Program Reviewed: Chemical Engineering Graduate Program

Onsite Review Dates: February 24-26, 2014

Name of Reviewers

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

External:
*Please include name, title, and Department*
W. Robert Ashurst, PhD
Associate Professor
Associate Department Chair
Undergraduate Program Chair
Chemical Engineering at Auburn University

I. Academic Unit Description and Strategic Plan

Please evaluate the following:

*Vision, Mission and Goals*

__ Excellent  __ Very Good  _X_Appropriate  __Needs Improvement

*Strategic Plan*

__ Excellent  __ Very Good  _X_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)
The strategic plan as presented is very brief. Detail on the strategic plan is described is described in other locations throughout the self-study document. The strategic seems to be in-line with expectations from the University and College. The Missions, Goals and Visions also seem appropriate and in-line with expectations from the College and University.

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.

Click here to enter text.

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

Curriculum Delivery - Admitted students with non-traditional backgrounds (i.e., those students that do not have chemical engineering backgrounds) need a tailored “remediation” plan that could involve
undergraduate coursework or other preparation. Applicants that the department intends to admit should have the remediation plan clearly explained prior to admission and the department needs to develop a policy regarding admission and student support standards for applicants with non-traditional backgrounds. This is potentially more relevant in view of the need to expand the size of graduate program and add diversity to the research themes, where traditionally prepared applicants may be insufficient in number or skillset to fulfill future admission needs.

Other comments (optional)
The Chemical Engineering Graduate Curriculum seems very standard and appropriate for the discipline. The TTU curriculum model is consistent with that of peer institutions in terms of number of core courses and core course content. The learning outcomes seem to be assessed appropriately but it is unclear if or how unmet learning objective from specific courses are dealt with in the curriculum.

Overall Educational and Student Learning outcomes for the PhD and MS seem appropriate as well, but the metrics used may need further refinement. For example, assessing the graduates’ ability to effectively communicate technical information may not be correctly assessed by the ability of the graduate to find a job. I would encourage the department to identify other/additional metrics, perhaps by utilizing other examples of technical communication (such as conference presentations, poster presentations, journal article manuscripts, other research presentations, etc.) that could be captured and assessed by advisors as a part of the overall department evaluation of the student learning outcomes.

III. Faculty Productivity
Please evaluate the following

Qualifications

__ Excellent   _X_ Very Good   __Appropriate   __Needs Improvement   __N/A

Publications

__ Excellent   _X_ Very Good   __Appropriate   __Needs Improvement   __N/A

Teaching Load

__ Excellent   __ Very Good   _X_Appropriate   __Needs Improvement   __N/A

External Grants

__ Excellent   _X_ Very Good   __Appropriate   __Needs Improvement   __N/A
Teaching Evaluations
___ Excellent ___ Very Good ___ Appropriate ___ Needs Improvement ___ N/A

Professional Service
___ Excellent ___ Very Good ___ Appropriate ___ Needs Improvement ___ N/A

Community Service
___ Excellent ___ Very Good ___ Appropriate ___ Needs Improvement ___ X 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 Faculty Productivity.
Click here to enter text.

Other comments (optional)
Community service – I feel this category is not applicable to the graduate program of chemical engineering.

Teaching load – Some of the less research-active faculty appear to have lower teaching loads than the established guidelines recommend.

The faculty as a whole are well qualified and very active in professional service. The faculty do an outstanding job at securing funding for their research, especially in view of the current rankings, department history and facilities. The department trajectory in the area of funded research is extremely promising and the faculty should be rewarded for their efforts. Their scholarly contributions are impressive.

The teaching evaluations from students are very positive and the faculty should be commended for their teaching efforts as well.
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
- Very Good
- Appropriate
- Needs Improvement
- N/A

**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.
Click here to enter text.

Other comments (optional)
In general, the student metrics are typical of peer institutions. Graduation rates, time to degree, retention and enrollment are generally appropriate for the number of faculty. The job placement of graduates is very good and it is clear that the faculty are actively helpful in placing their students. Job placement is very important to the visibility of the department and building “name brand” recognition in industry, academics and at large.

Student comments were universally very positive toward their advisors. Students like their advisors and feel that they get good advice.

