Physics2NM3 - Media Numeracy: Telling stories with numbers

Course Level: 2
Course Pre-requisites: None
Instructor: David Venus, Department of Physics and Astronomy
Offered: Term 2 of 2017/18 on Dean's permission (it is not in the official Calendar yet – don't worry if you can't find it there).

Purpose of the course
Stories, in a general sense, are how people communicate meaning. When we wish to learn more about a topic, most of us search out friends, acquaintances, blogs, posts, wikis, newspaper and magazine articles or other media stories. In a modern society informed by science, these stories are filled with statements of numerical findings or statistics that motivate or corroborate the story. As society seems to be moving to a "post-truth era" with "alternative facts", repeating an assertion loudly and frequently is sometimes seen as the most effective method to establish commonly accepted "knowledge". Citizens must be able to evaluate numerical information that is used (or misused) to support stories and narratives, so that they can inform themselves.

"Twice as many people have been murdered in Toronto this year to date, as were murdered in Toronto at the same date last year."
"*New protocol 33% more effective in treating rare blood disorder.*"
What role do these statements play in the stories containing them? What story do the quoted numbers tell? How can we evaluate and compare these two stories? The purpose of **Physics 2NM3 - Media Numeracy: Telling stories with numbers** is to provide students from every academic background with **simple, practical and understandable tools** that will allow them to interpret the vast majority of the quantitative statements they encounter in media stories. (Basic high school math skills will be required.)

Content of the course
Examples of some topics that could be treated include:
1. When is an error not a mistake? Measured or counted numbers have a range of validity.
2. The idea of randomness. What does "random" mean? Why is this a useful concept?
3. The power of N. Deconstructing "this result is accurate to within 3%, 19 times out of 20".
4. What is risk, and how is it used? How risk is calculated vs. how people interpret it.
5. How likely are unlikely events? Should we be surprised when a particular event occurs?
6. Percentages – how do these work? How fractions can obscure meaning from the unwary.
7. Orders of magnitude. What is possible? What is meant by "certainty"?
8. News about medicine. With all this great news, why are so many people still sick?

Structure of the course
The course will have three major components:
1. Short readings taken from on-line, video or print sources that students study before class.
2. Lectures that start with a short overview of the topic under discussion in the reading, followed by peer group discussion guided by a series of quiz questions, with feedback through i-Clickers.
3. In-class participation and a series of graded assignments and/or presentations in which students practice the skills and techniques covered in class will be a significant part of the course evaluation. There will also be a midterm quiz and a final.