200101 - FVC - Complex Variable Functions

**Coordinating unit:** 200 - FME - School of Mathematics and Statistics  
**Teaching unit:** 749 - MAT - Department of Mathematics  
**Academic year:** 2018  
**Degree:** BACHELOR'S DEGREE IN MATHEMATICS (Syllabus 2009). (Teaching unit Compulsory)  
**ECTS credits:** 7.5  
**Teaching languages:** Catalan

### Teaching staff

- **Coordinator:** JORDI QUER BOSOR  
- **Others:**  
  - Segon quadrimestre:  
    - FRANCESC FITÉ NAYA - A  
    - JOSE TOMAS LAZARO OCHOA - B  
    - JORDI QUER BOSOR - A, B, CFIS  
    - JUAN JOSÉ RUE PERNA - CFIS

### Degree competences to which the subject contributes

**Specific:**
1. CE-2. Solve problems in Mathematics, through basic calculation skills, taking into account tools availability and the constraints of time and resources.  
2. CE-3. Have the knowledge of specific programming languages and software.  
3. CE-4. Have the ability to use computational tools as an aid to mathematical processes.

**Generical:**
4. CB-1. Demonstrate knowledge and understanding in Mathematics that is founded upon and extends that typically associated with Bachelor's level, and that provides a basis for originality in developing and applying ideas, often within a research context.  
5. CB-2. Know how to apply their mathematical knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader or multidisciplinary contexts related to Mathematics.  
6. CB-3. Have the ability to integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgements.  
7. CG-1. Show knowledge and proficiency in the use of mathematical language.  
8. CG-2. Construct rigorous proofs of some classical theorems in a variety of fields of Mathematics.  
9. CG-3. Have the ability to define new mathematical objects in terms of others already know and ability to use these objects in different contexts.  
10. CG-4. Translate into mathematical terms problems stated in non-mathematical language, and take advantage of this translation to solve them.  
11. CG-6 Detect deficiencies in their own knowledge and pass them through critical reflection and choice of the best action to extend this knowledge.

**Transversal:**
11. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one's knowledge.
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Teaching methodology
There are three one hour lectures and two one hour problem sessions per week.

Learning objectives of the subject
(Section not available)

Study load

| Total learning time: 187h 30m | Hours large group: 45h 24.00% | Hours medium group: 0h 0.00% | Hours small group: 30h 16.00% | Guided activities: 0h 0.00% | Self study: 112h 30m 60.00% |

There are three one hour lectures and two one hour problem sessions per week.
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<tr>
<th>Content</th>
<th>Learning time: 10h</th>
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| **The Complex Plane** | Theory classes: 6h  
Practical classes: 4h |
| **Description:** | Review of complex numbers: cartesian and polar coordinates; exponential form. Sequences and series of complex numbers. The complex plane: metric and topology. The Riemann sphere. |
| **Functions of a complex variable. Power series** | Theory classes: 6h  
Practical classes: 4h |
| **Derivation. Holomorphic functions** | Theory classes: 6h  
Practical classes: 4h |
| **Description:** | Complex derivative. Holomorphic functions. Relation with the real derivative. Cauchy-Riemann equations. |
| **Contour integral. Cauchy's theorems and applications** | Theory classes: 6h  
Practical classes: 4h |
| **Description:** | Curves and contours. Contour integral. Fundamental theorem of calculus. Cauchy's theorem. Applications to definite integral computations and to obtain determinations of multivalued functions. |
There will be a mid-term exam (ME) and a final exam (FE). The final grade will be the maximum between the grade of FE and the mean grade of ME and FE.

An extra exam will take place on July for students that failed during the regular semester.
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Bibliography

Basic:


Complementary: