

Course Information	
Course title	Measuring the World and Beyond
Semester	114-2
Designated for	
Instructor	STARK, COLIN PETER
Curriculum Number	CIE4025
Curriculum Identity Number	501E49670
Class	
Credits	2.0
Full/Half Yr.	Half
Required/ Elective	
Time	Wednesday 3,4(10:20~12:10)
Remarks	The upper limit of the number of students: 40.
Course introduction video	
Table of Core Capabilities and Curriculum Planning	Table of Core Capabilities and Curriculum Planning

Course Syllabus

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Course Description	<p>In modern life, we take for granted so many numbers describing the world around us. But how do we know them? What technology is needed to measure them? And can we trust them? Take, for example, how smartphones routinely tell us where we are on Earth to within a few meters: this technology relies on extremely accurate timing provided by atomic clocks in orbit (with corrections made possible by Einstein). Three hundred years ago, the invention of another kind of accurate clock arguably led to a more fundamental advance in estimating geographic position, because sailors were finally able to measure their longitude and safely navigate the oceans.</p> <p>In this course we will look at the history, science and technology of measurement.</p>
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	<p>We will learn how we know such basic numbers as the size, age and temperature of the Earth, and the clever tricks that science has contrived to estimate them. We will study how measurements are made across a vast range of scales, from the sub-atomic to the galactic, and how in some cases (such as observation of gravitational waves) both are important at the same time. We will discover that many of the numbers we see and trust, like the strength of a typhoon or the magnitude of an earthquake, have only recently been measured accurately and require global instrumentation to make such measurements possible. At the end of the course, we will have a much better appreciation for the certainty and uncertainty inherent in the fundamental data that guides our lives.</p>	
Course Objective	<p>Some familiarity with the science and technology involved in making measurements, from the fundamental to the apparently routine; an appreciation for how closely the progress of science and society is intertwined with the technology of measurement; a sense for how scientific data of various kinds are generated, and how the measurement of simple numbers may entail a great deal of sophistication and complexity.</p>	
Course Requirement		
Student Workload (Expected weekly study hours before and/or after class)	3	
Office Hours		
Designated reading	<p>"Inventing Temperature: Measurement and Scientific Progress," Hasok Chang, 2004, OUP. Chapter 1.</p>	
References	<p>"Longitude: The True Story of a Lone Genius Who Solved the Greatest Scientific Problem of His Time," Dava Sobel, 1995. "Measuring the World," Daniel Kehlmann, 2005</p>	
Grading	<ol style="list-style-type: none"> 1. NTU has not set an upper limit on the percentage of A+ grades. 2. NTU uses a letter grade system for assessment. The grade percentage ranges and the single-subject grade conversion table in the NATIONAL TAIWAN UNIVERSITY Regulations Governing Academic Grading are for reference only. Instructors may adjust the percentage ranges according to the grade definitions. For more information, see the Assessment for Learning Section. 	
Progress		
Week	Date	Topic
No data		