## Table 2.4. Goal 1: Enhance the Quality of WPI’s Academic Programs

<table>
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<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>
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</table>

**Objective 1.1**

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

**Performance:**

- Faculty size
  - The faculty size of CS was volatile recently.
For AY00 two faculty members were hired, both are no longer with us (one left the same year).

For AY01 we hired one faculty member.

For AY02 we did not succeed in hiring any faculty member, and three left that year (IFC, GXS, MVS).

For AY03 we succeeded in hiring three (probably four) new faculty members, and lost one (NIH) who has been on a leave for the last two years.

In addition, we hired a Professor of the Practice, raised one adjunct employment level from 3/4-time to full time, and two from 1/2 time to full time.

• Impact of first-year
  
  The department is preparing a sweeping reorganization of the first four software courses that will have a deep impact on the first-year experience of CS majors, and a more limited one on the programming experience of many of the students at WPI (albeit not necessarily in the first year).

  One faculty member served as Insight advisor.

• Curriculum improvements
  
  CS has made several changes in its distribution requirements, in part due to accreditation issues, and in part to adapt to new perceptions of the required core skills of CS.

  We continue to increase our offerings at the 4000-level.

• Learning outcomes
  
  A comprehensive mechanism has been set up by the CS accreditation committee to implement self-assessment, outcome evaluation, and a framework to induce feedback in this system.

• Number of large classes
  
  Due to the large increase in CS major, small progress has been made in this area, beyond introducing parallel section when classes got to a size beyond 140,
approximately. In a sense, this _increases_ the number of large classes (over 35)...

- However, all large classes are split into sections for the purpose of labs, recitations or assignments to TA office hours. In addition, we believe that the large amounts of time faculty devote to interaction with the students, in office hours, and more and more -- through structured email forums, alleviate the hardship and alienation of the large classes to a significant extent.

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

**Performance:**
- Faculty diversity
  - The department has had for some time an unusually high proportion of women on the faculty. No change in this.
  - Despite efforts over several years, last year was the first in which we succeeded in hiring an American-Chinese faculty member. and 2002 is the first year in which we advanced beyond this: we hired two faculty with African (Nigeria) and Asian (India) background.
- Close faculty salary gap
  - Definite steps were made; the gap has narrowed noticeably, though we still have some ways to go, especially in the associate and full professor levels.
- Compensate staff against CUPU benchmarks
  - Staff incentives are unfortunately outside the department authority.

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

**Performance:**
- Undergraduate summer research
  - A small number of CS students register for ISPs in the summer, usually advancing their knowledge more than the frontiers of research. In some cases, especially as continuation of MQPs, better results have been
recorded, including papers in good conferences and the seeds of theses.

- Graduate research fellowships
  - CS has averaged over the last few years 5--7 graduate fellowships from various sources (Industry, Goddard, Fulbright). While the numbers are going up, it is hard to discern or claim a trend.

**Objective 1.4**  
**Maintain contemporary teaching laboratories.**

**Performance:**

- Planning for equipment and instrumentation renewal
  - The teaching labs used in the first programming courses we teach have recently migrated out of Fuller labs, due to expansion pressures of all the tenants of the building. This was no improvement. The equipment is provided and maintained by the CCC and is mostly adequate for the task; some courses require so many sections that the current labs require scheduling beyond Wednesday,
  - For very few courses (two operating systems courses, and computer animation) specific labs have been installed with NSF funding (and a significant WPI cost-sharing). The instructors and students find these laboratories a great improvement over using general labs for the courses.
  - While a few additional courses could gain from dedicated teaching labs, and funding is in principle available via NSF instructional infrastructure programs, no further such labs are planned until the department gains additional space.

### 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</td>
<td>Admissions Office; Director, Financial Aid; Assistant VP Student Affairs.</td>
</tr>
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</table>
students receiving financial aid.

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<tr>
<th>2.2 Support the faculty's efforts in research and scholarship.</th>
<th>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.</th>
<th>Associate Provost; Thrust Area Directors; Academic Department Heads; Director, Plant Services.</th>
</tr>
</thead>
<tbody>
<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 student; payroll per student credit hour delivered.</td>
<td>Provost's Office; Faculty Governance; VP University Relations.</td>
</tr>
<tr>
<td>2.5 Expand opportunities for synchronous and asynchronous networked learning.</td>
<td>Number students involved in distance learning; number courses offered; number companies participating.</td>
<td>Dean, Division of Continuing Studies; Provost's Office; VP Information Technology.</td>
</tr>
<tr>
<td>2.6 Conduct a comprehensive image-building and marketing effort.</td>
<td>Uniformity of publications; name recognition; changes in number of applications; geographic base of applicant pool.</td>
<td>University Relations; Dean, Division of Continuing Studies.</td>
</tr>
</tbody>
</table>
**Objective 2.1**  
*Improve the quality and diversity of the student body.*

