Program/Discipline: Physics and Engineering

Annual Program Review Update

Instructions
The Annual Update is conducted district-wide by each program/discipline and consists of a) analysis of general changes, staffing, resources, facilities, equipment and other needs, as well as b) reporting of curricular changes and outcomes assessment.

The questions on the subsequent pages are intended to assist you in planning for your program or area. Input should be sought from all campuses. It should be submitted or renewed every year by the designated date in anticipation of budget planning for the next fiscal year.

Institutional data used to document program/discipline statistics and trends will be provided by Institutional Research.

Please include pertinent documents such as student learning outcomes assessment reports and data analysis to support any requests for new faculty, facilities, equipment, etc. Retain this information for your discipline’s use,

Submit an electronic copy of your Annual Update Document and supporting data to the Program Review Committee. Also submit a copy of these documents to your Division Chair, Director, or Campus Lead Faculty.
Annual Program Review Update
*Be sure to include information from all three campuses.

Program/Discipline: **Physics and Engineering**
Submitted by (names): **David Bazard, Steve Brown, Steve Jackson**
Contact Information (phone and email): **dave-bazard@redwoods.edu; 476-4224**
Date: **9/12/08**

1. Program/Discipline Changes
   Has there been any change in the status of your program or area since your last Annual Update? (Have you shifted departments? Have new degrees or certificates been created by your program? Have activities in other programs impacted your area or program? For example, a new nursing program could cause greater demand for life-science courses.)
   
   **Note:** curricular changes should be addressed under 12 (Curriculum).

   [ ] No (go to next question)
   [x] Yes  Describe the changes below:

   Creation of Science Transfer Preparation advising materials and implementation of a Science emphasis within the Liberal Arts, Associates Degree has put Physics courses in the context of a larger set of preparatory courses required for all students intending to transfer as a science majors. Specifically, we are advising and requiring (in the Science Emphasis area) that a student take the Physics 2 or 4 series as part of these degree options. Physics is also an option under the new Science Exploration emphasis area of the Liberal Arts AA degree. Students taking Engineering courses for transfer should also be considering the broader context of Math and Physics courses required for transfer; however, Engineering courses are not presently part of these emphasis areas described above. We anticipate that both the advising and new emphasis areas will increase enrollment in Physics courses.

2. Program/Discipline Trends
   Refer to the data provided (data link is located at [http://inside.redwoods.edu/Assessment/ProgRev/TrendData.asp](http://inside.redwoods.edu/Assessment/ProgRev/TrendData.asp)) and describe the trends in enrollment, retention, success rates, and student demographics. If applicable, describe how changes in these areas are impacting your discipline and describe efforts within your area to address these impacts.
   
   **Enrollment in both Physics and Engineering stayed consistent from 04/05 to 05/06 (a combined enrollment of about 220 students enrollments per year). There was a decline in Physics during 06/07 and 07/08 and a decline in Engineering during 07/08. Some of this may related to student interest and ability to staff courses. Our full-time Engineering instructor was laid-off after 05/06 and our full-time Physics instructor resigned after the 06/07 year. An important point when considering enrollments is that the most of the physics...**
courses are lab courses with six contact hours per week per student. This results in a higher FTES fraction than a standard three-contact hour course. The success rates in Physics ranges from 68% to 80%, but there is not a systematic increase or decrease. The success rate in Engineering varies between 61% and 74%. Again, there has not been a systematic change. The retention rates in both disciplines averages at about 85%. This is consistent with other science disciplines.

