Table 2-4. Goal 1: Enhance the Quality of WPI's Academic Programs

<table>
<thead>
<tr>
<th>Outcome Objectives</th>
<th>Performance Measures</th>
<th>Responsible Parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Fully develop the WPI Plan for all students around an &quot;honors college&quot; metaphor at all levels.</td>
<td>Faculty size; number National Merit Scholars; ranking of undergraduate program; impact of first year; curriculum improvements; graduation rate; practice graduate program statistics; IQP quality; learning outcomes; number large (&gt;35) classes.</td>
<td>Provost’s Office; Admissions Office; Faculty Governance.</td>
</tr>
<tr>
<td>1.2 Develop aligned incentives for faculty and staff to promote action plans.</td>
<td>Faculty diversity; faculty and staff salaries compared to benchmarks; employee satisfaction; effectiveness of reward system.</td>
<td>Provost; Director of Human Resources; Assistant VP Student Affairs; Multicultural Awareness Staff Member; Faculty Governance.</td>
</tr>
<tr>
<td>1.3 Provide increasing opportunities for student involvement in research.</td>
<td>Number students in summer research; impact of graduate fellowships.</td>
<td>Associate Provost.</td>
</tr>
<tr>
<td>1.4 Maintain contemporary teaching laboratories.</td>
<td>Adequacy of funding for equipment and instrumentation maintenance and renewal; average age statistics.</td>
<td>Property Administrator; Provost’s Office; Dean, Division of Continuing Studies.</td>
</tr>
</tbody>
</table>

Objective 1.1 Fully develop the WPI Plan for all students around an "honors
college metaphor at all levels.

Performance:

- **Faculty size:** A chaired position (White Chair) was added to the CEE Department in 1999. The overall number of CEE tenure track positions, however, has remained constant due to the loss of one line (DeFalco retirement). A second faculty member has reduced his CEE Department involvement (Fitzgerald), which effectively further reduces the number of tenure track positions available for teaching and scholarship activities. Hopefully in the near future budget issues will allow us to recover from these losses.

- **Impact of first year:** CEE offers an introductory civil engineering course (CE1030 - Introduction to Civil Engineering and Computers), which has been very popular with our students and is proving to be most useful for introducing new topics—such as ethic, professional responsibility, writing and asphalt technology. Professors Salazar, Albano and Mathisen have been heavily involved with freshman advising programs (first reach).

- **Curriculum improvements:** A reorganization of the undergraduate curriculum chart was accomplished during the spring of 2000 to aid students in planning their academic program. This chart clearly identifies a set of introductory courses that the faculty has designated to contain fundamental engineering science knowledge, and is directly related to materials covered in the Fundamentals of Engineering Examination.

- The freshman CEE course series (CE2000, 2001 and 2002 has been completely reorganized according to:
  - Integrate material across the three courses.
  - Reinforce key concepts, such as free-body diagrams, by repetition.
  - Introduce design experiences within each course, including a term-ending project.
  - Emphasize learning and applying concepts to new problems outside of the classroom and the textbook.
examples.
  o Improve student attitudes and satisfaction with the sophomore-level courses.
  o Increase exposure to the analysis and design of indeterminate structures without compromising the coverage of topics in other areas.

• The transportation engineering course sequence (CE3050, 3051) has been reorganized to focus on contemporary transportation issues, make better use of the text and the expertise of the faculty teaching the course. Two new courses (CE 3054 - Asphalt Technology, and CE305x - Impact Analysis) have also been added to the undergraduate transportation-engineering curriculum.

• Three civil engineering laboratory courses (CE3026, CE3054 and CE4060) have been substantially restructured to make use of the new state-of-the-art facilities available through the Keck Foundation equipment grant ($ 500,000) and the civil engineering department laboratory renovation project ($ 1,200,00).

• The ADLN program now offers a minimum of four environmental engineering courses per year, making it possible for a student to receive an MS completely through distance learning in less than three years. The complete CEE ADLN program is available online.

• IQP quality: CEE faculty members play major roles as advisors in several off-campus project centers, including Boston, Worcester, Costa Rica, London, and Venice.

• Learning outcomes: The civil engineering department developed a comprehensive outcomes assessment process that:
  o Monitors outcome achievements of individual students,
  o Analyzes the collective performance of undergraduate classes,
  o Involves the entire undergraduate teaching faculty in all stages of the process (development, data
collection, analysis and corrective action), and
  o Is designed to be a sustainable process.

- The biennial MQP review also provides valuable data on a broad range of our program outcomes. Past MQP reviews as well as descriptions of past reports may be found at: https://www.wpi.edu/Academics/Depts/CEE/mqp_index.html.

