Report on UMBC Faculty Size, Composition, and Allocation

Preamble

Throughout its brief history, UMBC has built its faculty through a process of local needs assessment by academic departments, persuasive arguments by chairs in support of new or replacement lines, and allocation of new lines or authorization to fill vacant lines by deans, in consultation with the provost. As support from the State has waxed and waned in synchrony with changes in the economy and political climate, this approach has resulted in periodic fluctuations in hiring rather than a planned and principled approach to adding and allocating faculty as enrollment, new programs, and institutional values dictated.

Since 1998, UMBC has made a concerted effort to strengthen its planning processes, and more importantly, to link planning priorities to the university's budget. The Planning Leadership Team (PLT), which includes administrators, faculty and staff leaders, and the chairs of six planning task forces, has identified the university's highest priorities, along with initiatives and actions to achieve them, and it tracks progress and outcomes on an ongoing basis. The PLT's top two priorities are both critically dependent on the size and quality of the UMBC faculty: (1) Continue to rank in the top tier of research universities and (2) continue to build the quality and size of the undergraduate and graduate student bodies.

UMBC's status as a research university is rising.[1] External grants and contracts have risen from $44.5 million in 1997 to $85.5 million in 2002. Federal research and development expenditures have moved UMBC from a national ranking of 200 in 1996 to 153 in 2000. UMBC's record in technology transfer is particularly noteworthy, with a national rank of 6th in inventions disclosed and 9th on patent applications filed, per 1 million research dollars spent. UMBC is also achieving recognition for faculty quality on indicators that are not normalized for the size of the faculty. Compared to its 10 performance-peer institutions,[2] UMBC ranks 2nd in the average number of NSF Career Awards (6.4 from 1997 to 2001) and ties for 3rd in the average amount of those awards. UMBC tied for 3rd place in the number of prestigious faculty awards in 2000[3]. Statistics such as these and inter-institutional comparisons make it clear that the size and quality of UMBC's faculty will be major determiners of our future status as a research institution. Not only is it important to build the faculty, it is equally important to provide a support structure for research and teaching that will foster retention of the faculty who are hired.

The PLT's second priority, building the size and quality of the student body, has direct implications for the size of the instructional faculty. In academic year 1999, the Enrollment Management

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[1]Data taken from the report of Scott A. Bass, Vice Provost for Research and Planning, presented at the annual UMBC Retreat, August 20, 2002.

[2]University at Albany (SUNY); University of Arkansas; University of California, Riverside; University of California, Santa Cruz; Clemson University; University of Delaware; Mississippi State University; Oklahoma State University; University of Rhode Island; and University of Wyoming. These institutions were selected as most comparable to UMBC from among the 23 former Carnegie public Research II institutions. For funding purposes, UMBC is compared to all 23 of these universities.

[3]Prestigious awards include the following: Fulbright, Guggenheim, National Endowment for the Humanities, and Sloan Fellowships; Young Investigator CAREER Awards; and election to the National Academy of Sciences, the National Academy of Engineering, the Institute of Medicine, the American Academy of Arts and Sciences, and the National Academy of Education.

Task Force set a goal of 10,000 undergraduate and 2,000 graduate students by Fall 2007. As of Fall 2002, we have already met that goal at the graduate level, and our total enrollment stands at 11,711. UMBC has also set a goal of 23:1 for the ratio of students to faculty, as reported annually to the Maryland Higher Education Commission (MHEC). This ratio is a very important quality indicator, not only for performance accountability within the State of Maryland, but also for our rankings nationally relative to other public research universities. According to our Managing for Results (MFR) plan, we are striving to reach this target by Fall 2003.

Given the importance of building and maintaining a first-rate faculty, this report addresses three questions: "*How large should the UMBC faculty be*?"; "*What should the composition of the faculty be*?"; and "*How should faculty lines be allocated to departments and programs*?"

The first question is addressed in the first section of this report, which describes the current size and composition of UMBC's instructional faculty and presents historical data and projected trends on UMBC's faculty size in relation to enrollment, faculty workload, and faculty demographics. A comparison with peer institutions provides context for evaluating UMBC's performance. The second section of the report provides data on composition of the faculty at other public research universities, and the third section of the report outlines a set of general principles to guide the deans and the provost as they consider the needs of academic departments and programs and set priorities for faculty recruitment.

I. *Size of the UMBC Faculty*

A. Historical Trends in Enrollment and Faculty Composition

Enrollment. Table 1 shows enrollment data for the past 11 years. Following a low point in 1997, total enrollment has increased steadily over the past four years, particularly at the graduate level. The composition of the student body is also shifting, with a trend toward greater percentages of full-time students and graduate students.

Table 1. UMBC Fall Headcount Enrollment

	Fall										
	'92	**'93**	**'94**	**'95**	**'96**	**'97**	**'98**	**'99**	**'00**	**'01**	**'02**
Total	10654	10667	10315	10467	9932	9863	10122	10265	10759	11237	11711
Undergraduate	9084	9068	8808	8899	8475	8451	8638	8854	9101	9328	9549
Full Time	6384	6476	6137	6311	6202	6255	6602	6983	7267	7572	7793
Part Time	2700	2592	2671	2588	2273	2196	2036	1871	1834	1756	1756
Graduate	1570	1599	1507	1568	1457	1412	1484	1411	1658	1909	2162
Full Time	689	592	617	622	587	552	625	627	765	920	1176
Part Time	881	1007	890	946	870	860	859	784	893	989	986
FTES[1]	8267	8268	7941	8111	7837	7826	8192	8495	8941	9407	9883
Full-Time	66.4%	66.3%	65.5%	66.2%	68.4%	69.0%	71.4%	74.1%	74.7%	75.6%	76.6%
Graduate	14.7%	15.0%	14.6%	15.0%	14.7%	14.3%	14.7%	13.7%	15.4%	17.0%	18.5%

[1]FTES = Full time students plus 1/3 part-time students.

Source: Office of Institutional Research, Report IENRL02, September 2002

Faculty. Faculty counts can be reported in a variety of ways, and it is important to distinguish among the several categories of faculty. The distinctions between *instructional* faculty and *research* faculty, between *full-time* (FT) and *part-time* (PT) faculty, and between *tenured/tenure-track* (T/TT) faculty and *non-tenure-track* (NTT) faculty are important for characterizing the composition of the faculty. Figure 1 shows the numbers of faculty in these categories in Fall 2002.

Instructional faculty are those with regular instructional responsibilities. This includes the tenured/tenure-track faculty, along with Lecturers, Instructors, and a few others with titles that are infrequently used. Research faculty are those whose primary responsibility is in research and who usually do not have instructional responsibilities. The vast majority of research faculty are supported by grants and contracts and not by state funds. The research faculty includes Research Associates (postdoctoral fellows), Research Scientists, and Research Professors. With the establishment and growth of large research centers, such as the Joint Center for Earth Systems Technology (JCET) and the Goddard Earth Sciences and Technology Center (GEST), research faculty now constitute 22.7% of all faculty. There are also research faculty within academic departments who are supported by grants and contracts.

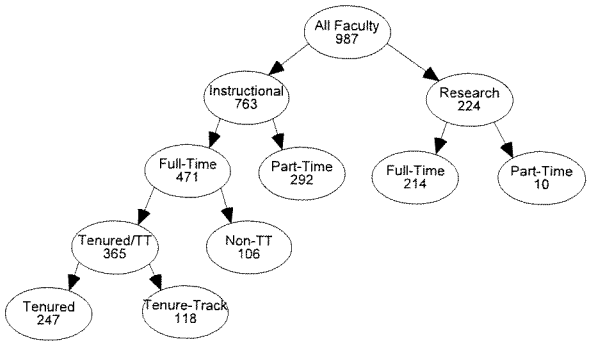

Figure 1: Composition of the UMBC Faculty, Fall 2002

Among the instructional faculty, 61.7% are full-time. The FT instructional faculty are further classified according to whether they are on the tenure track (77.5%) or "off-track." Finally, 67.7% of the tenure-track faculty are tenured. Another distinction that is important for calculation of student/faculty ratios is the count of "professorial" faculty (not shown). These are the instructional faculty members with professorial titles, regardless of whether they are on the tenure-track; this includes visiting faculty and clinical faculty.

