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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.*
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| 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.*
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| 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.*
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| 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).*
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| 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.*
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| Chapter VI | ***Basic and Commonly Used Functions*** * *Natural logarithm,*
* *Natural exponential,*
* *Logarithm of any base,*
* *Power function,*
* *Hyperbolic functions and Reciprocal hyperbolic functions.*
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