T S	HMWK: MONDAY		HMWK: WEDNESDAY	HMWK: THURSDAY	HMWK: FRIDAY	S
	1/12	1/13	1/14	**1/15**	1/16	
	PRE-CLASS NOTES: 1.) On the first day of class, you will be given a journal and a copy of 13 Things That Don't Makes Sense; (the journal is yours, the book you will return to me later) 2.) the class Website is found by going to **faculty.polytechnic.org/physics** and clicking on Cosmology, Astornomy and Relativity in the left-hand column**;** 3.) If you find a URL on this pdf and it spans only one line, the link should be active; if the link spans more than one line, you will have to copy and paste the link into a browser to go to the site (this bit of weirdness seems to be the case in general with pdfs made from Excel files); 4.) also, be aware that our daily progress is not necessarily set in stone, so expect the calendar to change pretty continuously	**SECOND SEMESTER BEGINS:** **CLASS:** 0.) do video names 1.)) intro the course: (motiv. behind the course (old and new format emphasizing wonder); class Web site; journals; 2.) your world is a lot more interesting than you realize--it is devoted to introducing to you "stuff" you didn't know existed 3.) a few words about mathematics at Veritasium https://www.youtube.com/watch?v=Zrv1EDIqHkY 4.)watch "relative size" "immensity of universe"; 5.) not only very large, but very small--talk about intricacies of atom (illusion, and you never really touch anything); 6.)	**Day 2**	**CLASS:** 1.) oral exam on Wednesday. 2.) talk about "2019 OK" and info about meteor craters (any wonder here?); 3.) reiterate conclusions from yesterday--expand to include other amazing things about this place (of 5 trillion cu ft in sphere, only 1 cu foot of matter); 3.) talk about Newton (Gmm/r^2 and inventing Calculus) and why he didn't like his theory; 4.)explain where Special Relativity came from (start with Young's experiment, the idea that light is a wave, the problem of the medium in space; the theory of e/m waves for light and Maxwell's equations, newton's theory with everything being frame depedent; the problem and how relativity came about	**CLASS:** 0.) do a quick rundown of Calculus (http://faculty.polytechnic.org/cfletcher/Phys%20With%20Calc_Vol%201_%20web_pdfs%20_Jan_2010/aaPwC-Vol_I--Chapters,%20Review,%20Solu's.html) 1.) start Episode 1 of "The Elegant Universe" at https://www.pbs.org/wgbh/nova/series/the-elegant-universe/ 2.) at unification at 8:30 min mark: talk about equation that summarizes all----give theory behind springs 3.) Gravity and interaction of mass and the fabric of space/time; 4.) back to unification--electricity and magetnism and Maxwell's equations; 5.) Maxwell's equations 5.) Theory of Everything? (difference in strength outweighs similarities); 6.) when you get to how particles inside the atom interact with one another, look at Quantum Mechanics (stop at 30:20 min).	
