Università degli Studi della Basilicata
Scuola di Ingegneria

COURSE: Fundamentals of Turbomachinery Fluid Mechanics				
TEACHER: Aldo Bonfiglioli				
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Language: italian				
ECTS: 6	n. of hours: 54	Academic year: 2014-2015	Campus: Potenza	Semester: first

TOPICS
Incompressible potential flow using complex analysis. Steady Q1D compressible flows. Un-steady 1D compressible flows.

TEACHING METHODS (please tick one or more options)
× Theoretical lessons
× Tutorials in classroom
× Tutorials in laboratory
□ Project works
□ Technical visits
Other activities (please specify) _____

TEXTBOOKS
I.G. Currie Fundamental Mechanics of Fluids; Napolitano, De Palma, Pascazio, Corso di Gasdinamica, Politecnico di Bari. A. Bonfiglioli: course notes available on the instructor's website.

ON-LINE EDUCATIONAL MATERIAL
web address: http://oldwww.unibas.it/utenti/bonfiglioli/www.html

LEARNING OUTCOMES
Give the student the fundamental tools needed to study 2D incompressible steady inviscid flows and Q1D steady and un-steady compressible inviscid flows.

REQUIREMENTS

EVALUATION METHODS (please tick one or more options)
□ Intermediate verifications
× Written examination
□ Discussion of a project work
□ Practical test
× Oral examination
Other methods (please specify) _____

DETAILED CONTENT
Potential flows: potential and velocity in the complex field.
Uniform flow, source, sink, vortex, flow in an angular sector, doublet, flow past a circular cylinder with and without circulation.
Blasius' laws. Conformal mappings: Joukowski transformation.
Potential flow past an ellipse, a flat plate. Kutta- Joukowski condition.
Flow around a symmetric, non-symmetric Joukowski airfoil.
Governing conservation equations for Q1D compressible flows.
Flow in converging-diverging nozzles. Normal shock-waves.
Fanno, Rayleigh and isothermal 1D flow.
Un-steady compressible gas-dynamics in 1D. Moving shock waves, shock reflection. Characteristic formulation of the un-steady 1D Euler equations: centred expansion fan and simple waves. Shock tube.

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SEMINARS BY EXTERNAL EXPERTS	YES □ NO ×
FURTHER INFORMATION	