

## 1. Program Description

*Include aspects of your program like degrees offered, student enrollments and graduation rates, number of faculty and other attributes. Include your program's strategic vision for student learning and how it aligns with WSU's Mission and Core Themes.*

The Department in Rocket Science is a key unit in the College and part of the university's overall Strategic Plan. Our exciting new curriculum, the most significant revision in the history of the Department, focuses on educating leaders for a global society and includes interdisciplinary courses in the biological and physical sciences, the arts and humanities, and social science as well as the capstone thesis requirement. Our new multi-cultural proficiency requirement ensures that our graduates are globally competitive for graduate/professional schools as well as career opportunities. Department in Rocket Science students continue to fully participate in opportunities for study abroad which provide essential cross-cultural awareness. WSU's graduates with a degree in Rocket Science are able to compete successfully for prestigious scholarships and admission to top graduate programs.

Nearly 90% of the students who earned a degree from the Department in Rocket Science in 2007-2008 graduated *summa, magna, or cum laude*, including a 12% increase in the two highest levels of distinction from the previous year. More than 30% gain first-hand global knowledge by studying abroad at least once during their undergraduate years at WSU – most in non-English speaking countries. That is more than 15 times the national average. Thirty-one percent of spring 2008 graduates passed WSU's junior Writing Portfolio "With Distinction," an accomplishment of just 10% of students campus-wide.

The retention of Rocket Science students from the 1<sup>st</sup> to the 2<sup>nd</sup> years exceeded 90% in the fall of 2007. Cumulative GPAs of students admitted into the Rocket Science major have approximated 3.6 or higher for the past six years. The six-year graduation rate is 63.6%. **[Exhibits/Profile of Department in Rocket Science First Year Cohorts.pdf]**

Although the Department in Rocket Science is not mandated by state statute, a survey of our peer Land Grant universities as well as the Globally Competitive states demonstrates that all of these institutions include a Rocket Science Department or College. Rocket Science certificates or minors, are not the equivalent of the four-year curriculum offered by the Department at WSU, which has been a national leader in this regard since its founding just after the launch of Sputnik.

Admission to the major in Rocket Science is by application. This process involves providing information above and beyond application requirements of most majors. Each application is read and evaluated by a team of Department in Rocket Science faculty who analyze the strength of the lower division transcript as well as letters of recommendation, a significant writing sample, and evidence of leadership and involvement in extracurricular activities.

The Rocket Science curriculum focuses on the Six Learning Goals of the Baccalaureate. Based on the extensive assessment and revision work we have undertaken over the last 3 years, our curriculum is a coherent, four-year degree program. Ongoing faculty development efforts take place to encourage creative pedagogical approaches to teaching, learning and assessment, specifically focused on the learning goals adopted by the university and the Department in Rocket Science. **[Exhibits/Rocket Science Strategic Plan.pdf]**

## **1. Assessment Team and System**

*Please include your team (including participating faculty, TAs, and external stakeholders, and your communication strategy for engaging all program faculty). Specifically address the systematic implementation of assessment-related activities.*

In the current academic year (2007-08), the 21 Rocket Science faculty breakdown by is:

15% full professors  
21% associate professors  
22% assistant professors  
28% instructors  
9% clinical assistant and associate professors

Therefore, nearly 60% of the faculty teaching Rocket Science courses are in tenure-track positions. The three Departmental administrators have minimal teaching responsibilities.

**[Exhibits/Rocket Science Faculty AY 2007-08]**

The assessment team is lead by the Department's Assistant Director and has ten (10) members drawn from all the faculty ranks, Teaching Assistants, key members of the Department's alumni advisory board and industry representatives from the state of Washington.

The system has evolved over the last three years in several phases described below. At the beginning of the process, with the creation of the team and system, assessment attention had been focused on recruitment, retention and graduation rates. Those key outcomes were and are still are being achieved at high levels, but the system has become more comprehensive, involving all the faculty in activities that align the curriculum in ways aimed at improve student learning outcomes.

The Assessment Team has a rotating membership among the tenure track faculty. Faculty have three year terms, with annual appointments for teaching assistants, alumni and industry representatives. The team meets monthly during the academic year, and twice annually reports findings to the whole faculty. One of these reporting periods is timed to coincide with WSU Homecoming events so that a number of alumni can be attracted to attend as part of the Department's activities. In the spring, industry representatives meet with the team when they are on campus for recruiting.

This year the Department has begun to experiment with a website for communication to the wider public about the Department's learning outcomes success. This involved a re-vamping of the previous website. While the site maintains its marketing focus, the inclusion of syllabi, selected assignments and examples of thesis, undergraduate research and student projects undertaken with industry partners reinforces the Department's claims of excellence. An important feature of the website is an interactive section that helps prospective families understand how the WSU's Goals of the Baccalaureate apply to learning in the Department.

### **Department Goals**

Work on the Department's learning goals was triggered by an unusually high turn over in core faculty caused by retirements. As a result of a series of meetings among the whole faculty the University's Goals of the Baccalaureate were identified as the Department's Learning Goals. In large part this work involved developing a consensus about a mapping between our disciplinary language about what it means to be a well educated Rocket Scientist and the University's goals.

## **2. Program Outcomes and Measures**

*Identify student learning outcomes at the program level and describe the different kinds of evidence you are collecting and assessing, and how you do it. Provide rationale and details for your choice of assessment measurements and methods; and their connection to questions program faculty and administration care about.*

The Department's 3-year effort on defining program goals and outcomes was triggered by an unusually high turn over in core faculty caused by retirements. As a result of a series of meetings among the whole faculty the University's Goals of the Baccalaureate were identified as Goals.