The size and composition of the faculty for the past 11 years is given in Table 2, and Figures 2 and 3 show two important trends. First, there has been a slow, but steady increase in the number of full-time instructional faculty, and more variable, but also increasing numbers of part-time faculty. For the past five years, about half of all UMBC faculty have been full-time instructional faculty. Second, among the full-time instructional faculty, a small but increasing percentage are non-tenure-track faculty.

Figure 2a: Instructional Faculty

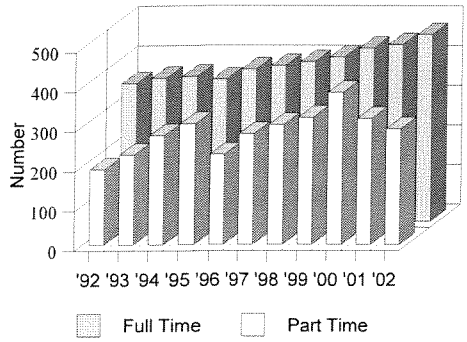

Figure 2b: Percent Full-Time

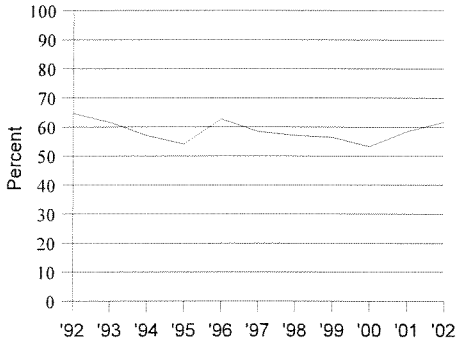

Figure 3a: FT Instructional Faculty

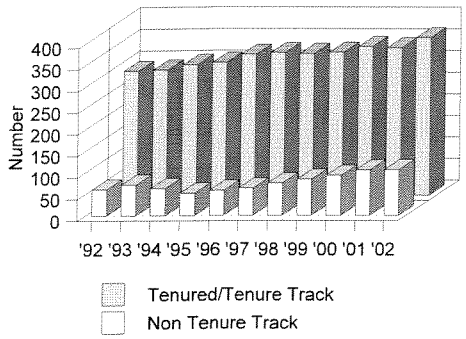

Figure 3b: % Tenured/Tenure-Track

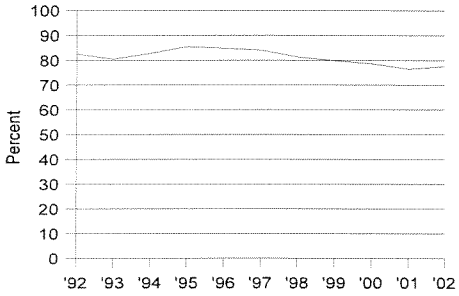

Table 2: UMBC Faculty Size and Composition

	Fall										
	'92	**'93**	**'94**	**'95**	**'96**	**'97**	**'98**	**'99**	**'00**	**'01**	**'02**
All Faculty	623	696	725	756	664	754	796	835	946	934	987
Instr. Faculty[1]	540	589	642	664	612	673	706	736	821	754	763
FT	349	362	366	359	384	393	403	415	437	446	471
T-TT	288	291	303	307	326	330	328	331	344	341	365
NTT	61	71	63	52	58	63	75	84	93	105	106
PT	191	227	276	305	228	280	303	321	384	308	292
Res. Faculty[2]	83	107	83	92	52	81	90	99	125	180	224
FT	35	45	58	68	47	68	80	85	110	170	214
PT	48	62	25	24	5	13	10	14	15	10	10
% FT Inst. Fac.	56	52.0	50.5	47.5	57.8	52.1	50.6	49.7	46.2	47.8	47.7
FTEF[3]	429	458	466	469	462	491	507	527	570	552	568

[1]The instructional faculty includes tenured and tenure-track professors, instructors, and lecturers, including visiting and clinical faculty. Faculty administrators such as the President, Provost, Deans, Vice Provosts, and Associate Deans, are excluded.
[2]The research faculty includes research scientists, research professors, research associates, and other faculty whose primary responsibility is research.
[3]FTEF = Full-time instructional faculty plus 1/3 part-time faculty.

Source: Office of Institutional Research.

B. Student/Faculty Ratio

Combining the enrollment and faculty trends produces the student/faculty ratios shown in Table 3. In the top portion of the table, the student/faculty ratio is calculated as a ratio of full-time equivalent students to full-time professorial faculty. This is the ratio reported to MHEC and to the American Association of University Professors, and, with few exceptions, it represents ratio of FTE studetns to "core" faculty. UMBC's target is 23:1 for FY 2004 (Fall 2003), and this is approximately the value of the ratio we had attained in 1996 and 1997. Although this target seemed attainable as recently as 1998, the ratio has climbed significantly with increases in enrollment in the last four years. As enrollment grows, each 100 additional students requires a net increase of about 4 new professorial faculty members just to maintain the current ratio of 25.5:1. This year, UMBC appointed 38 new tenured and tenure-track faculty members, resulting in a net gain of 24 in this category. This enabled the university to maintain, and slightly reduce, last year's student/faculty ratio in concert with growing enrollment. However, with today's enrollment, reducing the ratio to the targeted 23:1 would require an additional 42 full-time professorial faculty. To achieve this goal in the near future would require a large, indeed unprecedented, faculty recruitment and retention effort.

Table 3: Student/Faculty Ratios

	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	'02
FT Instr. Prof.	298	308	309	315	339	338	344	346	360	364	388
FTES[2]/FTIPF[1]	27.7	26.8	25.7	25.7	23.1	23.2	23.8	24.6	24.8	25.8	25.5
FT Instr. Faculty	349	362	366	359	384	393	403	415	437	446	471
FTES[2]/FTIF[3]	23.7	22.8	21.7	22.6	20.4	19.9	20.3	20.5	20.5	21.1	21.0
FTE Inst. Faculty	429	458	466	469	462	491	507	527	570	552	568
FTES/FTEF[4]	19.3	18.1	17.0	17.3	17.0	15.9	16.2	16.1	15.7	17.0	17.4

[1]FTIPF = Full-time instructional faculty with professorial rank (including visiting, clinical, etc.; excluding faculty on leave without pay).
[2]FTES = Full time students plus 1/3 part-time students.
[3] FTIF = Full-time instructional faculty.
[4]FTEF = Full-time instructional faculty + ⅓ part-time instructional faculty

For comparison purposes, we note that a student/faculty ratio based on all full-time instructional faculty produces a nearly constant value of about 20.5:1 over the past few years, reflecting the tendency for new full-time faculty hires to include a higher percentage of non-tenure-track faculty. This ratio includes a great many Instructors and Lecturers who are longstanding and highly respected members of the faculty, who teach key courses in the undergraduate curriculum, and who participate actively in shared governance and in university and community service.

A third way of defining the student faculty ratio, and the one used by publications such as *U. S. News & World Report* to rank colleges and universities, is the ratio of full-time equivalent students to full-time equivalent faculty. These ratios are shown in the bottom portion of Table 3. As with the other ratios, the value fell to a low point in 1996 and 1997, but has been rising in the last two years.

