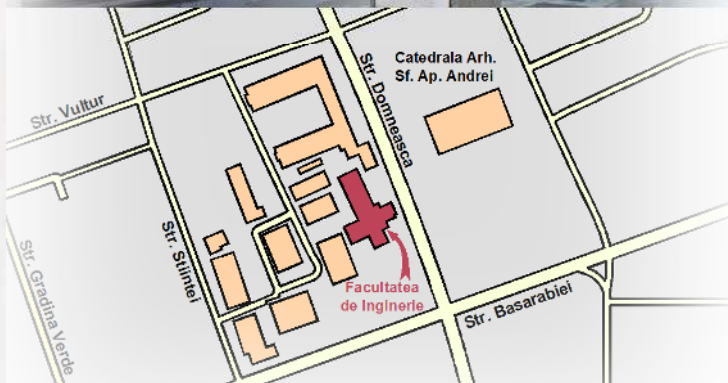


“Dunarea de Jos” University of Galați  
ReForm Multidisciplinary Research Platform  
Center of Excellence in Polymer Processing  
Domneasca Street, 111, Galați, România  
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Spring School

## Polymers vs. Composites: Basics, Mechanical Properties, Rheology and Processing

Invited speakers

Acad. Prof. Bogdan C. Simionescu  
Prof. Marc J.M. Abadie  
Prof. Constanța Ibănescu  
Eng. Marius Lungu

9-12 April 2019

Domneasca Street, 111, Room D12

Galați, România



“Petru Poni” Institute of Macromolecular Chemistry  
Academy of Technical Sciences of Romania



# SYLLABUS

## Course Objectives

- The purpose of this course is to introduce to the students the principal definitions of organic polymers and composites, their respective properties, rheology and processing as well;
- It also provides some fundamental knowledge of different new materials developed and their application in the design and the use for automotive, marine and aircraft manufacturing.;
- Ultimately the course should offer to the students the ability to engineer properties combining the design of the composites to fulfill the properties of the materials required v.z.-Nature of fibres & matrices - Orientation and fibres architecture -Arrangement of folds -Laminate & lamina stackings.

## On completion of this course, the students should be able to:

- understand the main difference between thermoplastics, thermosets and elastomers;
- understand basic definition, properties and difference between polymers and composites;
- understand important relationships between structure and properties of polymers and composites;
- understand the advantages and limitations of both type of materials;
- have a better understanding and approach of polymer and composite processing.

## COURSE DETAILS

*18h Lectures*

presented by  
*Acad. prof. B.C. Simionescu*

<b>Challenges in Polymer Science</b>		
<b>Polymer Basics</b>		
<b>Composite Basics</b>		<i>Prof. Marc J.M. Abadie</i>
<b>Polymer Processing</b>		
<b>Composite Processing</b>		
<b>Rheology</b>		<i>Prof. Costanta Ibanescu</i>
<b>Applications:</b>	<b>Automotive Marine &amp; Aircraft</b>	<b>Marius Lungu</b> from <b>Renault-Roumanie</b> <i>Prof. Marc J.M. Abadie</i>

**Bogdan C. Simionescu** is the vice-president of Romanian Academy and head of the Laboratory of Polymeric Materials Physics of "Petru Poni" Institute of Macromolecular Chemistry of Romanian Academy, Iasi. He is a professor at "Gheorghe Asachi" University of Iasi.



**Costanta Ibanescu** is a professor at "Gheorghe Asachi" University of Iasi and a Senior Researcher at "Petru Poni" Institute of Macromolecular Chemistry.



**Marc J.M. ABADIE** is Emeritus Professor at the Université of Montpellier, Institute Charles Gerhardt of Montpellier - Aggregates, Interfaces and Materials for Energy (ICGM – AIME, UMR CNRS 5253). He was full Professor at the Université Montpellier II, Sciences and Techniques of Languedoc and head of Laboratory of Polymer Science and Advanced Organic Materials – LEMP/MAO. He is currently "Michael Fam" Visiting Professor at the School of Materials Science and Engineering, Nanyang Technological University, Singapore and ERA CHAIR holder at the SupraChem Lab, Petru Poni Institute of Macromolecular Chemistry ICMPP, Iasi, Romania.



