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**COURSE: SCIENCE of POLYMER MATERIALS**

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**ACADEMIC YEAR: 2019-2020**

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**TYPE OF EDUCATIONAL ACTIVITY: Free choice**

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**TEACHER: Vincenzo Villani**

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e-mail: vincenzo.villani@unibas.it

website:

phone: 0971205464

mobile (optional):

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Language: Italian

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ECTS: (lessons e  
tutorials/practice)n. of hours: (lessons e  
tutorials/practice)Campus: Potenza  
Department of Science  
Program: CHIMICA (L-27)Semester: II  
expected dates:  
02/03/2020,  
19/06/2020

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**EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES**

Knowledge: fundamentals of strength and rheology of materials with respect to structural and viscoelastic properties of polymers.

Ability: evaluate the applicative characteristics of the polymeric materials and their processing conditions.

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**PRE-REQUIREMENTS**

Fundamentals of Macromolecular Chemistry.

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**SYLLABUS**

Young's law

Axial stresses and stress-strain plot of polymer materials

Polymer toughness

Poisson's coefficient

Bending deformation of natural or synthetic polymers

Shear stress

Torsion deformation

General state of stress

Fracture mechanics

Newtonian or non-newtonian fluids

Rheopectic or thixotropic behaviours

Dynamic-mechanical analysis of polymers

Creep and stress-relaxation experiments

Maxwell and Kelvin-Voigt viscoelastic models

Rheological behaviour and models of polymeric liquids

Polymer composites

Processing of polymer materials

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**TEACHING METHODS**

Theoretical lessons.

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**EVALUATION METHODS**

Intermediate verifications or oral examination.

The exam is divided into 3 parts that take place during the course; the test consists of 4 tracks open to play in 2 hours.

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**TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL**

Villani Vincenzo, *Introduzione alla Scienza dei Materiali Polimerici*, Aracne Editrice

Bruckner et al., *Scienza e tecnologia dei Materiali Polimerici*, EdISES

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**INTERACTION WITH STUDENTS**

Office hours: Monday, Wednesday and Friday from 11 to 17 in the studio or in lab of Macromolecular Chemistry.  
Moreover, the teacher is available on his e-mail.

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**EXAMINATION SESSIONS (FORECAST)<sup>1</sup>**

21/02/2020, 27/03/2020, 24/04/2020, 22/05/2020, 26/06/2020, 24/07/2020, 25/09/2020, 23/10/2020,  
27/11/2020, 11/12/2020

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**SEMINARS BY EXTERNAL EXPERTS**    YES     NO

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<sup>1</sup>Subject to possible changes: check the web site of the Teacher or the Department/School for updates.