	to reflect updates . . .	**HMWK:** 1.) Google "2019 OK" and briefly write up what you find there; 2.) Google "meteor crater;" let your curiosity get the better of you . . . 3.) Go on-line to class Web page and read both "About the Books" and "Course Information." 4.) make your first entry into your journal		**HMWK:** 1.) make your second journal entry (you should have a ton of stuff to report by now . . .) And your first oral exam will be in two class periods on next Wednesday)	**HMWK:** 1.) journal	
	1/19	1/20	1/21	1/22	1/23	
T e s t W k ?	**MLK Jr Holiday**	**Day 5**	**CLASS:** 1.) first oral exam, just for fun . . .	**CLASS:** 1.) finish Elegant section--start at 27:27 2.) begin discussion of QM with video of creepy guy and double slit experiment; 3.) introduce Mithuna Yoganathan and Looking Glass Universe (Google LGU to see all of her videos); (the "lie": https://www.youtube.com/watch?v=fbzHNBT0nl0) 4.) first video: introduction to quantum mechanics (USE MY ORIGINAL VERSION!!!) --newer version is intro but also talks about what it means to be measured https://www.youtube.com/watch?v=8Dso6Fv1FUw 5.) take a quick look at the "newer version" if time permits 6.) look at "answers to questions" video (talks more about "what is a measurement?" at https://www.youtube.com/watch?v=YBcQ0PeFsx4;	**Day 2**	

		HMWK: 1.) relax	**HMWK:** 1.) journal; 2.) google "wave function" in quantum mechanics and see if you can find a video that explains what it is (put URL in your journal)	
1/26	1/27	1/28	1/29	1/30
CLASS: 0.) NOTE homework 1.) superposition rule and measurement rule, then look at LGU wave function video (use my original version); 2.) a secondary video on wave function (not LGU) at https://www.youtube.com/watch?v=EmNQuK-E0kI 3.) quantum randomness at https://www.youtube.com/watch?v=hGGb0nGTPLk&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=1 (this talks about the coefficients of the wave function--the probability functions), also, outcome random but probability not 4.) how likely are possible outcomes?--the Born Rule https://www.youtube.com/watch?v=VHlqY44fOg0&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=2 (got to) 5.) mention magn of complex numbers are called amplitudes n angles phases)	**CLASS:** 1.) reiterate what-all we've covered (messed up and didn't show first video for Tuesday--go back and do that); 2.) noting that an eigenstate is just one of the possible states of a system and a wave function's "basis" is the parameter being measured, look at video on quantum interference at https://www.youtube.com/watch?v=tt8gVXDsh7Q&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=3--the follow-up to this video is at https://www.youtube.com/watch?v=sTTgZQVtaPE&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=4 start at 2.45 (what is observable in double slit experiment);	**Day 5**	**CLASS:** 1.) talk about Heisenberg Uncertainty principle using LGU video at https://www.youtube.com/watch?v=rciVgQm-F_U&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=9 2.) show video of laser beam spreading out as slit cuts beam off . . . "visualization of Heisenberg's Unc Prin.flv" in my files 2.) look at the Schrodinger Equation from two authors, the first from LGU: https://www.youtube.com/watch?v=ZfKq3g3MHqE&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=10 (talks about measurement problem), the other at https://www.youtube.com/watch?v=QeUMFo8sODk; 3.) how to use Schrodinger equation (LGU) at https://www.youtube.com/watch?v=DEgWbrMv6-k&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=11	**CLASS:** 1.) look at the deBroglie wavelength video at (this gets way too far into the weeds for most, but it has bits and pieces of stuff I want to talk about: https://www.youtube.com/watch?v=eqTY6Cyb0do&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=8 good review for wave function and eigenstates along with converting from position basis to momentum basis--talks about how the phase of an eigenstate might change even though the probability not due to the imaginary nature of the probability functions--(mention that Taylor expansion of "e^i(theta)" is the same as that of "cos(theta) + i sin(theta)";
HMWK: 1.) journal; 2.) pretend you are taking your first ORAL EXAM. Write out the talking points you would hit in that exam. In other words, what have we talked about in the last two weeks THAT YOU HAVE FOUND REALLY INTERESTING	**HMWK:** 1.) Google Amy Noether--read about her life 2.) look at the video about Noether's Theorem at https://www.youtube.com/watch?v=CxIHLqJ9I0A&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=7 (note that she misspoke about gravitational potential energy at the 3:10 mark--don't be put off by this--it's easy to do when riffing) 3.) concerning the video, read and think about the first three comments (from Eric Vilas and 12tone)		**HMWK:** 1.) journal; 2.) if you find this interesting and want to look at quantum spin, look at the LGU video at https://www.youtube.com/watch?v=cd2Ua9dKEl8&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=5; and its extension covering angular momentum as spin at https://www.youtube.com/watch?v=z_6B2M12H9w&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=6	**HMWK:** 1.) journal; 2.) if you are still interested and want to learn more, look at the video on quantum entanglement at https://www.youtube.com/watch?v=Xzmp7byh77E 2.) you and also learn about "spin" at the quantum level at https://www.youtube.com/watch?v=gh7xITmvgyU 3.) think about what you are going to say during ORAL EXAM
2/2	2/3	2/4	2/5	2/6