Unit Planning: Instruction For 2008-2009 (FY 09) Science Division

Section I: Data Elements

Data elements tell an incomplete story about the work and results of instructional activity in the Science Division. The numbers for enrollment, capacity, student success and budget fail to measure the true impact of instructional activities and student engagement in science learning. The Science Division offers courses in the transfer disciplines of Anatomy and Physiology, Biology, Chemistry, Engineering, Earth and Environmental Science, and Physics. The division also houses the Energy Management (NRG) program which offers an AAS degree in Energy Management with an option in Renewable Energy Management and three continuing education certifications plus customized courses.

Where possible, we have analyzed data elements at the discipline level. This work requires re-grouping courses at the prefix level, since course prefixes are not a one-to-one match with discipline definitions. The analyses are further complicated by changes in the comparison data from last year to this year. Section counts are particularly muddied by last year's inclusion of College Now sections, and this year's intended exclusion. In order to present the most accurate view of the work of the division, we have taken a detailed and closer look at many of the CRN and course level spreadsheets this year. Because the Energy program is self-supporting, we are reporting its data elements separately, when possible. Because of our more detailed approach to the data this year, this year's Unit Plan data elements cannot be reliably compared with last year's report.

The four-year look back and special analyses for the Science Division reveal:

- The transfer program of the Science Division produced an increase in student FTE of 5.5% from FY06 to FY07.
- The Science Division produces student FTE per faculty comparable to Math and Social Science, despite the fact that the majority of science courses are lab courses with an average class size of 24 students.
- EES, Engineering and Physics experienced increases in registrations, capacity and student FTE for FY07.
- Early results for FY08 show overall increases in capacity for Summer (97.0%) and Fall (96.3%) terms.

1) Longitudinal Enrollment Data Division and Discipline Level: Student FTE

When accurately accounted, the transfer program of the Science Division produced an increase in student FTE of 5.5% from FY06 to FY07.

Previous analyses of enrollment data have been distorted by inclusion of College Now sections and NRG management sections which include occasional workshops. Classbuilder data for 06-07 are further distorted by the inclusion of numerous "shadow sections" which are built in Banner to allow for special enrollment cases. These inflated section counts have resulted in a misleading appearance of growth in sections and lower-than-actual FTE increases for the transfer courses.

Our longitudinal analysis will use the four years starting with 03-04 because data that exclude College Now sections for enrollment and FTE are available for this range of years. Separate totals are presented for the transfer program, College Now, Co-op sections and Energy Management. The 06-07 section count has been decreased by 27 sections, accounting for shadow sections in Biobonds which affects

Chemistry and Biology section counts. The Classbuilder Annual Comparison (no College Now) data indicate that overall, from 05-06 to 06-07 Science grew 5.9% in sections and a corresponding 4.4% growth in FTE. When section counts are corrected and NRG sections are removed, a more accurate accounting of the transfer program is an increase of only one section (+ 0.3%) and an increase in FTE of 5.5%.

Table 1 breaks down the student FTE by disciplines, and separates Energy Management, Co-op, College Now and science taught at the Cottage Grove and Florence satellite campuses. Approximately 25% of the Science FTE from satellite campuses derives from telecourses offered by Science Division faculty. Approximately 75% of the FTE is generated by Science courses taught by other part-time faculty and supported by Science Division faculty.

Sections FTE %Chna %Chng DISCIPLINES 04-05 05-06 06-07 03-04 04-05 05-06 06-07 03-04 06 to 07 06 to 07 A&P 52 51 160.39 -2.7% 50 53 -3.8% 166.24 161.26 156.12 116 121 115 120 4.3% 320.38 310.87 307.09 319.10 3.9% Biology Chemistry 66 78 82 78 -4.9% 184.55 168.78 167.98 166.00 -1.2% 5 7 16.7% Engineering 6 6 8.72 9.81 10.76 13.68 27.1% EES 40 39 36 35 -2.8% 127.11 122.13 84.67 101.99 20.5% 91.23 Physics 34 34 32 34 6.3% 76.82 68.22 86.09 26.2% TOTAL SCIENCE 330 324 325 898.2 799.1 TRANSFER 311 0.3% 849.7 843.0 5.5% 31.96 NRG Mat¹ 35 55 45 43 -4.4% 34.11 37.64 37.59 -0.1% 17 19 -23.6% Co-op 18 17 -10.5% 18.19 18.50 16.72 12.77 TOTAL SCIENCE 403 388 385 -0.8% 948.4 902.3 853.5 893.3² 4.7% DIVISION 363 College Now n/a 15 18 30 66.7% n/a 48.4 61.2 68.4 11.8% TOTAL SCIENCE W/COLLEGE 406 415 948.4 914.7 NOW³ 363 418 2.2% 950.7 961.7 5.1% 12.88 CottGr-Floren⁴ 13 14 12 9.8 10.3 13.5 30.8% 14 16.7% TOTAL LCC SCIENCE 429 **COURSES FTE** 376 432 418 2.6% 958.2 963.5 925.0 975.2 5.4% ¹NRG includes courses with the NRG and DRF prefixes and a variety of X-prefixes for various workshops conducted by the NRG faculty. ²06-07 section counts and FTE have been corrected to include a Physics section that accidentally was attached to the BDC. ³These numbers are comparable to figures from last year's Unit Plan data elements, with corrections for Biobonds shadow sections for 06-07 and the wandering Physics section.

Table 1. Annual Science Student FTE: Transfer disciplines separated from Energy Management, Co-op, College Now and satellite campus sections

⁴These classes are included to provide a full picture of Science FTE at Lane; approximately 75% of the FTE in this category comes from courses physically taught at satellite campuses. The remainder is generated by Science Division distance learning classes.

The Science Division experienced growth in Biology, Engineering, Earth and Environmental Science (EES) and Physics, as well as continued growth in College Now FTE. For the purposes of our discipline level analyses, A&P includes the 200-level A&P sequence and microbiology course required by nursing and some other health occupations. The Biology discipline includes a large program of general education 100-level classes plus the biology majors' sequence. The biology courses are very popular with students, as evidenced by the high fill rates.