As a means for the new faculty to come to understand one-another and the Department's intentions and needs, a simple curriculum mapping activity was undertaken during the 2005-06 academic year. To accomplish the curriculum mapping, we did a survey of each course that to gather data about how each of the Department's goal was being addressed in each course in the curriculum [**Exhibits/Rocket Science Curriculum Survey**]

Data from the first Curriculum Survey surfaced the wide divergence among the faculty about the Goals and how they needed to be articulated across the program to create a coherent learning experience.

During the summer of 2006 the Department leadership reviewed data regarding retention, with particular attention to our lower than WSU ability to retain students of color. A review of the literature found the interesting suggestion that different student populations respond to different pedagogical strategies, and that for the minority population active learning strategies, such as undergraduate research were particularly successful at enhancing learning outcomes.

The Department had been discussing enhancing its Undergraduate Research activities and this data provided the incentive to move forward with planning a curricular revision. Approximately 7% of majors we able to find a research activity during the 2006-07 pilot.

In 2006-07 the Department repeated the curricular mapping survey, and additionally asked for course syllabi and representative student work as part of the survey responses.

A review of the syllabi by the Department's Assessment Team found that 81% of them had some form of objectives or learning goals, but that these goals were not always expressed in ways that paralleled the Department's and University's goals.

During the summer of 2007, one of the assignment prompts collected in the curricular survey was assessed for its learning goals, using the Department's rubric. This also confirmed the divergence of perspective among the faculty about the semantics of the Department goals. [**Exhibits/Rocket Science 2007 Assignment Assessment**]

Also during the summer of 2007 the Assessment Team leadership attended a conference and returned with the observation that the efforts to date were not assessing the students' perceptions of the curriculum. In particular, did students appreciate the course's efforts to develop their skill with the Department goals? We realized that, despite putting goals in the syllabus and refining assignments to prompt work related to the goals, the students may not be making the connections.

The team realized that the Department's course evaluation had a question that might get at the

issue of student perceptions of the extent to which courses were addressing the Department's goals. The previous two years (4 semesters) of course evaluations were analyzed to explore the question of student perceptions. The conclusion of that work was that the data transformation, combined with the uncertainty of the original data (syllabi and assignment changes, faculty not being normed on their expectation) did not produce any conclusive results. However, the recommendation was to consider revising the course evaluation to make the question more specifically aligned to the Department's goals and repeat the work as the Department's changes became more stabilized. [**Exhibits/Rocket Science 2007 Course Evaluation Study**]

#### The 2008-09 Benchmark Year

As a result of the work above, the Department has achieved maturity in its assessment methods and can demonstrate a coherence in faculty perspectives and the curriculum. Three independent strategies are undertaken each year:

1. Curriculum mapping based on survey of all of the course instructors
2. Assignment review by a normed teams of reviewers
3. Student assessment of perceptions of the course's accomplishment of Department goals- collected as part of the course evaluation

### **3. Action Plan or Strategy for Responding to Assessment Results**

*Describe how your program analyzes the results of various measures (such as balance and connection between direct and indirect measures) and how that analysis is also informed by current best practices / literature in SoTL and by the context of your program. Provide recommendations based on the evidence you analyzed, and how they will be prioritized. Provide a plan that identifies strategies, timelines, essential resources, time, and personnel—including roles, responsibilities—and other support needed for effective follow through.*

The data described above are used by the Department's Assessment Team in several ways:

1. Assignment review is used to corroborate the curriculum mapping data.
2. Student perceptions are used to corroborate the curriculum mapping data
3. Curriculum maps are reviewed for program alignment and coherence

The Department communicates the results of its assessment to key stakeholders (external members of the assessment team) and uses the communication events to gather additional perspective. This sharing is providing opportunities for the wider community to discuss and clarify the values of the Rocket Science profession in terms of the University's goals. A multi-semester project has just been undertaken to assess in detail and possibly re-write some parts of the Department's rubric used to assess its goals.

The Department facilitates conversations among faculty to enhance the articulation of courses, using evidence gained from the assessment work. This is leading to changes in particular courses and sets of courses aimed at increasing the alignment among the course expectations.

Individual faculty are experimenting with details in their courses, eg, specific assignments, or the syllabus to make the course activities and communications clearer to students. One faculty member has undertaken SoTL projects exploring student ability to provide peer critique normed with the faculty. Another project in a senior design course is using industry professionals to provide mid-term formative assessment to students using the Department's rubric.

#### **4. Administrative Leadership & Support**

*Include the ways leadership participates in assessment; communicates with stakeholders, supports instruction using the Scholarship of Teaching and Learning, supports evidence-based innovation in teaching and faculty development, implements program policies, and provides adequate resources to support these activities.*

The Department of Rocket Science leadership has taken an active role in these assessment activities, as evidenced by the sustained and department-wide efforts. Specific support has come in these areas:

Support for travel to conferences to learn about assessment strategies and release time for individual faculty to implement course re-design, aimed at improving course-level learning outcomes.

Release time has also been used by the Department to facilitate broad interaction with both professional communities and industry partners related to Rocket Science. These interactions have been fostered with travel funds, and special hosted on-campus events for alumni and recruiters. This effort has provided grounding for the curriculum analysis and revision work

Faculty workshops and meetings have been held regularly devoted to understanding the wealth and nuance of the assessment data and finding ways to understand the data to create greater curricular coherence.