Universidad Carlos III de Madrid
www.uc3m.es

| DENOMINACIÓN ASIGNATURA: Switching | | |
|---|---|---|
| GRADO: Telematics Engineering, Telecommunication Technologies Engineering, Mobile and Space Communications Engineering. | CURSO: 3 | CUATRIMESTRE: 2 |

***The course includes 29 sessions distributed through 14 weeks. Labs can be planned in any of the weeks. Each week students will have two sessions, except for one week that will include 3 sessions.***

**COURSE WEEKLY SCHEDULE**

| WEEK | SESSION | DESCRIPTION OF THE SESSION CONTENT | GROUPS | | Special room for session (computer classroom, audiovisual classroom, etc) | Mark YES/NO if it is a session with two professors | WEEKLY PROGRAMMING FOR STUDENT | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | LECTURE | SEMINAR | | | DESCRIPTION | CLASS HOURS | HOMEWORK HOURS (Max. 7h week) |
| 1 | 1 | Introduction. Switching Techniques. | | X | | NO | Reading of class notes. | 1,66 | 5 |
| 1 | 2 | **Packet Switches**. Types and architectures. Flow of packets within a router. Slow vs Fast Path. Memory management. Network processing hardware. | X | | | NO | Review of class lecture.<br>Reading of next class material. | 1,66 | |
| 2 | 3 | **Packet Switches**. Types of switching fabrics. HOL. Control Algorithm. Exercises | | X | | NO | Review of class lecture.<br>Prepare exercises. | 1,66 | 5 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 4 | **Packet switches**. Route Lookup | X | | | NO | Review of class lecture.<br>Reading of next class material. | 1,66 | |
| 3 | 5 | **Packet switches**. Review. Exercises | | X | | NO | Review of class lecture.<br>Prepare exercises. | 1,66 | 5 |
| 3 | 6 | **QoS in packet switching**. Introduction | X | | | NO | Review of class lecture.<br>Reading of next class material. | 1,66 | |
| 4 | 7 | **Route Look-Up Lab. Session 1.** | | X | Computer Classroom | YES | Reading and comprehension of Lab document.<br>Preparation. | 1,66 | 5 |
| 4 | 8 | **QoS in packet switching**. Introduction. Classification. Scheduling algorithms. Concept of Max-Min Fair sharing. GPS, WFQ, DRR. | X | | | NO | Review of class lecture.<br>Reading of next class material. | 1,66 | |
| 5 | 9 | **Route Look-Up Lab. Session 2.** | | X | Computer Classroom | YES | Reading and comprehension of Lab document.<br>Preparation. | 1,66 | 5 |
| 5 | 10 | **QoS in packet switching**. Review. Traffic models and shapers: Leaky Bucket, Token Bucket. | X | | | NO | Review of class lecture.<br>Prepare exercises. | 1,66 | |
| 6 | 11 | Interim Exam 1. Packet switches. | | X | | NO | Exam preparation. | 1,66 | 5 |
| 6 | 12 | **QoS in IP:** Diffserv vs Intserv. | X | | | NO | Review of class lecture.<br>Reading of next class material. | 1,66 | |
| 7 | 13 | **QoS.** Review**.** Exercises | | X | | NO | Review of class lecture.<br>Prepare exercises. | 1,66 | 5 |
| 7 | 14 | **MPLS.** Introduction. | X | | | NO | Review of class lecture.<br>Reading of next class material. | 1,66 | |
| 8 | 15 | **QoS.** Review**.** Exercises | | X | | NO | Review of class lecture.<br>Prepare exercises. | 1,66 | 5 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 16 | **MPLS**. Forwarding. Control. | X | | | NO | Review of class lecture.<br>Reading of next class material. | 1,66 | |
| 9 | 17 | **MPLS**. Review. Exercises | | X | | NO | Review of class lecture.<br>Prepare exercises. | 1,66 | 5 |
| 9 | 18 | **MPLS**. Applications: Traffic Engineering, Fast Re-route, VPN. | X | | | NO | Review of class lecture.<br>Reading of next class material. | 1,66 | |
| 10 | 19 | **MPLS**. Review. Exercises | | X | | NO | Review of class lecture.<br>Prepare exercises. | 1,66 | 5 |
| 10 | 20 | **Interconnection networks**. Basic concepts. Equivalences. Crossbars. Multi-stage networks full connectivity. Clos networks. | X | | | NO | Review of class lecture.<br>Reading of next class material. | 1,66 | |
| 11 | 21 | **MPLS Lab: Session 1** | | X | Computer Classroom | YES | Reading and comprehension of Lab document.<br>Preparation. | 1,66 | 5 |
| 11 | 22 | **Interconnection networks**. Partial connection networks. Banyan Networks. Sorting and Merging Networks. | X | | | NO | Review of class lecture.<br>Reading of next class material. | 1,66 | |
| 12 | 23 | **MPLS Lab: Session 2** | | X | Computer Classroom | YES | Reading and comprehension of Lab document.<br>Preparation. | 1,66 | 5 |
| 12 | 24 | **Interconnection networks**. Partial connection rearrangeable networks. Slepian-Duguid, EBNs. | X | | | NO | Review of class lecture.<br>Reading of next class material. | 1,66 | |
| 13 | 25 | **Interconnection networks.** Review. Exercises. | | X | | NO | Review of class lecture.<br>Prepare exercises. | 1,66 | 5 |
| 13 | 26 | **Interconnection networks**. RBNs. Self-routed Re-arrangeable Networks: Batcher-Banyan. | X | | | NO | Review of class lecture.<br>Reading of next class material. | 1,66 | |
| 14 | 27 | Interim Exam 2. QoS+MPLS | | X | | YES | Exam preparation. | 1,66 | 5 |
| 14 | 28 | **Interconnection networks.** Review. Exercises. | X | | | NO | Review of class lecture.<br>Prepare exercises. | 1,66 | |
| | 29 | **Lab Route-LookUp Exam** | | X | Computer Classroom | YES | Exam Preparation | 1,66 | 2 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Subtotal 1** | **48,14** | **72** |
| | | **Total 1** *(Hours of class and homework weeks 1-14)* | | | | | | **120,14** | |
| 15 | | **Delayed classes, doubts and assignments** | | | | | | 1 | 1 |
| 16 | | Preparation of assessment and assessment. | | | | | | 5 | 10 |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| | | | | | | | **Subtotal 2** | **6** | **11** |
| | | **Total 2** *(Hours of class and homework weeks 15-18)* | | | | | | **17** | |
| **TOTAL** *(Total 1 + Total 2. Máximo 180 horas)* | | | | | | | | **137,14** | |