ASTR/PHYS 105A  
Cosmology  
Winter 2013

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Phone: 777-0681  
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Textbook:  
Cosmology: The Science of the Universe, 2nd Edition  
Edward Harrison

Prerequisite:  
Math 50

Calculator:  
Scientific calculator recommended.

Content:  
Chapters 1-22, 25

Absences:  
Students are responsible for the material covered and announcements made during absences from class. School policy regarding excessive absence will be adhered to. More than 4 missed sessions will be regarded as excessive. Late arrivals are very disruptive. Thus promptness is expected and if tardiness becomes habitual, it will be counted as 1 or more of the 4 missed sessions.

Classroom Protocol:  
All students in this class are expected to behave in a manner that is compatible with learning. This means that you will come to class prepared to work, that you will turn off all cell phones, pagers, or other electronic devices (Computers included unless being used as a part of class procedures), that you will make an honest effort to understand the course material, that you will not deliberately waste class time by creating disturbances, and that you will treat both the subject matter and the other class participants fairly and with respect. The instructor reserves the right to remove students from the class who do not behave in such a manner.

Homework:  
Daily reading and homework assignments will be required. A penalty for late homework may be assessed. Homework will not be accepted after the material has been covered in class. In the event of a long absence, late homework will be accepted as long as the absence is excused.

Tests:  
There will be four tests worth 100 points each. There will be up to ten quizzes worth 10 points each. Tests will be announced in advance. Therefore NO make-up tests will be allowed unless prior approval is given and a valid reason is presented for such approval. Failure to take an exam means a score of zero is recorded.

Point Distribution:  
Tests–400 points; Quizzes–100 points; Homework–200 points; Video reports–90 points

Grading:  
Grading is on a curve. To see where you stand, put your average in the following.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&gt;= 93%</td>
</tr>
<tr>
<td>A-</td>
<td>92% &gt;</td>
</tr>
<tr>
<td>B+</td>
<td>&gt;= 87%</td>
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<tr>
<td>B</td>
<td>86% &gt;</td>
</tr>
<tr>
<td>B-</td>
<td>&gt;= 80%</td>
</tr>
<tr>
<td>C</td>
<td>79% &gt;</td>
</tr>
<tr>
<td>C-</td>
<td>&gt;= 77%</td>
</tr>
<tr>
<td>D</td>
<td>72% &gt;</td>
</tr>
<tr>
<td>D+</td>
<td>&gt;= 67%</td>
</tr>
<tr>
<td>D</td>
<td>66% &gt;</td>
</tr>
<tr>
<td>E</td>
<td>&lt;= 60%</td>
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Statement on Student Assessment and Accreditation

Muskegon Community College is fully accredited by the Higher Learning Commission located in Chicago. The College is currently seeking reaccreditation by completing a two-year process called a self-study. Accreditation helps ensure students that they are receiving a quality education and can transfer to other colleges and universities with ease and confidence. MCC is committed to an essential part of the reaccreditation process: assessing student learning. You may be asked to participate in assessing student academic achievement this semester by doing such things as:

- Evaluate your class and your instructor by completing a Student Opinion Survey, usually given toward the end of the semester.
- In some classes, you will find that one hour of class time may be devoted to completing a test of your general knowledge. Your performance on this test will not affect your grade in this course or your status in the College.
- You may also be asked to be part of a group of students who will be interviewed or surveyed about their views of the College’s strengths and weaknesses.

If you have any comments you would like to make about the quality of education at MCC, please email the College’s assessment coordinator at this address: studentassessment@muskegoncc.edu

Statement on MCC Email

All email communication originating from MCC to students will be via their email account. CHECK YOUR MCC EMAIL FREQUENTLY.

Statement on Student Behavior

Muskegon Community College is a community of scholars whose members include administrators, faculty, staff, and students. Mutual respect and civility are expected in the classroom or other college academic settings, as well as, in any communication.

- MCC has the duty of providing students with privileges, opportunities, and protections that best promote learning;
- Students have the right to a non-threatening learning environment;
- Students have the responsibility to refrain from infringing on the right of others to learn or the right of teachers to teach; and
- Any student whose behavior disrupts learning may be subject to disciplinary action as outlined in the Muskegon Community College Student Handbook/Planner.

Academic Integrity Policy

Muskegon Community College expects that all faculty and students will adhere to high standards of personal and academic honesty. This means that all academic work will be done by the student to whom it is assigned without unauthorized aid of any kind. Faculty members, for their part, will exercise care in the planning and supervision of academic work so that honest effort will be positively encouraged.

Academic dishonesty consists of, but is not limited to:

A. Cheating. Cheating is defined as using or attempting to use, giving or attempting to give, and obtaining or attempting to obtain, materials or information, including computer material pertaining to a quiz, examination, or other work that a student is expected to do alone.