**Objective 1.2** Develop aligned incentives for faculty and staff to promote action plans.

**Performance:**
- **Faculty diversity:** The CEE Department currently has one female faculty member.

- **Faculty and staff salaries compared to benchmarks:** Significant increases over the past several years have been realized. These increases have been very effective in making it possible for the CEE Department to attract highly productive faculty members. Faculty start-up along with new laboratory facilities has also proved to be effective in attracting new highly productive faculty members.

- **Employee satisfaction:** Faculty satisfaction among the more active members is good. Faculty members with evidence of low performance ratings are certainly not happy with a metric system that is based on actual productivity rather than perceived productivity. Among the staff, there is a general feeling of confusion, as there appears to be little relation to the tightened assessment process and limited reward outcome.

- **Effectiveness of reward system:** The faculty assessment model, used by the CEE Department for the last four years is now well established and clearly understood by the department. The relationship between performance and reward, although not always graciously accepted, especially by faculty members with low performance records, is very clear.

**Objective 1.3** Provide increasing opportunities for student involvement in research.
Performance:  

- **Number of students in summer research:** Active research faculty members have routinely made efforts to obtain summer student support. Graduate student support has primarily been sought through external sources, while undergraduate student support has primarily been sought through internal sources. The success rate for internal requests has been about 50%. It would be very helpful if this percentage could be increased.

- **Impact of graduate fellowships:** Applications for institute-sponsored fellowships have not been high. There is and perceived disconnect between these awards and specific faculty focuses scholarship programs. In other words, faculty members do not see fellowship sponsorship as a clear benefit to scholarship programs. It is more of an individual student award system that will not necessarily benefit a scholarship program.

**Objective 1.4  Maintain contemporary teaching laboratories.**

Performance:  

- **Adequacy of funding for equipment and instrumentation maintenance and renewal:** All laboratories in the civil engineering department (environmental, impact analysis, materials/structure analysis, asphalt technology, and computers) are considered teaching laboratories. The recent upgrade of these facilities has made tremendous improvements for these teaching facilities. The present operating budget allocation for maintenance and renewal, however, is very low and will certainly be felt in the future as this new equipment ages. The present high laboratory support demands places a strain on other operating budget needs.

- **Average equipment age statistics:** Most of the laboratory equipment in Kaven Hall is under three years old - due to the Keck equipment grant, start-up funds for new faculty and other equipment grants received by individual faculty members. The laboratory facilities have been recently upgraded. The geotechnical engineering laboratory, however, is in an extreme state of decline.
### Table 2.5. Goal 2: Further WPI's Position as a National University

<table>
<thead>
<tr>
<th>Outcome Objectives</th>
<th>Performance Measures</th>
<th>Responsible Parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Improve the quality and diversity of the student body.</td>
<td>Admissions parameters; undergraduate geographic composition; distribution of majors; number applications from independent high schools; percentage minorities and women; percentage of students receiving financial aid.</td>
<td>Admissions Office; Director, Financial Aid; Assistant VP Student Affairs.</td>
</tr>
<tr>
<td>2.2 Support the faculty’s efforts in research and scholarship.</td>
<td>Impact of thrust areas on faculty and graduate student recruiting; annual research expenditures; number proposals and awards; number publications; faculty and graduate student support levels; AACSB accreditation status; average course load for faculty; minimum and mean GRE scores; annual number Ph.D. graduates; number full time graduate students; annual research expenditures per faculty member; amount of Indirect Costs recovered.</td>
<td>Associate Provost; Thrust Area Directors; Academic Department Heads; Director, Plant Services.</td>
</tr>
<tr>
<td>2.3 Develop creative partnerships with industry, organizations, and other universities.</td>
<td>Number of partnerships; value added; statistics associated with Silicon Valley center and other new ventures.</td>
<td>Provost Office; Dean, Division of Continuing Studies; VP University Relations.</td>
</tr>
<tr>
<td>2.4 Continue to develop a comprehensive base of programs through aligned resource allocations.</td>
<td>Student participation in humanities and arts programs; status of academic programs; alumni satisfaction with preparation; percentage and average gift value of alumni participation in Annual Fund; endowment per</td>
<td>Provost's Office; Faculty Governance; VP University Relations.</td>
</tr>
</tbody>
</table>
Objective 2.1  Improve the quality and diversity of the student body.

Performance:

- Undergraduate Student Recruitment: Professors Albano, Plummer and Mathisen have been actively involved with undergraduate recruitment and open house activities. Details on the undergraduate recruitment program may be found at:

  https://www.wpi.edu/Academics/Depts/CEE/Undergrad/open_house.html

Objective 2.2  Support the faculty's efforts in research and scholarship.

