



UNIVERSITÀ DEGLI STUDI DEL MOLISE

UNIVERSITY OF MOLISE PhD PROGRAMS. COURSE ON:

HIGH-PERFORMANCE MATERIALS AND DEVICES WITH TAILORED MORPHOLOGY AND STRUCTURAL/FUNCTIONAL PROPERTIES: FUNDAMENTALS AND DESIGN METHODS

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TUESDAY 14TH MARCH
WELCOME ADDRESS

Prof. Vincenzo DI NUOSCIO

Unimol Delegate for PhD programs

Prof. Salvatore GERBINO

Chair

INTRODUCTION

Prof. Luigi AMBROSONE

Unimol

10.00 - 13.00

Classification of Materials

Advanced Materials and needs

Processing-Structure-Properties-Performance Correlations

Materials characterization methods

Basic mechanical concepts
and simple relationships

Metals, Ceramics, Polymers and Composites:
differences in terms of structures and properties

INTRODUCTION TO POLYMER SCIENCE

Prof. Antonio GLORIA

CNR

14.00 - 17.00

From little molecules to big molecules

Molecular weight and molecular weight distributions

Polymer transitions and methods of measuring transitions

Polymer synthesis and structure

Classification of polymers

Rubber elasticity

Mechanical behavior of polymers

OPEN DISCUSSION

17.00 - 18.00

WEDNESDAY 15TH MARCH

VISCOELASTICITY AND FLOW

Prof. Luigi AMBROSONE

Unimol

9.30 - 12.30

Rheology: basic principles

Newtonian and non-Newtonian fluids

Steady shear tests

Viscoelasticity: theory and concepts

Stress relaxation, creep

Dynamic mechanical tests

Storage or elastic modulus, viscous or loss modulus, loss factor

Polymer Processing

Principles and design

COMPOSITE MATERIALS

Prof. Antonio GLORIA

CNR

13.30 - 16.30

Principles in designing fiber-reinforced,
micro-, nano-composite materials

Reverse Engineering and Additive Manufacturing:
concepts and applications

Conventional and non conventional technologies

Image capture and analysis techniques

An approach toward the design
of custom-made devices for different applications

Design of advanced scaffolds with
tailored morphology and properties for tissue engineering

Surface modification/Functionalization

of scaffolds for tissue engineering;

Analysis of cell-material interactions

DISCUSSION AND CONCLUSION

17.00 - 18.00

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