FAYETTEVILLE STATE UNIVERSITY
COLLEGE OF ARTS AND SCIENCES
DEPARTMENT OF CHEMISTRY AND PHYSICS

I. LOCATOR INFORMATION

Semester: Spring, 2014
Instructor: Dr. Jianshi Wu
Course Name and Number: College Physics III, PHYS123 - 01
Number of Semester Hours of Credit: 2

Day and Time Class Meets: TR: 8:00 - 9:50 am

Room / Bldg Where Class Meets: LSA 345

Office Location: ST 318 Office Telephone: 672-1926

Office Hours: MWF: 11:00 am - 1:00 pm
MW: 3:00 pm - 5:00 pm
( Available at other times by appointments. )

E_mail Address: jwu@uncfsu.edu

Department Office: ST 304; Telephone: 672-1975/2441

FSU Policy on Electronic Mail: Fayetteville State University provides to each student, free of charge, an electronic mail account (username@uncfsu.edu) that is easily accessible via the Internet. The university has established FSU email as the primary mode of correspondence between university officials and enrolled students. Inquiries and requests from students pertaining to academic records, grades, bills, financial aid, and other matters of a confidential nature must be submitted via FSU email. Inquiries or requests from personal email accounts are not assured a response. The university maintains open-use computer laboratories throughout the campus that can be used to access electronic mail.

Rules and regulations governing the use of FSU email may be found at http://www.uncfsu.edu/PDFs/EmailPolicyFinal.pdf
II. COURSE DESCRIPTION

A continuation of PHYS 122, emphasizing the principle of special relativity, quantum physics, nuclear and high-energy physics. Demonstrations of essential principles will be an integrated feature of this course.

Prerequisites: PHYS 122

III. DISABLED STUDENT SERVICES

In accordance with Section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act (ACA) of 1990, if you have a disability or think you have a disability to please contact the Center for Personal Development in the Spaulding Building, Room 155 (1st Floor); 910-672-1203.

IV. TEXTBOOK


V. Student Learning Outcomes:
Upon completion of this course all students will be able to:
A. Identify the fundamental laws and principles of modern physics, including:
   1. Einstein's postulates of special relativity
   2. Einstein's equation of mass and energy
   3. de Broglie's hypothesis
   4. Heisenberg's uncertainty principle
   5. Pauli's exclusion principle
   (Assessment: Tests and Quizzes)
   
B. Recall the important terms and basic formulas, in conjunction with the related units of measurements in physics, including:

rest energy            time dilation        length contraction
photon                  Compton effect     quantum numbers
wave function           spin                  line spectra
shell model             fermi energy        radioactivity
fission                 fusion               quarks
leptons                 baryons              mesons
hadrons
(Assessment: Homework, Tests and Quizzes)

C. Interpret word problems in terms of the symbols used in the mathematical expressions of the laws of physics.
D. Apply those principles and laws to a systematic and coherent explanation of physical phenomena, and relate the major concepts of physics to biology, chemistry, and the earth/space sciences.
(Assessment: A paper on radioactive dating)

This course addresses the following competencies specified by the North Carolina Department of Public Instruction.

1.0 Explain the major concepts and principles of physics. Teachers should demonstrate competence and understanding in their ability to investigate:

1.1 The properties of matter, including but not limited to, spatial characteristics, inertia, gravity, density, magnetic, optical, electrical, and radioactivity.

1.9 Principles of modern physics (nuclear).

2.0 Understand the interrelationships among the sciences, and relate the major concepts of biology, the earth/space sciences, and chemistry to physics.

3.0 Apply appropriate mathematics to investigations in physics and the analysis of data.

4.0 Relate the concepts and principles of physics to contemporary, historical, environmental, technological, and societal issues.

VI. Course Requirements and Evaluation Criteria:

A. Grade Scale:
The letter grade awarded will be determined by the following scale: 90 -- 100 : A  80 -- 89 : B  70 -- 79 : C  60 -- 69 : D  59 & below : F

B. Attendance Policy:
A student will be assigned a grade of "EA", if the student has been absent in excess of 4 contact hours.

C. Graded Assignments:
(1) 5 best scores for homework assignments are averaged for the overall evaluation. Bonus points are awarded to the other assignments turned in on time. More assignments turned in on time, more bonus points earned.

(2) Quizzes will be administered at the beginning of the
Class for bonus points.