Increases is Engineering and Physics are largely attributed to the change in the prerequisites to Physics with calculus (PH211-212-213 sequence) which were instituted by the Physics discipline beginning in FY07. An additional course sequence was added and enrollments have nearly doubled in the course sequence. Finally, the EES discipline continues a strong rebound from two very low-enrollment years attributed to adding a math prerequisite. Once the prerequisites were removed, students returned to the popular general education 100-level courses. The discipline has added three new courses over the past three years, generating increased student interest.

College Now section increases from 18 in FY 06 to 30 in FY 07 are attributed to increases in all disciplines, and the addition of Environmental Science classes for College Now credit.

- Fig. 1. Four Year Enrollment History See page 5.
- Fig. 2. Science Student FTE in Transfer Courses for 06-07



Student FTE/Faculty FTE ratio

The Science Division produces student FTE per faculty comparable to Math and Social Science, despite the fact that the majority of science courses are lab courses with an average class size of 24 students.

The Student FTE/Faculty FTE ratios are approximations only and should be interpreted with caution. Due to changes in methodology, the FY07 ratio is not comparable to previous years' reports. When compared to other general education divisions (see Fig. 3, page 5), the Science Division produces student FTE per faculty comparable to Math and Social Science, despite the fact that the majority of science courses are lab courses requiring significant class time for students and faculty. The average class size in Science is 24 students.

Table 2. Student FTE/Faculty FTE ratios (unadjusted for NRG management FTE corrections).

Department	Student FTE 2006-07	Approximation of Faculty Appointment Percents for the Dept. ("FTE") (calculated 10/31/06)	Approximate Ratio of {Student FTE} / {Faculty Appointment Percent}
Science (excluding Energy Management ⁵)	850.5	29.1	29.2
Energy Management	40.9	3.2	12.9
Science Total (including Energy Management)	891.4	32.3	27.6

Four Year Enrollment History Science Division - Reimbursable Student FTE by Discipline





Fig. 3. Science (excluding NRG) compared to other General Education Divisons

Capacity Analysis (fill rate of class sections):

EES, Engineering and Physics show gains in fill rates for FY07. Early results for FY08 show overall increases in capacity for Summer (97.0%) and Fall (96.3%) terms.

Tables 3 and 4 and Fig. 4 report trends in section counts and fill rates in Science. Section counts may include independent studies which are not counted in teaching workloads. The data show only the Fall, Winter and Spring terms each year. Over the four year period, the number of sections in the transfer disciplines has varied from a low of 242 to a high last year of 263. The increase from FY04 to FY05 was the result of instituting "tuition-based" courses. The FY07 number does not seem accurate to our experience of cutting sections in several disciplines; time did not permit a detailed analysis of the data source.

Table 3. Section count (w/o NRG)

FY04	FY05	FY06	FY07
242	260	255	263

Division capacity rates, including NRG, have declined over the past four years. Current efforts to use the Enrollment Management Planning Tool to manage enrollment are showing early success in overall increases in capacity for Summer (97.0%) and Fall (96.3%) terms of FY 08; these are large increases over the same terms in FY07.

	FY04	FY05	FY06	FY07				
A&P	107.6%	100.6%	100.8%	87.4%				
Biology	101.5%	97.9%	92.1%	86.7%				
Chemistry	95.8%	89.1%	84.0%	84.2%				
EES	93.3%	91.8%	68.3%	78.8%				
Engineering	78.3%	58.8%	66.9%	76.1%				
Physics	82.1%	74.1%	68.0%	71.4%				
NRG Mgt.	65.1%	67.8%	64.7%	61.8%				
Total (w/o NRG)	97.1%	92.1%	85.6%	83.3%				
Total including NRG	93.9%	89.9%	83.2%	81.4%				

Table 4. Capacity rates by Discipline for Science, FY04 - FY07.



Fig. 4. Four year summary of Capacity Rates by Discipline

2) Longitudinal Student Success Data

Student Completion and Success Percentages, FY07

Student completion and success percentages provide approximations for the percentage of students who remain enrolled in classes and who pass. The pass rate is taken as a percentage of those initially registered so is reduced by the number of student drops. As such, the percentage does not reflect the success of just those students who remained in the class. The numbers are reported here by discipline and non-majors (100-level introductory) classes and majors (200-level) classes. The overall completion rate for Science transfer courses (excluding Co-op and NRG) in FY07 was 91.15%, with a corresponding success rate of 83.27%.

	Non-M	lajors	Мај	ors
	Non- Majors Complete Rate	Non- Majors Success Rate	Majors Complete Rate	Majors Success Rate
A&P	none	none	92.32%	87.64%
Biology	91.11%	83.17%	91.32%	81.51%
Chemistry	83.18%	73.83%	89.96%	80.75%
Engineering	98.68%	96.05%	95.56%	86.67%
EES	89.76%	82.44%	86.11%	80.56%
Physics	92.13%	83.97%	91.15%	83.63%
Transfer total	90.54%	82.75%	91.50%	84.75%

Table 5. Non-majors and Majors Completion and Success, FY07

Fig. 5. Non-majors and Majors Completion and Success, FY07



3) Budget

General Fund General Fund Allocation Actual Costs of Unit Operation Revenues (Course Fees, etc.) Cost per Student FTE: add comparison data when available and appropriate

The financial information in the Classbuilder data elements for the Division at subject levels provides a confusing picture of the Division's budget, actual costs and revenues. The Science Advisory Committee, Interim Chair, and support staff are engaged in re-aligning the Division budget to provide timely and accurate costs and revenue tied to Discipline categories. The course prefix "crosswalk" method used for the data elements fails to provide an accurate accounting. As a result the cost per student FTE calculations (Table 6) are too flawed to be useful. The cost per FTE at the subject level is overly dependent on the pay level of individuals assigned to courses and does not reflect actual costs involved in generating FTE. The problem is exacerbated when other costs are estimated and apportioned among subject prefixes. In addition, the high costs of the Energy Management program drive up the Division level per FTE costs artificially. The Energy Management program is self-sufficient and funded by outside gifts, grants and contracts.

