George Ellery Hale COLLAGE Course (Spring 2018): Helio and Asteroseismology
CU Boulder listing ASTR 7500 (Duane G328)
UH/IfA listing ASTR 736 (IfA C221)

Calendar: Class meets MW 19:00 – 20:30 UTC
CU: 12:00 – 1:30pm MST, 12:00 – 1:30pm MDT
UH/IfA: 9:00 – 10:30am HST (after 11 March, 8:00 – 9:30am HST)

First day of class:
17 January 2018
Holidays (no class):
19 February 2018 (UH Presidents Day)
12 and 14 March 2018 (MSU Spring Break)
26 and 28 March 2018 (CU and UH Spring Break)
Last day of class:
2 May 2018

Course description: This web-enabled course is the fifth offering of the George Ellery Hale Collaborative Graduate Education (COLLAGE) Program, a joint effort between CU Boulder, the National Solar Observatory (NSO), New Jersey Institute of Technology (NJIT), University of Hawaii (UH), New Mexico State University (NMSU), Montana State University (MSU), and the High Altitude Observatory (HAO).

The focus of this semesters course is helio and asteroseismology. We will examine the theoretical underpinnings, practical applications, and scientific outcomes. The web based environment poses unique challenges to learning, and the instructors will attempt to overcome these using pre-class readings and in class tutorials.

At CU this is offered as:
ASTR 7500 (1-3) Special Topics in Astrophysical and Planetary Sciences
Acquaints students with current research in astrophysical and planetary sciences. Topics vary each semester.
Repeatable: Repeatable for up to 9.00 total credit hours. Allows multiple enrollment in term.
Requisites: Restricted to graduate students only.
CU Location: Duane G328 (door code 18HALE (184253))

At UH/IfA this is offered as:
ASTR 736 (2 cr) Astronomy Seminar III
Selected advanced topics in astronomy and astrophysics.
Repeatable unlimited times.
Prerequisites: Restricted to Astronomy major. Consent.
UH/IfA Location: IfA C221

Syllabus (26 x 1.5hr class periods):

1:	(1/17)	Course Intro (Rast)
2:	(1/22)	Why do stars oscillate? (Rast)
3:	(1/24)	Sun as a star (Trampedach)
4:	(1/29)	Overview of stellar oscillations on the HR diagram (Rast)
4 – 5:	(1/31, 2/5)	Acoustic Gravity Waves (Rast)
6:	(2/7, 2/12)	Solar modes – non-radial oscillations (Rast)
7 – 9:	(2/14, 2/21)	Excitation (Rast)
10 – 12:	(2/26, 2/28)	Global Mode Inversions (Hindman)
13 – 14:	(3/5, 3/7)	Acoustic Holography (Lindsey)

NOTE: MST to MDT change 11 March 2018

15 – 16:	(3/19, 3/21)	Time-distance (Jackiewicz)
17 – 18:	(4/2, 4/4)	Ring Diagram Analysis (Hindman)
19 – 20:	(4/9, 4/11)	Asteroseismology (Huber)
21 – 25:	(4/16 – 4/30)	Asteroseismology (Jackiewicz)
26:	(5/2)	Course wrap-up (Rast)

Texts:

(Dropbox link: https://www.dropbox.com/sh/m1we7bsooi4gx0d/AAD4K_GfFOuTK7YFxkeKIa0ra?dl=0)

Aerts, C, Christensen Dalsgaard, J., and Kurtz, D.W. 2010, Asteroseismology, (Dordrecht: Springer).

Basu, S and Chaplin, W.J. 2017, Asteroseismic Data Analysis: Foundations and Techniques (Princeton: Princeton University Press).

Christensen Dalsgaard, J. 2014, Lecture Notes on Stellar Oscillations
http://astro.phys.au.dk/~jcd/oscilnotes/

Collins, G.W. 2nd, The Fundamentals of Stellar Astrophysics
(http://ads.harvard.edu/books/1989fsa..book/)

Grading:

Homework (approximately one every week or two, collaboration encouraged) 75%
Class engagement (essential to overcome the challenges unique to the web environment) 25%