

International Doctorate in Civil and Environmental Engineering

DOCTORAL COURSE

Positioning and navigation methods for terrestrial and aerial applications

Teacher: Prof. **Andrea Masiero** and Prof. **Simone Morosi**

DICEA and DINFO, Università degli Studi di Firenze

andrea.masiero@unifi.it – simone.morosi@unifi.it

Calendar	
10/06/2020, 09,00-13,00 – Room to be defined - Scuola di Ingegneria, Via di S. Marta 3, Firenze	Introduction to positioning and navigation, Location Based Services, positioning in civil engineering, surveying, mapping applications. position fixing, dead reckoning, inertial sensors, radio signals, and fingerprinting
17/06/2020, 09,00-13,00 – Room to be defined - Scuola di Ingegneria, Via di S. Marta 3, Firenze	Triangulation, trilateration, GNSS and radio signal based position fixing
01/07/2020, 09,00-13,00 – Room to be defined - Scuola di Ingegneria, Via di S. Marta 3, Firenze	Inertial Sensors calibration and navigation. GNSS/INS integration.
08/07/2020, 09,00-13,00 – Room to be defined - Scuola di Ingegneria, Via di S. Marta 3, Firenze	Simulation tool, examples and applications (terrestrial and UAV positioning)
Total	16 hours – 8 credits

Program
<p>This course provides an introduction to the positioning and navigation problem, and a resume of the main techniques used for such purposes in outdoor, both terrestrial and aerial, and indoor environments.</p> <p>A short summary of the topics that the course will consider is listed in the following. Characteristics and comparison of position fixing vs dead reckoning methods. Positioning via (tri)lateralation, triangulation, fingerprinting. Global Navigation Satellite System (GNSS) positioning. Inertial Navigation System (INS): inertial sensor error modeling and calibration, mechanization. GNSS/INS integration. Examples will be provided on terrestrial and UAV positioning.</p>