Subject profix	Direct Fac	FTE tied to	Faculty	Total Division
Subject prelix	Costs	Faculty	costs/FTE	costs/FTE
ASTR	36,019	34.4	1,047	1,954
BI	1,331,822	449.3	2,964	4,037
СН	521,986	162.9	3,205	4,237
ENGR	12,111	1.7	7,209	8,984
ENVS	6,629	3.4	1,967	2,875
G	256,982	48.0	5,349	6,449
GS	22,748	58.6	388	1,293
PH	255,611	75.9	3,368	4,394
Total Transfer courses	2,443,907	834	2,930	3,974
DRF	5,405	2.3	2,381	3,280

Table 6. Classbuilder data: Direct Faculty costs and Division total costs per FTE

Subject prefix	Direct Fac Costs	FTE tied to Faculty	Faculty costs/FTE	Total Division costs/FTE
NRG	221,738	30.4	7,296	15,091
NRG Subtotal	227,142	33	6,955	14,270
Total Science	2,671,050	867	3,081	4,362

We propose using actual costs from the F07 Division budget and expenditures and relating these costs and associated revenues from tuition, fees and state reimbursement to the FTE generated by the Science disciplines. Given the timeline for the Unit Planning process, this work was not completed. If these data are needed at a later time, the Interim Chair will undertake the analysis.

Other community support (in-kind, donations, cooperative worksites,....)

The Energy Management program has numerous community partners from public and private industry.

4) **Division planning parameters**

FTE target for disciplines

Science faculty and staff are committed to increasing student FTE by increasing enrollments in existing classes and capturing FTE from existing services provided by the Science Resource Center. We are targeting increases in the course fill rate in all disciplines that are currently below 95%; and setting a 95% fill rate as the Division benchmark. However, given the course cuts for FY08, we may not achieve a target of 2% enrollment increase.

At this time, we conservatively project an annual total of 293 sections, resulting in 793 FTE, if Winter and Spring terms are at 90% capacity. If we reach our capacity target of 95% overall, we could reach 819 FTE, which would fail to reach our 2% growth target of 859 FTE based on 06-07 direct transfer reimbursable FTE. The actual annual change in part-time budget will be variable.

Expected budget to work within

The Science Division is engaged in setting a zero-based budget for administration and discipline instruction for FY08. In this way, we can prioritize spending to achieve internal goals for marketing and outreach, and our Rapid Transfer project. We are committed to optimizing the resources we have. The Division budget for part-time faculty for FY08 is still undetermined.

We request "04" personnel funding for the online TA for Biology's distance learning class, BI 102I. As shown in the economic impact analysis later in the plan, the affordable TA assists faculty to generate significantly more student FTE.

Section II: Accomplishments

Accomplishments from 2006-2007, as posted to OISS database Completed 11/7/07; Revised 11/30/07; Revised 12/10/07

- 1. Developed four new courses: Forensic Chemistry, Global Climate Change, Supplemental Instruction for Biobonds, and Supplemental Instruction for General Chemistry. The SI courses provide support for student success and retention.
- 2. Completed course improvements: Science received 250 hours of curriculum development funds to support course improvements and program development in A&P, Biology, Physics, Earth and Environmental Science. Improvements include coordinating and aligning curriculum in A&P and the prerequisite BioBonds courses; and redesigning BI 212 to improve articulation with OSU and UO. In addition, the NSF MAPS GIS grant provided curriculum development funds for three faculty to create and integrate GIS modules into Science courses.
- 3. Developed plans for efficiencies and revenue enhancement: Science faculty and staff engaged in thoughtful planning to streamline processes and enhance revenues through recruiting and retention as part of the 06 07 Unit Plan.
- 4. Developed new program and emphasis areas: The Energy Management program began work on two new AAS degrees: Water Conservation Technician and Sustainability Coordinator. The Science Division began work on an inter-disciplinary Sustainability Emphasis for the AAOT. This work led to a successful curriculum development initiative.
- 5. Supported student success: Science staff supported student success and retention through the Science Resource Center, serving 780 students (those who registered) and generating 18.35 FTE through tutoring services; faculty members wrote numerous letters of recommendation for program admittance and scholarships, supporting the academic careers of many students.
- 6. Provided student research opportunities: Faculty in Physics oversaw the UCORE program, which linked Lane students with summer research opportunities at UO and continues to support the students as mentors at Lane. Faculty in Biology led an Advanced Seminar in Biology in which students completed initial field surveys of Lane's wetland area across 30th Avenue.
- 7. Expanded and strengthened College Now: Science offers over 12 different courses for credit at 12 local high schools, contributing 11% of the total 600 FTE Lane earned from the College Now program last year. Faculty members maintain active relationships with their high school colleagues.
- 8. Shared expertise and gained visibility: Faculty organized, gave presentations and participated in numerous local, regional and national professional conferences and workshops, including Lane's Faculty Connections, the meeting of the Oregon Section of the American Association of Physics Teachers, the Building Capacity Workshop of the Green Chemistry Institute, the 11th Green Chemistry and Engineering Conference, the Green Chemistry in Education Workshop at UO; NWBIO, BioQUEST, National Evolutionary Synthesis Center, and Adjunct Faculty Conference at Chemeketa Community College.
- 9. Received recognition for excellence: The ongoing work of the Energy Management program was recognized with the ISPQ Accreditation for the Renewable Energy Technician Program; a Special Recognition for Roger Ebbage from the Interstate Renewable Energy Council at its 25th annual meeting; and a grant for \$50,000 per year for two years from the Oregon Department of Energy for program operation.

- 10. Completed trainings: Support staff completed professional development activities to stay current with software and hardware and gain expertise with Banner systems.
- 11. Enhanced technical infrastructure for student learning: 30 new computers were added to the Science Resource Center and the time needed to back-up the science server has been significantly decreased.
- 12. Managed enrollment and increased total FTE by 5.5% for transfer courses (excluding Co-op and Energy Management). Actual sections taught (removing the "shadow sections" used to manage BioBonds enrollment) increased by only one section from 05-06, for a plus .3% change. Total FTE increased by 5.5% for transfer courses and 4.7% when independent studies, Co-op and Energy Management are included. When adjusted for courses within each discipline, the largest increases were in Earth and Environmental Science, up 20.5%; Engineering, up 27.1%, and Physics (including Astronomy), up 26.2%. Enrollment in the Physics with calculus series doubled; the increase is attributed to changing the prerequisites for calculus-based General Physics to better match student needs. The change in prerequisite, led by Dennis Gilbert, was strongly contested for nearly two years. (updated 12/10/07)

Section III: Planning for efficiencies, productivity and revenue enhancements: 2008-2009 (FY 09)

The theme for the Science Division's plans for FY09 is optimizing the curricula and resources we already have. This theme extended to our process for the Unit Plan. We started with the extensive list of ideas for efficiencies, productivity and revenue enhancements generated during the Fall06 Unit Planning (for FY08) process. Several of those ideas are being implemented this year. For this year's plan, the process followed by the Division to identify ideas was:

- Initial review by the Science Advisory Committee (SAC) of the plan for FY08 and Division meeting minutes which included all ideas generated
- SAC hosted Brown Bag #1 review and discussion on Nov. 16, 2007
- Division meeting review of data elements and proposed ideas for FY09 plan, Nov. 30, 2007
- E-mail of draft of Unit Plan Section III to all Division members, Dec. 5, 2007; deadline for comments by Dec. 7
- Discipline summaries requested; due by Dec. 7
- SAC hosted Brown Bag #2 review of draft of Unit Plan Section III, Dec. 5, 2007
- Discipline leads prepared summaries of accomplishments, challenges and goals.
- Final analyses, writing, and editing incorporating input from e-mail, Brown Bag session and summaries.