B. Plagiarism. Plagiarism is defined as the use of another’s words or ideas without acknowledgement.

C. Penalties for violation of these standards of conduct may result in sanctions of up to and including suspension or expulsion from MCC.

Statement on Dispute Resolution Process

Should a student not agree with a faculty member’s decision or actions as they may relate to this policy, the following steps shall be followed:

1. A student suspected of academic dishonesty shall be notified in writing within two school days of the time the violation is discovered. Copies of the written notification shall also be filed with the department chair and Vice President of Student Services.

2. The student should try to reach resolution of the matter through direct discussion with the involved faculty member within three (3) school days of the written notification.

3. If the matter is not resolved in Step 2, the student shall bring the matter to the attention of the department chairperson of the involved faculty member.

4. If the matter is not resolved at the department chairperson level, the student shall bring the matter to the attention of the Vice President for Academic Affairs who shall render a decision within five school days of the receipt of the dispute information.

5. If a satisfactory solution is not reached at the Step 4 level, the student may file a written request with the Vice President of Student Services for a hearing before the disciplinary board. This meeting shall be held no more than 20 days following the written request. A student may request a hearing before the disciplinary board. The disciplinary and judicial procedures are outlined in the Muskegon Community College Student Handbook/Planner.
<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPICS</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Cosmology, Terminology, Scientific method. Early Scientific Cosmology</td>
<td>1, 2</td>
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<tr>
<td>2</td>
<td>History of Cosmology Newtonian Physics, Video—“Seeing is Believing”</td>
<td>2, 3, 4</td>
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<td>3</td>
<td>Physics of Light and Matter Stars, Video “Cosmic Alchemy” (Test 1)</td>
<td>5</td>
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<td>4</td>
<td>Stars Galaxies VIDEO — “Exploding Stars”</td>
<td>5, 6</td>
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<td>5</td>
<td>Space, Time, Cosmic Edge, and Cosmic Center Spacetime, Curved Space</td>
<td>7, 8, 9, 10</td>
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<td>6</td>
<td>Special Relativity: General Relativity VIDEO — “Physics of Relativity”</td>
<td>11, 12</td>
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<tr>
<td>7</td>
<td>Black Holes VIDEO — “Black Holes” (Test 2)</td>
<td>13</td>
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<td>8</td>
<td>Expansion of the Universe Redshifts, Energy loss</td>
<td>14, 15</td>
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<tr>
<td>9</td>
<td>Observational Cosmology VIDEO — Hawking’s “The Big Bang” Evidence for the Big Bang (CBR, WMAP, Latest Telescopes)</td>
<td>19</td>
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<tr>
<td>10</td>
<td>The Many Universes, The Current Standard Model</td>
<td>18</td>
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<tr>
<td>11</td>
<td>The Early Universe Horizons in the Universe, The Relic problem. VIDEO — “The Edge of the Universe” (Test 3)</td>
<td>20, 21</td>
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<tr>
<td>12</td>
<td>Hot Big Bang Problems: Inflation</td>
<td>22</td>
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<td>13</td>
<td>VIDEO — Hawking’s “Dark Matter” Dark Matter, Dark Energy</td>
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<td>14</td>
<td>The New Standard Model, Open Questions</td>
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<td>15</td>
<td>VIDEO — “The Runaway Universe” What of the Future?</td>
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<tr>
<td>16</td>
<td>Final Exam Week — (Test 4) Time to be announced</td>
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Supplementary Reading List

Introductory

“The Big Bang” – Joseph Silk
“Foundations of Modern Cosmology” – John Hawley and Katherine Holcomb
“A Brief History of Time” – Stephen Hawking
“The Big Bang Theory” – Karen Fox
“Black Holes and Time Warps” – Kip Thorne
“The Elegant Universe” – Brian Green
“The Inflationary Universe” – Alan Guth
“Before the Beginning” – Martin Rees
“Quintessence” – Lawrence Krauss
“The Runaway Universe” – Donald Goldsmith
“The Universe in a Nutshell” – Stephen Hawking
“The Whole Shebang” – Timothy Ferris
“The Extravagant Universe” – Robert Kirschner
“Alpha & Omega” – Charles Seife
“Flatland” – Edwin Abbott
“Relativity Visualized” – Lewis Carroll Epstein
“Genesis and the Big Bang” – Gerald R. Schroeder

Advanced

“Parallel Universes” – Alan Wolf
“The Life of the Cosmos” – Lee Smolin
“Three Roads to Quantum Gravity” – Lee Smolin
“Hunting Down the Universe” – Michael Hawkins
“The Universe Next Door” – Marcus Chown
“The First Three Minutes” – Steven Weinberg
“Black Holes and Baby Universe and Other Essays” – Stephen Hawking
“The Book of Nothing” – John D. Barrow
“Simply Einstein” – Richard Wolfson
“Beyond Einstein” – Michio Kaku and Jennifer Thompson