The analyses presented thus far consider UMBC in isolation and only with regard to its previously stated goals for enrollment growth and student/faculty ratios. It is informative to compare UMBC's enrollments, faculty, and student/faculty ratio to those of our performance peers. This provides an external context that helps us to evaluate whether our goals are realistic and competitive. On the key measure of concern in this section, the student/faculty ratio, UMBC compares unfavorably with its peers.

Appendix A gives the current comparison of UMBC with its peers on several performance indicators. Although the student/faculty ratio is a relative measure that controls for overall size of the institution, UMBC is clearly lagging behind its peers, with nine of the ten current peer institutions achieving better student/faculty ratios than UMBC. The average of our peers on this measure is 20.4.

C. Budgeted Faculty Lines

From a budgetary perspective, UMBC has fewer tenured and tenure-track faculty than it is budgeted to have. Data provided by the Budget Office are shown in Table 4 from 1992 to 2002.

Table 4: UMBC Budgeted Faculty Size and Composition (State-Supported Instruction)

	Fiscal Year										
	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	'02
All Faculty	421.7	414.8	413.8	418.0	415.5	429.7	442.6	441.6	455.3	469.3	496.7
Instructional	415.7	409.8	409.7	412.8	411.4	426.7	438.6	438.6	453.3	467.3	495.7
T/TT	373.4	363.0	363.0	368.7	365.7	375.8	383.0	384.4	392.4	403.9	406.0
NTT	42.4	46.8	46.7	44.2	45.7	51.0	55.6	54.2	60.9	63.4	89.7
Research	6.0	5.0	4.2	5.2	4.2	3.0	4.0	3.0	2.0	2.0	1.0

Since 1992, the number of budgeted full-time instructional faculty lines has risen from 416 to 496, and 406 of those lines in 2002 are budgeted for tenured/tenure-track faculty. In contrast, only 90 lines are budgeted for non-tenure-track faculty. Comparison with Table 2 shows that whereas the university has budgeted for tenured/tenure-track faculty to constitute about 82% of the full-time instructional faculty, the actual value at present is less than 78%. If UMBC had as many tenured/tenure-track faculty as we are budgeted to have, the current student/faculty ratio would be at the targeted value of 23:1.

The discrepancy between budgeted faculty lines and actual faculty is attributable to several factors. First, when a search for a tenure-track faculty member is unsuccessful, the department sometimes requests, and receives, permission to hire a visiting faculty member or a Lecturer. Such hires contribute to the excess number of non-tenure-track faculty. Second, a small number of faculty are on leave without pay each year. The budget still shows their lines, but they are not tallied in the faculty count while on leave. Third, a small number of faculty hold tenured appointments in academic departments, but serve as faculty administrators. Their budgeted lines remain in the department, but for the duration of their administrative appointments, they are counted as administrators rather than faculty. Finally, and perhaps most importantly, enrollment pressures and the economy of part-time instruction can result in vacant lines remaining unfilled while the budgeted salary savings is used to hire additional part-time faculty.

D. Projected Enrollments

The university's projected enrollments for the next 9 years are shown in Table 5, together with the number of faculty needed to achieve and maintain our stated target student/faculty ratio. Although they were carefully prepared using data on admissions, retention, and other factors that affect them, the projections in Table 5 are almost certainly underestimates. UMBC has exceeded its projected enrollments in recent years, and the Fall 2002 headcount of 11,711 already exceeds the projected enrollment for Fall 2003. A corollary effect of this over-attainment is that it will take even greater numbers of new faculty to

balance the enrollment increases. Unfortunately, in the current budget climate, recruitment of new faculty this year is being limited to only 15 searches, and the outlook for next year is uncertain as well. This will result in a very small net gain in faculty, and perhaps even a net loss, if current trends in retirement and resignation continue.

Clearly, the major hurdle for UMBC is to attain an appropriate student/faculty ratio. Under the model used to generate the enrollment projections, maintaining the student/faculty ratio, once attained, would be a manageable challenge. However, given that UMBC has consistently exceeded its enrollment projections and given that its burgeoning reputation is attracting greater and greater numbers of students, the pressures for faculty growth will be intense and unyielding for the foreseeable future.

Table 5: Projected Fall Enrollments and Faculty Counts Needed to Achieve Target Student/Faculty

	'03	'04	'05	'06	'07	'08	'09	'10	'11
FTUg	7718	7742	7776	7799	7805	7804	7805	7804	7806
PTUg	1790	1795	1803	1809	1810	1810	1810	1810	1810
FTg	938	948	957	967	977	986	996	1006	1016
PTg	1248	1302	1336	1360	1381	1408	1433	1459	1486
FTES	9669	9722	9779	9822	9846	9863	9882	9900	9921
Total Headcount	11694	11787	11872	11935	11973	12008	12044	12079	12118
FTIPF[2]	420	423	425	427	428	429	430	430	431
FTES/FTIPF	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0

Note: FY 2004 (shaded area) is the year designated for achieving the 23:1 target.

FTES[1] = Full time students plus 1/3 part-time students.
FTIPF[2] = Full-time instructional faculty with professional rank (including visiting, clinical, etc.; excluding faculty on leave without pay).

II. *Composition of the UMBC Faculty*

A. Comparison to USM Institutions and National Norms

UMBC faces the same challenges as other colleges and universities in determining the appropriate composition of its faculty. In a research university, where tenured and tenure-track faculty must excel not only in research and scholarship, but also in teaching and service, it is very difficult, with limited resources, to meet the needs of students without substantial reliance on non-tenure-track and part-time faculty. Among the instructional faculty, UMBC has increased its reliance on part-time faculty over the past ten years,[4] and among the full-time instructional faculty, the percentage of non-tenure-track

[4]The faculty database maintained by the Department of Human Resources includes all faculty whose appointments have not been formally separated from the university. Because part-time faculty often teach periodically, rather than every semester, the number of part-time faculty in the database overestimates the number of part-time faculty employed by the university at any given time. In 2001, the Office of Institutional Research, in cooperation with the academic departments, began reporting only *active* part-time faculty, that is, those who were actually teaching. This accounts for the apparent drop in part-time faculty in 2001.

faculty has also grown. The status of full-time and part-time non-tenure-track faculty has been an issue of concern both nationally and regionally.[5]

The composition of the faculty in the University System of Maryland institutions from 1996-2000 is shown in Table 6 with regard to the percentage of faculty who are full-time and the percentage who are tenured/tenure-track. Of the three research universities in the USM, UMBC has the lowest percentage of full-time faculty but the highest percentage of full-time faculty who are tenured/tenure-track.

Table 6: Composition of the Faculty at USM Institutions

	Percentage of Faculty Who are Full-Time					Percentage of Full-Time Faculty Who are Tenured/Tenure-Track				
	'96	'97	'98	'99	'00	'96	'97	'98	'99	'00
Bowie State University	55.4	48.3	54.1	45.7	51.3	75.5	71.4	67.3	71.8	71.7
Copppin State College	53.9	66.9	81.4	68.9	48.5	92.7	95.7	85.1	86.7	88.2
Frostburg State Univ.	72.4	72.2	73.0	74.0	68.9	88.7	89.6	92.0	89.5	90.7
Salisbury University	72.2	69.0	70.9	66.2	64.6	80.3	81.5	80.6	82.4	82.5
Towson University	48.2	45.0	45.2	45.7	46.0	92.8	93.3	91.5	85.6	83.5
University of Baltimore	52.4	48.1	44.2	46.5	48.6	92.9	93.0	90.3	87.4	81.4
U.M., Baltimore	79.3	77.8	78.5	80.9	81.5	49.7	48.4	47.3	46.4	45.8
UMBC	64.9	61.1	60.7	59.9	58.0	76.1	71.8	68.3	66.4	62.7
U.M., College Park	78.6	78.3	76.0	74.4	74.6	61.6	60.0	59.4	57.1	54.0
U.M., Eastern Shore	69.0	60.7	60.2	63.7	67.4	49.7	57.7	63.6	49.4	57.5
U.M., Univ. College	1.4	1.4	1.5	0.0	1.4	0.0	0.0	0.0	0.0	27.3

Table 7: Faculty Status by Institution Type (Fall 1998)

	Full-Time		
Type of Institution	**T/TT**	**NTT**	**Part-Time**
All institutions	38%	13%	49%
Public Doctoral Universities	50%	15%	35%
Public Research Universities	58%	13%	30%
UMBC	42%	19%	39%

Note: Adapted from Anderson (2002, Table 1, p. 6); data for UMBC added. Percentages are based on both instructional and research faculty.

