



UNIVERSITÀ DEGLI STUDI
DI PERUGIA



CIVIL AND ENVIRONMENTAL ENGINEERING

DOCTORAL PROGRAM

COURSE ON COMPOSITES SCIENCE AND TECHNOLOGY

Instructors: Prof. Luigi Torre, Prof. Debora Puglia

Course Description: The aim of this course is to provide the basis for use and characterization of composite materials in several field of application. The course will start introducing the main materials used to make composites, describing their main characteristics, their main properties, availability and production. Different applications of composite materials will be illustrated. The connection between processing and properties will be discussed in the light of their application as structural materials. Furthermore, the elementary mechanical interaction between fiber and matrices and the fundamentals of lamination theory will also be exposed. The final part of the course will be dedicated to the main processing techniques and to processing science.

June 24th, 2024: 9:00- 15:00

Module 1: Composite material definition, general characteristics for composites

June 25th, 2024: 9:00 - 15:00

Module 2: Matrices, Thermoplastics and Thermosetting Polymeric materials, fibers reinforcements, fillers

June 26th, 2024: 9:00 - 15:00

Module 3: Composites Mechanics: Fiber-matrix interactions, micromechanics and macromechanics, lamination theory

June 27th, 2024: 8:00 - 14:00

Module 4: Processing science of Composite Materials

June 28th, 2024: 8:00- 14:00

Module 5: Composite Materials and their Processing Techniques

Suggested Readings:

P: K: Mallik. Fiber Reinforced Composites, Ed. Marcel Decker
R. F. Gibson, Principles of Composite Material Mechanics, Mc Graw Hill

Luigi Torre got his Ph.D. in Chemical Engineering from the University of Washington (Seattle) USA. His main research interests are: characterization of thermoplastic and thermoset matrices for polymeric composites, thermal analysis, modeling of composite and polymer processing, degradation of composite and polymeric materials, ablative materials, plastic recycling, crush resistant structures, nanocomposites, biodegradable polymer for packaging applications. In 2012 he has been awarded "Fellow of the SAMPE society". Currently, Professor Torre is the Director of the Material Science and Technology Laboratory of the University of Perugia. He been President of SAMPE Europe (Society of Advancement Material and Processes) from 2008 to 2009 and President of SAMPE Global in 2016. He has published more than 180 papers on International Journal edited books and proceeding of international conferences

Debora Puglia obtained the degree in Materials Engineering (1999) and the PhD (2003) in Industrial Engineering at the University of Perugia. Her research interests are related to the study of biodegradable polymers and nanocomposites, thermosetting/thermoplastic matrix composites reinforced with vegetable fibers, nanocomposites reinforced with silica, lignocellulosic and carbon nanostructures. She is author of 20 book chapters and more than 220 papers on peer reviewed journals (h=53, Scopus). She currently has a position as Associate Professor at the University of Perugia.

Location: Campus of Engineering of University of Perugia
Latitude: 43.118177 Longitude: 12.357942

Timetable: June 24-28, 8:00 a.m. – 15:00 p.m.

