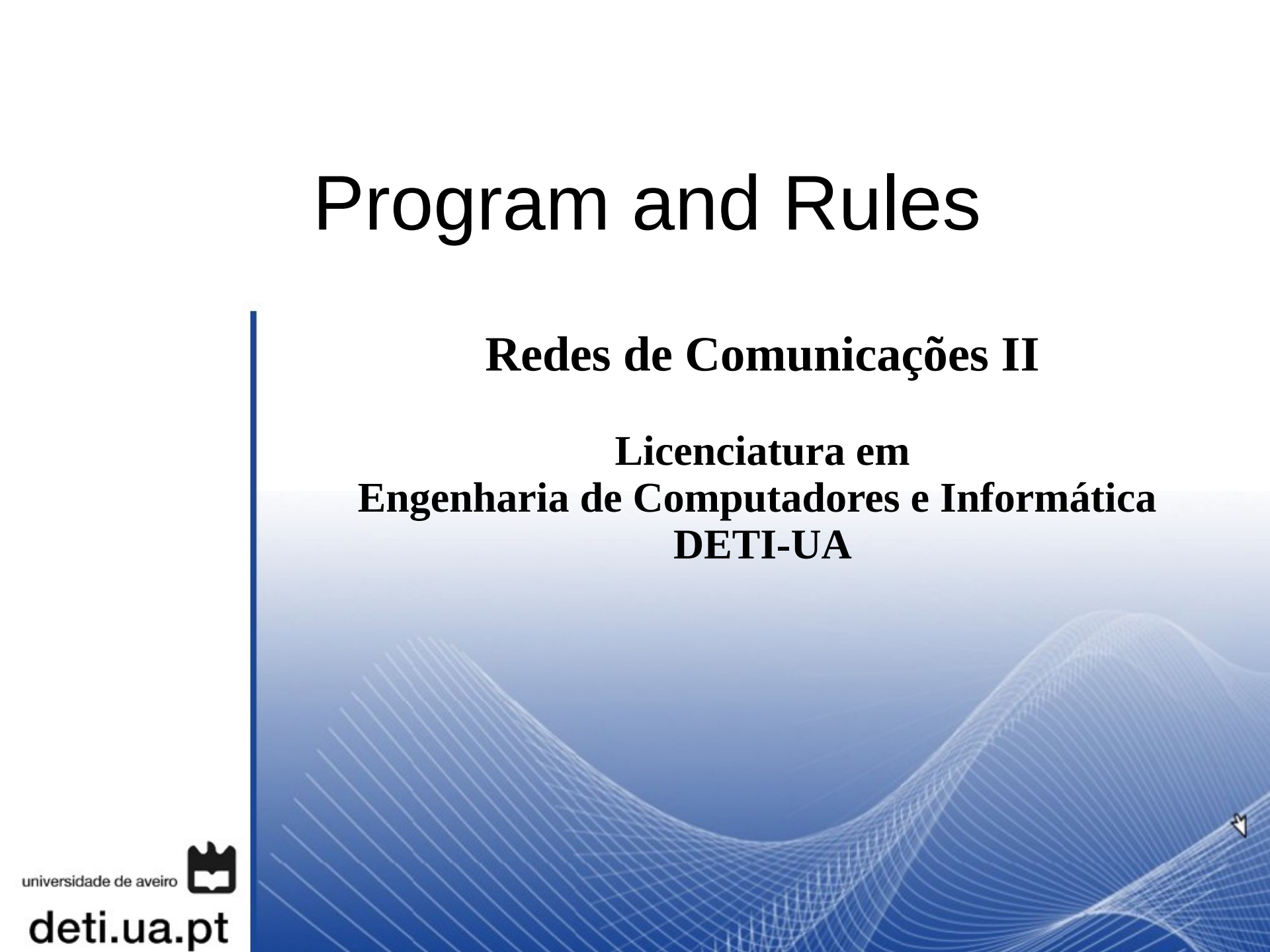
Program and Rules

Redes de Comunicações II

Licenciatura em
Engenharia de Computadores e Informática
DETI-UA



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Professors

- Prof. Paulo Salvador (theory classes)
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- Prof. Amaro de Sousa (practice classes)
  - Email: asou@ua.pt

Prof. Ayman Radwan (practice classes)

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UC Informations

- All materials, documents and software will be available on eLearning.ua.pt (Moodle).
  - Subjected to weekly updates.

  Flexible office hours
  - Email (to discuss any topic or schedule a meeting).
  - Discord: Invite https://discord.gg/bPPpKy5
    - **Change your nick to your real name** (First and Last names).
    - **Ask RC2 student role.**
    - Only after you will have access to the course contents.

Objectives and Outcomes

- The objective of the course is to present students with:
  - Essential concepts in computer networks;
  - Identifying the fundamentals applied to the control and transport of data.
- It is intended that at the end the students should:
  - Have an understanding of the underlying fundamentals of communication networks;
  - Understand new technologies and concepts of communication networks;
  - Be able to use their knowledge to respond to current changes in communication networks.