[5]Several relevant documents are available at the website of the American Association of University Professors (http://www.aaup.org), and the University System of Maryland's Board of Regents recently passed two new policies on full-time and part-time non-tenure-track faculty, respectively (see policies II-1.05 and II-1.06 at the USM Board of Regents Web site, http://www.usmd.edu/Leadership/BoardOfRegents/Bylaws/SectionII/).

Data are also available from the *National Study of Post-Secondary Faculty: 99* (Anderson, 2002) that place UMBC's faculty composition in the context of other universities. Table 7 shows faculty status in Fall 1998 for different types of institutions. The public doctoral and research universities show less reliance on part-time faculty than UMBC, and their percentages of tenured/tenure-track faculty are higher. This pattern is reversed for the entire sample, which includes two-year institutions.

The results presented in Tables 6 and 7 are consistent in showing a higher percentage of part-time faculty at UMBC, particularly in comparison to public research universities. When the data in Table 7 are expressed in terms of the percentage of full-time faculty who are tenured/tenure-track, UMBC's value of 68.3% (c.f. Table 6, 1998) is the lowest of all institution types. The values for the research and doctoral universities are 81.8% and 76.5%, respectively. For all institution types combined, the value is 74.5%. All three research universities in the USM are substantially below these national averages.

All of these comparisons may be influenced somewhat by the inclusion of research faculty in the headcounts underlying Tables 6 and 7. Research faculty, many of whom are located in the university's large research centers, are likely to be both full-time (supported by external funds) and non-tenure-track.

B. Comparison to Peer Institutions

Although it is useful to place UMBC's faculty composition in local and national contexts, it is our performance peers with whom we are directly compared for institutional accountability. These institutions were chosen from among 23 Carnegie Research II Universities to be as similar to UMBC as possible.

Table 8: Comparison of UMBC with Performance Peers on Indicators of Size and Staffing (Fall 2000)

	Total Enroll-ment	Total Faculty	FT Faculty	PT Faculty	% FT	Tenured Faculty	FT Staff	Staff per FTES
Albany	11780	1129	567	625	47.6%	394	1323	0.09
Arkansas	15346	961	889	72	92.5%	542	2115	0.16
California, Riverside	13015	1051	840	211	79.9%	364	1670	0.15
California, Santa Cruz	12144	1012	697	315	68.9%	323	1819	0.17
Clemson	17465	1305	1040	265	79.7%	626	2965	0.19
Delaware	19072	966	933	33	96.6%	633	2502	0.14
Mississippi State	16561	1016	892	124	87.8%	515	3403	0.25
Oklahoma State	18383	1254	1115	139	88.9%	683	3140	0.18
Rhode Island	14362	701	676	25	96.4%	508	1634	0.14
Wyoming	11743	877	826	51	94.2%	375	1527	0.17
UMBC	10759	830	495	335	59.6%	234	1056	0.12

Table 8 presents data extracted by the Office of Institutional Research from the IPEDS[6] Peer Analysis System for UMBC and its 10 performance peers. Because UMBC's funding from the State is linked to performance comparisons with these institutions, it is important to understand their institutional characteristics. Size is particularly important, since UMBC is smaller than almost all of its peers, both in terms of enrollments and overall faculty size.

In terms of Fall 2000 enrollments, UMBC was smaller than any of its peers. In 2000, UMBC had fewer faculty than all but one of its peers, significantly fewer full-time and tenured faculty than any of its peers. Given its smaller enrollments, these comparisons may not be surprising. Nevertheless, despite its small size, UMBC had the second highest number of part-time faculty and the second lowest percentage of full-time faculty; only the University at Albany (SUNY) had a lower percentage. UMBC was also comparatively short-staffed, relative to the number of full-time equivalent students.

Yet another source for comparison is the *Common Data Set*, a compilation of descriptive and statistical information that is published each year by post-secondary educational institutions for use by publishers and secondary schools in college selection and comparison (see the *Common Data Set* link at http://www.umbc.edu/oir). According to the rankings in this year's *U.S. News & World Report*, the ratio of full-time equivalent students to full-time equivalent faculty for UMBC (see Table 3) compares more favorably with our peer institutions. The range for our peers is from 13:1 to 20:1, with UMBC's 17:1 at the median.

C. Impact of Faculty Composition on Instruction

Taken together, all of the inter-institutional comparisons above demonstrate that UMBC relies more heavily on part-time faculty than other universities. This has a direct impact on the instruction delivered to our students. Table 9 shows the percentage of course sections taught and the student credit hours generated by four categories of faculty: tenured/tenure-track, non-tenure-track, supplemental, and teaching assistants. The supplemental category includes part-time faculty plus others, such as administrators and staff members, who teach part-time. Teaching assistants are included when they are the instructor of record for a credit-bearing course.

Table 9: Course Sections Taught and Student Credit Hours Generated (%) by Four Categories of UMBC Faculty (Fall 2001)

	Course Sections					Student Credit Hours							
						Undergraduate				Graduate			
Faculty Category	Lab./ Disc.	Lower Div.	Upper Div.	Grad.	Total	Lower Div.	Upper Div.	Ind. Instr.	Total	Courses	Ind. Instr.	Total	Total
T/TT	50.4	23.0	45.9	78.1	43.2	30.4	47.5	37.9	37.7	71.7	94.7	75.1	40.9
NTT	30.9	15.2	18.1	5.9	15.7	23.1	16.8	30.9	20.7	8.2	1.3	7.1	19.5
Suppl.	18.7	57.0	36.0	16.1	39.3	44.3	35.6	31.2	40.4	20.2	4.0	17.8	38.5
TA	0.0	4.7	0.0	0.0	1.8	2.2	0.0	0.0	1.2	0.0	0.0	0.0	1.1

Source: UMBC's submission to *The Delaware Study of Instructional Costs and Productivity*.

[6]IPEDS is the Integrated Postsecondary Education Data System, a data collection program for the National Center for Educational Statistics.

In terms of organized course sections, UMBC relies most heavily on supplemental faculty for teaching lower-division undergraduate courses. Only 23.0% of lower-division courses are taught by tenured and tenure-track faculty; an additional 15.2% are taught by full-time non-tenure-track faculty. Not surprisingly, these percentages improve at the upper-division and graduate levels. But overall, 39.3% of all regular course sections are taught by supplemental faculty. A similar picture emerges in terms of student credit hours generated in regular lower- and upper-division courses. All three categories of faculty (excluding TAs) are engaged in individual instruction at the undergraduate level, but at the graduate level, this is almost entirely a responsibility of the tenured and tenure-track faculty.

In planning for an appropriate full-time/part-time faculty distribution for UMBC, several issues should be taken into consideration. First, an individual faculty member's part-time status reflects both the university's needs and resources and the preferences of the faculty member. At one end of the continuum are part-time faculty who are highly qualified professionals and who represent specialized areas of expertise that are important to delivery of our academic programs. These faculty are likely to teach upper-division undergraduate and graduate courses. Many have taught for UMBC for many years and hold formal appointments as adjunct faculty. They neither desire nor seek full-time employment at UMBC, and their departments have no intention of creating a full-time line in their specialty. In contrast, there are part-time faculty who teach in core areas of the curriculum, areas where the department would prefer to have a full-time faculty member, and there are part-time faculty members who would prefer to hold a full-time position. Any plan to modify the percentage of faculty with part-time appointments must take into account the kinds of courses part-time faculty teach and the kinds of faculty who teach part-time.

