Math course : Complex Analysis

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This is a gentle introduction to the function theory of one complex variable. Course Description.

- Chapter 1 : The complex plane.
 (the field C of complex numbers, topological properties of C, notion of continuity, the Riemann sphere).
- Chapter 2 : Holomorphic functions.
 (differentiable functions and partial derivatives, holomorphic functions, entire series and analytic functions, the exponential function).
- Chapter 3 : Primitive of a holomorphic function.
 (Curves in the complex plane, integral along a curve, primitive of a holomorphic functions)
- Chapter 4 : Properties of holomorphic functions.
 (Analyticity of holomorphic functions, topological properties of holomorphic functions, biholomorphic functions)
- Chapter 5 : Homotopy (Homotopy of paths, invariance of integrals by homotopy, simple connectivity, index of a closed path)
- Chapter 6 : Meromorphic functions (Meromorphic functions, singularities and Laurent development)

Schedule.

There are 7 sessions of 3.5 hours which are organized as follows :

- First week : Monday, Wednesday, Friday;
- Second week : Tuesday, Thursday;
- Third week : Monday, Wednesday (exam), Friday.

On average each session from 1 to 3 corresponds to almost one corresponding chapter. Session 4, 5 and 6 are devoted to Chapter 4 and 5. Finally, Chapter 6 is discussed in Session 8. In each session 2 hours are devoted to the theory part and the remaining 1.5 hours are left for the exercises.

Textbooks.

 Conway, John B. Functions of one complex variable. Second edition. Graduate Texts in Mathematics, **11**. Springer-Verlag, New York-Berlin, 1978. xiii+317 pp.
 Vogel, Pierre. Mathématiques pour la licence. Fonctions analytiques. Cours et exercices avec solutions. Dunod, Paris, 1999, viii+240 pp.