No demographic data was available for this update.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrollment</td>
<td>113</td>
<td>103</td>
<td>62</td>
<td>71</td>
</tr>
<tr>
<td>Success</td>
<td>74%</td>
<td>68%</td>
<td>74%</td>
<td>80%</td>
</tr>
<tr>
<td>Retention</td>
<td>88%</td>
<td>87%</td>
<td>89%</td>
<td>96%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Engineering</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrollment</td>
<td>113</td>
<td>115</td>
<td>119</td>
<td>80</td>
</tr>
<tr>
<td>Success</td>
<td>74%</td>
<td>68%</td>
<td>61%</td>
<td>65%</td>
</tr>
<tr>
<td>Retention</td>
<td>86%</td>
<td>90%</td>
<td>89%</td>
<td>85%</td>
</tr>
</tbody>
</table>

3. Labor Market Review (for occupational programs)

Occupational programs must review their labor market data. Links to various reports and information, as well as instructions on how to create program-specific reports, can be found at [http://inside.redwoods.edu/Assessment/ProgRev/LaborMarketResources.asp](http://inside.redwoods.edu/Assessment/ProgRev/LaborMarketResources.asp). Institutional Research (IR) is available to help with surveys and reviews. All survey data (whether collected by your program or the institution) should be sent to IR to be kept on record.

a. Meets a documented labor market demand,

b. Does not represent duplication of other training programs (in the region), and

c. Is of demonstrated effectiveness as measured by the employment and completion success of its students.

4. Budget Resources

List your area’s budget for the following categories in the table below. Restricted funds have a sponsor/grantor/donor (federal, state, local government, etc). The funds are restricted by the sponsor/grantor/donor. Everything else is unrestricted.

<table>
<thead>
<tr>
<th>Category</th>
<th>Unrestricted Funds</th>
<th>Restricted Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply and printing budget</td>
<td>$1,712 shared with Science Dept.</td>
<td>$475.00 Physics supply budget</td>
</tr>
<tr>
<td>Equipment replacement and repair budget</td>
<td>$300.00 shared with MSE Division</td>
<td>None, other than through</td>
</tr>
</tbody>
</table>
Professional Development funds of the Academic Senate

Work-study funding: none
Additional Budget Items: Shared $500.00 office supply budget with MSE division

Is the funding for these areas adequate? ☐ Yes ☒ No
If not, describe the impact of unaddressed needs on your discipline or program.

Physics instruction requires labs and associated equipment. The lack of a stable instructional staff in physics (eight different full and part-time instructors in the last eight years) has resulted in inconsistent maintenance and restocking of supplies. The small supply budget will likely be exhausted when our next full-time faculty member conducts an evaluation of supplies (a search is currently underway). This may not be a compelling argument for increasing the supply budget this year. However, we need to begin considering a budget adjustment once we hire a full-time faculty member and as we observe an enrollment increase (anticipated from the new degree emphasis area).

5. Learning Resource Center Resources
   Is the level of resources provided by the Academic Support Center and Library (Learning Resource Center) adequate. ☐ Yes ☒ No
   If not, explain.
   There is a need for tutors to help Physics students.

6. Student Services Resources
   Complete the following grid concerning Student Services Areas.

<table>
<thead>
<tr>
<th>Student Services Area</th>
<th>Does the area satisfy the needs of your discipline?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>There is a connection to this discipline/program and YES the student services area does satisfy the needs of the discipline.</td>
</tr>
<tr>
<td>Admissions and Records</td>
<td>☒</td>
</tr>
<tr>
<td>Counseling</td>
<td>☐</td>
</tr>
<tr>
<td>Financial Aid</td>
<td>☒</td>
</tr>
<tr>
<td>Career Services</td>
<td>☒</td>
</tr>
<tr>
<td>Disabled Student Programs and Services (DSPS)</td>
<td>☒</td>
</tr>
</tbody>
</table>
If a lack of support was indicated in the table above, describe your program/discipline need.

We need better advising for Science and Engineering majors. We have developed the Science Transfer Preparation materials and the Science emphasis area. However, this has been primarily a department level effort and there is inconsistent awareness of the details of these advising/degree tools at the Student Services/Counseling level.