Another issue that must be examined is the role of graduate students as instructors. Graduate students serve as teaching assistants, with a faculty member as the instructor of record, and some are occasionally hired as part-time faculty, but there are no formal programs or requirements that acknowledge the importance of teaching experience in the training of graduate students. Over the years UMBC has taken some pride in having part-time faculty teaching courses that might otherwise have been assigned to graduate students. This may, in part, account for the high percentage of faculty who are part-time. However, the practice deserves scrutiny as we develop a plan for the composition of the instructional faculty.

D. Productivity of Full-Time Faculty

Planning for the composition of the full-time faculty should be informed by data on the instructional and non-instructional productivity of faculty. The Faculty Workload Report, submitted annually to the University System of Maryland, provides such data for full-time tenured/tenure-track, for non-tenure-track instructional faculty, and for those research faculty who teach. The most recent data, for Academic year 2001-2002, are summarized in Table 10.

Instructional productivity. The productivity profiles in Table 10 highlight the differences between the tenured/tenure-track faculty and the non-tenure-track instructional faculty. In 2001-2002, the non-tenure track faculty taught an average of 8.4 course units per year and generated more than twice the student credit hours of the tenured/tenure-track faculty. This difference in delivery of Instruction makes it clear why enrollment pressures lead to appointments of non-tenure-track faculty.

Non-instructional productivity. As expected, the profiles are reversed with regard to non-instructional productivity, although the non-tenure-track faculty are also professionally active. On average, the tenured/tenure-track faculty published 0.3 books, 2 refereed articles, about 1 creative work, and made about 3 professional presentations in that year. About 40% of the tenured/tenure-track faculty had external grants and contracts and the number of awards, averaged over faculty, was 1.1. Dollars in

external grants and contracts awarded to these faculty members averaged $105,723 per full-time equivalent faculty member. There was also some grant activity among the non-tenure-track faculty.

The research faculty included in Table 10 represent only a fraction of the research faculty because most are not affiliated with academic departments and do not teach. Those who teach include research professors in the Joint Center for Earth Systems Technology and some externally-supported research

Table 10: Summary of Faculty Productivity 2001-2002

Indicator (Per FTEF)	T/TT	NTT Instructional	NTT Research
Student Credit Hours taught	310	671	51
Course units taught	5.0	8.4	0.3
Books published	0.3	0.1	0.0
Refereed articles	2.0	0.2	1.3
Non-refereed articles	0.4	0.1	0.3
Creative works	0.9	1.3	0.0
Presentations	2.9	0.7	1.8
External grants/contracts	1.1	0.0	0.5
Faculty with external grants/contracts	0.4	0.0	0.3
Dollars in external grants/contracts	$105,723	$869	$33,423

Note: Only research faculty located in or affiliated with academic departments are included in the Faculty Workload Report.

faculty within academic departments, including research associates (postdoctoral fellows). The amount of external support for the research faculty reflects only the grants and contracts on which they are principal investigators, not the grants awarded to tenured/tenure-track faculty who support them.

Productivity of tenured/tenure-track faculty. A more detailed examination of the productivity of the tenured/tenure-track faculty for the past seven years is given in Table 11. The top panel shows headcount, full-time equivalent, and State-supported full-time equivalent faculty, respectively. These counts are reported to the USM and used in computation of various productivity ratios.

The second panel gives a breakdown of instructional productivity in terms of course units and student credit hours (SCH) generated. One course unit is equivalent to a 3-credit regular lecture course. Independent studies, research credits, internships, thesis and dissertation research, and other forms of instruction are converted to course units by formula. The expected number of course units per faculty member is 5, and the average number of course units per faculty member has been greater than or equal to 5.0 each year since 1996. Faculty members who teach from 4.5 to 5.5 course units are considered to be teaching the standard load. The table shows that about one-third of the tenured/tenure-track faculty have been teaching more than the standard load, and in some case, considerably more. When these statistics are broken down by department, it is possible to identify departments where the average number of course units taught is 6, and where the majority of faculty members are teaching more than the standard load.

Table 11: Faculty Workload and Productivity

	Academic Year													
	1996		1997		1998		1999		2000		2001		2002	
Tenured/Tenure-track faculty	315		327		328		330		331		350		348	
FTEF	282		286		287		289		292		312		303	
State-supported FTEF	280		280		280		281		274		304		297	
Courses and Student Credit Hours Taught	#	*Per SSFTEF*	#	*Per SSFTEF*	#	*Per SSFTEF*	#	*Per SSFTEF*	#	*Per SSFTEF*	#	*Per SSFTEF*	#	*Per SSFTEF*
Course units taught	1520	5.4	1505	5.4	1523	5.4	1592	5.7	1675	6.1	1513	5.0	1660	5.6
Faculty w/ standard load	95		96		95		83		92		115		103	
Faculty over standard load	103		111		116		125		122		108		120	
Student credit hours (SCH)	107834	385.0	101371	362.7	101436	362.1	102560	365.5	99609	363.7	100941	332.0	102720	345.9
Lower division SCH	44877	160.2	41568	148.7	41645	148.7	40281	143.6	39400	143.9	38799	127.6	40358	135.9
Upper division SCH	51473	183.8	48957	175.2	48831	174.3	51136	182.2	48630	177.6	48900	160.9	49058	165.2
Graduate SCH	11484	41.0	10846	38.8	10960	39.1	11143	39.7	11579	42.3	13244	43.6	13305	44.8
Exemptions from Standard Teaching Load	#	*Course Units*	#	*Course Units*	#	*Course Units*	#	*Course Units*	#	*Course Units*	#	*Course Units*		*Course Units*
Number of faculty	117	230	120	222	117	217	122	207	117	224	127	275	125	229
Instruction-related	25	37	27	29	22	21	25	33	10	13	11	16	11	15
Dept. administration	6	5	10	11	10	11	10	11	19	28	18	42	17	32
Ext.-funded research/svc	34	62	36	65	41	74	43	71	39	82	28	62	39	66
Dept-supp research	17	31	14	22	35	24	9	12	13	18	14	25	10	13
Dept-supp svc - prof.	3	3	0	0	0	0	0	0	1	1	1	2	1	1
Dept-supp svc - internal	2	3	3	3	4	4	4	5	6	8	12	14	3	4
Dept-supp svc - public	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Sabbatical	23	72	23	73	25	74	21	56	18	51	27	81	23	55
Contractual/illness/other	7	17	7	19	3	9	10	19	11	22	16	33	21	43
Research, Scholarship, and Other Activities	#	*Per SSFTEF*	#	*Per SSFTEF*	#	*Per SSFTEF*	#	*Per SSFTEF*	#	*Per SSFTEF*	#	*Per SSFTEF*	#	*Per SSFTEF*
Books published	94	0.3	72	0.3	70	0.3	91	0.3	67	0.2	83	0.27.0	83	0.3
Refereed works	661	2.4	646	2.3	571	2.0	576	2.1	700	2.6	645	2.1	645	2.2
Non-refereed works	208	0.7	279	1.0	118	0.4	96	0.3	108	0.4	88	0.3	88	0.3
Creative activities	185	0.7	235	0.8	161	0.6	236	0.8	288	1.1	298	1.0	298	1.0
Professional presentations	770	2.7	773	2.8	744	2.7	757	2.7	924	3.4	886	2.9	886	3.0
Ext.-funded grants/contracts	228	0.8	247	0.9	340	1.2	287	1.0	282	1.0	315	1.0	315	1.1
Faculty awarded grants	112	0.4	115	0.4	139	0.5	144	0.5	131	0.5	134	0.4	134	0.5
Dollars in grants/ contracts	24,597,833	87,818	19,614,728	70,178	26,341,379	94,043	30,516,110	108,757	28,452,307	103,886	36,943,227	121,524	36,943,227	124,388
Days spent in public svc	2963	10.6	3119	11.2	2830	10.1	2520	9.0	2621	9.6	2873	9.5	2873	9.7

