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| **Establishment** | **Faculty** | **Department** |
| *Mohamed Khider*  *University, Biskra* | *Faculty of Exact Sciences and Natural Sciences and Life* | *Mathematics* |
| **Domain** | **Study** | **Specialty** |
| *Mathematics and*  Computer sciences | *Analysis 1* | *----*  *----* |

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| **Course leader : *Mouloud CHERFAOUI*** | |
| **Cycle : License *First year*** | |
| **Course title: *Analysis 1*** | |
| **Course content :** | |
| Chapter I | **The Fields of the real numbers:**   * *ℝ is a commutative Field ;* * *ℝ is a fields totally ordered, Reasoning by induction ;* * *ℝ is a valued field, Intervals ;* * *Bounds (Sup and Inf) of a sub-set on ℝ ;* * *ℝ is an Archimedean field ;* * *Characterization of the upper and lower bounds,* * *The integer part function.* * *Bounded sets,* * *Extension of ℝ : Completed number line ℝ, Topological properties of ℝ, Closed open parts.* |
| Chapter II | **The field of Complex Numbers:**   * *Algebraic operations on complex numbers ;* * *Modulus of a complex number ;* * *Geometric representation of a complex number ;* * *Trigonometric form of a complex number ;* * *Euler formulas ;* * *Exponential form of a complex number ;* * *The nth roots of a complex number.* |
| Chapter III | **Sequences of real numbers**   * *Concept of numerical sequence;* * *Bounded sequences;* * *Convergent sequences;* * *Properties of convergent sequences;* * *Arithmetic operations on convergent sequences;* * *Extensions to infinite limits;* * *Infinitely small and Infinitely large;* * *Monotonous sequences;* * *Extracted suites (sub-sequences);* * *Cauchy sequence;* * *Generalization of the notion of the limit;* * *Upper limit; Lower limit;* * *Recurring sequels.* |
| Chapter IV | **Real functions of a real variable**   * *Graph of a real function of a real variable,* * *Even-odd functions, Periodic functions,* * *Bounded functions,* * *Monotonic functions, Local maximum, Local minimum,* * *Limit of a function, Theorems on limits, Operations on limits,* * *Continuous functions, the first and second discontinuities types, Uniform continuity,* * *Theorems on continuous functions on a closed interval,* * *Continuous reciprocal function,* * *Order of an equivalence variable (Landau notation).* |
| Chapter V | **Differential-Differentiable functions**   * *Right derivative, left derivative, Geometric interpretation of the derivative,* * *Operations on differentiable functions,* * *Differential-Differentiable functions,* * *Fermat's theorem, Rolle's theorem, Mean value theorem,* * *Higher order derivatives,* * *Taylor/Maclaurin Polynomials and Series,* * *Local extremum of a function,* * *Bounds of a function on an interval,* * *Convexity of a curve. Inflection point,* * *Asymptote of a curve,* * *Construction of the graph of a function.* |
| Chapter VI | ***Basic and Commonly Used Functions***   * *Natural logarithm,* * *Natural exponential,* * *Logarithm of any base,* * *Power function,* * *Hyperbolic functions and Reciprocal hyperbolic functions.* |