Graduate Program Review
Texas Tech University

Program Reviewed: Physics Department


Name of Reviewers

Internal:
Please include name, title, and Department
Click here to enter text.

External:
Please include name, title, and Department
Mark L. Weaver, Professor, Department of Metallurgical & Materials Engineering, The University of Alabama

I. Academic Unit Description and Strategic Plan
Please evaluate the following:

Vision, Mission and Goals
○ Excellent
○ Very Good
☒ Appropriate
○ Needs Improvement

Strategic Plan
○ Excellent
☒ Very Good
○ Appropriate
○ Needs Improvement

Please elaborate if you have identified any items in this section as Excellent.

Click here to enter text.
Please elaborate if you identified any items in this section as Needs Improvement. Provide recommendations in the area of Strategic Planning.

Click here to enter text.

Other comments (optional)
There is concern that the program may have extended into too many research areas. However, the faculty recognize this and are taking action to increase the number of faculty in these areas. Further investment on the part of upper administration (i.e., faculty lines, startup, etc.) will help the department reach its goals.

The qualifying examination

II. Program Curriculum
Please evaluate the following:

Alignment of program with stated program and institutional goals and purposes
☐ Excellent
☐ Very Good
☐ Appropriate
☐ Needs Improvement
☐ N/A

Curriculum development coordination and delivery
☐ Excellent
☐ Very Good
☐ Appropriate
☐ Needs Improvement
☐ N/A

Program learning outcomes assessment
☐ Excellent
☐ Very Good
☐ Appropriate
☐ Needs Improvement
☐ N/A
Program curriculum compared to peer programs

☐ Excellent
☐ Very Good
☐ Appropriate
☐ Needs Improvement
☐ N/A

Please elaborate if you have identified any items in this section as Excellent.
The Department has done an excellent job in identifying areas of need whilst optimizing available resources (i.e., faculty time, teaching loads, etc.). The decision to expand into the area of Astrophysics was wise and has contributed towards increased interest from students. Similar moves have been made in peer programs (including my home institution, The University of Alabama). This shows that the Department is keeping up with current trends and is responsive towards current research and teaching needs.

Please elaborate if you identified any items in this section as Needs Improvement. Provide recommendations in the area of Program Curriculum.
Click here to enter text.

Other comments (optional)
Click here to enter text.

III. Faculty Productivity

Please evaluate the following:

Qualifications
☐ Excellent
☐ Very Good
☐ Appropriate
☐ Needs Improvement
☐ N/A

Publications
- Excellent
- Very Good
- Appropriate
- Needs Improvement
- N/A

**Teaching Load**
- Excellent
- Very Good
- Appropriate
- Needs Improvement
- N/A

**External Grants**
- Excellent
- Very Good
- Appropriate
- Needs Improvement
- N/A

**Teaching Evaluations**
- Excellent
- Very Good
- Appropriate
- Needs Improvement
- N/A

**Professional Service**
- Excellent
- Very Good
Please elaborate if you have identified any items in this section as Excellent.
Click here to enter text.

Please elaborate if you identified any items in this section as Needs Improvement. Provide recommendations in the area of Faculty Productivity.
Click here to enter text.

Other comments (optional)
The Department's productivity is appropriate at this time and is in line with equivalent programs peer institutions. The young faculty hired to replace retired senior faculty are enthusiastic, productive, and on pace to reach the productivity levels of their predecessors. The current (and projected) national funding climate are worrisome and could inhibit Departmental progress. Upper administration should stay aware and plan accordingly to help its departments succeed.

IV. Students and Graduates
Please evaluate the following:

Time to degree
☐ Excellent
☐ Very Good
☐ Appropriate
☐ Needs Improvement
☐ N/A
Retention
- Excellent
- Very Good
- Appropriate
- Needs Improvement
- N/A

Graduate rates
- Excellent
- Very Good
- Appropriate
- Needs Improvement
- N/A

Enrollment
- Excellent
- Very Good
- Appropriate
- Needs Improvement
- N/A

Demographics
- Excellent
- Very Good
- Appropriate
- Needs Improvement
- N/A

Number of degrees conferred annually
- Excellent
Support Services

☐ Excellent
☒ Very Good
☐ Appropriate
☐ Needs Improvement
☐ N/A

Job Placement

☐ Excellent
☐ Very Good
☒ Appropriate
☐ Needs Improvement
☐ N/A

Student/Faculty Ratio

☐ Excellent
☐ Very Good
☒ Appropriate
☐ Needs Improvement
☐ N/A

Please elaborate if you have identified any items in this section as Excellent.
Click here to enter text.

