



Department of Civil and Environmental Eng.
BIT – Barcelona Innovative Transportation group
BarcelonaTech

TRANSPORTATION PLANNING AND MANAGEMENT ON THE TERRITORY

M.Eng. in Civil Engineering

Course 2019-2020 – Q2 quarter (Group 30, #250409)

Schedule: Wednesdays and Fridays, from 10.10am to 12noon. Classroom: A1-102.

Responsible: Prof. Francesc Robusté (f.robuste@upc.edu, office B1-101, cell phone: +34 619468940).

Other lecturers: Dr. Miquel A. Estrada, Dr. Manel Grifoll, Dr. Pere Macias, Dr. Adriana Martínez, Dr. Elisabet Roca, Dr. Francesc Soriguera. Guest speakers: F. Gutiérrez and O. Altisench.

Structure: two parts, T (concepts) and C (cases). Part T (theory) includes the background, scientific issues and further readings. Part C (cases) includes professional cases, mainly related to Barcelona, Catalonia or Spain, trying to illustrate how the principles have (or have not) been implemented in practice and showing the real life constraints that face implementations (they may include guest speakers).

Background: basic Calculus, Algebra, Physics, Geometry and Probability plus specific Transportation Engineering background on Location, Mathematical Programming, Demand modeling, Operations (trajectories and queues), and Microeconomics.

Evaluation:

- **Attendance (A):** class attendance by signing the attendance sheet. Weight = 10%. You can miss 2 classes. If you attended n classes out of $N=27$ ($n \leq N$), $A = 10 \min\{n/(N-2); 1\}$. Cheating by signing by someone else will imply failing the subject. Attendance only helps to improve the grade.
- **Quizzes (Q):** two short (30') multiple-choice exams on **April 17 2020**, and **June 05 2020**, at 10am. The quiz grade is the arithmetic average: $Q = (Q_1 + Q_2)/2$. No *re-sit* chances for multiple-choice quizzes.
- **Exam rehearsal:** Atenea will contain a past exam (Quizzes + Modeling) and its solution.
- **Exam of modeling (M)** on **April 17, 2020**. Re-sit on **June 05, 2020**. You need $M \geq 3$ to count Attendance A in the final grade. If $M < 3$, only exams and report will count for the grade. If $R = \emptyset$, only exams.
- **Report (R)** is an individual report among a list of topics. **Due: June 08, 2020.**
- **Exam (E)** is the arithmetic average of the quizzes and the modeling exam: $E = (Q + M)/2$.

Grade = $(A + 7E + 2R)/10$ if $M \geq 3$ and $A > M$. If $M < 3$ or $A < 3$, **Grade** = $(7E + 2R)/9$. If $R = \emptyset$, **Grade** = E .

Official grades of all passing grades (≥ 5) **will be magnified** following the re-escalating algorithm of the Civil Engineering School (5% A+, 30% A, 30% B, 35% C). “**Curricular evaluation**” for grades ≥ 4 (Civil Eng. School).

Teaching and learning methods, expected learning results, competences: See Camins OpenCourseWare. Atenea intranet will contain a Powerpoint file, a Word file, and few complementary readings before each class. Each lesson will include references, key learning goals, expected background, evaluation hints or old exam questions and exercises or cases. Developments on the blackboard for the main concepts or exercises.

Vertical contents: Transportation Planning and Management principles and applications.

Transversal concepts: Economic and Social Territory, City and Regional Planning, Sustainability, Environment, Energy, Accessibility, Supply vs Demand, Global vs Local, Functionality, Transportation System Management, etc.

References:

- Daganzo, C. *Fundamentals of transportation and traffic operations*. Pergamon, 1997.
- Dupuy, G. *El urbanismo de las redes*. Oikos-Tau. 1996.
- Jara-Díaz, S. *Transport Economic Theory*. Emerald. 2007.
- Meyer, M. & E. Miller. *Urban Transportation Planning*, Ed. Mc Graw Hill, 2001.
- Oppenheim, N. *Urban Travel Demand Modelling*, John Wiley & Sons, Inc., 1995.
- Ortúzar, J.D. & L. Willumsen. *Modelling transport*. John Wiley. 4th edition, 2011.
- Sinha, K.C. and S. Labi. *Transportation Decision Making*. John Wiley, 2007.

