

**MATHEMATICS I**

Academic year 2014/15

MODULE	SUBJECT MATTER	YEAR	SEMESTER	CREDITS	TYPE				
Basic Formation	Mathematics	1	1	6	Basic				
<b>TEACHERS*</b>		<b>CONTACT'S FULL ADDRESS FOR TUTORING (Home address, telephone, email, etc.)</b>							
		Dpto. Análisis Matemático, 1st floor, Facultad de Ciencias. Offices nº 4, 1, 18, 17 y 18 email: aperalta@ugr.es, madiaz@ugr.es, juliobg@ugr.es, fjperez@ugr.es y pacopolo@ugr.es							
		<b>TUTORING SCHEDULE*</b>							
<ul style="list-style-type: none"> <li>• Antonio M. Peralta Pereira</li> <li>• Manuel Díaz Carrillo y Julio Becerra Guerrero</li> <li>• Francisco Javier Pérez González</li> <li>• Francisco J. Fernández Polo</li> </ul>		Monday & Wednesday 10:30-12:30, Thursday 11:30-13:30 (Antonio M. Peralta Pereira). Monday & Thursday 11-13, Tuesday 18-20 (Manuel Díaz Carrillo) Monday & Tuesday 9-12 (Julio Becerra Guerrero) Tuesday & Wednesday 11-13, Wednesday 17-18 & 19-20 (Javier Pérez González) Monday, Wednesday and Thursday 11-13 (Francisco J. Fernández Polo)							
<b>DEGREE IN WHICH IT IS TAUGHT</b>		<b>OTHER DEGREES IN WHICH IT COULD BE OFFERED</b>							
Degree in Civil Engineering									
<b>PREREQUISITES AND/OR RECOMMENDATIONS (if appropriate)</b>									
<b>BRIEF DESCRIPTION OF CONTENT (ACCORDING TO THE UNDERGRADUATE DEGREE VERIFICATION REPORT)</b>									
<ul style="list-style-type: none"> <li>• Differential Calculus in one and several variables.</li> <li>• Power series</li> <li>• Ordinary Differential Equations. Introduction to Partial Differential Equations.</li> </ul>									
<b>GENERAL AND SPECIFIC SKILLS</b>									
<ul style="list-style-type: none"> <li>• <b>CG1:</b> Scientific-technical qualification for the profession of Technical Engineer in Public Works and</li> </ul>									



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- knowledge of consultancy, analysis, design, calculation, project, construction, maintenance, conservation and operation.
- **CG2:** Understanding of the multiple technical and legal factors that arise in the construction of public works. Ability to use certified, proven methods and technologies for more efficiency in the construction industry, respect for the environment, and protection of the health and safety of workers and users of public works.
  - **CB1:** Ability to solve mathematical problems posed by engineering. Aptitude for applying knowledge on: linear algebra; geometry; differential geometry; differential and integral geometry; differential equations and partial derivative equations; numerical methods; numerical algorithms; statistics and optimisation.
  - **CB2:** Ability for spatial vision and knowledge of graphic representation techniques using conventional metric geometry and descriptive geometry, as well as computer aided design software.
  - **CB3:** Computer literacy and basic knowledge of computer programming, operative systems, databases and computer software applied to engineering

#### **OBJECTIVES (GIVEN AS EXPECTED LEARNING OUTCOMES)**

The knowledge of Calculus and basics of Differential Equations.

#### **DETAILED SYLLABUS**

Chapter 1: Real and Complex numbers. Functions of one variable. Limit and continuity.

Chapter 2: Differential Calculus in one variable. Optimization. Newton-Raphson algorithm.

Chapter 3: Sequences and series of real numbers. Power series.

Chapter 4: Integral Calculus in one variable. Riemann integral.

Chapter 5: The euclidean space  $R^N$ . Topology of  $R^N$ .

Chapter 6: Differential Calculus in several variables. Gradient. Scalar fields. Differentiability. Curves and surfaces.

Chapter 7: Integral Calculus in several variables.

Chapter 8: Ordinary Differential Equations. Introduction to Partial Differential Equations.

#### **BIBLIOGRAPHY**

- Ayres-Mendelson, *Cálculo diferencial e integral*, McGraw-Hill, 1990.



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- Bradley-Smith, *Cálculo de una variable (Tomo 1)*, Prentice Hall, 1998
- Bradley-Smith, *Cálculo de varias variables (Tomo 2)*, Prentice may, 1998
- Stewart, *Cálculo diferencial e integral*, Internacional Thomson Editores, 1998
- Stewart, *Cálculo multivariable*, Internacional Thomson Editores, 1999
- Thomas-Finley, *Cálculo (una variable)*, Addison-Wesley Longman, 1998.
- Thomas-Finley, *Calculus con Geometría Analítica (2 volúmenes)*, Addison-Wesley Iberoamericana, 1987

#### **RECOMMENDED LINKS**

#### **TEACHING METHOD**

- Lectures (30%, 45 horas).
- Practics and assessment (10%, 15horas).
- Tutoring, individual work, search and treatment of information (60%, 90horas).

#### **ASSESSMENT (ASSESSMENT INSTRUMENTS, ASSESSMENT CRITERIA AND PERCENTAGE OF FINAL MARK, ETC.)**

- Written exam: 70%-80% of the final mark.
- Exercises and other activities: 20%-30%.

#### **Single Final Assessment of the Subject**

Pursuant to Article 8 of the University of Granada's Rules for Student Assessment and Marking (Ratified by the Governing Council on 20 May 2013), students may have the option of a single final assessment, providing they send a written request to the Director of the Civil Engineering Department within the first two weeks of their date of enrolment, stating and justifying their reasons for not being able to follow the method of continuous assessment. Failure to receive a written answer from the Director of the Department within 10 days means that the student's request has been rejected.

#### **ADDITIONAL INFORMATION**



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