Università degli Studi della Basilicata
Scuola di Ingegneria

COURSE: Mathematica Analysis II (Calculus II)				
PROFESSOR: Sorin Dragomir				
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Language: Italian				
ECTS: 6	n. of hours: 60	Academic year: 2015/2016	Campus: Potenza	Semester: Fall

TOPICS

Differential calculus for functions of several real variables. Extremum points. Regular curves and curvilinear integrals. Differential forms. Double and triple integrals on normal domains. Regular surfaces and surface integrals. Green's lemma.

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) Homework assignments (bi-weekly).

TEXTBOOKS

E. Giusti, *Analisi Matematica 2,* Bollati Boringhieri Ed. s.r.l., Torino, 1989.

G. Di Fazio & P. Zamboni, *Analisi Matematica Due,* Monduzzi Ed., Bologna, 2008.

G. Fiorito, *Analisi Matematica 2,* Spazio Libri Ed., Catania, 2007.

R.A. Adams, *Calcolo Differenziale 2. Funzioni di più variabili,* Casa Editrice Ambrosiana, 1992, (Edizione italiana a cura di Luigi Quartapelle).

N. Fusco & P. Marcellini & C. Sbordone, *Analisi Matematica Due, Liguori Editore, Napoli, 1996.*

ON-LINE EDUCATIONAL MATERIAL
web address:

LEARNING GOALS

Reaching abilities of differential and integral calculus for functions of several real variables together with knowledge of elements of local differential geometry of curves and surfaces and elements of potential theory (Gauss-Green formulas) as required by the need of comprehending specific applications of mathematical analysis within physics and engineering disciplines.

REQUIREMENTS

Contents of courses *Linear Algebra and Geometry* and *Mathematical Analysis I (Calculus I)*

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EVALUATION METHODS (please tick one or more options)
□ Intermediate verifications
x Written examination
□ Discussion of a project work
□ Practical test
□ Oral examination
Other methods (please specify) Evaluation of the results obtained in the homework assignments.

DETAILED CONTENT

Differentiability of functions of several real variables. Directional derivative, differential, gradient. Theorem of the total differential. Theorem of Schwartz. Differentiation of composed functions (chain rule). Taylor's formula. Critical points of quadratic forms and eigenvalue theory. Maximum and minimum points of real functions of several real variables. Necessary/sufficient conditions for a critical point to be a relative extremum point. Eigenvalues of the Hessian matrix. Homogeneous functions and Euler's equation. Introduction to the theory of partial differential equations. Convection equation. Laplace equation. Het equation. Wave equation. Maxwell's equations. Elements of differential geometry of plane and space curves. Curvature, torsion, Frenet formulas. Curvilinear integrals. Differential forms. Closed forms, exact forms. Integration of differential forms. Criteria of exactness for differential forms. Double integrals on normal domains. Change of variables under the double integral sign. Triple integrals on normal domains. Change of variables under the triple integral sign. Elements of local differential geometry of surfaces. Regular surfaces, the first and second fundamental forms. Curves on surfaces. Surface integrals. Elements of potential theory. Gauss, Green and Stokes formulas. Applications of integral calculus to mechanics and the theory of partial differential equations.

EXAMINATION SESSIONS (FORECAST)
February 4 2016
June 14 2016
July 7 2016
October 7 2016
November 4 2016

SEMINARS BY EXTERNAL EXPERTS YES □ NO x

FURTHER INFORMATION