Performance:

- 2000 - 2001 Scholarship Activities
  1. Eight Active Research Projects: ($390,520)
  2. Refereed Publications: (28)
  3. Non-refereed Publications (27)
  4. Twenty Grant Applications
- 2001 - 2002 Scholarship Activities
  1. Fourteen Active Research Projects: ($362,400)
  2. Refereed Publications: (21)
  3. Non-refereed Publications (5)
4. Twenty-eight Grant Applications

- Faculty and graduate student support levels: Substantially more RA support is needed; this must come from increased grant income generated by individual faculty members.

- Minimum and mean GRE scores: Few CEE applicants (particularly few US citizens) submit GRE scores.

- Annual number Ph.D. graduates: Historically, CEE has graduated very few Ph.D students. Hopefully, this number will improve with increased scholarship activities noted in the last four years.

<table>
<thead>
<tr>
<th>Category</th>
<th>92-93</th>
<th>93-94</th>
<th>94-95</th>
<th>95-96</th>
<th>96-97</th>
<th>97-98</th>
<th>98-99</th>
<th>99-00</th>
<th>00-01</th>
<th>01-02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Time</td>
<td>29</td>
<td>29</td>
<td>33</td>
<td>36</td>
<td>33</td>
<td>28</td>
<td>28</td>
<td>27</td>
<td>23</td>
<td>19</td>
</tr>
<tr>
<td>Part Time</td>
<td>26</td>
<td>26</td>
<td>32</td>
<td>34</td>
<td>36</td>
<td>29</td>
<td>11</td>
<td>32</td>
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<td>32</td>
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<tr>
<td>Total</td>
<td>55</td>
<td>57</td>
<td>65</td>
<td>70</td>
<td>69</td>
<td>57</td>
<td>39</td>
<td>59</td>
<td>43</td>
<td>51</td>
</tr>
</tbody>
</table>

**Objective 2.3** Develop creative partnerships with industry, organizations, and other universities.

**Performance:**

- **Number of partnerships:** Considerable outreach efforts have been suggested to the CEE Faculty through CEE Department Advisory Board Meetings. In the pavement research area, WPI has created partnerships with a number of industries, State Departments of Transportation (DOT) and universities for initiating and conducting research and for implementation of results of research. In partnership with Maine DOT, University of Massachusetts at Dartmouth (UMASS-D) and Massachusetts Highway Department (MHD), WPI had sent in problem statements to the New England Transportation Consortium (NETC), three of which have been selected in the last four years. WPI, in partnership with UMASS-D, has been successful in procuring all of these three projects, in addition
to a fourth one, which was initiated by New Hampshire DOT. WPI has been working with UMASS-D in the initiation of a pooled fund project, funded jointly by MHD and Rhode Island Department of Transportation (RI DOT). The first of these projects has been approved, and is in the process of being awarded. WPI has been partnering with Maine DOT since 2000 in procuring research funds from the Federal Highway Administration (FHWA) sponsored Recycled Materials Resource Center (RMRC) at University of New Hampshire - Maine DOT has been cost sharing a considerable amounts of these funds. One of the bigger projects involved work with the National Center for Asphalt Technology at Auburn University and Albany (NY) based Gorman Brothers, Inc. WPI has been actively engaged in partnership with the private industry in conducting research and implementing research results. Notable examples are collaborative work with Massachusetts (MA) based Aggregate Industries (formerly Bardon Trimount) in conducting research on use of manufacture waste shingles in hot mix asphalt, procurement of accelerated pavement testing equipment with Palmer Paving Cooperation (MA), and research work on testing equipment with IntroTek. WPI also worked with Edwards and Kelcey (MA) and Bowker Consulting (MA) in submitting a proposal on development of better airfield pavement mix to Massachusetts Port Authority (MassPort). Recently, WPI has established a partnership with GeoTesting Express (MA) and Tufts University (MA) for conducting research on the use of recycled plastics in hot mix asphalt. With in-kind contribution of materials from Connecticut and New Hampshire DOTs, and equipment from North Carolina based InstroTek, Inc, WPI is currently conducting research work on development of a test procedure for evaluation of stripping of aggregates.

Objective 2.4  Continue to develop a comprehensive base of programs through aligned resource allocations.

Performance:

- CEE Alumni Committee: An on-line alumni committee has been formed to receive feedback and to increase alumni awareness of the CEE Department operations. A complete description of this committee and its mission may be found
**Objective 2.5  Expand opportunities for synchronous and asynchronous networked learning.**

**Performance:**  
- Considerable efforts have been expended to increase the CEE ADLN program Enrollments and courses offered are summarized in the below table. The standard method of instruction has been video taped with web sites used to supplement lecture materials. During the summer of 2002, activities are planned to develop virtual laboratory tours and experiments.

