



## IDENTIFYING DATA

### Mathematics: Calculus 1

|                     |                                                                                                                                                                                                                                                      |                 |      |            |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------|------------|
| Subject             | Mathematics:<br>Calculus 1                                                                                                                                                                                                                           |                 |      |            |
| Code                | V12G360V01104                                                                                                                                                                                                                                        |                 |      |            |
| Study programme     | Grado en<br>Ingeniería en<br>Tecnologías<br>Industriales                                                                                                                                                                                             |                 |      |            |
| Descriptors         | ECTS Credits                                                                                                                                                                                                                                         | Choose          | Year | Quadmester |
|                     | 6                                                                                                                                                                                                                                                    | Basic education | 1st  | 1st        |
| Teaching language   | Spanish<br>Galician                                                                                                                                                                                                                                  |                 |      |            |
| Department          |                                                                                                                                                                                                                                                      |                 |      |            |
| Coordinator         | Martínez Martínez, Antonio                                                                                                                                                                                                                           |                 |      |            |
| Lecturers           | Busto Ulloa, Saray<br>Díaz de Bustamante, Jaime<br>Estévez Martínez, Emilio<br>Martínez Martínez, Antonio<br>Meniño Cotón, Carlos<br>Prieto Gómez, Cristina Magdalena<br>Rodal Vila, Jaime Alberto<br>Vidal Vázquez, Ricardo                         |                 |      |            |
| E-mail              | antonmar@uvigo.es                                                                                                                                                                                                                                    |                 |      |            |
| Web                 | <a href="http://moovi.uvigo.gal/">http://moovi.uvigo.gal/</a>                                                                                                                                                                                        |                 |      |            |
| General description | (*)O obxectivo desta materia é que o estudante adquira o dominio das técnicas básicas de cálculo diferencial nunha e en varias variables e de cálculo integral nunha variable que son necesarias para outras materias que debe cursar na titulación. |                 |      |            |

## Training and Learning Results

|      |                                                                                                                                                                                                                                                                                                                                   |  |  |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Code |                                                                                                                                                                                                                                                                                                                                   |  |  |
| B3   | CG3 Knowledge in basic and technological subjects that will enable them to learn new methods and theories, and equip them with versatility to adapt to new situations.                                                                                                                                                            |  |  |
| B4   | CG4 Ability to solve problems with initiative, decision making, creativity, critical thinking and to communicate and transmit knowledge, skills and abilities in the field of Industrial Engineering.                                                                                                                             |  |  |
| C1   | CE1 Ability to solve mathematical problems that may arise in engineering. Ability to apply knowledge about: linear algebra, geometry, differential geometry, differential and integral calculus, differential equations and partial differential equations, numerical methods, numerical algorithms, statistics and optimization. |  |  |
| D1   | CT1 Analysis and synthesis.                                                                                                                                                                                                                                                                                                       |  |  |
| D2   | CT2 Problems resolution.                                                                                                                                                                                                                                                                                                          |  |  |
| D6   | CT6 Application of computer science in the field of study.                                                                                                                                                                                                                                                                        |  |  |
| D9   | CT9 Apply knowledge.                                                                                                                                                                                                                                                                                                              |  |  |
| D14  | CT14 Creativity.                                                                                                                                                                                                                                                                                                                  |  |  |
| D16  | CT16 Critical thinking.                                                                                                                                                                                                                                                                                                           |  |  |

## Expected results from this subject

| Expected results from this subject | Training and Learning Results |    |     |
|------------------------------------|-------------------------------|----|-----|
| (*)                                | B3                            | C1 | D1  |
| (*)                                | B3                            | C1 | D1  |
| (*)                                | B3                            | C1 | D2  |
|                                    | B4                            |    | D9  |
|                                    |                               |    | D14 |
|                                    |                               |    | D16 |

|     |          |    |                              |
|-----|----------|----|------------------------------|
| (*) | B3<br>B4 | C1 | D1<br>D2<br>D9<br>D14<br>D16 |
| (*) | B4       | C1 | D2<br>D6<br>D9<br>D16        |