The Division recommended economic costing of two proposals that achieve our objective of optimizing existing curricula and resources. Other proposals are strongly supported by the Division and are charted with qualitative economic impact analyses.

1) <u>Efficiencies and Productivity</u>

Update on Efficiencies/Productivity proposals implemented from the FY 08 Unit Plan

Two proposals were implemented. Kyle Hammon will teach two sections of a Biology distance learning telecourse for Science this year, resulting in savings of part-time faculty budget. It is unclear if this arrangement will be recurring, so we show it as non-recurring below.

The Division has planned course cuts to increase capacity rates for FY08. The actual number of sections cut from FY 06 to FY 07 is a moving target, as we balance FTE against costs using the EMPT term by term. We have cut 13 sections so far, resulting in significant increases in class capacity rates for Summer and Fall.

Description	Impact	Consequences	\$	R/NR
Kyle Hammon to teach 2 sections of telecourse, BI101J	Save cost of two PT-taught sections per year	May adversely affect Kyle's other responsibilities	2 sect. @ \$6,114 = \$12,228 savings	NR?
Reduce number of sections offered (in transfer program)	Faculty costs for up to 18 sections; net reductions so far, including summer cancellations = 13 sections. Increased fill-rates in remaining transfer classes: Sum 06 = 66.8% Sum 07 = 97.0% Fall 06 = 86.2% Fall 07 = 96.3%	Lost potential FTE for F07 @ 86% fill rate = 13.4 FTE Fewer time and topic options for students	Less PT budget	Variable

Updated Guaranteed Efficiencies/Productivity FY 08:

Proposals for Efficiencies/Productivity recommended for FY 09

1. "Rapid Transfer" academic planning: keeping Biology majors at Lane to complete more science credits

"Rapid Transfer" will result in higher fill rates for classes and more effective use of classroom facilities. This idea was proposed last year as a revenue enhancement and continues to be a high priority for Science. We have dubbed the idea "Rapid Transfer" and moved it to the Efficiency/Productivity category because the concept is based on making more effective use of the curriculum we already have. The initial step of identifying the courses that science majors need for transfer to UO and OSU has been completed and is one of the tabs on the attached spreadsheet, Rapid Transfer Analysis. We will request curriculum development funds to support the work of faculty and academic advisors to develop the Rapid Transfer advising sheets.

Science faculty and staff will:

- Reduce conflicts between timing of majors courses, to develop scheduling pathways.
- Develop multiple tracks for majors in physics, geology, chemistry and biology.
- Work with advisors, all disciplines within Science and other critical divisions (Math) as necessary.
- Distribute Science major "Rapid Transfer" advising sheets at the beginning of all first term science major courses, in EOR Packets, and other appropriate venues; and to counseling and advising staff.
- Track enrollment gains in Biology, O-Chem and Gen Physics.

<u>Rationale</u>

Every year a significant number of science majors leave Lane to take science courses at fouryear institutions that they could have completed here. If students are provided with clear academic plans for completing science courses of study, similar to those provided in Lane's career and technical programs, we will improve retention and create increased enrollment in other required science courses. By improving coordination between courses and getting students on track earlier we can retain students who may otherwise take required classes elsewhere. We can also use the academic plans to attract more incoming high school students who are choosing between Lane and UO or OSU.

Majors in all science disciplines need to complete chemistry and/or physics to continue in the majors. We recommend designing one or more recommended paths that will enable students in each major science discipline to complete their science prerequisites for transfer as efficiently as possible. Currently about 105 Biology majors begin their studies each Fall at Lane, but only about 40 students enroll in Organic Chemistry or General Physics. If "Rapid Transfer" is successful, a greater percentage of biology majors will complete their chemistry and physics at Lane. We will need to increase the number of sections currently offered in Organic Chemistry and General Physics. If all Biology majors completed their other required science courses at Lane, we could add as many as 12 sections annually (at 24 students each), without recruiting any new students to the college. Since these students are already here, the additional workload for student support services and other college services is much less than for new students.

Large increases in the numbers of sections will necessitate hiring additional full-time faculty in one or both disciplines in order to ensure that these 200-level classes maintain their quality and consistency as direct transfer courses. Revenue projections and potential costs are updated and changed from those presented last year. The economic analysis has these assumptions:

- Potential increases in enrollment in Biology majors courses are not computed.
- Increased FTE assumes slow growth in enrollment in General Physics and Organic Chemistry.
- We will fill existing sections to 95% or better before new sections are added.

- When a new section is added, fill rates may temporarily decline.
- Growth beyond three new sections in each discipline will require additional full time faculty to maintain curricular consistency.
- All faculty involved in teaching Science majors will contribute to the start up and maintenance of the Rapid Transfer project.
- We will request Curriculum Development funds for project start up.