<table>
<thead>
<tr>
<th></th>
<th>1999-00</th>
<th>2000-01</th>
<th>2001-02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>Fall 17</td>
<td>Spring 36</td>
<td>Fall 27</td>
</tr>
<tr>
<td>Courses</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

**Objective 2.6  Conduct a comprehensive image-building and marketing effort.**

**Performance:**  
- *Department Newsletter:* is distributed to all CEE Alumni and is also available on the web at:
  
  [http://cee.wpi.edu/newsletter_01/](http://cee.wpi.edu/newsletter_01/)

- Department Annual report: is delivered to all advisory board members and is also available on the web at:
  
  [http://cee.wpi.edu/00_01/](http://cee.wpi.edu/00_01/)

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Table 2-6. Goal 3: Establish WPI as a Leader in Global Technological Education

<table>
<thead>
<tr>
<th>Outcome Objectives</th>
<th>Performance Measures</th>
<th>Responsible Parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Expand participation by students and faculty in the Global</td>
<td>Dollar value of scholarship fund; faculty involvement; number projects conducted at global sites</td>
<td>VP University Relations; Provost's Office; Faculty</td>
</tr>
</tbody>
</table>
Objective 3.1 Expand participation by students and faculty in the Global Perspective Program.

Performance: • Faculty involvement: CEE faculty members are involved in the global program. Professors Salazar and Pietroforte have participated in the Costa Rica program. Professors Ray and Plummer will soon participate in the London program.

Objective 3.2 Make the transition from multinational sites to a global system.

Performance: None.

Table 2-7. Goal 4: Improve WPI’s Campus Culture and Community Presence

<table>
<thead>
<tr>
<th>Outcome Objectives</th>
<th>Performance Measures</th>
<th>Responsible Parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Construct and renovate facilities to accommodate social and academic activities and solve the parking problem.</td>
<td>Funds available; adherence to construction timetable.</td>
<td>VP University Relations; VP Student Affairs; Assistant VP Student Affairs; VP Administration; Director, Plant Services.</td>
</tr>
<tr>
<td>4.2 Improve ethnic and gender diversity in our community.</td>
<td>Quality of life on campus; role and value of support groups.</td>
<td>VP Student Affairs; Assistant VP Student Affairs; Multicultural Awareness Staff Member.</td>
</tr>
<tr>
<td>4.3 Provide a safe environment for our community that fosters</td>
<td>Safety statistics; number violations of alcohol and drug policies; results of</td>
<td>Director Public Safety; Campus Safety Officer; Assistant VP Student Affairs.</td>
</tr>
</tbody>
</table>
**Objective 4.1** Construct and renovate facilities to accommodate social and academic activities and solve the parking problem.

**Performance:** None. However, the department head does park his motorcycle on the sidewalk and, therefore, reduces the parking problem.

**Objective 4.2** Improve ethnic and gender diversity in our community.
Objective 4.3  Provide a safe environment for our community that fosters learning and development with appropriate alternatives to alcohol and drug abuse.

Objective 4.4  Expand efforts to meet the needs of adult learners.

Objective 4.5  Enhance the Career Development Center.

Objective 4.6  Maintain facilities and surrounding peripheral properties according to master plan.

Objective 4.7  Enhance support for K-12 system and the local community.

Table 2-8. Goal 5: Expand WPI's Educational Resources

<table>
<thead>
<tr>
<th>Outcome Objectives</th>
<th>Performance Measures</th>
<th>Responsible Parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 Improve library resources, services, and facilities</td>
<td>Relocation of Mass Academy; library budget constraints; number projects involving digital library; off-campus usage statistics.</td>
<td>Associate Provost; Director, Gordon Library; VP University Relations; Director, Plant Services; Faculty Governance; VP Information Technology.</td>
</tr>
<tr>
<td>5.2 Establish state-of-the-art computing</td>
<td>Network capacity; internet usage statistics;</td>
<td>VP Information Technology; VP University Relations;</td>
</tr>
</tbody>
</table>
resources and network performance modes of off-campus access; state of computer laboratories and central servers. Provost’s Office.

5.3 Create and maintain sufficient electronic classrooms to support on- and off-campus programs. Usage rate of IT in classes; state of electronic classrooms; notebook computer usage rates. Director Plant Services; Director, Instructional Media Center; Provost’s Office; Director, CEDTA.

**Objective 5.1** Improve library resources, services, and facilities.

**Performance:** None.

**Objective 5.2** Establish state-of-the-art computing resources and network performance.

**Performance:** None.

**Objective 5.3** Create and maintain sufficient electronic classrooms to support on- and off-campus programs.

**Performance:** None.