

## 27014 - Complex Analysis

### Información del Plan Docente

Academic Year	2018/19
Subject	27014 - Complex Analysis
Faculty / School	100 - Facultad de Ciencias
Degree	453 - Degree in Mathematics
ECTS	9.0
Year	3
Semester	Annual
Subject Type	Compulsory
Module	---

### 1.General information

#### 1.1.Aims of the course

#### 1.2.Context and importance of this course in the degree

#### 1.3.Recommendations to take this course

### 2.Learning goals

#### 2.1.Competences

#### 2.2.Learning goals

#### 2.3.Importance of learning goals

### 3.Assessment (1st and 2nd call)

#### 3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

### 4.Methodology, learning tasks, syllabus and resources

#### 4.1.Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, problem-solving sessions, tutorials and individual work and study.

#### 4.2.Learning tasks

This course is organized as follows:

- **Lectures.** Three weekly hours on theoretical results and key problems.

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- **Problem-solving sessions.** With the purpose of understanding and applying the theoretical results.
- **Individual work and study.** Including problem assignments for individual work.
- **Tutorials.** Individual tutoring.
- **Assessment tasks.** Several midterm theory exams will be done during the period of classes as well as a bigger midterm exam at the end of the first semester.

### 4.3.Syllabus

This course will address the following topics:

#### Section I. First semester.

- **Topic 1.** Holomorphic functions. Cauchy-Riemann conditions. Harmonic functions.
- **Topic 2.** Analytic functions. Power series. Elementary functions.
- **Topic 3.** Complex integration. Cauchy local theory.

#### Section II. Second semester.

- **Topic 4.** Cauchy global theory. Cycles and homology. Simple connection.
- **Topic 5.** Zeros and singularities. Meromorphic functions. Laurent expansions.
- **Topic 6.** Residue theorem and applications.
- **Topic 7.** Conformal mappings.

### 4.4.Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the Faculty of Sciences website (<http://ciencias.unizar.es/>) and Moodle (<https://moodle2.unizar.es/add/>). You can also check [http://www.unizar.es/analisis\\_matematico/docencia.html](http://www.unizar.es/analisis_matematico/docencia.html) for more information and material.

### 4.5.Bibliography and recommended resources

- Cuartero, B.; Ruiz, F. J.: Teoría de funciones de variable compleja. Lecture notes available in Moodle.
- Palka, B. P.: An introduction to complex function theory. New York, Springer, 1991.
- Conway, J. B.: Functions of one complex variable. 2nd ed., New York, Springer, 1978.
- Volkovyski, L. I.; Lunts, G. L.; Aramanovich, I. G.: A collection of problems on complex analysis. Oxford, Pergamon Press, 1965.
- Bruna, J.; Cufí, J.: Complex analysis. Zürich, European Mathematical Society Publishing House, 2013.
- Ponnusamy, S.; Silverman, H.: Complex variables with applications. Boston, Birkhäuser, 2006.
- Rudin, W.: Real and complex analysis. London, McGraw-Hill, 1970.

See also [http://www.unizar.es/analisis\\_matematico/docencia.html](http://www.unizar.es/analisis_matematico/docencia.html) and <https://moodle2.unizar.es/add/>.