VARIABLES	(DE) = Data Element	Before implementation			After implementation			
		FY06	FY07 ¹	FY08	FY09	FY10	FY11	
Effectiveness	Retention (DE)		90.4%	91.4%	93.2%	95.0%	95.0%	
	Success (DE)		81.6%	n/a	n/a	n/a	n/a	
	Enrollment FTE (DE adjusted)	799	843	851	861	874	904	
	%Change due to RT			1.0%	1.1%	1.5%	3.4%	
	Other:FTE gain in O-Chem	n/a	0.0	0.0	3.1	4.5	14.0	
	Other:FTE gain in GenPhys	n/a	0.0	3.6	6.3	8.6	15.9	
Efficiencies	Maximizing class capacity in O- Chem (Capacity Utilization DE)	64%	72%	75%	87%	92%	92%	
	Maximizing class capacity in GenPhys (Capacity Utilization DE)	56%	59%	79%	92%	88%	90%	
	(Student FTE) / (FacultyFTE) (DE)			increased	increased	increased	increased	
Costs	Curriculum Development for RT planning, scheduling				\$3,794			
	Additional Lab Support						will be needed	
New sections	Additional sections					1	5	
Initially at PT rates	@ ave. PT rate					\$7,231	\$36,155	
From Science budget	M&S: Marketing			\$400	\$800	\$400	\$400	
	Cost / new FTE		base year	\$110	\$487	\$584	\$1,226	
Revenue	Tuition		base year	\$10,585	\$23,762	\$32,157	\$69,752	

Science Rapid Transfer Economic Impact Analysis

VARIABLES	(DE) = Data Element	Before implementation		After implementation		ation	
		FY06	FY07 ¹	FY08	FY09	FY10	FY11
	Fees: omitted as revenue neutral						
	Other:State Reim @ F07 rate		base year	\$8,010	\$14,020	\$19,029	\$35,056
	Revenue / new FTE			\$5,180	\$4,006	\$3,914	\$3,515
Net Income	Net Income/ new FTE			\$5,069	\$3,519	\$3,331	\$2,289
	Total NEW Net Income			\$18,198	\$33,188	\$43,554	\$68,253
	New Income Total over four years			\$18,198	\$51,386	\$94,940	\$163,193

Science Rapid Transfer Economic Impact Analysis

FY08 figures

2. Increasing enrollment in Biology distance learning courses: adding online TA help to increase FTE per faculty

The Biology discipline proposes developing a General Biology online sequence using online TA's to support large enrollments, increasing opportunities for students to complete General Biology requirements through distance learning. Online classes are becoming increasingly popular with two-year college student nationally. The Science division has increased its distance learning offerings (including hybrid courses, online, and telecourses) from 17 sections in FY05 to 21 sections in FY07. This year we are increasing the capacity of BI 102I – Human Biology from 35 to 50 students per term with the addition of a teaching assistant to help with technical support and content tutoring during the term. The TA is hired as "04" classified employee working approximately 100 hours/term. The TA is responsible for:

- Monitoring and responding to the forums discussions (Week One F07: 187 postings)
- Providing technical support for students (Moodle, IPCDs, System software support, Mozilla and Netscape)
- Answering content questions on the human body
- Chat room tutoring
- Monitoring quiz sessions online

F07 enrollment is 49 students equating to 6.34 FTE. This compares to FTE of 4.53 for enrolling 35 students. We plan to run BI 102I in the large section format for the remainder of FY08. We project an additional 5.30 FTE over the year, producing a net income (tuition and State reimbursement) of \$3,814 per FTE.

Swank evaluated the effectiveness of the online TA concept for his large-enrollment online class this Fall. From the data, 95% of the students would not have been able to take a Biology course this term if not for this online course. All respondents (100%) stated they would recommend this online course to other students. Additionally, 100% (33/33) of the students strongly agreed or agreed that the level of online support for this course was higher when compared to other online courses they had taken. The full report is available upon request.

From the student data collected, and his evaluation of the course with the TA, Swank concluded that this experiment was very successful. Students indicated they enjoyed the course and the format, were supported in their efforts by the TA and the instructor, and indicated a strong positive experience overall with the course. The attrition for the course actually decreased from 12% to 8% this term, while enrolling almost twice as many students. While the TA was very helpful in managing the course, Swank reported that his workload as instructor was not reduced. He continued, as in past years, to read all the postings, coordinate the quizzes and grading, and respond to postings and questions. He recommends continuing the large enrollment sections with help from the online TA because the position brought an additional resource for the students, and was a real value for their learning. The online course helps meet the needs of many non-traditional students.

Based on this analysis, the Biology discipline proposes developing a General Biology online sequence, so that students can complete General Biology requirements through distance learning. We already have a BI 103L, Evolution and Diversity offered two terms per year in an online format for 30 students per term. Joe Russin's hybrid course, BI 101F, Survey of Biology, could be developed as a fully online course. We are proposing curriculum development funds to revise Russin's course, along with a second year of development funds in case our other course needs revisions as well. These additional costs are figured into the economic impact analysis. We are estimating about 110 hours per term for future years for the online TA "04" position. (For this year, we are using 100 hours per term as a base estimate.) We request funding for the "04" position (110 hours/class) for a total of \$5,795 (salary and OPE) in budget planning for FY09.

VARIABLES	(DE) = Data Element	Befor	re implem	entation	Afte	r implement	ation
		FY06	FY07	FY08 projected	FY09	FY10	FY11
Effectiveness	Retention (DE)						
	Success (DE)						
	Enrollment (DE)	111	175	216	256	280	315
	Student FTE	14.36	22.65	27.95	33.13	36.24	40.76
	Other: FTE in excess of FY07 base	-8.29	0	5.30	10.48	13.59	18.11
Efficiencies	Maximizing class capacity(Capacity Utilization DE)	79.6%	77.4%	80%	80%	80%	90%
	(Student FTE) / (FacultyFTE) (DE)	25.6	28.9	35.7	42.3	46.2	52.0
	Large enrollment (50) sections		0	3	5	7	7
Costs	Curriculum Development: 100 hours				\$3,794	\$3,794	

Science Large DL Classes Economic Impact Analysis

VARIABLES	(DE) = Data Element	Befo	re implem	entation	Afte	r implement	ation
		FY06	FY07	FY08 projected	FY09	FY10	FY11
Online TA	Personnel: 04 classified FY08 100 hrs/class, FY09 and beyond 110 hrs/class		n/a	\$3,477	\$6,375	\$8,924	\$8,924
For additional FTE	Cost / FTE: Online TA for additional FTE		n/a	\$656	\$970	\$936	\$493
No new expense for faculty	Cost per FTE (DE): Current faculty of record; for comparison to costs of TA		\$3,197	\$2,591	\$2,186	\$1,999	\$1,777
Revenue for additional FTE	Tuition for extra students above FY07		\$0	\$11,972	\$23,652	\$30,660	\$40,880
	Fees: omitted as revenue neutral						
	Other:State Reim @ F07 rate x addit. SFTE		\$0	\$11,728	\$23,176	\$30,045	\$40,062
	Revenue / extra FTE		\$0	\$4,469	\$4,469	\$4,468	\$4,468
Net Income	Net Income/FTE		\$0	\$3,814	\$3,498	\$3,532	\$3,976
	Total NEW Net Income		\$0	\$20,223	\$36,660	\$47,987	\$72,018
	New Income Total over four years		\$0	\$20,223	\$56,882	\$104,869	\$176,887

Science Large DL Classes Economic Impact Analysis

in FY08 dollars

The Science Division supports implementing the following ideas for efficiencies and productivity. All the ideas support our goal of optimizing existing curricula and resources. We fully support using sustainable processes and products in all Science classrooms and facilities.

