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COURSE: Mathematical Physics	
ACADEMIC YEAR: 2018/2019	
TYPE OF EDUCATIONAL ACTIVITY: Basic	
TEACHER: Angelo Raffaele Pace	
e-mail: raffaele.pace@unibas.it	web:
phone:	mobile (optional):
Language: Italian	

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ECTS: 6	n. of hours: 36 (lessons) n. of hours: 24 (practice) n. of hours: 60 (total)	Campus: Potenza School of Engineering Program: Mechanical Engineering / Civil and Environmental Engineering	Semester: I
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#### EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

- **Knowledge:** knowledge of the basic laws of mechanics of systems of particles and rigid bodies as well as their consequences.
  - **Skills:** to be able to set some basic problems of statics and dynamics. In the case of statics, to be able to calculate the equilibrium positions and to determine the reaction forces. In the case of dynamics, to be able to solve the differential equations of motion in simple situation leading to linear differential equations with constant coefficients
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#### PRE-REQUIREMENTS

Basic knowledge of Mathematical Analysis and Physics I

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#### SYLLABUS

Representation of the motion of material points in different systems of reference. Motion under constraints. Degrees of freedom, lagrangian coordinates, configuration and phase-space. Dynamics of material points and Newton's laws. Principle of virtual power and its application to the motion of constrained mechanical systems. Balances of linear momentum, angular momentum and energy for systems of material points. Motion with respect to the center of mass. Koenig's decomposition theorem for energy and angular momentum. Principle of virtual power and Lagrange equations. Conservation laws for Lagrangian systems. Representation of rigid body motion and Mozzi theorem. Dynamics of rigid bodies.

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#### TEACHING METHODS

Theoretical lessons. Classroom tutorials.

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Written (necessary) examination and oral (facultative) examination.

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#### TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- Biscari, Ruggeri, Saccomandi, Vianello: MECCANICA RAZIONALE, Springer-Verlag Italia, 2013
  - D'Acunto, Massarotti: MECCANICA RAZIONALE PER L'INGEGNERIA, Maggioli Editore, 2015
  - Frosali, Minguzzi: MECCANICA RAZIONALE PER L'INGEGNERIA, Società Editrice Esculapio, 2017
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#### INTERACTION WITH STUDENTS

Office hours: Friday 15:00 – 17:00 DiMIE

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

15/02/2019; 26/04/2019; 07/06/2019; 19/07/2019; 04/10/2019; 06/12/2019

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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.



Università degli Studi della Basilicata  
**Scuola di Ingegneria**

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FURTHER INFORMATION

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