(3) 10 bonus points may be awarded towards the regular tests for special assignments to be announced in class.

D. Grade Distribution:
The student's grade for the course will be computed in accordance with the following distribution:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three Regular Tests</td>
<td>60%</td>
</tr>
<tr>
<td>Final Exam (comprehensive)</td>
<td>30%</td>
</tr>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
</tbody>
</table>

E. Policy on missed and late assignments:
Assignments turned late without an acceptable excuse will be graded with 10% deduction for each week after the due date. The deadline for a late assignment is three weeks from the due date.

F. Other Rules and Requirements:

Attendance:
The attendance policy of the University will be strictly adhered to. The student is required to attend lecture, and recitation sessions, except in cases of illness or unforeseen emergency. In the latter cases, it is the responsibility of the student to contact the instructor about the steps that must be taken towards making up any missed work. It is recommended that the student contact the instructor within twenty-four hours of having missed a lecture/recitation/laboratory session or a test.

Students are expected to be in class on time. Therefore, attendance will be taken promptly at the very beginning of each class period. Any student coming 15 minutes after the beginning of the class hour will have been marked absent.

Student must take all tests and the final exam. A make-up test is possible for documentary absence from a test with an acceptable excuse, but this courtesy will not be extended to the student who is simply unprepared on the day of a test. Undocumented absence from a major commitment such as a test or any assignment deadline commitment automatically earn the student a grade of "FAILURE" for that commitment. If the student anticipates a conflict of the scheduling of any course requirement with some personal event notice should be given to the instructor before the conflict in order to have consideration given to the problem.

Assignments:
Assignments for this course consist of word and/or
numerical problems chosen from the full set at the end of each chapter. The assignments for each chapter should be turned in at the beginning of the class hour on the due date. The deadline is three weeks from the due date. Absence from class is not an excuse for missing homework assignments. If abnormal circumstances seem likely to prevent the student from meeting a deadline, a one-day notice in advance of the deadline should be extended to the instructor for special consideration.

The student is encouraged to devote as much time as possible to the thorough understanding of the concepts and techniques involved in the solution of the problems, since these reflect heavily in the questions of the exams. The list of homework problems is given in the assignment schedule.

Examinations:
Each exam is graded on a 60/40 basis; 60 points are allotted to objective questions and 40 points are earned by solving problems. The objective questions emphasize concepts and one-step problems. Partial credit can be earned for any steps toward the solution of the multi-step problems. It is recommended that any examination, missed because of illness or an unforeseen emergency, be made up prior to the next scheduled test.

Blackboard and Email:
Blackboard and email are the official channels of communication for this course. Students are required to check email everyday, and to visit blackboard/course PHYS123 for announcements and special assignments.

Other Requirements:
All students are required to have a scientific calculator, and it is expected that the student will always bring a scientific calculator and the textbook to each class. NO SMOKING, EATING AND DRINKING WILL BE ALLOWED IN CLASS. THE STATE PROHIBITS THE USE OF DRUGS AND ALCOHOL ON STATE PROPERTY.

Consequences for Failing to Meet Behavioral Expectations:
The first time a student violates one of these rules, the instructor will warn him or her privately, either after class or before the next class. (The instructor reserves the right to warn students publicly if needed.)

VII. ACADEMIC RESOURCES
Students are encouraged to seek academic support at Blackboard (on-line), University College Learning Center, the FSU RISE PROGRAM (LS 312) and the FSU Center for Promoting STEM Education and Research (LSA 329).

**VIII. COURSE OUTLINE AND ASSIGNMENT SCHEDULE**

This course consists of four phases: regular tests are administered at the end of first three phases. A comprehensive final examination is given at the completion of the course. An assignment schedule is given with a due date for each assignment.

