# PHYSICS (BS)

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| 1. Communication Skills   | (1) Students will be required to complete written lab reports and critique published research papers. (PHY4802L,PHY4936)  
(2) Graduating seniors present their research results to their peers, The Society of Physics Students. The presentation is expected to be in power point involving graphs, tables, digital photographs of equipment, and careful analysis of data. A question-and-answer period follows the presentation. 
Every graduating senior will receive a mean score of 80% in the oral presentation exit exam, graded by a team of faculty members using the presentation rubric.(PHY4936)  
(3) Students will write a scientific paper that includes an abstract, introduction, materials and methods, results, and discussion (PHY4936). | After the students are placed in graduate school of positions of employment, the department chairpersons or employers will be asked to answer the question: “How well do FAMU Physics graduates communicate in written and oral form compared to their peers from other undergraduate degree programs?” An evaluation of at least 80% saying that FAMU graduates are equal to or surpass students from other undergraduate degree programs will be judged a success. |
|                           | Direct Measure  | Indirect Measure |
| 2. Critical Thinking Skills | A graduating physics major should have solved many and different kinds of problems in various physics and other science and math courses. The measure of one’s critical ability of solving problems is demonstrated by the grades a student receives in various course work | Students during their sophomore and junior year summers will participate in at least one summer research experience at FAMU or at a national lab or another university. The employers will be asked to evaluate FAMU Physics student’s critical thinking skills. If 80% think they compare favorably with students from other undergraduate Physics programs, this will be judged a success. |
### 3. Project Management
- Collaborate effectively with team members
- Solve problems through skilled time management

**Direct Measure**
Students are given take-home exams to work out solutions collaboratively. 80% of the students are expected to get a B or better. Students engage in general physics and advanced physics labs as a group and write reports. 80% are expected to get a B or better. Students have opportunity to work in research projects with experimentalists in laboratories where graduate and undergraduate students are involved. 80% of students participating in these research experiences are expected to get a favorable evaluation.

**Indirect Measure**
After placement in graduate programs or positions of employment, the respective department chairpersons or employers will be asked to compare FAMU Physics graduates with Physics graduates from other undergraduate Physics programs as to their ability to manage projects. If 80% say FAMU Physics graduates compare favorably with other Physics graduates, this will be judged a success.

### 4. Specific Content Knowledge
- Recognize and apply basic principles in the main areas of physics, including Newtonian methods, quantum mechanics, and relativity
- Use the terminology of physics accurately
- Describe possible career options related to physics
- Recognize and apply mathematical tools useful to the practice of physics, including calculus, differential equations, vector algebra and calculus, variables and functions, and partial differential equations

**Direct Measure**
All Physics students are required to take the core courses in Physics and pass with a “C” or better. Students must take math courses as required by the major and must pass with a grade of C or better. Students take the GRE subject exam to measure their knowledge of physics with respect to the rest of physics majors. 80% of our students will pass at the 50th percentile in order for our program to be judged a success.

**Indirect Measure**
After having been placed in a graduate program or a position of employment, the respective chairpersons or employers will be asked to rate our Physics graduates compared with graduates from other undergraduate Physics programs. They will be asked for a percentile. A rating of 80% will be judged a success.

### 5. Integrity/Values
- Demonstrate self-direction in learning
- Recognize ethical problems that may occur in the context of solving physics problems
- Adhere to the values of science: objectivity, precision, persistence

**Direct Measure**
Students enroll in special problems course to conduct research on their own under a guidance of a faculty member. 80% of the students are expected to pass the Special Problems course with a “C” or better. (PHY4936)

Students take advanced physics lab course to perform difficult experiments. 80% of the students are expected to pass the Advanced Lab course with a “C” or better. (PHY4802L)

Students are taught to present results that are not tampered to fit theory. 80% of the students will be expected to pass these courses with a “C” or better. (PHY4802L, PHY4936)

**Indirect Measure**
A student committee will do semi-annual surveys to assess the level of integrity and values of the student body. They will be asked how much cheating and plagiarism occurs. A high level of integrity will be judged to exist if 75% of the students say little or no cheating or plagiarism occurs.