



# **Intensive Course**

# Advanced Design with Composite Materials

# June 16-20, 2025 In-Person and Virtual Attendance

Department of Management and Engineering - University of Padova Complesso Universitario di Viale Margherita – Vicenza (ITALY)



Course coordinator: Prof. Marino Quaresimin, University of Padova

# **COURSE OVERVIEW**

The course is specifically designed for engineers, technicians, and designers working in the composites industry who wish to acquire a deeper understanding of the structural design of polymer matrix composites parts. The first day will be dedicated to the introduction of basic topics to bring newcomers to a level suitable for the course attendance The advanced module provides an overview on state-of-the-art and advanced methodologies related to topics such as static design (strength and stiffness), fatigue design, bonded joints, design of 3D-printed parts, design of short fibre reinforced parts, structural health monitoring. A lab session is also planned to provide an insight into the testing activity essential for a safe and reliable design.

The entire course will consistently refer to pragmatic and implementation aspects related to the industrial reality and examples of practical applications will be discussed.



## **COURSE PROGRAM**

#### Base module

#### Monday, June 16 afternoon

- 1) Materials, constituents and manufacturing technologies
- 2) Micromechanics and basic elastic and strength properties

#### Tuesday, June 17 morning

- 3) Macromechanics and stress/strain rotation
- 4) Stress analysis (CLT) and classical failure criteria

#### Advanced module

#### Tuesday, June 17 afternoon

- 1) Course introduction, objectives and methodology
- 2) Damage mechanics of composites under static and cyclic loadings

#### Wednesday, June 18 full day

- 3) Failure criteria and basic approaches to predict damage and failure under quasistatic loadings, including notch effect
- 4) Approaches for the design against fatigue and SN curve-based life prediction
- 5) Advanced discrete damage approach for the damage and life prediction
- 6) Examples of calculation and product development case histories

#### Thursday, June 19 full day

- 7) Testing and damage analysis of composites: lab session 1 (in presence only)
- 8) Testing and damage analysis of composites: lab session 2 (in presence only)
- 9) Bonded joints: damage mechanics, classical and advanced modelling approaches
- 10)Mechanical behaviour and design approaches for 3D printed continuous fiber composites

#### Friday, June 20 morning

11)Mechanical behaviour and design approaches for short-fibre composites

12)Structural Health Monitoring

13)Closure

## **REGISTRATION FEES**

	In-Person attendance*	Virtual attendance
Base module only	500 + VAT	400 + VAT
Advanced module only	1700 + VAT	1200 + VAT
Base module + Advanced module	2000 + VAT	1500 + VAT

\*includes lunches, coffee breaks and (for the advanced module only) course dinner

# For more information and inquiry:

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#### Get to know us: Composite Group at DTG, Composite Lab DTG







