

## Double Master's Degree in Civil Engineering (ETSECCPB) and Urban Mobility (ETSECCPB)

### ITINERARY 1 (via MDCE or via Double Degree)

#### First year

Mandatory courses from the Master's Degree in Civil Engineering

Fall semester			Spring semester		
250401	Mechanics of continua	9	250405	Structural engineering	6
250402	Numerical modelling	9	250406	Computational engineering	6
250403	Structural analysis	7,5	250407	Geomechanical & geotechnical engineering	6
250404	Hydraulic infrastructure	4,5	250408	Water engineering	6
			250409	Planning & management of transportation	6

#### Second year

Mandatory courses from the Master's Degree in Urban Mobility and elective courses from:

- Master's Degree in Urban Mobility (MDUM)
  - Innovation & entrepreneurship track
  - Sustainable urban mobility transitions track
- Master's Degree in Civil Engineering (MDCE)
  - Transportation engineering & urban planning track

Fall semester			Spring semester		
250MUM010	Introduction to supply chain	5	250MUM002	Project based on an innovation challenge	10
250MUM011	Mobility modeling	5	250MUM015	Travel demand & behavioral modeling	5
250MUM012	Operation & management of transport systems	5	250MUM001	Liveable cities & urban mobility	5
250MUM013	Data analysis in transport systems	5	Elective courses: MDCE-Transportation engineering & urban planning or MDUM-Sustainable urban mobility transitions		10
230712UM	Innovation & entrepreneurship for world challenges	5			
250MUM014	Decision making & economy in urban mobility	5			

#### Third year

Mandatory courses from the Master's Degree in Urban Mobility and elective courses from:

- Master's Degree in Urban Mobility (MDUM)
  - Innovation & entrepreneurship track
  - Sustainable urban mobility transitions track
- Master's Degree in Civil Engineering (MDCE)
  - Transportation engineering & urban planning track

Fall semester		Spring semester	
Elective courses: MDCE-Transportation engineering & urban planning or MDUM-Sustainable urban mobility transitions	15	250499 TFM MICCP + 250MU TFM MUM M	55
MDUM elective courses-Innovation & entrepreneurship	10		

## ITINERARY 2 (via MDUM)

### First year

Mandatory courses from the Master's Degree in Urban Mobility and elective courses from:

- Master's Degree in Urban Mobility (MDUM)
  - Innovation & entrepreneurship track
  - Sustainable urban mobility transitions track
- Master's Degree in Civil Engineering (MDCE)
  - Transportation engineering & urban planning track

Fall semester			Spring semester		
250MUM010	Introduction to supply chain	5	250MUM002	Project based on an innovation challenge	10
250MUM011	Mobility modeling	5	250MUM015	Travel demand & behavioral modeling	5
250MUM012	Operation & management of transport systems	5	250MUM001	Liveable cities & urban mobility	5
250MUM013	Data analysis in transport systems	5	Elective courses: MDCE-Transportation engineering & urban planning or MDUM-Sustainable urban mobility transitions		10
230712UM	Innovation & entrepreneurship for world challenges	5			
250MUM014	Decision making & economy in urban mobility	5			

### Second year

Mandatory courses from the Master's Degree in Civil Engineering

Fall semester			Spring semester		
250401	Mechanics of continua	9	250405	Structural engineering	6
250402	Numerical modelling	9	250406	Computational engineering	6
250403	Structural analysis	7,5	250407	Geomechanical & geotechnical engineering	6
250404	Hydraulic infrastructure	4,5	250408	Water engineering	6
			250409	Planning & management of transportation	6

### Third year

Mandatory courses from the Master's Degree in Urban Mobility and elective courses from:

- Master's Degree in Urban Mobility (MDUM)
  - Innovation & entrepreneurship track
  - Sustainable urban mobility transitions track
- Master's Degree in Civil Engineering (MDCE)
  - Transportation engineering & urban planning track

Fall semester			Spring semester		
Elective courses: MDCE-Transportation engineering & urban planning or MDUM-Sustainable urban mobility transitions		15	250499	TFM MICCP + 250MU TFM MUM M	55
MDUM elective courses-Innovation & entrepreneurship		10			

## ELECTIVE COURSES

### MDCE- Specialty in Transportation engineering & urban planning

Fall semester			Spring semester		
250450	Urban mobility	5	250451	Road network planning & operation	5
250453	Urban planning & urban service infrastructure	5	250452	High-speed rail line management	5

### MDUM- Specialty in Sustainable urban mobility transitions

Fall semester			Spring semester		
250MUM02	Transports of goods	5	250MUM017	Optimization models for transportation networks	5
250MUM026	Smart mobility	5	250MUM019	Railway transport	5
250MUM024	Airport management	5	250MUM016	Public transport	5
250MUM027	Port management & maritime transport	5		Transportation system planning & management	5
250MUM023	Traffic	5	250MUM021	Mobility & development	5
250MUM025	Vehicle routing models	5	250MUM020	Sustainable mobility	5
			250MUM018	Traffic simulation models	5

### MDUM- Specialty in Innovation & entrepreneurship

Fall semester			Spring semester		
210216UM	Management & creation of innovative companies in architecture	3	270860UM	Viability of business project	6
32120UM	Technology asset management	5			
250MUM003	Product or service development project	4			
250MUM006	Case studies in urban mobility	5			