SEMINARIOS
(SEMINARS)

MÁSTER UNIVERSITARIO EN SISTEMAS DE INGENIERÍA CIVIL

-CURSO 2023/2024-

PROPUESTA DE SEMINARIO
(SEMINAR PROPOSAL)

UNIVERSIDAD POLITÉCNICA DE MADRID
ETSI CAMINOS, CANALES Y PUERTOS

Título (*Title*)

Digital Infrastructure and Road Safety: vision for tomorrow.

Ponente (*Lecturer*)

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Resumen (*Abstract*)

The teaching program covers a comprehensive exploration of road safety and the integration of digital technologies in road infrastructures. It includes discussions on smart roads, automation levels, the human factor, and the use of synthetic indices. These topics are interrelated to provide a holistic understanding. During the lessons, the relationship between road safety and the increasing digitization of road infrastructure will be attended to by clarifying current challenges related to road safety and how new technologies are helping to mitigate them. Starting with the concept of "smart roads," we will examine how road infrastructure is evolving toward increasingly advanced integration of technologies and sensor networks to improve safety and efficiency by focusing on the role of the three macro categories involved in infrastructure digitization: the vehicle, the users, and the infrastructure itself. Indeed, to contribute to safety in a smart road, it is necessary to identify possible repeatability in user behaviors and possible input and output correlations that may influence these reactions. These latter, in turn, can be caused by any risks or problems in the design or maintenance of that section of the infrastructure. In a broader view, information derived from the network of sensors installed in the various infrastructure components would need to be managed by a platform that acquires it, processes it, and returns it, appropriately processed, to the various users of interest. In order to obtain all this information, it is necessary to acquire various types of data useful for assessing the "Workload" of the users through various sensor networks. The importance of finding synthetic indicators derived from correlation algorithms to monitor and improve road safety will also be briefly discussed. These indicators could be used to determine alerts for other road users or infrastructure

agencies. In summary, this course provides an overview of innovative aspects of research related to road safety and infrastructure digitization, examining the crucial role of technologies and human behavior in the pursuit of a safer and more efficient transportation system.

Programa (*Agenda*)

The seminar activity, lasting about 8 hours, will include lectures on various topics related to the digitization and smart infrastructure relative to the road safety system, level of automation, driving behavior in real and simulated environments, and the human factor.
In addition, an overview of data and sensors useful for monitoring various correlations among smart road stakeholders will be presented during the seminar, and students will have the opportunity to learn about and work with raw sensor data on which they will then do elaborations.

Evaluación (*Evaluation*)

Regarding the evaluation, each student is required to provide a written relation covering topics discussed in the seminar. The written assignment (around 32 hours of student work) will should include analysis of raw data according to a procedure outlined during the seminar.