Department of Mathematics & Statistics
Concordia University

> ## MAST 653 (MATH 630), Sec. BB
> Topics in the Foundations of Mathematics
> ***Winter 2019***

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Office Hours: _____

Class Schedule: Mondays & Wednesdays, 16:15-17:30.

Topics: The Non-Standard Analysis (NSA) is a new mathematical discipline created by Abraham Robinson in 1960-s. The mathematical universe of NSA is immensely wider than that of the classical mathematics. It contains infinite and infinitesimal numbers, and much more. The NSA provides the tools of mathematical constructions which are infinitely more powerful than the classical ones. However, the use of NSA requires a strong logical discipline; not all the classical constructions are permitted there. We cannot form viable sets as freely as we are used to. The course is devoted to the systematic study of the basics of NSA from the beginning, i.e. the set theory and elements of mathematical logic. On this basis the fundamental notions of NSA are developed, like the Transfer Principle, Internal Sets, Overflow and Underflow, etc. By the end of the course I'm going to discuss some applications of NSA to the Geometry (Asymptotic spaces) and Dynamics, including some problems of Fluid Dynamics. The course does not require special prerequisits beyond the elementary set theory and analysis.