Please elaborate if you identified any items in this section as Needs Improvement. Provide recommendations in the area of Students and Graduates.
Two areas for improvement have been identified.
Retention is a difficult area to evaluate but appears to be an issue that needs to be addressed. Approximately 50% of the students fail the qualifying examination on each attempt. A survey of students indicates that many are not really sure what the requirements are for the exam or what the requirements are to pass it. A formal clarification of requirements might help students prepare better for the examination and improve retention rates. Demographics is always an issue in science and engineering departments. The numbers of female and minority students are traditionally low in the United States. Perhaps the addition of faculty from underrepresented groups will help in the recruitment and retention of students. This is a difficult issue for which a sustainable long-term plan should be developed.

Other comments (optional)
Without increases in faculty size, the Department will find it difficult to reach its goals due to increased undergraduate enrollment. More resources will be needed to maintain manageable student/faculty ratios and high levels of research productivity.

V. Facilities and Resources

Please evaluate the following:

**Facilities**
- Excellent
- Very Good
- Appropriate
- Needs Improvement
- N/A

**Facility Support Resources**
- Excellent
- Very Good
- Appropriate
- Needs Improvement
- N/A

**Financial Resources**
- Excellent
- Very Good
- Appropriate
Please elaborate if you have identified any items in this section as Excellent.
Click here to enter text.

Please elaborate if you identified any items in this section as Needs Improvement. Provide recommendations in the area of Facilities and Resources.

There are several areas that need improvement.
Facilities: The current building is inadequate in terms of square footage for teaching, square footage for research labs, office space, and useable laboratory infrastructure. New faculty will require modern lab space that at a minimum includes standard lab items (i.e., adequate power, ventilation, working hoods, etc.). The allocation of adequate laboratory space should be a high priority in order to improve the Department's visibility and attractiveness to new faculty and students. Related to this, teaching space must also be improved to reflect the growing number of students on campus. Such improvements will allow for a more efficient use of teaching resources (i.e., faculty and teaching assistants) and will enhance productivity.

Finances: In general, financial support is good. However, it is very disturbing to see that Departments are responsible for laboratory renovations. Many of the facilities that were observed on the site visit will require tens of thousands of dollars in renovations just to make them safe. Institutional investment in this area would be beneficial and ensure the continued development/improvement of this department and others on campus. Also, with new hires planned or on the way, the Department will need financial support to cover rising startup costs.

Staff Resources: The faculty and students generally seem to be pleased with the staff. However, it was consistently noted that additional IT support and academic staffing would be beneficial to all in the department.

Other comments (optional)
Assistance in replacing some older research instrumentaiton and facilities is in order. For example, we observed a 45 year old EDM in the machine shop. Though it "works" it undoubtedly requires more man hours to maintain than a more modern instrument would. Replacement of such items would benefit the department and institution in terms of reduced maintenance costs and improved research capability.
VI. Overall Ranking

**Overall Ranking**
- Excellent
- Very Good
- Appropriate
- Needs Improvement

*Please provide summative conclusions based on the overall review.*
The Physics Department has done a very good job of identifying areas for growth and responding to them. Department leadership is excellent and appears to have the program pointing in the right direction. Additional support from upper administration in the forms of space (new and/or renovated) and faculty lines will position the Physics Department for long-term growth and success.

*Please provide summative recommendations based on the overall review.*
The Department is urged to keep up the good work. It’s efforts have clearly resulted in increased enrollment. Space (laboratory, office, and teaching) are major hurdles that must be overcome soon to avoid catastrophe in the future. It is recommended that some assistance be provided to help the Department improve those facilities. Such improvements will serve to boost the reputation and ranking of the Department as well as TTU at large.

The University should help the Department in its effort to improve faculty and student diversity. I realize that this is very difficult in science-based fields, however the number of faculty from underrepresented groups is currently inadequate. The Physics Department itself has done a good job of recruiting/attracting diverse applicant pools with limited resources. The University could assist through the development of a formal and effective spousal hiring program.