- 3. Use Enrollment Mgt. Planning Tool to efficiently add/cut classes to optimize capacity
- 4. Implement building systems efficiencies
- 5. Reduce use of paper thru duplex printing and increased e-communication
- 6. Encourage and implement sustainability behaviors (green purchasing, life cycle costing, expanded native landscaping, etc.)

Economic Impact Variables	Other Proposals, qu	ualitatively analyzed	l	
	3. Use Enrollment Mgt. Planning Tool to efficiently add/cut classes; increase FTE by greater than 2%	4. Implement building systems efficiencies.	5. Reduce use of paper and copying expenses through duplex printing and increase E- communication	6. Encourage and implement sustainability behaviors (green purchasing, life- cycle costing, native landscaping, etc.
Effectiveness Retention, Success, Enrollment, other	Add high FTE sections; cut low FTE sections	Improved learning and working environment	Sustainable printing processes and effective communication	Best practices for sustainability
Efficiencies Maximizing Capacity, Student FTE/Fac. FTE, other	Increase fill-rates in remaining sections; increased FTE/Fac.	Efficient HVAC, lighting, water, cleaning, etc.	Sustainable printing processes	Best practices for sustainability
Costs Curriculum Development, Personnel, M&S, Cost/FTE	Where possible, balance cuts and additions; Add judiciously. Net decrease in cost/FTE	Re- commissioning of Bldg. 16	Printer maintenance, IT systems support	Initial equipment and landscaping costs
Revenue/ Savings Tuition, Fees, other Revenue/ FTE	Increase greater than 2% FTE over 06-07	Savings in utilities and maintenance	Savings on paper and copying	Savings over the long term; healthier, more sustainable environment
Net income Bottom line	Increase in net income	Net savings realized	Net savings and sustainable practice	Net savings and sustainable practice

2) <u>Revenue Enhancements</u>

Update on Revenue Enhancements proposals implemented from the FY 08 Unit Plan

Three proposals were implemented. Supplemental Instruction courses were developed for BioBonds and Gen Chem 221. Both were offered this fall with 199 numbers. The supplemental instruction courses are too new to assess outcomes.

The Sustainability emphasis course of study initiative received Curriculum Development support which enabled part-time faculty member Claudia Owen to lead the Science Sustainability workgroup and to develop a new course, Global Climate Change. This course also was taught for the first time this fall as G199. The Sustainability workgroup submitted this report of accomplishments to date:

- ENVS 199- Global Climate Change. Course has been developed and taught. The course had full enrollment, was positively received by students, and included many activities and lively discussion
- Workgroup met on a nearly weekly basis, with the final goal of developing a course of study and a draft brochure for a Sustainability Competency Award from the Science Division.
- A science faculty survey solicited ideas for established and possible new courses to be included in the course of study. Several modifications of existing courses were suggested.
- Several science faculty members submitted ideas for new courses which would emphasize sustainability issues.
- The draft brochure, including the description of the Course of Study, will be completed by the end of 2007.
- The final Curriculum Development Project Report will also be finished by the end of 2007.

Proposals for Revenue Enhancements recommended for FY 09

The Division proposes the following activities to enhance revenues for the Division. We have established a Marketing and Outreach workgroup, who will lead activities to visit area schools, attend Lane Preview night and other marketing events, and provide internal and external marketing materials. This work is being funding by re-prioritizing existing M&S funds and contributing work time to the effort.

The summer program ideas are also supported by in-house efforts. We will establish a Summer Program workgroup beginning in January.

A third workgroup was recently formed to analyze funding and services for the Science Resource Center. This work may result in future requests for more staffing for this vital student resource center.

- 1. Marketing and outreach efforts to increase enrollment in existing classes
- 2. Community short courses, summer academy, local experts seminars (with FTE)
- 3. Focused summer credit courses, with aggressive marketing
- 4. Increased extended learning FTE collection [SRC, fieldtrips, others]
- 5. Redesigning SRC funding and FTE generation

Economic Impact Variables	Revenue Enhancement Proposals, qualitatively analyzed							
	1. Marketing and outreach efforts to middle and high schools to increase enrollment in existing classes	2. Community short courses, summer academies, local experts seminars	3. Focused summer credit courses, with aggressive marketing	4. Increased extended learning FTE collection [SRC, fieldtrips, others]	5. Redesigning SRC funding and FTE			
Effectiveness Retention, Success, Enrollment, other	Long term growth in FTE; strengthen community support for Lane	Community outreach, relationship building, student recruitment	Increased enrollment, satisfaction	Enhance retention and success	SRC learning activities enhance retention and success			

Economic Impact Variables	Revenue Enhancement Proposals, qualitatively analyzed						
Efficiencies Maximizing Capacity, Student FTE/Fac. FTE, other	Maximize capacity; increase student FTE/Fac FTE	Generates new FTE; utilizes facilities in summer, nights, weekends	Maximize capacity, and use of facilities in summer; increase student FTE/Fac FTE	Gain FTE for existing learning activities	Redirect SRC FTE revenues to funding for the SRC		
Costs Curriculum Development, Personnel, M&S, Cost/FTE	Repurpose \$\$ from Division M&S time and effort of faculty and staff	Innovative staffing and compensatio n for effective cost/FTE	Marketing costs recouped in increased FTE; result in lower cost/FTE	None	Additional staff to support learning activities in the SRC		
Revenue/ Savings Tuition, Fees, other Revenue/ FTE	Tuition, fees, State reimb. for increased FTE	Tuition or special fees for cover all costs and produce modest profit	Tuition, fees, State reimb. for increased FTE	State reimb. for FTE	Tuition, fees, reimburseme nt		
Net income Bottom line	Increase in net income	Tuition to Division plus modest net income to support future activities	Increase in net income for summer offerings	Increase in net income	Not possible to forecast		

Discipline summaries

Discipline summaries and other summaries were drafted by individual faculty and represent their candid assessments of strengths, challenges, goals and needs.