Note: This table is adapted from the *Faculty Workload Report* submitted annually to the University System of Maryland. "Per SSFTEF" measures are based on State-supported, full-time equivalent faculty. na = data not available.

course units, which shows a steady, if not rising, level of productivity. Only an in-depth analysis on a department-by-department basis can provide confirmatory data, but since credit-hour production reflects class size, any attempt to reduce class size is likely to result in lower credit-hour production per faculty member. Departments in which some core faculty teach large lower-division lecture courses can maintain credit-hour production. But in disciplines where small courses are essential, and where efforts are being made to offer small seminars by tenured/tenure-track faculty that will enhance student engagement, it follows that lower credit-hour production for those faculty will result. Clearly, student credit-hours is an ambiguous measure that must be interpreted in terms of the number of course units taught. If the latter is at an acceptable level, then lower student-credit hour production can be a measure of *quality* of instruction rather than simply an indicator of *quantity* of instruction.

The third panel of Table 11 shows the numbers of faculty exempted from teaching the standard load, together with the reasons for the exemptions. For the past seven years, as many or more faculty members have been exempted from teaching the standard load as have exceeded it. Each year, the largest single category has been due to course buyout for externally funded research, and the average number of course units is roughly two per year for these faculty members. Sabbatical leave and instruction-related exemptions are the other two significant categories. About 7% of the tenured/tenured-track faculty take a sabbatical leave in any given year, with an average of 66 course units exempted. Other categories of exemption occur much less frequently, but the cumulative impact of release time for departmental administrative service, departmentally supported research, and service to the professions, to the department, to the university, and to the public, all have an impact on the delivery of instruction. Course release time has, understandably, been used as an incentive for faculty to increase their level of effort, usually on a temporary basis, in some activity that is deemed beneficial to the university.

The last panel in Table 11 shows the trends in non-instructional productivity. The research, scholarly and creative activities of the faculty contribute to UMBC's reputation and enhance our status as a Carnegie Research-Extensive university. The measures in Table 11 are same as in Table 10, and most fluctuate from year to year, with no discernible trends. The one exception is the dollar amount of awards from external grants and contracts. As the tenured/tenure track faculty has grown, the number of faculty with awards has increased from 112 in academic year 1996 to 134 in academic year 2002, and the dollar amount per faculty member has also grown. In 2002, $124,388 in external funding was received by UMBC per state-supported full-time equivalent faculty member.

E. Planning

Research versus instructional faculty. As the university's research centers increase in number and complexity, the numbers of research faculty, nearly all of whom are full-time, will continue to grow. Research faculty, particularly postdoctoral fellows and visiting research scientists, are also appointed within academic departments with support from research grants and contracts of the instructional faculty. Growth in this area can also be expected as increasing numbers of faculty have such external awards. The research faculty contribute to the national reputation of UMBC and enhance our status as a research university.

With mechanisms in place through shared governance for oversight and ongoing evaluation of research centers, an appropriate balance between research and instructional faculty can be achieved. At present, the ratio of instructional faculty to research faculty is 3.4:1. If the tenured/tenure-track faculty were at their budgeted level of 406, other counts remaining constant, the ratio would be 3.6:1. Because some national data sources report on all faculty and others report on only instructional or only full-time faculty, it is difficult to determine the ratio of instructional to research faculty for our peers or for top-tier

public research universities. How high, or low, this ratio should be is a matter for further research and discussion, but it is clear that growth in both categories of faculty is desirable in terms of our institutional priorities.

Full-time verus part-time instructional faculty. The one consistent finding across different data sources and comparison groups is that UMBC relies much more heavily on part-time faculty than other research universities do. According to *U.S. News & World Report*'s *America's Best Colleges 2003*, among the top 50 doctoral universities only 15 had less than 90% full-time instructional faculty. Among the top 50 public doctoral institutions, lowest ranked University of Arizona and University of Kentucky were at 99% and 88% full-time, respectively. If UMBC wants to achieve its vision of an Honors University, the most important step it can take is to dramatically increase the percentage of full-time instructional faculty--currently at only 47.7%.

Clearly, the University needs to set a target for the composition of the instructional faculty. One way of achieving this is to identify courses that are currently taught by part-time faculty who are highly qualified and who have expertise that complements that of the full-time faculty and those that are taught by part-time faculty only because we lack the resources to hire full-time faculty. This exercise can provide insight into our use of part-time faculty to enhance instruction versus our use of part-time faculty as a means of stretching our resources. With this information, we can target conversion of part-time instruction to full-time instruction, retaining those part-time faculty who represent special expertise and who teach part-time by choice, while making the investment to fill vacant full-time lines and reduce our heavy dependence on part-time faculty for teaching lower-division and other undergraduate courses.

Tenured/tenure-track versus non-tenure track instructional faculty. As the University builds its full-time faculty, a balance must be achieved between tenured/tenure-track and non-tenure-track faculty. Just as part-time faculty provide a cost-effective mechanism for offering instruction relative to full-time faculty, non-tenure-track faculty, because of their higher teaching loads, are cost-effective in that regard. Full-time Lecturers and Instructors at UMBC fulfill an important part of the university's instructional mission, and the essential role of non-tenure-track faculty is being recognized throughout the USM. In addition to policies that provide for enhanced conditions of employment for non-tenure-track faculty, the USM has recently created a rank of Senior Lecturer to recognize their contributions and to provide a mechanism for promotion. This approach explicitly values the instructional contributions of non-tenure-track faculty and reflects performance standards that are consistent with an emphasis on pedagogy.

At the same time, it is vital to maintain and enhance UMBC's standing as a research university. This cannot be accomplished without a solid foundation of tenured and tenure/track faculty who contribute to that mission both in terms of their research and their production of doctoral students. These faculty also contribute to undergraduate instruction in the Honors University. The data on faculty workload summarized in Table 11 attest to the multiple roles and heavy demands that are placed on tenured and tenure-track faculty members.

Recruitment vs. retention. Another significant challenge to overcome in building the faculty is retention. Although faculty members leave the university for many reasons, we have lost significant numbers of faculty to other universities that can offer higher salaries, lower teaching loads, and other perquisites. Faculty retirements are also a significant factor. For the period between Fall 1998 and Fall 2002, UMBC hired 135 tenured or tenure-track faculty, with initial salaries totaling $8.0 million and start-up commitments of over $8.2 million. The net increase was only 37 faculty (see Table 2). One implication of these data is that, at some point, we may need to make difficult decisions between hiring new faculty and enhancing the salaries of current faculty. According to data recently distributed by USM,

mean salaries for UMBC Assistant, Associate, and full Professors are currently at the 61st, 51st, and 51st percentiles, respectively, in comparison to all (public) Carnegie Research/Extensive universities. Last year, when UMBC salaries were compared with those of Research II institutions (from which our peers are drawn), our salaries fell at the 88th, 84th, and 88th percentile, respectively. Clearly, the choice of reference group has an impact on the rankings, but since UMBC identifies itself with the "top tier" of research institutions, the new frame of reference makes it clear what our competition is and what our aspirations should be.