7. Faculty Resource Needs

Complete the Faculty Employment Grids below (data link is provided at http://inside.redwoods.edu/Assessment/ProgRev/FacultyLoadDistribution.asp). Please list full- and part-time faculty numbers in separate rows:

---

**Faculty Load Distribution in the Program**

<table>
<thead>
<tr>
<th>Discipline Name (e.g., Math, English, Accounting)</th>
<th>Total Teaching Load for fall 2007 term</th>
<th>% of Total Teaching Load by Full-Time Faculty</th>
<th>% of Total Teaching Load Taught by Part-Time Faculty</th>
<th>% Change from fall 2006</th>
<th>% Change from fall 2005</th>
<th>Explanations and Additional Information (e.g., retirement, reassignment, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR</td>
<td>12</td>
<td>100%</td>
<td>0%</td>
<td>-7.68 TLU</td>
<td>-8.1 TLU</td>
<td>Corresponds to loss of FTF</td>
</tr>
<tr>
<td>PHYSICS</td>
<td>4.5</td>
<td>0%</td>
<td>100%</td>
<td>-15.5 TLU</td>
<td>-15.5 TLU</td>
<td>Corresponds to loss of FTF</td>
</tr>
</tbody>
</table>

---

**Faculty Load Distribution in the Program**

<table>
<thead>
<tr>
<th>Discipline Name (e.g., Math, English, Accounting)</th>
<th>Total Teaching Load for spring 2008 term</th>
<th>% of Total Teaching Load by Full-Time Faculty</th>
<th>% of Total Teaching Load Taught by Part-Time Faculty</th>
<th>% Change from spring 2007</th>
<th>% Change from spring 2006</th>
<th>Explanations and Additional Information (e.g., retirement, reassignment, etc.)</th>
</tr>
</thead>
</table>

---
a. Describe the status of any approved, but unfilled full-time positions.

A full-time faculty position has been approved for Physics. The position is currently being advertised and a screening committee has been formed. We anticipate appointing a full-time Assistant Professor of Physics by January 20, 2009.

b. If you are requesting a Full-Time Faculty position develop an attachment to this report that addresses the following criteria (as listed in AR 305.03)
   • The ratio of full-time to associate faculty
   • Current availability of associate faculty
   • Relation to program review recommendations
   • Effect on diversity of the faculty
   • Effect on academic offerings and ability to serve students and the community
   • Effect on the vitality and future direction of a program and/or the college
   • Effect on student learning

c. If your Associate Faculty needs are not being met, describe your efforts to recruit Associate faculty and/or describe barriers or limitations that prevent retaining or recruiting Associate Faculty

Our efforts to employ Associate Faculty in Physics and Engineering have resulted in three Associate Faculty being employed during the Fall 2008 semester (two in Physics, one in Engineering). We are currently exploring options to employ a second Associate Faculty member in Engineering. We hope to continue to employ associate faculty in Physics after the full-time faculty is appointed. Our intent is to teach Physics 10 (or a new Technical Physics course - see goal #3) at one or more off-site locations, possibly expand into on-line teaching, and/or add sections of this course at the main campus. This would allow for both growth and additional stability in the program.

8. Staff Resources

Complete the Classified Staff Employment Grid below (please list full- and part-time staff). This does not include faculty, managers, or administration positions. If a staff position is shared with other areas/disciplines, estimate the fraction of their workload dedicated to your area.
<table>
<thead>
<tr>
<th>English)</th>
<th>(give number)</th>
<th></th>
<th>retirement, reassignment, health, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR</td>
<td>2 shared office coordinators - MSE and BTECH Divisions</td>
<td>.05</td>
<td>0</td>
</tr>
<tr>
<td>PHYSICS</td>
<td>1 shared MSE office Coordinator Less than 10% of the physical science technician position (primarily for chemistry)</td>
<td>.05</td>
<td>0</td>
</tr>
</tbody>
</table>

Do you need more full-time or part-time classified staff?  ☐ yes  ☑ no
If yes, explain why.