Program

- Local Area Networks (LAN)
  - Virtual LAN: purpose, implementation, segmentation models, Layer 2 interconnection (802.1Q and VXLAN) and Layer 3 interconnection.
  - Spanning Tree-protocol(s).
- Network Design Models
  - Types of topology. Redundancy and resilience requirements. Hierarchical design model.
- IP Routing
  - Unicast Routing: static, dynamic and police based routing.
  - Internal Routing protocols (RIPv1, RIPv2, OSPF, ISIS).
  - Internet general AS architecture and core networks. Inter-AS routing (MP-BGP).
  - Multicast Routing protocols (IGMP, MLD, PIM-DM, PIM-SM, PIM-SSM).
- Overlay Networks: IP-IP and GRE IP tunnels.
- Core Networks: SDH and DWDM. MPLS.
- (Other) Access Networks
  - CATV/HFC (DOCSIS), SDH/SONET/GPON,
  - Celular networks (4G/5G).
- Communication models: client-server and P2P.
- VoIP Service: SIP and WebRTC.
- Sensor Networks: BT, Zigbee, LoRA, NB-IoT.

Evaluation

- Final Grade = 50% * Theory Grade + 50% * Practice Grade
  - There are no minimum grade for any component.
  - Theory grade
    - 1 Final Exam (100%) in the exam season;
    - and/or 1 Exam in “repeat exam” season;
    - The best grade is considered.
  - Practice Grade
    - 2 multiple choice tests (25%+25%)
      - During practice classes;
      - First test – April 17th, 21st;
      - Second test – Junho 2nd, 5th.
    - “Repeat exam” season
      - One single test with all topics.
      - The best grade is considered.

Planning (tentative)

Semana	Teórica (6F-1.5h)		Prática (2h)	Prática (2F-2h)	Prática (6F-2h)	
13/Feb	Program and rules. Local Area Networks (LAN): Virtual LAN: purpose, implementation, segmentation models, Layer 2 interconnection (802.1Q and VXLAN) and Layer 3 interconnection.		TP1: Trabalho GNS3 com SWL3.	TP1	TP1	
20/Feb	Spanning Tree-protocol(s).		TP2: VLAN and Spanning-Tree Protocol	TP2	TP2	
27/Feb	Network Design Models: Types of topology. Redundancy and resilience requirements. Hierarchical design model. CLOS topology.		TP2: VLAN and Spanning-Tree Protocol	TP2	TP2	
06/Mar	IP Unicast Routing: static, dynamic and police based routing. Internal Routing protocols (RIPv1, RIPv2, OSPF, ISIS).		TP2: VLAN and Spanning-Tree Protocol	TP2	TP2	
13/Mar	IP Unicast Routing: static, dynamic and police based routing. Internal Routing protocols (RIPv1, RIPv2, OSPF, ISIS).		TP3: Dynamic Routing	TP3	TP3	
20/Mar	Overlay Networks: IP-IP and GRE IP tunnels.		TP3: Dynamic Routing	TP3	TP3	
27/Mar	Internet general AS architecture and core networks. Inter-AS routing. MP-BGP.		TP3: Dynamic Routing + (Optional) Policy Based Routing	TP3	TP3	
03/Apr	**Páscoa**		**Páscoa**	**Páscoa**	**Páscoa**	
10/Apr	Internet general AS architecture and core networks. Inter-AS routing. MP-BGP.		TP4: IPv4 tunnels. IPv6 over IPv4 tunneling.	**Páscoa**	TP4	
17/Apr	Communication models: client-server and P2P. VoIP Service: SIP and WebRTC.		**TESTE PRÁTICO**	**TESTE PRÁTICO**	**TESTE PRÁTICO**	TP1+TP2+TP3
24/Apr	**Semana académica**			**Semana académica**	**Semana académica**	
01/May	IP Multicast Routing: protocols (IGMP, MLD, PIM-DM, PIM-SM, PIM-SSM).			**Feriado**	TP5	
08/May	**Feriado**		TP5: MPBGP	TP4	**Feriado**	
15/May	Traffic Engineering (TE). Multiprotocol Label Switching (MPLS)		TP5: MPBGP	TP5	TP5	
22/May	Core Networks: SDH/SONET and DWDM. (Other) Access Networks: CATV/HFC (DOCSIS), SDH/SONET/GPON, Celular networks (4G/5G). Sensor Networks: 802.15.4, BT, Zigbee, LoRA, NB-IoT+Thread.		TP6: Volp (SIP)	TP5	TP6	
29/May	Revisions.		**TESTE PRÁTICO**	TP6	**TESTE PRÁTICO**	TP4+TP5+TP6
05/Jun				**TESTE PRÁTICO**		TP4+TP5+TP6

Bibliografy

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- **Computer Networks: A Systems Approach, Larry Peterson, Bruce Davie, ISBN-13: 978-0128182000, 6th Edition, 2021.**
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