## PROGRAMME

Tuesday, 9 April 2019

- 9<sup>00</sup> – 9<sup>30</sup> **Opening Address**  
*Acad. prof. Bogdan C. Simionescu & Prof. Cătălin Fetecău*
- 9<sup>30</sup> – 11<sup>00</sup> **Challenges in Polymer Science**  
*Acad. prof. B.C. Simionescu*
- 11<sup>00</sup> – 11<sup>30</sup> **Coffee & Tea Break**
- 11<sup>30</sup> – 13<sup>00</sup> **Polymer Basics 1.  
Classification, Synthesis, Polymers @ Solid State**  
*Prof. Marc J.M. Abadie*
- 13<sup>00</sup> – 14<sup>30</sup> **Lunch Break**
- 14<sup>30</sup> – 16<sup>00</sup> **Polymer Basics 2.  
Thermal Analysis, Molar masses, Molar distribution**  
*Prof. Marc J.M. Abadie*
- 16<sup>00</sup> – 17<sup>00</sup> **Presentations of Graduate Master & PhD Students thesis**
- 17<sup>30</sup> – 18<sup>30</sup> **Dinner**

Wednesday, 10 April 2019

- 9<sup>30</sup> – 11<sup>00</sup> **Composite Basics 1. Definition & Advantages of Composites,  
Prepregs & B-Stage Curing**  
*Prof. Marc J.M. Abadie*
- 11<sup>00</sup> – 11<sup>30</sup> **Coffee & Tea Break**
- 11<sup>30</sup> – 13<sup>00</sup> **Composite Basics 2. Matrices, Reinforcing Agents**  
*Prof. Marc J.M. Abadie*
- 13<sup>00</sup> – 14<sup>30</sup> **Lunch Break**
- 14<sup>30</sup> – 16<sup>00</sup> **Composite Basics 3. Interfaces/Interphases, Stacking &  
Laminates, Hybrid Metal Laminates, Calculus**  
*Prof. Marc J.M. Abadie*
- 16<sup>00</sup> – 17<sup>00</sup> **Open discussion**
- 17<sup>30</sup> – 18<sup>30</sup> **Dinner**

Thursday, 11 April 2019

- 9<sup>30</sup> – 11<sup>00</sup> **Rheology 1.  
A Comprehensive Introduction to Rheology and Rheometry**  
*Prof. Constanta Ibanescu*
- 11<sup>00</sup> – 11<sup>30</sup> **Coffee Break**
- 11<sup>30</sup> – 13<sup>00</sup> **Rheology 2. Rheology in Applied Chemistry**  
*Prof. Constanta Ibanescu*
- 13<sup>00</sup> – 14<sup>30</sup> **Lunch Break**
- 14<sup>30</sup> – 16<sup>00</sup> **Polymer Processing  
1. Thermoplastics: Thermoforming, Rotational Molding,  
Extrusion, Blow Molding, Injection Molding  
2. Thermosets: Compression & Transfer Molding, RTM**  
*Prof. Marc J.M. Abadie*
- 16<sup>00</sup> – 17<sup>00</sup> **Open discussion**
- 17<sup>30</sup> – 18<sup>30</sup> **Dinner**

Friday, 12 April 2019

- 9<sup>30</sup> – 11<sup>00</sup> **Composite Processing  
1. Open Mold Process: Hand lay-up, Spray lay-up, Tape lay-up,  
SMC, Autoclave molding  
2. Closed Mold Process: Compression molding, Injection molding,  
Transfer molding  
3. Other: Pultrusion, Filament winding, Drilling**  
*Prof. Marc J.M. Abadie*
- 11<sup>00</sup> – 11<sup>30</sup> **Coffee Break**
- 11<sup>30</sup> – 13<sup>00</sup> **Application 1. Automotive  
1. Vehicle Architecture : upstream, development and  
industrialization in automotive  
2. Vehicle Process engineering: domains and participation in projects**  
*Marius Lungu from Renault-Roumanie*
- 13<sup>00</sup> – 14<sup>30</sup> **Lunch Break**
- 14<sup>30</sup> – 16<sup>00</sup> **Application 2. Marine & Aircraft Manufacturing**  
*Prof. Marc J.M. Abadie*
- 16<sup>00</sup> – 17<sup>00</sup> **Feedback from participants & Closing Address**
- 17<sup>30</sup> – 18<sup>30</sup> **Dinner**