## Contents

| Topic                                                           |                                                                                                                                                                         |
|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Convergence and continuity                                      | Introduction to real numbers. Absolute value. Euclidean space $\mathbb{R}^n$ . Successions. Series.<br>Limits and continuity of functions of one and several variables. |
| Differential calculus of functions of one and several variables | Differential calculus of real functions of one real variable<br>Differential calculus of functions of several real variables                                            |
| Integral calculus of functions of one variable                  | The Riemann integral. Calculus of primitives.<br>Improper integrals.<br>Applications of the integral.                                                                   |

## Planning

|                                 | Class hours | Hours outside the classroom | Total hours |
|---------------------------------|-------------|-----------------------------|-------------|
| Problem solving                 | 20.5        | 30                          | 50.5        |
| Laboratory practical            | 12.5        | 5                           | 17.5        |
| Lecturing                       | 32          | 39                          | 71          |
| Problem and/or exercise solving | 3           | 3                           | 6           |
| Essay questions exam            | 2           | 3                           | 5           |

\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

## Methodologies

|                      | Description                                                                                                      |
|----------------------|------------------------------------------------------------------------------------------------------------------|
| Problem solving      | The professor will resolve problems and exercises type and the student will have to resolve similar exercises.   |
| Laboratory practical | They will employ computer tools to resolve exercises and apply the knowledges obtained in the classes of theory. |
| Lecturing            | The professor will expose in the theoretical classes the contents gives the matter.                              |

## Personalized assistance

| Methodologies        | Description                                                                  |
|----------------------|------------------------------------------------------------------------------|
| Problem solving      | The professor will attend personally the doubts and queries of the students. |
| Laboratory practical | The professor will attend personally the doubts and queries of the students. |

## Assessment

|                                 | Description                                                                                                                        | Qualification | Training and Learning Results |    |                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------------------------|----|------------------------------------|
| Problem and/or exercise solving | They will make controls written and/or works.<br>The weight of each one of them will not surpass 30% of the continuous evaluation. | 60            | B3<br>B4                      | C1 | D1<br>D2<br>D6<br>D9<br>D14<br>D16 |
| Essay questions exam            | It will do a final examination on the contents of the whole of the matter.                                                         | 40            | B3<br>B4                      | C1 | D1<br>D2<br>D9                     |

## Other comments on the Evaluation

The continuous eval. carry to cape on the previously exposed criteria. Those students that do not receive to the continuous eval be evaluated with a final examination on the contents of the whole of the matter, that will be the 100% of the note.

The continuous eval. of the students in second announcement consist in an examination on the contents of the whole of the matter, that will be 100% of the note.

Commitment:

"It expects that the present student a behaviour ethic o suitable. In case to detect a behaviour no-ethic o (copy, plagiarism, use of electronical devices unauthorised, and others) consider hat the student doesnt the necessary requirements to surpass the matter. In this case the calification in the present course will be of suspense (0.0)."

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## Sources of information

### Basic Bibliography

Burgos, J., **Cálculo Infinitesimal de una variable**, 2ª, McGraw-Hill, 2007

Burgos, J., **Cálculo Infinitesimal de varias variables**, 2ª, McGraw-Hill, 2008

Galindo Soto, F. y otros, **Guía práctica de Cálculo Infinitesimal en una variable**, 1ª, Thomson, 2003

Galindo Soto, F. y otros, **Guía práctica de Cálculo Infinitesimal en varias variables**, 1ª, Thomson, 2005

Larson, R. y otros, **Cálculo 1**, 9ª, McGraw-Hill, 2010

Larson, R. y otros, **Cálculo 2**, 9ª, McGraw-Hill, 2010

Stewart, J., **Cálculo de una variable. Trascendentes tempranas**, 7ª, Thomson Learning, 2014

### Complementary Bibliography

García, A. y otros, **Cálculo I**, 3ª, CLAGSA, 2007

García, A. y otros, **Cálculo II**, 2ª, CLAGSA, 2006

Rogawski, J., **Cálculo. Una variable**, 2ª, Reverte, 2012

Rogawski, J., **Cálculo. Varias variables**, 2ª, Reverte, 2012

Tomeo Perucha, V. y otros, **Cálculo en una variable**, 1ª, Garceta, 2011

Tomeo Perucha, V. y otros, **Cálculo en varias variables**, 1ª, Garceta, 2011

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## Recommendations

### Subjects that continue the syllabus

Mathematics: Calculus 2 and differential equations/V12G330V01204

### Subjects that are recommended to be taken simultaneously

Mathematics: Algebra and statistics/V12G330V01103