The department needs to ensure that policies, academic requirements, and timing of degree milestones are clearly communicated to all students in the program.

V. Facilities and Resources
Please evaluate the following:

Facilities
__ Excellent  __ Very Good  __ Appropriate  X Needs Improvement  ___ N/A

Facility Support Resources
__ Excellent  __ Very Good  __ Appropriate  X Needs Improvement  ___ N/A

Financial Resources
__ Excellent  __ Very Good  X Appropriate  ___ Needs Improvement  ___ N/A
Staff Resources

___ Excellent    ___ Very Good    ___ Appropriate    __X_ 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 Facilities and Resources.
Staff Resources – the department appears to be very understaffed. It is apparent that the two staff persons available to the department are operating at capacity. With the anticipated new hires and additional graduate students expected to enter the department, current staffing will be insufficient. Personnel should be added to assist with technical maintenance of lab equipment, procurement of lab supplies, administrative tasks (i.e., copying, processing travel reimbursements, coordinating recruiting efforts, etc.). Furthermore, technical staff across the college appears to be insufficient for a growing research institution.

Facility Support Resources – Several instances were mentioned by students and faculty regarding repairs to infrastructure taking an excessive amount of time. These included various leaks, fume hood operation problems and a variety of other maintenance issues. These may individually seem like small problems, but they are important in the larger scope and in setting the tone of excellence. Lab spaces need to be properly and promptly maintained for safety and industrial hygiene.

Facilities – The department seems to have enough laboratory space for the currently present research active faculty. The quality of the lab space is varied, but the amount of space seems adequate. New hires will therefore cause the department to require additional space. Any additional space should be of sufficient quality for the department to continue their upward research trajectory. The department needs higher quality space to attract the best new faculty candidates possible and to assist in the retention of existing faculty. It is also recommended that allocated research lab space be located in close proximity to the main (core) department spaces.

Other comments (optional)
Financial Resources – the department has done well in managing finances in these difficult economic times.
VI. Overall Ranking

*Overall Ranking*

__ Excellent  __X_ Very Good  __Appropriate  __Needs Improvement

*Please provide summative conclusions based on the overall review.*

The Chemical Engineering Department at TTU is clearly greater than the sum of its parts. The people in the department appear passionate, motivated, and eager to improve their program. The department is doing an outstanding job in view of the resources available. The department appears to be a cohesive body that recognizes their own considerable forward momentum and potential. My impression is that the department is in actuality much better than their current ranking numbers alone would indicate.

The department has self-identified three key challenges that must be addressed in order to continue in their advancement and upward trajectory. The department has put considerable effort into program improvements to date and has made considerable advances. I agree with the department in their assessment of the nature and importance of these challenges moving forward.

Key challenge #1 – retaining successful faculty

The issue of faculty retention is complex and multi-faceted. There is no clear single solution to address this issue. It appears that faculty retention will continue to be an issue as TTU continues to improve.

Key challenge #2 – research lab space

The quantity and quality of research lab space is a key issue. This issue is perhaps related to faculty retention. New hires will require additional space. Attracting the best candidates will be easier if the lab spaces available are high quality.

Key challenge #3 – staffing

The available staff are “borderline adequate” for the amount of research and instruction done by the department. Additional hires and/or increased research efforts will require additional staff support.

*Please provide summative recommendations based on the overall review.*

The chemical engineering department has a demonstrated record of recent improvement. It is appreciated that their improvement comes as a result of efforts across the University, meaning that all interested parties (i.e., graduate students, staff, faculty, the Dean’s office, upper administration and
others) have contributed to the success of the chemical engineering program and all parties benefit from the improvement. The department will need additional resources from the administration to continue their improvement.

One recommendation is to provide the department with additional, high quality lab space. Such additional lab space will allow the department to attract the best new hires and grow the program in accordance with the stated University growth objectives. Higher quality lab space may also help with faculty retention.

Another recommendation is to provide additional staffing to the department. Additional staffing will help to reduce the administrative load on research active faculty and allow them to have additional time to put their unique and creative talents to use in growing the research programs and providing better educational experiences to students. Additional staffing may also help with faculty retention.