

**CORRECTED SYLLABUS** (2015 Aug 14). Initial version had the room number incorrect!

Syllabus	<b>PHYS 315</b> <b>Galaxies and the Interstellar Medium</b>	UMBC 2015 Fall
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<i>Credits</i>	3 credits
<i>Alt. Title</i>	
<i>Prerequisite</i>	PHYS 122 or PHYS 122H with grade C or higher. A good grade in either PHYS 105 or PHYS 304 will be of some advantage, but not required.
<i>Corequisite</i>	None
<i>Lectures</i>	Mon, Wed, Fri 11:00-11:50 (main campus) Sherman, <b>Rm 014</b>
<i>Texts</i>	<i>Extragalactic Astronomy and Cosmology</i> (2 <sup>nd</sup> Ed) by P. Schneider ISBN 978-3-642-54082-0 or ISBN 978-3-642-54082-7 (eBook)
<i>Materials</i>	Scientific Calculator (non-programmable) <i>No devices (like smart-phones, tablets, etc) with internet-connectivity will be allowed in exams.</i>
<i>Instructor</i>	<b>Dr. Ian M George</b> Office Physics Room 410 <b>Office Hours</b> <b>Mon, Wed, Fri 12:30-13:30</b> Phone 1-410-455-1518 <b>e-mail</b> <a href="mailto:ian.george@umbc.edu">mailto:ian.george@umbc.edu</a>
<i>T.A./Grader</i>	<b>Natalie DeNigris</b> Office Hours by e-mail arrangement <b>e-mail</b> <a href="mailto:ndenigr1@umbc.edu">mailto:ndenigr1@umbc.edu</a>
<i>Course Overview</i>	The formation, structure and dynamics of normal galaxies, dark matter, the evolution of elliptical and spiral galaxies, quasars, radio galaxies and active galaxies. Theoretical models will be compared to observations in radio, IR, optical, X-ray and gamma-rays.

**Galaxies and the Interstellar Medium**

*Course Objectives* The main objectives of the course are for students to become familiar with the latest ideas in characteristics of and components within the various types of galaxies in the known universe. The formation of galaxies will also be explored along with the use of galaxies as test of cosmological models.

*Detailed Objectives* By the end of the course, successful students will be able to:

1. Describe the variety of galaxies found in the universe.
2. Describe the various observing techniques used in the study of galaxies
3. Understand the various components of our Galaxy: the Milky Way
4. Understand the consequences of supermassive black holes lurching at the centers of galaxies
5. Understand the role observations of galaxies play in cosmology, and the study of dark matter and dark energy

<i>Grading Summary</i>	Final Exam	30%
	Mid-Term#1	10%
	Mid-Term#2	20%
	Regular Homework	25%
	Project	15%

A ***provisional*** schedule of topics to be covered is attached. However please note that this ***may be revised*** as the course progresses.

**A detailed week-by-week schedule of topics covered, homework due-dates etc will be continuously updated during the semester via UMBC Blackboard, in-class announcements, and/or e-mails.**

## PHYS 315 2015 Fall Calendar (v 2015 Jul 01)

Meetings etc held **11:00-12:00 Mon/Wed/Fri** in **Sherman Hall Rm 014** *(unless noted otherwise)*