Graduate Students. At present, teaching assistants are responsible for about 1% of the student credit hours generated, all at the lower-division level (see Table 9). But graduate students are also among the part-time faculty members listed as "supplemental" faculty. Which category a student falls into depends on how he or she is categorized in the Student Information System. Since normative data is available from the Delaware Study, it would be informative to see how other research universities utilize their teaching assistants. As noted previously, UMBC does not have a formal program for training and mentoring graduate students in pedagogy, although this is done within some academic departments, the Director of Faculty Development has special expertise in this area. As we prepare some of our students for future academic careers, it would be appropriate to create a Teaching Fellows Program and to plan for a small percentage of course sections and student credit hours to be delivered by Fellows.

Selecting Target Numbers. Careful consideration of the data in Table 9, together with normative data, by discipline, from the Delaware Study, can assist us in generating target numbers for each type of faculty. For example, we can select targets for the percentages of lower-division, upper-division, and graduate courses and/or student credit hours that should be taught by tenured/tenure-track faculty, non-tenure-track faculty, and part-time faculty. Alternatively, we can select targets for the distribution across types of instruction for each type of faculty member, differentiating between those who have graduate teaching responsibilities and those who do not. With either approach, these values, in combination with projections of the numbers of sections and credit hours that must be offered, will provide estimates of the numbers of faculty needed in each category. Such projections must also take into account, however, that many faculty have released time for research and service and do not teach the standard load. It cannot be assumed that the nominal full teaching load of a faculty member will be realized in all cases. Together with enrollment projections, the targeted faculty composition can be used to estimate the student/faculty ratios that reflect on institutional quality.

It is clear that UMBC must face the challenge of increasing the numbers of tenured/tenure-track faculty, along with increases in the full-time non-tenure-track faculty and must allocate the budgetary resources, over time, to accomplish this. Although significant progress toward our targets is unlikely in the current budget climate, establishing such targets provides a frame of reference for planning the size of the tenured/tenure-track faculty needed for UMBC to compare more favorably with its peers. Other sources of funding for faculty lines must also be sought, because it is unlikely that increases in State funds will be sufficient to permit progress. The challenge to the campus' planning leadership is to develop strategies that can achieve these goals.

III. *Allocation of Faculty to Departments and Programs*

Once targets have been set for the overall size and composition of the faculty, difficult decisions remain concerning the allocation of new faculty lines to departments and programs. When resources are limited, competing needs and values must be balanced and prioritized to maximize positive outcomes for the institution. Many of the principles used to plan the composition of the faculty at an aggregate level can be applied at the department/program level as well. Because meeting the needs of students and

Table 12: Faculty and Instructional Course Load (Fall 2001)

Department/ Program	Faculty				Teaching					
	Regular Faculty		Supplemental Faculty	Total	Student Credit Hours			Course Sections		
	T/TT	NTT			Undergrad.	Grad.	Total	Undergrad.	Grad.	Total
Africana Studies	6.0	1	1.75	8.75	1421	0	1421	18.0	0.0	18.0
American Studies	4.0	1	3.17	8.17	1863	3	1866	24.0	0.0	24.0
Ancient Studies	5.0	0	2.25	7.25	2089	3	2092	19.0	0.0	19.0
Biological Sciences	25.0	14	0.42	39.42	7057	388	7445	52.3	5.0	57.3
Chem. & Biochem. Eng.	4.5	8	1.75	14.25	749	169	918	10.0	4.0	14.0
Chemistry & Biochemistry	17.0	18	0.75	35.75	4421	218	4639	46.5	5.0	51.5
Comp. Sci. & Elec. Eng.	28.5	16	9.92	54.42	8024	1539	9563	62.8	26.5	89.3
Dance	3.0	3	1.08	7.08	951	0	951	21.5	0.0	21.5
Economics	14.0	2	12.00	28.00	7578	157	7735	77.0	2.0	79.0
Education	11.0	13	12.50	36.50	2534	3054	5588	59.5	58.5	118.0
Emerg. Health Services	2.0	4	2.17	8.17	878	172	1050	20.0	6.0	26.0
English	12.0	13	13.75	38.75	6621	23	6644	108.8	0.0	108.8
Geog. & Env. Systems	8.0	3	2.92	13.92	3610	8	3618	27.5	1.0	28.5
History	16.0	2	4.42	22.42	4453	313	4766	45.3	7.0	52.3
Information Systems	15.0	9	15.00	39.00	6784	1532	8316	71.0	26.0	97.0
Mathematics & Statistics	26.5	2	11.67	40.17	11339	335	11674	61.9	14.4	76.3
Mechanical Engineering	15.0	3	0.25	18.25	928	255	1183	15.0	5.0	20.0
Modern Lang. & Ling.	17.0	3	17.67	37.67	7560	282	7842	180.0	4.5	184.5
Music	4.0	5	11.67	20.67	3494	0	3494	54.0	0.0	54.0
Physical Education	0.0	2	5.42	7.42	1816	0	1816	46.0	0.0	46.0
Philosophy	7.0	3	2.08	12.08	2442	51	2493	26.0	4.0	30.0
Physics	16.0	24	2.08	42.08	3288	233	3521	21.5	10.5	32.0
Policy Sciences	11.5	0	3.00	14.50	120	421	541	1.0	7.0	8.0
Politcal Science	6.0	0	0.50	6.50	2753	131	2884	31.0	2.0	33.0
Psychology	24.0	2	5.42	31.42	9500	836	10336	42.0	21.0	63.0
Sociology & Anthropology	15.0	1	5.75	21.75	5261	303	5564	39.0	56.0	95.0
Social Work	7.0	2	3.50	12.50	1934	0	1934	32.0	0.0	32.0
Theatre	6.0	2	1.00	9.00	1216	0	1216	26.3	0.0	26.3
Visual Arts	21.0	4	10.17	35.17	4561	175	4736	74.3	7.0	81.3

Note. Data excerpted from UMBC's Fall 2002 submission to *The Delaware Study of Instructional Costs and Productivity.*

delivering our academic programs is of paramount importance, student enrollments must be a heavily weighted factor in the assignment of new faculty lines. But it should not be the only factor. This section of the report discusses enrollment, along with several other relevant factors, that differ, often substantially, from one department to the next and that should be taken into account in allocating new faculty resources. Comparisons among academic departments are made to illustrate how specific factors can be used to inform the planning process, not to suggest specific faculty allocations at this time.

A. Faculty Resources

At the university level, it is possible to generate student/faculty ratios from full- and part-time student headcount enrollments. At the department or program level, students are not uniquely associated with a given unit, even if they are declared majors. Enrollment pressures translate into course sections offered and student credit hours (SCH) generated. Data presented in Table 12 show the faculty resources available in each academic department/program and the course sections and student credit hours generated. These data are taken from UMBC's 2002 submission to *The Delaware Study of Instructional Costs and Productivity*,[7] an annual survey of over 300 institutions that "is now generally acknowledged as the 'tool of choice' for comparative analysis of faculty teaching loads, direct instructional cost, and separately budgeted scholarly activity, all at the level of the academic discipline" (Middaugh, 2002).

In Table 12, faculty are categorized as regular faculty (both tenured/tenure-track and non-tenure-track), supplemental faculty (including part-time faculty and others who teach on an occasional basis), and teaching assistants (students who receive a stipend for teaching, regardless of whether they are the instructor of record).

Full-time/part-time status. Comparison of the numbers of regular and supplemental faculty reveals wide variation in the extent to which departments rely on part-time faculty. The percentage of faculty (excluding teaching assistants) who hold regular appointments ranges from below 60 % for four departments (Physical Education, 27%; Music, 43%; Modern Languages and Linguistics, 53%; and Economics, 57%) to more than 90% for five departments (Biological Sciences, 99%; Mechanical Engineering, 99%; Chemistry and Biochemistry, 98%; Physics, 95%, and Political Science, 92%). Interpretation of these percentages must take into account the departmental teaching portfolio and the extent to which specialized expertise is needed in areas where regular faculty appointments are neither contemplated nor desired. Departments with excessive reliance on part-time faculty, however, particularly for courses within the major and for key General Foundation Requirement (GFR) courses, should be targeted for regular faculty allocation.