9. Facilities, and Classroom Technology
Are teaching facilities adequate for achieving the educational outcomes of this discipline/program?  ☑ Yes  ☐ No
If No was checked, complete and attach Facility Form (facilities.form) for each instructional space that does not meet the needs of this discipline/program:

10. Equipment
Is the available equipment (other than classroom specific equipment described in the facilities section) adequate to achieve the educational outcomes of your program/discipline?  ☐ Yes  ☑ No
If No was checked, complete the following grid for each piece of equipment being requested for this area/discipline:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Approximate Price</th>
<th>Number of students using equipment each semester</th>
<th>Describe how the equipment allows achievement of program/discipline educational outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office Computer for PS111D</td>
<td>$1070.00</td>
<td>The physics instructor will use this to facilitate their teaching of all courses.</td>
<td>The current office computer is a Pentium 3 model without a Flash Drive, driver. It is running Windows 98. The new full-time instructor will require current equipment to develop course materials and to communicate with the college community.</td>
</tr>
</tbody>
</table>
The status of Physics and Engineering Instructional Equipment needs to be evaluated. The current equipment is not adequate to achieve outcomes. However, an analysis needs to be undertaken by the new full-time physics faculty member before equipment can be requested.

**Equipment Repair**
Is the equipment used for your discipline/program in need of repair, which is outside your current budget allotment? *This does not include classroom specific equipment repair described in the facilities section.*  
☐ Yes  ☒ No

If Yes was checked, provide the following information to justify a budget allotment request:

<table>
<thead>
<tr>
<th>Equipment requiring repair</th>
<th>Repair Cost / Annual maintenance cost</th>
<th>Number of students using equipment each semester</th>
<th>Describe how the equipment allows achievement of program/discipline educational outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>This will also depend on an assessment by the new Physics Professor</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**11. Learning Outcomes Assessment Update.**

List all expected program-level outcomes, whether you have completed the assessment loop (use of results) or not. For each outcome, identify the means of assessment and the criteria for success. Summarize the data that have been collected in the ‘Assessment Results’ column. If no data have been collected and analyzed for a particular outcome, use the ‘Assessment Results’ column to clarify when these data will be collected and analyzed. In the fourth column, indicate how the assessment results are being used to improve the program.

<table>
<thead>
<tr>
<th>Program Outcomes (Not all disciplines have program-level outcomes)</th>
<th>Means of Assessment and Performance Criteria</th>
<th>Assessment Results Summary</th>
<th>Use of Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
List all course-level student learning outcomes for which some assessment activity (assessment, analysis, or use of results) has taken place since the most recent program review, and complete the table below as appropriate.

<table>
<thead>
<tr>
<th>Student Learning Outcomes (course-level)</th>
<th>Means of Assessment and Performance Criteria</th>
<th>Assessment Results Summary</th>
<th>Use of Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engr 23 SLO: Create accurate isometric, oblique, and perspective pictorial representations of designs using CAD and sketching.</td>
<td>Numerous projects of increasing difficulty are used to measure achievement of the SLO. Final assessment is done through portfolio and exam.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discuss the extent to which part-time faculty (if applicable) have been involved in the dialogue about assessing student learning outcomes:

Part-time faculty have not been involved because we are still in the process of updating Physics course outlines with SLOs. We intend to complete Physics outlines this semester. At that point we will begin to implement a plan of assessing outcomes.

12. Curriculum Update

Identify curricular revisions and innovations undertaken

a. in the last year.

b. planned for the coming year.

We plan to update the entire Physics Curriculum this semster. We have reserved the Eureka Downtown Site for Saturday Oct 4 to hold a outline writing session. We completed a first draft of the Physics 10 outline last spring.

Complete the grid below. The course outline status report can be located at: [http://www.redwoods.edu/District/IR/Reports/Curriculum/Curriculum_Course_Outlines.htm](http://www.redwoods.edu/District/IR/Reports/Curriculum/Curriculum_Course_Outlines.htm)
If the proposed course outlines updates from last year’s annual update (or comprehensive review) were not completed, please explain why.

