Automobili Lamborghini Academy for carbon fiber arts and sciences

MODULE 1.1 Introduction to Carbon fiber technology, science and art

1-day program (9 am to 5 pm)	Enrollment fee: USD 600 per person.
Maximum enrollment: 8 people	No prerequisites required for enrolling.
Personnel: Paolo Feraboli, instructor	Bonnie Wade, lab supervisor

About the course:

A wide range of carbon fiber composite materials are finding use in today's aerospace, automotive, and other industry segments. These materials are finally fulfilling the promise of providing manufacturers with a cost-competitive alternative to traditional materials while offering higher properties at lower weight, as well as some other unique characteristics. Automobili Lamborghini has been a pioneer in the development of novel carbon fiber technologies, and the only car maker to date that has employed carbon fiber for continuous production vehicles. The ACSL in Seattle has been responsible for the development of most carbon fiber technologies currently in use at Lamborghini, in particular the Forged Composite technology.

Purpose of the course is to introduce the audience to the technology of carbon fiber, and expose them to the various aspects that set it apart from other materials available today. The audience will gain a general understanding of how to design a variety of products with carbon fiber, and will be engaged for further learning in more specific courses offered by the Academy.

Target audience includes recent graduates, current industry professionals, self-employed practitioners, and technology enthusiasts. Background in engineering, industrial design, architecture or applied arts is highly beneficial.

Day schedule:

9:00 – 9:30	Museum visit
9:30 – 10:45	Lecture 1
10:45 – 11:00	Espresso break
11:00 – 12:15	Lecture 2
12:15 – 1:00	Lunch with videos
1:00 – 2.15	Lecture 3
2:15 – 2:30	Espresso break
2:30 – 4:30	Lab activities
4:30 – 5:00	Recap of day and conclusions

Lecture topics

Lecture 1 **75 mins** ***Carbon fiber properties***

Basic definitions: fiber types and forms, resin types
Mechanical property knockdowns: from filament to part
Comparison with aluminum, steel, plastic
Mythbuster - Typical preconceptions with carbon fiber (brittle behavior)

Lecture 2 **75 mins** ***Manufacturing processes overview***

Wet lay-up
Filament winding, pultrusion
Prepreg lay-up
Automated fiber placement
liquid resin infusion and injection
Advanced Compression molding
Reinforced thermoplastics
Comparison with metal process technologies

Lecture 3 **75 mins** ***Design philosophy***

Anisotropy
Failure mechanisms
Damage tolerance
Part integration
Joining (fasteners and adhesives)
Economics
Case studies and applications