**Performance:**
- Attract high quality undergraduate students
  - The CS department has extremely limited influence there. We hope that some of our outreach activities help in attracting better quality candidates.
- Attract high quality graduate students
  - CS can afford now to be more selective in accepting foreign graduate students, and we expect to see the impact within a year. The number of students who choose the BS/MS track is increasing significantly, to the extent that this may require serious changes in the higher-division undergraduate courses. Few domestic students apply for doctoral studies. We have some plans to improve the situation, but they are unimplementable for lack of staff.
  - In the last two years the department sends each summer a poster advertising our graduate program to all major CS departments in the US, as well as selected universities overseas. We have greatly enhanced the information available on the department web site for prospective students.
- Summer programs for minorities and women
  - Every summer women faculty in CS obtain external funding, to sponsor 2--4 female undergraduate from around the nation in research projects, with the purpose of attracting them to graduate school.

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

**Performance:**
- Research thrust areas
  - Limited impact on the departmental research, but has helped in fostering cooperation between the CS and BBT departments.
- Increase annual research expenditures
  - The actual research expenditures in the department are hard to capture, and we do not consider implementing the mechanisms to tally them precisely. Grant awards
administered through the Research Administration office have been increasing regularly, in spite of the volatility of the faculty, at a rate of 10% a year, but are still very low at less than $600,000. Adding expenditures through WPI budgets and industry support may raise this figure to $1M. No funds were obtained through the development office.

- We expect the gradual increase to continue, but no breakthrough is likely before a significant increase in space and faculty (to reduce teaching load, as well as increase the number of proposals) is obtained.

- Increase number of full time graduate students
  - This is an objective we have done great strides in. Our enrollments are up. From 1998-99 to 2001-02 the full-time graduate population increased from close to 60 to more than 115. The increase in doctoral students went at the same rate, from 12 to nearly 30.

- Achieve a larger rate of PhD production
  - While the number of PhDs completing their studies has somewhat increased, it is still small, with about 2 per year. The pipeline is primed, and we expect this rate to increase, possibly double within 2--3 years.

- Peer reviewed Publications
  - In the AY2000--01 CS faculty (exclusive of joint appointments) published 5 books/chapters, 12 journal papers and 47 conference papers. These small numbers are due, at least to some extent to the very high level of teaching/student interaction load on the faculty.

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

**Performance:**

- Create comprehensive project centers
  - The director of the Silicon Valley project center, professor David Finkel, has been raising sponsors for more than ten projects a year for three years.
  - The Performance Evaluation and Distributed Systems Research Group of CS has conceived an interesting
concept for an academic-university consortium (the Center for research in E-Commerce Technology), but it has yet to establish itself.

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

**Performance:**

- Review academic programs
  
  o A constant activity, as the CS community continually revises its accepted wisdom on the fundamentals required by software engineers and computer scientists. At this time we are spearheading two activities:
    
    o At the undergraduate level: a complete revision of the first year programming courses. The intent is to increase the abstraction level of the programming activity from the initial involvement of the students in software creation.
    
    o At the graduate level we are slowly ratcheting up the level of difficulty of the courses. This is a slow process, which is made possible by the larger fraction of courses taught by full-time faculty members, and by the improving quality of the graduate student population.
    
    o In addition, we introduce new courses, both at the 4000 level and the graduate program, to allow the students wider choice as the discipline expands and new directions are opened.
  
- Nurture relationships with alumni
  
  o This is a major portion of the Public relation committee activity, which for the present is limited to an occasional newsletter and a survey of learning outcomes.

- Establish Program Advisory Board
  
  o We have established such a board, and it meets regularly.

**Objective 2.5** Expand opportunities for synchronous and asynchronous
networked learning.

Performance: The department has a modest involvement in off-campus learning. Each summer professor Karen Lemone leads two networked courses, capped at 10 students (they generate large waiting lists, and typically 12 students end up registering).

Objective 2.6 Conduct a comprehensive image-building and marketing effort.
Performance: None.

| Table 2.6 Goal 3: Establish WPI as a Leader in Global Technological Education |
|----------------------------------------|----------------|------------------|
| **Outcome Objectives** | **Performance Measures** | **Responsible Parties** |
| 3.1 Expand participation by students and faculty in the Global Perspective Program. | Dollar value of scholarship fund; faculty involvement; number projects conducted at global sites; number faculty and students involved with sister institutions. | VP University Relations; Provost's Office; Faculty Governance, Dean, IGSD. |
| 3.2 Make the transition from multinational sites to a global system. | Number teams involving remote sites; degree of integration of global sites. | Dean, IGSD. |

Objective 3.1 Expand participation by students and faculty in the Global Perspective Program.
Performance: None.

