Nonlinear Applied Analysis (Course: 2, Seminar: 1, Examination: during the semester)

Contents

Chapter 1: Contraction principle and applications; Qualitative properties of the fixed point set/fixed point problem;
Chapter 2: Generalizations of the contraction principle and applications;
Chapter 3: Caristi’s theorem, Graph contraction theorem;
Chapter 4: Picard and weakly Picard operators. Examples;
Chapter 5: A characterization theorem for weakly Picard operators; Abstract Gronwall lemma. Comparison theorems. Examples and applications;
Chapter 6: Hausdorff-Pompeiu metric. Introduction to multivalued operator analysis;
Chapter 7: Multivalued contraction principle;
Chapter 8: $K^2M$ principle and applications;
Chapter 9: Topological fixed point theorems. Schauder’s theorems and applications.

• **Evaluation:** during the semester: two written tests (WT1,WT2), the evaluation of the home-works (H-W) and seminar activity (SA).

• The schedule for the two written tests: First written test (WT1): March 31, 2021, Second written test (WT2): May 26, 2021. The written tests will be performed through the MS Teams platform.

• The home-works must be submitted until May 28, 2021, at the latest.

• **Final mark** $FM$
  
  $FM := 40\%WT1M + 40\%WT2M + 20\%(H - WM + SAM)$. 
• References

• Important notes
1) The course and the seminar will take place every Wednesday from 5.00-8.00 p.m. on Microsoft Teams platform, via the Nonlinear Applied Analysis 2021 Team, code 08nvfyf1
2) Office hours: Friday from 8.30-10.00 a.m., by appointment (E-mail: petrusel@math.ubbcluj.ro)
3) The two written tests cannot be recovered;
4) It is forbidden to transfer the home-works to the colleagues. In that case, both (all) of the home-works will not be considered;
5) In order to pass the exam every student need to have at least 10 participation at the seminars;
6) According to the National Education Law - 2011, the record through any procedure of the didactic activity can be done only with the consent of the guiding teacher and of all students. In particular, the record of this course is not allowed.