



**UNIVERSITY OF BASILICATA STUDIES**  
**DEPARTMENT OF MATHEMATICS, INFORMATICS AND ECONOMICS**

COURSE: Calculus II (second module of Calculus)	
ACADEMIC YEAR: 2019/2020	
TYPE OF EDUCATIONAL ACTIVITY: Basic	
TEACHER: dr. Vita LEONESSA	
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phone:	mobile (optional):
Language:	

ECTS: 6 ( 5 for lessons + 1 tutorials/practice)	n. of hours: 52 (40 for lessons + 12 for tutorial/practice)	Campus: Potenza Dept.: Mathematics, Computer Science and Economics Program: Scienze e Tecnologie Informatiche	Semester: second
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<p><b>EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES</b></p> <p>The teaching of Calculus II is the second module of Calculus. It is a basic teaching. Main knowledge are:</p> <ul style="list-style-type: none"><li>• infinite series;</li><li>• Riemann integration theory and methods for computing integrals of real valued functions of 1 variable;</li><li>• differential calculus for real valued functions of 2 variables;</li><li>• ordinary differential equations.</li></ul> <p>Main skills are:</p> <ul style="list-style-type: none"><li>• study the character of a infinite series;</li><li>• solve integrals;</li><li>• find maximum and minimum for functions of 2 variables;</li><li>• solve first order linear differential equations and relevant Cauchy problems;</li><li>• solve second order linear differential equations and relevant Cauchy problems.</li></ul>
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<p><b>PRE-REQUIREMENTS</b></p> <p>It is necessary to know the following basic arguments of mathematics:</p> <ul style="list-style-type: none"><li>• algebraic calculus;</li><li>• methods for solving equations and inequations of every kind.</li></ul> <p>It is necessary to know the following basic arguments of Calculus I:</p> <ul style="list-style-type: none"><li>• sequences (properties and limits);</li><li>• limit and derivatives of functions of 1 variable;</li><li>• elementary functions;</li><li>• methods for solving linear systems.</li></ul>
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<p><b>SYLLABUS</b></p> <ul style="list-style-type: none"><li>• Infinite series (12 hours). Character of an infinite series. Properties. Positive series and methods to study them. Series of any sign. Power series. Taylor and McLaurin series. algebraic calculus;</li><li>• Integration theory (16 hours). Definition and properties. Calculus of integrals;</li><li>• Two-variables functions (16 hours). Limit, continuity and differentiability for two variable functions. Searching of maximum and minimum (local or absolute).</li><li>• Ordinary differential equations (8 hours). First- order (linear / separable variables) differential equations and relevant Cauchy problems. Second- order linear differential equations and relevant Cauchy problems.</li></ul>
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<p><b>TEACHING METHODS</b></p> <p>The course consists in 52 hours of theoretical lessons; in particular 12 hours are of exercises.</p>
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<p><b>EVALUATION METHODS</b></p> <p>Achievements will be assessed by the means of a final exam. This is based on an analytical assessment of the "expected learning outcomes" described above.</p>
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The examination is composed of a written session. The students that obtained at least 16/30 are admitted to the oral exam. The final grade is computed as the arithmetic average of the two parts. The exam is passed if the final assessment (average of the marks of the written and oral exam) is at least 18/30.

There will be also three intermediate tests throughout the year. The exam is passed as well if the average of the marks in these tests is at least 18/30. For the students aiming at improving their score, an oral session is possible, but not obligatory.

**TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL**

- Lecture notes available on the course web site [informatica.unibas.it/moodle](http://informatica.unibas.it/moodle).
- M. Bertsch, R. Dal Passo, L. Giacomelli, ANALISI MATEMATICA, McGraw-Hill, 2011.
- P. Marcellini, C. Sbordone, Esercitazioni di Matematica, Liguori Editore.

**INTERACTION WITH STUDENTS**

Educational goals, syllabus and evaluation methods are described at the beginning of the course.

During the teaching all lecture notes will be available on the course web site.

Office hours: Monday 10:30-11:30, Tuesday 10:30-11:30, next to the office n. n. 3D236 of the Department of Mathematics, Computer Science and Economics.

It can be possible to contact the professor also by e-mail.

News of every kind are available on the FORUM session of the course web site.

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

12 February 2020; 6 May 2020; 1st July 2020; 15 July 2020; 16 September 2020; 15 December 2020.

**SEMINARS BY EXTERNAL EXPERTS** YES  NO

**FURTHER INFORMATION**

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