Objective 3.2 Make the transition from multinational sites to a global system.
Performance: None.

<p>| Table 2.7 Goal 4: Improve WPI's Campus Culture and Community Presence |
|----------------------------------------|----------------|------------------|
| <strong>Outcome Objectives</strong> | <strong>Performance Measures</strong> | <strong>Responsible Parties</strong> |
| 4.1 Construct and renovate facilities to accommodate social and academic activities and solve the | Funds available; adherence to construction timetable. | VP University Relations; VP Student Affairs; Assistant VP Student Affairs; VP Administration; Director, |</p>
<table>
<thead>
<tr>
<th>4.2 Improve ethnic and gender diversity in our community.</th>
<th>Quality of life on campus; role and value of support groups.</th>
<th>VP Student Affairs; Assistant VP Student Affairs; Multicultural Awareness Staff Member.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3 Provide a safe environment for our community that fosters learning and development with appropriate alternatives to alcohol and drug abuse.</td>
<td>Safety statistics; number violations of alcohol and drug policies; results of CORE Alcohol and Other Drug National Survey; results from Higher Education Research Institute National Survey.</td>
<td>Director Public Safety; Campus Safety Officer; Assistant VP Student Affairs; Healthy Alternatives Office.</td>
</tr>
<tr>
<td>4.4 Expand efforts to meet the needs of adult learners.</td>
<td>Net revenue; numbers of faculty and students involved.</td>
<td>Dean, Division of Continuing Studies; Director, ADLN; Academic Department Heads.</td>
</tr>
<tr>
<td>4.5 Enhance the Career Development Center.</td>
<td>Number students and employers involved; placement rates; number of alumni participating.</td>
<td>Director, Career Development Center; VP Student Affairs; VP University Relations.</td>
</tr>
<tr>
<td>4.6 Maintain facilities and surrounding peripheral properties according to master plan.</td>
<td>Progress against maintenance plan; deferred maintenance balance; state of grounds and facilities; neighborhood relations.</td>
<td>Director, Physical Plant.</td>
</tr>
<tr>
<td>4.7 Enhance support for K-12 system and the local community.</td>
<td>Number programs; number participants; summer program net revenue; number students in teacher certification program.</td>
<td>Provost's Office; Dean, Division of Continuing Studies; Assistant VP Student Affairs; Director Minority Affairs; VP University Relations.</td>
</tr>
</tbody>
</table>
Objective 4.1  Construct and renovate facilities to accommodate social and academic activities and solve the parking problem.

Performance:  None.

Objective 4.2  Improve ethnic and gender diversity in our community.

Performance:  None.

Objective 4.3  Provide a safe environment for our community that fosters learning and development with appropriate alternatives to alcohol and drug abuse.

Performance:  None.

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

Performance:  • Several modest activities are germane:
  o the above mentioned networked courses;
  o an NSF-supported summer workshop for high-school CS teachers to convey to them the message of the DrScheme program. Started Summer 2001, planned to be done annually.
  o faculty members take part in out-reach programs such as membership on boards of cultural institutions, participation in community activities (sports and charities) that promote WPI as an element of the community.

Objective 4.5  Enhance the Career Development Center.

Performance:  None.

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

Performance:  None.

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

Performance:  None.
Table 2. Goal 5: Expand WPI’s Educational Resources

<table>
<thead>
<tr>
<th>Outcome Objectives</th>
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</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 resources and network performance</td>
<td>Network capacity; internet usage statistics; modes of off-campus access; state of computer laboratories and central servers.</td>
<td>VP Information Technology; VP University Relations; Provost's Office.</td>
</tr>
<tr>
<td>5.3 Create and maintain sufficient electronic classrooms to support on- and off-campus programs.</td>
<td>Usage rate of IT in classes; state of electronic classrooms; notebook computer usage rates.</td>
<td>Director Plant Services; Director, Instructional Media Center; Provost's Office; Director, CEDTA.</td>
</tr>
</tbody>
</table>

The CS department contributes to this goal via obtaining grants that help purchase equipment, developing new academic programs and creating alliances with other universities (an activity which so far has only been done on a personal basis. We are now trying to create a more formal framework with the Politehnica University in Bucharest).

**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.