<table>
<thead>
<tr>
<th>DATE</th>
<th>SESSION</th>
<th>TOPIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 / 14</td>
<td>1</td>
<td>Class orientation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ch.37, Special Relativity</td>
</tr>
<tr>
<td>1 / 16</td>
<td>2</td>
<td>Ch.37, Lorentz Transformations</td>
</tr>
<tr>
<td>1 / 20</td>
<td>---</td>
<td>Holiday</td>
</tr>
<tr>
<td>1 / 21</td>
<td>3</td>
<td>Recitation, (Ch.37)</td>
</tr>
<tr>
<td>1 / 23</td>
<td>4</td>
<td>Ch.38, Photons</td>
</tr>
<tr>
<td>1 / 28</td>
<td>5</td>
<td>Ch.38, Matter waves</td>
</tr>
<tr>
<td>1 / 30</td>
<td>6</td>
<td>Ch.38, Schrodinger Equation</td>
</tr>
<tr>
<td>2 / 04</td>
<td>7</td>
<td>Recitation, (Ch.38)</td>
</tr>
<tr>
<td>2 / 06</td>
<td>8</td>
<td>Review (Ch.37 – 38)</td>
</tr>
<tr>
<td>2 / 11</td>
<td>9</td>
<td>Ch. 39, Wave Function</td>
</tr>
<tr>
<td>2 / 13</td>
<td>10</td>
<td>Exam 1. (Ch.37 – 38)</td>
</tr>
<tr>
<td>2 / 18</td>
<td>11</td>
<td>Ch.39, Hydrogen Atom</td>
</tr>
<tr>
<td>2 / 20</td>
<td>12</td>
<td>Recitation, (Ch.39)</td>
</tr>
<tr>
<td>2 / 25</td>
<td>13</td>
<td>Ch.40, Periodic Table</td>
</tr>
<tr>
<td>2 / 27</td>
<td>14</td>
<td>Recitation (Ch. 40)</td>
</tr>
<tr>
<td>3 / 04</td>
<td>15</td>
<td>Review (Ch. 39 – 40)</td>
</tr>
<tr>
<td>3 / 06</td>
<td>16</td>
<td>Exam 2</td>
</tr>
<tr>
<td>3 / 08 – 3 / 14</td>
<td>-----</td>
<td>Spring Break</td>
</tr>
</tbody>
</table>
3 / 18  17  Ch.41, Conduction
3 / 20  18  Recitation (Ch. 41)
3 / 25  19  Ch.42, Nuclear Properties
3 / 27  20  Ch.42, Radioactivity
3 / 28  *  Last Day to withdraw from class  *
4 / 01  21  Ch.42, Nuclear Models
4 / 03  22  Recitation (Ch.42)
4 / 08  23  Review (Ch.41 – 42)
4 / 10  24  Exam 3 (Ch.41 – 42)
4 / 15  25  Ch.43 Nuclear Energy
4 / 17  26  Recitation, (Ch. 43)
4 / 18  ------  Spring Holiday
4 / 22  27  Ch.44, Fundamental Particles
4 / 24  28  Ch.44, Cosmology
4 / 29  29  Recitation (Ch.44)
5 / 01  30  Review (Ch. 43 – 44)
5 / 02  *  Deadline for all assignments  *

Final Exam:  Tuesday, 5/06/2013, 8 – 9:50 am at ST 228

Assignment Schedule:

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Homework</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>2, 8, 18, 28, 34, 41, 44</td>
<td>1 / 28</td>
</tr>
<tr>
<td>38</td>
<td>3, 10, 18, 32, 42, 48, 67</td>
<td>2 / 11</td>
</tr>
<tr>
<td>39</td>
<td>4, 11, 33, 43, 49</td>
<td>2 / 27</td>
</tr>
<tr>
<td>40</td>
<td>4, 8, 17, 23, 28, 31, 34</td>
<td>3 / 18</td>
</tr>
<tr>
<td>41</td>
<td>3, 7, 9, 10, 31, 40</td>
<td>3 / 27</td>
</tr>
<tr>
<td>42</td>
<td>1, 7, 14, 28, 39, 60, 67</td>
<td>4 / 10</td>
</tr>
<tr>
<td>43</td>
<td>10, 18, 26, 36, 49</td>
<td>4 / 24</td>
</tr>
<tr>
<td>44</td>
<td>1, 11, 18, 30, 38</td>
<td>5 / 02</td>
</tr>
</tbody>
</table>
IX. TEACHING STRATEGIES

Physics is an experimental science which describes the real world. All physical concepts and theories originate from practice and observations. As a general approach in this course, we will start each topic from the experiences that students can relate to, and then move on to the generalizations and quantifications. This is the way not only making the materials more interesting and easier to understand, but also closer to the way physics is actually practiced. Mathematics is essential to the formulation and derivation of laws of physics, however, we will be more focused on physical concepts, and use mathematics as a tool to unravel the mystery of physical principles. In order to seek a systematic and coherent explanation of physical phenomena through this course, we will include as many applications as possible in problem solving.

X. BIBLIOGRAPHY
