

Spring 2019

# PHYS 728-002: Radio Astronomy

Dale E. Gary

Follow this and additional works at: <https://digitalcommons.njit.edu/phys-syllabi>

---

## Recommended Citation

Gary, Dale E., "PHYS 728-002: Radio Astronomy" (2019). *Physics Syllabi*. 53.  
<https://digitalcommons.njit.edu/phys-syllabi/53>

This Syllabus is brought to you for free and open access by the NJIT Syllabi at Digital Commons @ NJIT. It has been accepted for inclusion in Physics Syllabi by an authorized administrator of Digital Commons @ NJIT. For more information, please contact [digitalcommons@njit.edu](mailto:digitalcommons@njit.edu).

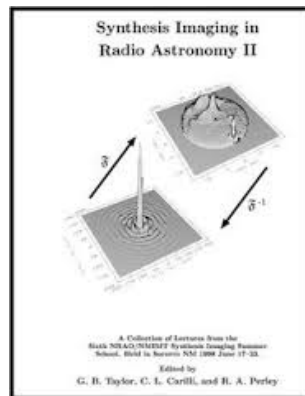
# PHYSICS 728, RADIO ASTRONOMY COURSE OUTLINE (Spring 2019)

Text for the course

(do not purchase--we have copies available)

## Synthesis Imaging in Radio Astronomy II

Edited by G. B. Taylor, C. L. Carilli,  
and R. A. Perley



Time: Wed 11:30-2:20 pm

Room: Tiernan 101

Prof. [Dale E. Gary](mailto:dgary@njit.edu)

Office: Tiernan 101

Office Hours: TF 11 am, 3 pm

Phone: (973) 642-7878

e-mail: [dgary@njit.edu](mailto:dgary@njit.edu)

Course Web Page: <http://web.njit.edu/~dgary/728>

Webex: <https://njit.webex.com/meet/gary>

Webex number: 644 296 834

- **Readings:** The reading assignments are listed below. Complete the readings **before** the corresponding lectures if possible. Lecture Notes will be placed on the web before the corresponding lecture, although in some cases it may be only hours before the lecture.
- **Homework:** There will be several homework assignments, generally due one week from the time it is assigned, unless otherwise specified.
- **Presentations:** There will be no exams in the course, but the final grade will be based largely on an oral and written presentation given at the end of the semester. You should get approval of the topic before committing to a particular topic. Some of you may elect to work on a hardware project, which we will discuss during the first few weeks.
- **Grades:** The grades will be based on attendance (5%), homework assignments (35%) the oral presentation (20%), and written report (40%).
- **Other Resources:** There are many other resources we will make use of during the semester, including the latest lectures from the [Synthesis Imaging Summer School](#), the [Essential Radio Astronomy](#) course, and excerpts from various other sources. We will use tools like [CASA \(Common Astronomy Software Applications\)](#) and [Miriad](#) for creating, calibrating, and analyzing radio data, and [Python](#) for general purpose programming and as a scripting interface to these tools. Note that Python has many extension packages, which you can install yourself, or alternatively you can download the [Anaconda Python](#) pre-packaged distribution for scientific computing.

Lecture Number and Title	Reading Assignment	Homework Assignment
<b>Lecture 1</b> ( W 01/23). <a href="#">Introduction to Radio Astronomy</a>	Lecture Notes	<a href="#">Problem Set #1</a> (due 30 Jan)
<b>Lecture 2</b> (W 01/30). <a href="#">Radio Emission Mechanisms</a>	Lecture Notes	<a href="#">Problem Set #2</a> (due 06 Feb)
<b>Lecture 3</b> (W 02/06). <a href="#">Radiative Transfer(Appleton Code)</a>	Lecture Notes	<a href="#">Problem Set #3</a> (due 13 Feb)
<b>Lecture 4</b> (W 02/13). <a href="#">Primary Antenna Elements</a> Get: <a href="#">(pyidl)</a>	<i>Synthesis Imaging</i> : Chapter 3	<a href="#">Problem Set #4</a> (due 20 Feb)
<b>Lecture 5</b> (W 02/20). <a href="#">Front End Receiving Systems</a>	Lecture Notes	<a href="#">Problem Set #5</a> (due 27 Feb)
<b>Lecture 6</b> (W 02/27). <a href="#">Fourier Synthesis Imaging</a>	<i>Synthesis Imaging</i> : Chapters 2 and 7	<a href="#">Problem Set #6</a> (due 06 Mar)
<b>Lecture 7</b> (W 03/06). <a href="#">The Receiving System for Interferometry</a>	<i>Synthesis Imaging</i> : Chapter 8	
<b>Lecture 8</b> (W 03/13). <a href="#">More On Correlation</a>	<i>Synthesis Imaging</i> : Chapter 4	
<b>Lecture 9</b> (W 03/27). <a href="#">Calibration</a>	<i>Synthesis Imaging</i> : Chapters 5 & 10	<a href="#">Problem Set #7</a> (due 03 Apr) <a href="#">uvpts</a>

		Choice of Presentation Topic Due <a href="#">Partial List of Presentation Topics</a>
<b>Lecture 10</b> ( <i>W 04/03</i> ). <a href="#">Solar Radio Emission</a>	<i>Solar &amp; Space Weather:</i> Chapters 4, 6 & 14	
<b>Lecture 11</b> ( <i>W 04/10</i> ). <a href="#">Solar Radio Emission (cont'd)</a>	<i>Solar &amp; Space Weather:</i> Chapters 8, 9 & 10	<a href="#">Problem Set #10</a> (due 17 Apr)
<b>Lecture 12</b> ( <i>W 04/17</i> ). <a href="#">Astronomical Radio Emission</a>	Lecture Notes	<a href="#">Problem Set #11</a> (due 24 Apr)
<b>Lecture 13</b> ( <i>W 04/24</i> ). Project Presentations	2 presentations (30 min each)	
<b>Lecture 14</b> ( <i>W 05/01</i> ). Project Presentations (cont'd)	4-5 presentations (30 min each)	
<b>Lecture 15</b> ( <i>W 05/08</i> ). Project Presentations (cont'd)	2 presentations (30 min each)	