Anatomy and Physiology



In the fall of 07 the Anatomy and Physiology discipline completed and posted to the science server its goals, objectives and mentoring resources manual for the Bl231, Bl232 and Bl233 sequence. Currently the discipline is looking at developing a clinically-based stress physiology course to be offered to students who have completed their AP sequence. This course would be offered as a two-week, 3 credit summer elective and afford students applying to, accepted into, or returning to health career programs an opportunity to delve deeper into applied physiological concepts. In light of the future expansion of Health Careers Programs and possible implementation of a physical therapy assistant program, we are examining the limitations of our discipline. Currently our classes

fill rapidly and we are not always able to meet the present demand. The effect of future growth will need to be examined as it may be limited by qualified A&P faculty, classroom space, prep room personnel and resources.

Only 44% of the fifty yearly courses of BI231 – BI23 are taught by full time instructors. When BI 112 is added in, the number of courses increases to 67 with only 38% of the overall courses being taught by full time instructors. The addition of a new faculty member would offset some of the strain of projected growth in student numbers. Continued growth in A&P enrollment will impact demand for tutoring in the science resource center, models for in and out of class use, staff to prepare the labs associated with our added sections, and computer support as we utilize current computers more heavily and ensure that all students in our program have equivalent access to technology.

Biology

The Biology discipline accomplished several goals in FY07. We improved majors' articulation by changing our course numbers to match regional transfer institutions and implementing a major curriculum change to the Winter term course (BI 212). We continue to examine our General Education offerings, adjusting section counts as needed between the emphasis courses and the survey sequence sections. Our budget continues to support facilities that expose students to exciting biological systems, such as the Wet Lab (aquaria), the Native Landscaping project, and the Herbarium. The field course to Costa Rica offers students tropical biology experience. We provide support and facilities for weekend workshops for the Raptor Center, and the



Oregon Truffle Festival. Our challenges are continued funding for support staff in the Life Science Stockroom, the Science Resource Center, and technological support for our classrooms. We cannot continue to give students the same level of education without these crucial resources.

Biology has the largest College Now enrollment of any of the science disciplines (35.19 FTE in FY07), representing 5.8% of the college total College Now FTE. The discipline is proposing expanding capacity in online courses as a means of meeting student demand and containing instructional costs.

Chemistry

Four experienced full-time faculty and several long-term, experienced part-time faculty contribute to a very productive chemistry discipline. Course offerings expanded this year to include two new chemistry supplemental instruction courses, and a new forensics course. During FY07, instructors participated in a



wide variety of instructional as well as professional development activities. These included training in data presentation and evaluation; training in project management and grant development; faculty/student presentation on biodiesel; faculty presentation at the Green Chemistry and Engineering Conference; faculty coordination and presentation at Green Chemistry in Education Workshop; and faculty attendance and presentation at annual fall conference of the Washington College Chemistry Teachers Association. The discipline celebrated National Chemistry Week October 22-26, with demonstrations and a hands-on chemistry and GIS workshop, in an effort to increase student awareness of the discipline and to attract more students to our courses.

The discipline carefully monitors Chemistry fees and their use, but there are some unanswered questions about recouping funds we thought we were saving over the last three years for our discipline 20-year equipment replacement cycle. We are engaged in the Division budget revision project and after examining the somewhat variable discipline budget data for the past three years, we have tentatively contributed \$2000 from our budgeted M&S for division-wide projects. Time will tell if we can live within this projected, reduced budget, or if we will need to request some Division support come Spring Term 2008. Another continuing challenge in the chemistry discipline is coordinating common curriculum. With so many instructors involved, it is necessary yet difficult to standardize the curriculum in a way that accommodates individual teaching styles. Finding the time to be innovative in our pedagogy, current within our field, and supportive of under-prepared students are additional challenges that are

exacerbated by limited and uninspiring classroom space for lectures, and under-equipped lab and instrument facilities.

There is one large goal that the chemistry discipline has set for the FY09 academic year, and under that umbrella many of our limitations and challenges will be addressed. Lane has recently been granted access to Meyer grant funds for sustainability projects to be shared by the University of Oregon and Lane, and distributed through an RFP process. Green chemistry and sustainability have already been infused into our organic chemistry curriculum, especially in the laboratory. The chemistry discipline will submit a pre-proposal to similarly infuse green chemistry into the rest of our curriculum. The grant proposal will have two components: a curriculum development component for materials that can be adopted by other institutions; and a dissemination component for publishing (GEM's database housed at UO), presenting at meetings, and hosting activities such as workshops. It is our hope that through this project, the chemistry discipline can show strong local and national leadership and innovation in the area of chemical education; participate in important collaboration with each other and the UO; and be responsive to and supportive of our students' interests in sustainability.

Earth and Environmental Sciences

- a. Discipline strengths and recent positive developments include:
 - Courses within our discipline naturally emphasize sustainability, especially the Environmental Science sequence.
 - Curriculum growth in sustainability
 - Part-time faculty are knowledgeable, committed, and highly educated
 - Existing part-time faculty work well together
 - Enrollment numbers reflect increasing student interest in 100level courses
 - Willingness by part-time faculty to develop new courses as evidenced by three new courses within the last three years
 - Participation by faculty members in enhancing instructional materials and displays
- b. Goals and Challenges
 - Develop two new courses, such as 1) Human Impacts on Earth's Surface, 2) Dinosaurs, and 3) Sustainable Oceans
 - Mounting and display of newly purchased maps
 - Change and improvement of displays in glass cases across from SRC to increase student interest in EES courses
 - Increase the number of 100-level sections offered
 - Continued acquisition of new lab specimens for existing and new courses
 - Increase assessment of teaching methods
 - Development of a plan for funding and running field trips
- c. Critical Needs
 - The discipline should have a full time faculty member, or at the very least, should have continued financial support for part-time faculty to perform the duties of a discipline coordinator.
 - Increased marketing for the discipline as a method to increase enrollment

Physics

Accomplishments - Except for a slight decrease in GS 104 (the physics quarter of physical science survey) and cutting PH 091,2 (principles of technology), every course category increased significantly. These categories are PH 101,2,3; PH 211,2,3; ASTR 107; PH 201,2,3; ASTR 121,2,3; GS 104; ENGR 221; GS 110,210 and PH 091,2.