ATENEA intranet:

PLANIFICACIÓ I GESTIÓ
DEL TRANSPORT EN EL
TERRITORI (250409)








Pw: TRANSPORT2020



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TRANSPORTATION PLANNING AND MANAGEMENT ON THE TERRITORY
COURSE 2019 – 2020 (Q2)

Session (2h)	Lecturer	Topic
Feb 12, 2020	Robusté	0. Introduction. 1. Transportation system.
Feb 14, 2020	Robusté	2. Location and Linear Mathematical Programming.
Feb 19, 2020	Robusté	3. Operations – trajectories.
Feb 21, 2020	Robusté	4. Operations – queues.
Feb 26, 2020	Robusté	5. Networks and accessibility.
Feb 28, 2020	Robusté	6. Transportation microeconomics.
Mar 04, 2020	Robusté	7. Pricing.
Mar 06, 2020	Robusté	8. Demand (1)
Mar 11, 2020	Robusté	8. Demand (2)
Mar 13, 2020	Robusté	9. Planning. Case: L9 metro line in Barcelona.
Mar 18, 2020	Robusté	10. Project appraisal - CBA.
Mar 20, 2020	Robusté	11. Project appraisal – Multicriteria analysis.
Mar 25, 2020	Robusté	12. Logistics - Vehicle routing & city logistics.
Mar 27, 2020	Estrada	13. Bus network layout & operation.
Apr 03, 2020	Soriguera	14. Traffic theory.
Apr 15, 2020	Estrada	15. Taxicabs and ridesharing.
Apr 17, 2020	Robusté	EXAM: QUIZ1 + MODELING Exam, 10h.
Apr 22, 2020	Robusté	Case 7: Mobility 4.0.
Apr 24, 2020	Robusté	Case 2: Terminal T1, BCN airport. Guest: Francisco Gutiérrez.
May 06, 2020	Robusté	Case 3: Tramway in Barcelona. Guest: Oriol Altisench.
May 08, 2020	Estrada	Case 4: Bus network layout & operation in Barcelona and Lleida.
May 13, 2020	Robusté	Case 5. Road safety.
May 15, 2020	Robusté	Case 6: Air quality and mobility.
May 20, 2020	Macias	Case 1: Railway infrastructure planning in Spain.
May 22, 2020	Robusté	Case 8: Mobility in developing cities/countries.
May 27, 2020	Grifoll	Case 9: Barcelona port and BEST container terminal.
May 29, 2020	Roca	Case 11: Social issues and participation.
Jun 03, 2020	Martínez	Case 10: Economics of quality in road pavements.
Jun 05, 2020	Robusté	EXAM: QUIZ2 + MODELING re-sit, 10h.

	Lecturer	Degree
	Dr. Miquel A. Estrada	Associate Professor of Transportation. Dr. Civil Engineer (BarcelonaTech). Head of Studies of Master in Civil Engineering, Civil Engineering School. BIT research group.
	Dr. Manel Grifoll	Associate Professor of Transportation. Dr. Civil Engineer (BarcelonaTech). ViceDean of int'l relations and research at the Nautical Faculty of Barcelona. BIT research group.
	Dr. Pere Macias	Assistant Professor of City Planning. Dr. Civil Engineer (BarcelonaTech). President of "Cercle d'Infrastructures" (Infrastructures Circle). EXIT research group.
	Dr. Adriana Martínez	Associate Professor of Roads. Dr. Civil Engineer (BarcelonaTech). MATCAR research group.
	Dr. Francesc Robusté	Professor of Transportation. Dr. Civil Engineer (BarcelonaTech), PhD, MEng in Transportation, MSc in Operations Research (UC Berkeley). Coordinator of BIT research group.
	Dr. Elisabet Roca	Associate Professor of Sociology. Dr. Environmental Scientist (Barcelona University). EXIT research group.
	Dr. Francesc Soriguera	Associate Professor of Transportation. Dr. Civil Engineer (BarcelonaTech). Co-Director of the Master in Supply Chain, Transportation and Mobility at BarcelonaTech. BIT research group.