

230154 - EQSIP - Quality of Service Engineering in IP Networks

Coordinating unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering
 Teaching unit: 744 - ENTEL - Department of Network Engineering
 Academic year: 2019
 Degree: BACHELOR'S DEGREE IN NETWORK ENGINEERING (Syllabus 2010). (Teaching unit Optional)
 BACHELOR'S DEGREE IN TELECOMMUNICATIONS SCIENCE AND TECHNOLOGY (Syllabus 2010).
 (Teaching unit Optional)
 BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Teaching unit
 Optional)
 BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING
 (Syllabus 2015). (Teaching unit Optional)
 ECTS credits: 6 Teaching languages: Catalan, Spanish

Teaching staff

Coordinator: MÓNICA AGUILAR IGARTUA
 Others: MÓNICA AGUILAR IGARTUA

Prior skills

Basic knowledge of communications networking protocols.

Requirements

Basic knowledge of communications networking protocols.

Learning objectives of the subject

The course includes basic engineering concepts for the provision of QoS (quality of service, QoS) in IP networks. We will work with analytical and simulation tools to conduct a performance evaluation of IP networks in various scenarios, with particular emphasis on infrastructureless wireless networks (ad hoc networks). Various objective and subjective QoS metrics will be studied and used to analyze the performance of multimedia services such as video on demand.

Study load

Total learning time: 150h	Hours large group:	39h	26.00%
	Hours small group:	13h	8.67%
	Self study:	98h	65.33%

230154 - EQSIP - Quality of Service Engineering in IP Networks

Content

<p>1. Introduction</p>	<p>Learning time: 26h Theory classes: 6h Laboratory classes: 2h Self study : 18h</p>
<p>Description:</p> <ul style="list-style-type: none"> - Architectures to provide quality of service (QoS, Quality of Service) in the Internet. Integrated services and data flow. Differentiated services and classes of services. - RSVP (Resource Reservation Protocol). TSPEC (Traffic Specification) to characterize the traffic. Example: Video on demand. - Most important QoS parameters for each type of traffic (data, video, voice...). - Most important QoS parameters for each type of traffic (data, voice, video). - Objective and subjective QoS parameters for video-on-demand services. - Main characteristics of the video-on-demand traffic. - QoS-aware routing protocols for Mobile and Vehicular ad hoc networks (MANET and VANET). - Laboratory practices with the simulators Scalev and NS2. 	
<p>(ENG) 2. Algorithms to suport the provision of QoS over the Internet</p>	<p>Learning time: 27h Theory classes: 7h Practical classes: 0h Laboratory classes: 2h Self study : 18h</p>
<p>Description:</p> <ul style="list-style-type: none"> - Control de admisi3n de un nuevo flujo de paquetes. - Algoritmos leaky bucket. Funci3n policia. Conformado del tráfico. - Algoritmos de disciplina de servicio (scheduling). First-In-First-Out (FIFO), Round Robin (RR), Weighted Round Robin (WRR), Weighted Fair Queueing (WFQ). 	
<p>(ENG) 3. Transmissi3n de video sota demanda a Internet</p>	<p>Learning time: 26h Theory classes: 6h Laboratory classes: 2h Self study : 18h</p>

230154 - EQSIP - Quality of Service Engineering in IP Networks

<p>4. QoS metrics for video on demand services over the Internet</p>	<p>Learning time: 30h Theory classes: 9h Practical classes: 0h Laboratory classes: 3h Self study : 18h</p>
<p>Description:</p> <ul style="list-style-type: none"> - Objective QoS parameters: percentage of packet losses, average packet delay, jitter delay, Peak-Signal-to-Noise Ratio (PSNR). - Subjective QoS parameters: Quality of Experience (QoE), Mean Opinion Score (MOS). - Measure of objective and subjective QoS parameters. 	
<p>(ENG) 5. Transmission of video on demand over infrastructureless wireless networks (MANET, Mobile Adhoc Network)</p>	<p>Learning time: 41h Theory classes: 11h Practical classes: 0h Laboratory classes: 4h Self study : 26h</p>
<p>Description:</p> <ul style="list-style-type: none"> - Main characteristics and applications of the MANETs. - Multipath routing protocol based on DSR (Dynamic Source Routing) which uses various metrics to make the routing decisions. MMDSR (Multipath Multimetric Dynamic Source Routing). - Performance evaluation of a video on demand service over MANETs using the NS2 simulator. 	

Planning of activities

<p>LABORATORY</p>	<p>Hours: 14h Theory classes: 14h</p>
<p>Description: Performance evaluation of IP networks using the NS-2 simulator.</p>	
<p>(ENG) EXERCICIS</p>	
<p>(ENG) CONTROLS DE RESPOSTA CURTA</p>	
<p>(ENG) EXAMEN DE RESPOSTES LLARGUES</p>	

230154 - EQSIP - Quality of Service Engineering in IP Networks

Qualification system

Final exam: 50%
Midle exam and controls: 20%
Laboratori practices: 30%

Bibliography

Basic:

Braun, T. [et al.]. End-to-end quality of service over heterogeneous networks [on line]. Springer, 2008 [Consultation: 08/10/2014]. Available on: <<http://site.ebrary.com/lib/upcatalunya/docDetail.action?docID=10240702>>. ISBN 9783540791201.

Complementary:

Marchese, M. QoS over heterogeneous networks. Chichester ; Hoboken, NJ: John Wiley & Sons, 2007. ISBN 9780470017524.

Hardy, W.C. QoS : measurement and evaluation of telecommunications quality of service. Chichester: John Wiley & Sons, 2001. ISBN 9780471499572.

Others resources:

Hyperlink

<https://sertel.upc.edu/~maguilar/simulators.html>

<http://sertel.upc.es/content/scalev-project>