Università degli Studi della Basilicata
Scuola di Ingegneria

COURSE: Fluid Mechanics				
TEACHER: Michele Greco				
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Language				
ECTS: 9	n. of hours: 90	Academic year: 2014-2015	Campus:Potenza	Semester: I and II

TOPICS
Properties of Fluids;
Fluid Statics;
Fluid Kinematics;
Dynamics of ideal and real fluids;
Practical problems of moving fluids

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

TEXTBOOKS
D. Citrini, G. Noseda. *Idraulica*. C.E. Ambrosiana, Milano, 1987
V. Marone *Idraulica* , Liguori Editore
A. Ghetti, *Idraulica*, Edizioni Libreria Cortina, 1987

ON-LINE EDUCATIONAL MATERIAL
web address:

LEARNING OUTCOMES
Students graduating will be able to: Explores fluid properties, hydrostatics, fluid dynamics, similitude, energy and momentum principles, closed conduit flow, open channel flow, flow measurement and unsteady flows. Includes exercises in flow measurement, open channel flow, pipe friction, physical modeling, and data collection.

REQUIREMENTS
Physics and Mathematics

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

DETAILED CONTENT
Basic principles of physics – mathematics
Properties of fluids:
- Mechanical quantities and units of measurement.
- Internal stresses in continuous systems and tensor properties.
- Compressibility, viscosity, density, steaming pressure.
- Equation of state.

Hydrostatics:
- Stevin law and pressure measurement.
- Hydraulic forces on flat and curved surfaces as well as on immersed bodies.

- Fundamental of fluid kinematics: lagrangian and eulerian description of the fluid flow.
- Uniform, steady and unsteady motion
- Fluid flow: uniform and steady flow
- Average velocity, mass and volume discharge.
- Ideal fluid dynamics: continuity equation.
- Momentum equations and its applications.
- Bernoulli's theorem and its applications.

Fluid dynamic forces:

- lift, pressure strength.
- Study of water flows.
- Pressure distribution in cross sections
- Flow measurement and speed.

Dynamics of real fluids: laminar motion instability, the boundary layer concept.

- Separation and wakes.
- Shear stresses.
- Boundary layer and turbulent boundary layer
- Forces and energy dissipation in turbulent motion, effect of the roughness of the wall.
- Moody's abacus.

Hydraulic machines: pumps and turbines
Pipeline flows: analysis of the problem of uniform
Unsteady flows: mass oscillations and water hammer
Open channel flows.

SEMINARS BY EXTERNAL EXPERTS YES ☐ NO ☐

FURTHER INFORMATION

Opportunity to carry on thesis work on topics related to the Fluid Mechanics, theoretically and experimentally both physical and numerical, even connected to other courses. The main topics refer to open channel flow dynamics in rivers, monitoring and modelling of open channel flows, water resources planning and hydraulic risk assessment and management.