**NOTE:** Topics to be covered & Mid Term dates should be considered **provisional** at this time

Mth/Day		PHYS315 Schedule (& other Notes)	
Apr	20 Mon	General Registration Opens	
Aug	25 Tue	2015 Fall Convocation	
Aug	26 Wed	First Day of 2015 Fall Semester	
		<b>Mtg01</b> <i>Introductions, Logistics, Course Overview</i>	
Aug	28 Fri	<b>Mtg02</b> <a href="#">1) Very Quick Overview</a> ; <i>From the Milky Way to Cosmology</i>	
Aug	31 Mon	<b>Mtg03</b> <i>The cosmic zoo of galaxies &amp; jargon review (but don't panic!)</i>	
Sep	1 Tue	Last Day to add name to Wait Lists	
Sep	2 Wed	<b>Mtg04</b> <i>Why are we bothering? What do we want to learn?</i>	
Sep	4 Fri	<b>Mtg05</b> <a href="#">2) Review of Basic Physics &amp; Techniques</a> ; <i>The available 'tools'</i>	
Sep	7 Mon	Labor Day: <b>No PHYS315 class</b>	
Sep	9 Wed	Last Day to add a Course, drop a Course without "W"	
		<b>Mtg06</b> <i>More on Telescopes &amp; Detectors (&amp; their limitations)</i>	
Sep	11 Fri	<b>Mtg07</b> <i>Spectroscopy 101 &amp; some basics of Quantum Physics</i>	
Sep	14 Mon	<b>Mtg08</b> <a href="#">3) Our "Milky Way"</a> ; <i>general characteristics of our Galaxy</i>	a
Sep	15 Tue	Last Day to apply for Ugrad Graduation	
Sep	16 Wed	<b>Mtg09</b> <i>The "distance-ladder": Techniques &amp; "Standard Candles"</i>	
Sep	18 Fri	<b>Mtg10</b> <i>Kinematics of the Milky Way revisited (incl "Dark Matter!")</i>	
Sep	21 Mon	<b>Mtg11</b> <i>buffer/review</i>	
Sep	23 Wed	<b>Mtg12</b> <b>Likely Date for MT#1</b>	b
Sep	25 Fri	<b>Mtg13</b> <a href="#">4) The Interstellar Medium in the Milky Way</a> ;	
Sep	28 Mon	<b>Mtg14</b> <i>"Cosmic abundances" &amp; the creation of the Z&gt;2 elements</i>	c
Sep	30 Wed	<b>Mtg15</b> <i>The post-death consequences of stellar evolution</i>	c
Oct	2 Fri	<b>Mtg16</b> <i>buffer</i>	c
Oct	5 Mon	<b>Mtg17</b> <a href="#">5) So what about all those other galaxies?</a> ;	d
Oct	7 Wed	<b>Mtg18</b> <i>Review of characteristics, role of environment etc</i>	
Oct	9 Fri	<b>Mtg19</b> <i>Scaling laws &amp; population synthesis</i>	
Oct	12 Mon	<b>Mtg20</b> <i>Chemical evolution, distance estimates, luminosity functions</i>	
Oct	14 Wed	<b>Mtg21</b> <i>buffer/review</i>	
Oct	16 Fri	<b>Mtg22</b> <b>Likely Date for MT#2</b>	

*continued over*

## PHYS 315 2015 Fall Calendar (continued)

Mth/Day	PHYS315 Schedule (& other Notes)
Oct 19 Mon	<b>Mtg23</b> <i>Active Galactic Nuclei - basics</i>
Oct 21 Wed	<b>Mtg24</b> <i>Active Galactic Nuclei - more details</i>
Oct 23 Fri	<b>Mtg25</b> <i>Active Galactic Nuclei - their hosts, role, &amp; importance</i>
Oct 26 Mon	<b>Mtg26</b> <b>6) Galaxy clustering (Groups, Clusters, Superclusters etc);</b>
Oct 28 Wed	<b>Mtg27</b> <i>Large-scale structure of the universe &amp; hierarchical clustering</i>
Oct 30 Fri	<b>Mtg28</b> <i>What can/do these major systems tell us?</i>
Nov 2 Mon	<b>Mtg29</b> <i>More on scaling lengths, light distribution, &amp; hot gas</i>
Nov 4 Wed	<b>Mtg30</b> <b>7) Galaxy Evolution &amp; Cosmology;</b>
Nov 6 Fri	<b>Mtg31</b> <i>OK, lets go back to the start of time....</i>
Nov 9 Mon	<b>Mtg32</b> <i>Brief Review of the standard model for particle physics (plus)</i>
Nov 11 Wed	<b>Mtg33</b> <i>Big Bang cosmology: the evidence in support of the paradigm</i>
Nov 13 Fri	<b>Mtg34</b> <i>Big Bang cosmology: the Thermal history of the universe</i>
Nov 16 Mon	<b>Mtg35</b> <i>Redshift &amp; SNe 1a surveys</i>
Nov 18 Wed	<b>Mtg36</b> <i>The observable universe at high redshift</i>
Nov 20 Fri	<b>Likely Date for Project Submission</b>
	<b>Mtg37</b> <i>Current issues in galaxy evolution</i>
Nov 23 Mon	<b>Mtg38</b> In-class review of Project Submissions
Nov 25 Wed	<b>Mtg39</b> buffer/Open Forum <i>[optional class]</i>
Nov 27 Fri	Thanksgiving: <b>No PHYS315 class</b>
Nov 30 Mon	<b>Mtg40</b> In-class review of Project Submissions (cont)
Dec 2 Wed	<b>Mtg41</b> <i>to be decided</i>
Dec 4 Fri	<b>Mtg42</b> <i>Review of current issues &amp; Looking into the future</i>
Dec 7 Mon	<b>Mtg43</b> buffer/review
Dec 8 Tue	Last Day of 2015 Classes <span style="float: right; border: 1px solid black; padding: 2px;">e</span>
Dec 10 Thu	Study Day
Dec ??? ???	<b>Mtg44</b> <b>PHYS315 FINAL EXAM (details yet to be confirmed)</b>
Dec 17 Thu	Undergraduate Commencement

### Notes

- a Rosh Hashana
- b Yom Kippur
- c Sukkot
- d Shmini Atzeret/Simchat Torah
- e Hanukkah