In 06-07, physics enrollment increased by 24%, student credit hours by 28.9%, and student FTE by 26.2%. The number of sections increased 6.3%.



The largest numerical enrollment increase occurred in the calculus-based general physics sequence which increased by 85%. This shows the wisdom of our two-year effort led by DG to change long-traditional calculus pre-requisites and to schedule the main sections starting in fall with a trailer section starting in the winter.

The next largest enrollment increase occurred by creating a full astronomy series, which DG led to approval. This increase was based primarily on offering more sections, and shows the accuracy of our assessment of demand for this full sequence and changing it from three to four credits.

The third largest enrollment increase occurred in PH 101,2,3. This is due primarily to increased advertising created by DG, which took place before fall and spring terms. Our ability to maintain the quality of the curriculum with the majority of the sections taught by new part-time colleagues was due to their work and mentoring by DG.

The fourth largest enrollment increase occurred in PH 201,2,3. This 14.7% increase is due to a combination of advertising previous to fall term, and a lower attrition rate due to the teaching of PB. This experience will help reverse elements of a bad reputation this sequence has had from the unevenness of faculty members teaching with very different styles, who were never-the-less working very hard to teaching the classes without a standard curriculum, standard labs or knowledge of the available lab equipment, and a generally inadequate infrastructure.

Limitations - The leadership of permanent faculty played, and will continue to play, an essential role in such systemic improvements. The main limitation to more major gains is the lack of sufficient permanent physics faculty members. For years the division has recognized the need for two more physics positions and calculations have been done showing the net increase in revenue is likely in addition to improving access and quality.

Urgent needs - Other urgent needs include, updating curriculum, getting adequate equipment, and organizing our physical infrastructure. In addition, we are undertaking a series of assessment projects, grants, and faculty-student efforts to improve the quality of our program.

Energy Management Program

The Energy Management, Renewable Energy Program, and the Northwest Energy Education continually have positive developments regardless of the fact that the programs are self funding. Being in existence is the program's most positive development. The Lane Board of Education recently approved a new AAS degree program, the Water Conservation Technician program; and forwarded it to the Oregon State Board of Education, Department of Community College and Workforce Development for their approval. Approval should be granted January 18, 2008.



Another positive development is the program director recently

completed a study tour to Germany, a leader in renewable energy. The program was funded by CDS International, a US non-profit, and Inwent, a German non-profit responsible for US-German education exchange. The trip proved to bare immediate fruit. The energy program director is now working on a national renewable energy National Science Foundation (NSF) Grant combining industry, non-profit and for-profit organizations, government, and community colleges to create a network of resources that will provide a uniform curriculum for solar PV and Thermal installers.

The Energy Program submitted an NSF pre-proposal in April of 2007. The proposal received excellent reviews which lead to a full proposal submitted in October 2007. The Energy Program is proposing to NSF to deliver the entire energy management program core via Internet Protocol Video.

NEEI signed a contract to deliver the National Sustainable Building Advisor Program for the area of Eugene and south to the Oregon Boarder. Our first class will begin in February 2008.

Challenges and Limits-The Energy Program's constant <u>challenge</u> which also <u>limits</u> our ability to grow within a vibrant industry is funding. Because we are self supporting, the program director is teaching more courses to conserve valuable resources which in turn limits his ability to seek additional funding for the program growth. The program is also <u>challenged</u> by a lack of sufficient classroom and laboratory space. The program has submitted a few unsuccessful proposals to the college administration that would lead to additional program space without a financial commitment by the college.

Critical Needs for 08-09-The program has an opportunity to significantly grow into extremely active energy efficiency, renewable energy, and water efficiency industries. The program has only one full-time faculty and it is becoming increasingly more difficult to retain competent adjunct faculty. The critical need for school year 08-09:

- Fulltime renewable energy faculty
- Fulltime water conservation faculty
- Fulltime energy management faculty
- Fulltime administrative support

Science Resource Center

During the academic year 2006-2007, the Science Resource Center (SRC) supported student success and retention, serving 780 documented students (and possibly many others who were not registered), and generating 18.35 FTE through tutoring services during Fall Term alone. Over 700 exams were administered to distance learning students, and the greatest student FTE for the SRC was recorded during that term also. The SRC also continued to provide students with a wide variety of discipline specific media, specimens, models, tools, and other equipment. Installation of 30 new computers enhanced technical infrastructure for student learning, and decreased back-up time.

The strength of the SRC is also its challenge – enhancing student success leads to greater use of the facility. The pedagogical diversity of seven science disciplines, the sheer floor area in square footage, and the number of people served daily involve complexity of supervision and coordination. Managing the facilities and supervising student employees are additional levels of responsibility. The greatest limitation for the SRC is inadequate staffing in the face of increasing number of students; increasing number of instructors requesting services (including part-time instructors); and increasing number and type of services requested. Current SRC staff members have been overtaxed for too long. They cannot take mandated breaks or participate fully in Division activities without limiting hours and quality of SRC operation and services rendered.

Goals for 2008-2009 include examining and adjusting hours of operation to match student use patterns and allow SRC staff to attend Division meetings and do other tasks, such as maintenance of model and specimen inventory. In addition, it would be helpful to revise open testing procedures to streamline and standardize complex directions, provide secure proctoring, and redirect the bulk of the test takers. The Social Science testing center will takeover some testing for Science courses this year. An additional work station will be set-up to provide proximity and faster service. Applying for grant money to purchase models for exclusive use by the SRC, instead of sharing and transporting to and from classrooms, would ease the burden on limited staff. Sharing space and personnel with Disability Services and the Math Division are also potential avenues to explore. A Division task force will begin this examining these and other options during Winter Term 2008.

College Now

Lane's Science faculty from Biology, Chemistry, EES and Physics work with high school faculty from 12 local schools to offer over 12 different courses for credit. Lane earned 600 FTE from the College Now program last year, and Science contributed 11% of that figure. We increased the number of schools significantly last year. We plan to visit the high school College Now classrooms to recruit students to come to Lane. This year's Discipline contacts are: Paul Bunson, Stacey Kiser, Gary Mort, and Claudia Owen.



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