VANIER
CÉGEP / COLLEGE

Faculty of Science & Technology
Department of Mathematics

Course Title:	Complexity	**Teacher:**	I.T. Ivanov
Course Number:	201-HTM-VA	**Office:**	D264
Section:	00001	**Phone:**	514-744-7500 ext. 7737
Semester:	Autumn 2020	**Email:**	ivanovi@vaniercollege.qc.ca
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Course Description: What can termites teach us about traffic control and ants tells us about cooperative strategies in war? How can a flock of birds or a herd of sheep be used to model movements on the financial markets and help predict the next stock market crash? To answer these and other questions, complexity theory is being used to understand the world around us. This new and exciting approach blends computer simulations with science to explain how order can arise from chaos, and how complicated behaviours can emerge from just a few simple rules. In this course students will be shown the latest tools and techniques used in complexity theory and learn how they can be applied to a wide variety of social and economic phenomena. From using fireflies to predict the next viral internet sensation, and turtles to model traffic jams – complexity theory offers a tantalizing glimpse into how large number of seemingly independent agents can spontaneously organize themselves into one coherent system. And if you think that our elections are tough, tell that to the bees and wolves.

Ponderation: Theory 1 hours per week, Lab 3 hours per week, Homework 2 hours per week

Prerequisites: No prerequisites and, no programming experience is expected.

Teaching Methods: Classes will be given online at the regular class schedule. Videos, notes and computer simulations will be published on the course webpage one week in advance of the scheduled discussion of the material. The simulation environment NetLogo will be introduced and used in the course.

Textbook: None. The Complexity course at the Santa Fe Institute has a lot of relevant videos and materials. The NetLogo models library contains versions of the simulations we will be considering and many other models.

Additional Expenses: None anticipated.

Office Hours: Thursdays 1pm – 3pm

Competencies to be achieved: For the course objectives and the expected learning outcomes please consult the course content document. It is available for viewing in Omnivox.

Academic Resources:

The Tutoring & Academic Success Centre (TASC) provides free peer tutoring every workday in E 300. See www.vaniercollege.qc.ca/tasc for further details.

Approximate Dates of Evaluations: Short essays on topics agreed by the student and the teacher and the supporting NetLogo simulations will be due on the 6th, 11th and 15th week of classes. Answers to short quizzes will be due every week.

Evaluation Procedures and Breakdown of Marks:

Twelve weekly quizzes	30%
Three essays supported with NetLogo simulations	70% (20%, 20% and 30% (for the best of the three))

Course Policies:

It is the student's responsibility to be familiar with and adhere to all Vanier College Policies. A summary of the course-level policies that apply in this and all other Vanier courses can be found under "Course-Level Policies" in Important Vanier Links on Omnivox, or by following this link: http://www.vaniercollege.qc.ca/psi/course-level-policies/. Complete policies can be found on the Vanier College website, under Policies.

Unless explicitly allowed by the instructor, all electronic devices including but not restricted to smart phones, smart watches, Fit Bits - all models, cameras, laser devices, MP3 players, recording and/or playback devices in any form, ear buds, any Bluetooth device are prohibited during in class examinations. A simple possession of such devices is considered cheating and will be treated as such.