We had intended to form a group of faculty in related disciplines (there is not full-time faculty in physics or engineering) to update the outlines in the spring of 2008. Unfortunately, this effort was not coordinated in time to result in completion. We did produce a first draft of the Physics 10 outline.

13. Communication

Are the current lines of administrative, faculty, and staff communication adequate to meet the needs of this discipline/program? Describe representative example of effective or ineffective communication.

The administrative levels of Science Area Coordinator and Division Chair have worked well within the discipline. This structure allowed the research and the follow-through required to find part-time physics instructors and to organize the curriculum outline sessions this fall. Communication with administrative levels outside the Division have also worked well. We were able to communicate the need for a full-time physics position and to obtain the support necessary to implement the Science Transfer Prep advising program and to help craft the Science Emphasis area within the Liberal Arts Degree. Communication regarding the new Academic Building have been limited and the current status is not known.


List any action plans submitted since your last annual update. Describe the status of the plans. If they were approved, describe how they have improved your area.

None were submitted

15. Goals and Plans

If you have recently undergone a comprehensive review, attach your Quality Improvement Plan (QIP) if applicable.

☐ QIP Attached
If you do not have a QIP, refer to the goals and plans from your previous annual update. For each goal and/or plan, comment on the current status. List any new goals and plans your area has for the coming year, and indicate how they are aligned with the goals/objectives in CR’s Strategic Plan. (CR’s strategic plan is located on the web at http://inside.redwoods.edu/StrategicPlanning/strategicplan.asp).

07/08 Goals and Plans for Physics:
1. Recruit a pool of Associate instructors to teach the Physics 2 and Physics 4 series in spring ‘08, as well as Physics 10. ACHIEVED
2. Continue to make the case for hiring a full-time physics instructor once the District is in a financial position to fill vacant positions. ACHIEVED
3. Update course outlines for all physics courses. ONGOING - SEE Question #12.
4. Develop an SLO assessment plan based on the SLOs in the updated course outlines. NOT DONE - WAITING ON CURRICULUM UPDATES.
5. Assess the status of the physics lab equipment and develop a plan for updating equipment (within the financial limits that currently exist). NOT DONE - WAITING ON APPOINTMENT OF FULL TIME POSITION
6. Continue asking that the science faculty be involved in facilities planning. ONGOING

07/08 Goals and Plans for Engineering:
Hold discussions between MSE and BTECH parties to determine if ENGR 1, 18, and 35 should be offered. If affirmative, decide on a scheduling routine over a two-year period. ACHIEVED - A YEAR LONG SCHEDULE WAS MADE AND A NEW EXPERIMENTAL COURSE (ENGR 88) WAS DEVELOPED.
b. Hold discussions between MSE and BTECH parties to determine if it is possible to update the all course outlines to include course learning outcomes. IN PROGRESS
   c. Update ENGR23 curriculum - ACHIEVED, 2-24-08

Based on the above, our Goals for the 08/09 year are:
Physics:
1. Update course outlines for all physics courses (Fall 2008).
2. Develop an SLO assessment plan based on the SLOs in the updated course outlines.
3. Investigate the need for a "Technical Physics" course that would satisfy the core requirements of students pursuing technical degrees.
4. Assess the status of the physics lab equipment and develop a plan for updating equipment (within the financial limits that currently exist, or applying for funding). To be done by newly appointed physics faculty (Spring 2008).
5. Assess the adequacy of the Physics Supply Budget.
6. Continue asking that the science faculty be involved in facilities planning (new academic building).
Engineering:
1. Continue to develop a pool of Engineering Associate Faculty.
2. Continue to work on a systematic offering of courses that allow a student to complete a pre-Engineering curriculum at CR. This includes offering an introduction course to help grow the program.
3. Update Engr 35 (Statics) and transfer current Engr 88 to a permanent course.