COURSE DESCRIPTION
ROAD SAFETY

SSD: STRADE, FERROVIE E AEROPORTI (ICAR/04)

DEGREE PROGRAMME: TRANSPORTATION ENGINEERING AND MOBILITY (P55)
ACADEMIC YEAR 2022/2023

COURSE DESCRIPTION

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GENERAL INFORMATION ABOUT THE COURSE

INTEGRATED COURSE: NOT APPLICABLE
MODULE: NOT APPLICABLE
CHANNEL: FG A-Z
YEAR OF THE DEGREE PROGRAMME: I
PERIOD IN WHICH THE COURSE IS DELIVERED: SEMESTER II
CFU: 9

REQUIRED PRELIMINARY COURSES

None.

PREREQUISITES

None.

LEARNING GOALS

Train road safety experts, transfer skills to manage the safety management process, determine countermeasure options from thorough information analysis, and prioritize and evaluate countermeasure implementation programs. The course covers procedures for highway safety management. It includes network screening, diagnosis, selection, and prioritization of countermeasures. Students acquire fundamental knowledge of the advanced safety management tools required by the EU Directive on road infrastructure safety management, such as road safety impact assessment, road safety audits, and road safety inspections.

EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

Knowledge and understanding

Upon successful completion of the course, students will acquire:

- *Understanding of the crash dynamics*
- *Understanding of road safety principles*
- *Knowledge of road safety management procedures*
- *Knowledge of national and international road safety standards and policies*

Applying knowledge and understanding

Upon successful completion of the course, students will be able to:

- Estimate the expected number of crashes using the safety performance functions
- Identify high-risk sites with the best approach in relation to available data
- Analyse crash data and identify potential contributory factors
- Identify crash contributory factors by site inspections
- Identify the countermeasures that can reduce the frequency and/or severity of crashes
- Designing safety improvement interventions
- Ranking priorities of safety countermeasures
- Carry out safety inspections
- Perform Road Safety Impact Assessment and Road Safety Audit

COURSE CONTENT/SYLLABUS

- *Crash data*
- *Characteristics of crashes*
- *Traffic conflicts*
- *Measurement of road safety*
- *Crash databases*
- *Highway safety plans*
- *Highway safety vision*
- *Highway safety management pillars*
- *UN Global plan decade of action for road safety 2021-2030*
- *EU Road Safety Policy Framework 2021-2030 –Next steps towards "Vision Zero"*
- *US strategic highway safety plan*
- *Safety performance functions*
- *Equations to estimate the expected crash frequency (including by crash severity and collision types) of a network, facility, or individual site*
- *Model form and data needs*
- *Error distribution*
- *Dispersion parameter*
- *Goodness of Fit measures*
- *Highway Safety Manual models*

- *Network screening*
- *General issues*
- *Regression to the mean*
- *Crash frequency*
- *Equivalent property damage only*
- *Crash rate, critical crash rate*
- *Proportion method*
- *Empirical Bayes method*
- *Potential for safety improvement*
- *Comparison among the methods*
- *Exercises*
- *Diagnosis*
- *Crash contributory factors*
- *Crash data analysis*
- *Crash patterns analysis*
- *Site inspections*
- *Case studies*
- *Exercises*
- *Selection of countermeasures*
- *Criteria for the selection of the countermeasures*
- *Countermeasures for intersections*
- *Countermeasures for segments*
- *Countermeasures for high-risk road users*
- *Exercises*
- *Economic appraisal and prioritisation*
- *General issues*
- *Crash modification factors (segments and intersections)*
- *Crash costs*
- *Benefits of countermeasures*
- *Costs of countermeasures*
- *Prioritisation criteria*
- *Safety effectiveness evaluation*
- *Exercises*
- *Road safety inspections*
- *Standards, procedure*
- *Checklists (master checklists, detailed checklists, checklists for pedestrians, checklists for cyclists, checklists for roadworks)*
- *Quantitative safety evaluation (rural two-lane highways, at-grade intersections, roundabouts, pedestrian crossings, roadworks)*
- *Network safety management based on road safety inspections*
- *Case studies*

•*Exercises*
•*Road safety impact assessment*
•*Background*
•*Definition*
•*Aims for new and old roads*
•*Procedure*
•*Examples and case studies*
•*Road safety audits*
•*Background*
•*Definition*
•*Aims and benefits*
•*Implementation stages*
•*Procedure*
•*Key issues to consider*
•*Legal implications*
•*Audit tools*
•*Examples and case studies*

READINGS/BIBLIOGRAPHY

Slides available in Teams.
AASHTO (2010). Highway Safety Manual, First Edition.
Cafiso S., La Cava G., Montella A., Pappalardo G. (2008). Operative Procedures for Safety Inspections on Two-Lane Rural Roads.
Lord D., Washington S., Montella A. et al. (2018). Safe Mobility: Challenges, Methodology and Solutions. Emerald Publishing.

TEACHING METHODS OF THE COURSE (OR MODULE)

Lectures, tutorials, exercises, and project work.

EXAMINATION/EVALUATION CRITERIA

a) Exam type

- ☐ Written
- ☑ Oral
- ☐ Project discussion
- ☐ Other

In case of a written exam, questions refer to

- ☐ Multiple choice answers
- ☐ Open answers
- ☐ Numerical exercises

b) Evaluation pattern