Tenure status. Among the regular faculty, there is also great variability in the percentage of faculty who are tenured or on the tenure track. In eight departments 50% or fewer of the regular faculty are in the tenure stream: Emergency Health Services, 33%; Chemical and Biochemical Engineering, 36%; Physics, 40%; Music, 44%; Education, 46%; English, 48%; Chemistry and Biochemistry, 49%; and Dance, 50%. Departments with very high percentages of tenured/tenure-track faculty include Ancient Studies, 100%; Policy Sciences, 100%; Political Science, 100%; Mathematics and Statistics, 93%; Sociology and Anthropology, 94%; and Psychology, 92%.

It is interesting to note how these two categories combine. One department, Physics, has a very high percentage of regular faculty (95%), but the percentage of regular faculty who are tenured/tenure-

[7]Definitions of terms and measures used in *The Delaware Study* can be found on their website at http://www.udel.edu/IR/cost/welcome.html.

track is only 40%. Other things being equal, conversion of part-time appointments to full-time non-tenure-track appointments has a positive impact on one measure and a negative impact on the other. In contrast, the Department of Music is low on both measures: only 43% of the faculty are regular faculty, and of those, only 44% are tenured/tenure-track. These examples illustrate how the statistical descriptors can provide information about departmental profiles, but they do not reveal the planning, strategies, or departmental values that underlie them.

B. Instructional Productivity

Student enrollments translate into student demand for courses, independent study, internships, and other types of instructional delivery. Student credit hours generated and the number of course sections offered are two important indicators of departmental instructional productivity. Although not incorporated into this report, data from *The Delaware Study* are available for inter-institutional comparisons on a discipline-by-discipline basis.

Student credit hours. Student credit hours provide an aggregate measure of the delivery of instruction and are useful for capturing student needs and student demand. Departments that offer courses essential for graduation (e.g., Mathematics and Statistics) and departments that offer popular GFR courses (e.g., Psychology) generate high enrollments and undergraduate student credit hours (11,339 and 9,500, respectively). These two departments together accounted for 18% of the undergraduate SCH in Fall 2001. The next three departments (Economics, 7,578; Modern Languages and Linguistics, 7,560; and Biological Sciences, 6,057) account for an additional 19%. At the graduate level, three departments exceeded 1,500 SCH: Education, 3,054; Computer Science and Electrical Engineering, 1,539; and Information Systems, 1,532.

Course sections. Information on enrollments is complemented by data on course sections offered. For example, the Department of Mathematics delivered its 11,339 SCH in Fall 2001 by offering about 62 course sections; Modern Languages and Linguistics required 180 sections to generate 7,560 SCH,. The nature of the discipline and its pedagogy has a direct impact on the number of course sections that must be offered, both to meet students' needs and to deliver a high quality program. Smaller class size is a desideratum in all disciplines, but the maximum enrollment per section must be determined on a course-by-course basis, and the number of course sections to be offered must be considered, in conjunction with enrollments, in planning faculty allocations.

C. Direct Costs of Instruction

Another consideration in the allocation of faculty lines is the direct cost of instruction per student. Although not a primary focus of this report, an overview of departmental instructional costs is available from *The Delaware Study* . Instructional costs include salaries and fringe benefits for all personnel in the instructional budget, both faculty and staff, and non-personnel costs that are part of the department's instructional operating budget.

In Table 13, the faculty resources tabulated in Table 12 are recast. Total full-time equivalent faculty, excluding teaching assistants, is shown in the first column; FTE instructional faculty, and the percentage who are tenured/tenure-track are shown in the next two columns. FTE students taught is a conversion from student credit hours taught using 15 undergraduate credits and 9 graduate credits as 1 FTE student. Two frames of reference are used in calculating instructional costs: student credit hours and full-time equivalent students. The latter measure takes into account graduate versus undergraduate instruction.

Table 13: Instructional Productivity and Cost Ratios (2001-2002)

Department/ Program	Total FTE Faculty Fall 2001	Total Instructional Faculty		FTE Students Fall 2001	Direct Instruct. Cost per SCH	Direct Instruct. Cost per FTE Student	Expenditures per FTE T/TT	
		FTE	% TT/T				Research	Publ. Service
Africana Studies	8.8	8.8	69%	94.7	$302	$9,069	$312	$0
American Studies	8.2	8.1	49%	124.5	$192	$5,763	$0	$0
Ancient Studies	7.2	7.2	69%	139.6	$146	$4,369	$147	$0
Biological Sciences	49.4	41.4	56%	513.5	$312	$9,049	$118,407	$0
Chem. & Biochem. Eng.	14.2	8.1	55%	68.7	$887	$22,639	$205,425	$0
Chemistry & Biochemistry	36.1	18.7	78%	319.0	$273	$7,939	$210,886	$249
Comp. Sci. & Elec. Eng.	62.8	44.9	54%	705.9	$267	$7,308	$167,399	$3,089
Dance	7.1	6.1	49%	63.4	$225	$6,760	$0	$1,833
Economics	28.0	27.1	48%	522.6	$114	$3,380	$157	$63
Education	37.2	37.2	30%	508.3	$340	$7,229	$128,784	$117,521
Emerg. Health Services	8.2	7.6	18%	77.6	$288	$7,702	$0	$544,124
English	38.8	35.2	30%	444.0	$158	$4,726	$0	$0
Geography & Env. Systems	13.9	10.9	64%	241.6	$145	$4,351	$44,682	$0
History	22.4	21.2	70%	331.6	$187	$5,388	$4,761	$0
Information Systems	39.3	39.3	38%	622.5	$165	$4,471	$33,732	$7,738
Mathematics & Statistics	42.5	39.3	62%	793.1	$129	$3,805	$27,387	$0
Mechanical Engineering[1]	16.2	13.2	98%	90.2	$736	$19,497	$70,887	$0
Modern Lang. & Ling.	41.0	41.0	41%	535.3	$132	$3,892	$1,915	$2,596
Music	20.7	18.7	16%	232.9	$150	$4,488	$2,752	$0
Physical Education	7.4	7.4	0%	121.0	$239	$7,160	N/A	N/A
Philosophy	12.1	10.1	69%	168.5	$150	$4,453	$2,327	$0
Physics	43.4	20.5	72%	245.1	$325	$9,399	$133,425	$0
Policy Sciences	6.5	6.0	92%	54.8	$1,021	$18,379	$49,474	$0
Politcal Science	14.5	13.5	78%	198.1	$198	$5,877	$535	$0
Psychology	40.1	36.3	58%	726.2	$170	$4,838	$46,562	$363
Sociology & Anthropology	21.8	20.2	67%	384.4	$159	$4,619	$40,150	$0
Social Work	12.5	11.3	60%	128.9	$210	$6,307	$30,251	$30,326
Theatre	9.0	8.0	63%	81.1	$434	$13,016	$495	$1,450
Visual Arts	35.2	30.6	60%	332.8	$283	$8,331	$917	3385

[1]Data adjusted to correct for two faculty member in Civil and Environmental Engineering.

Note. Data excerpted from UMBC's Fall 2002 submission to *The Delaware Study of Instructional Costs and Productivity.*

tenured/tenure track. The next highest department in FTE students is Information Systems (622.5), but in this department only 38% of FTE faculty are tenured/tenure-track.

Direct cost per credit hour. The combination of instructional costs and student credit hours produces the ratios shown in column 5 of Table 13. The highest cost per SCH ($1,021) is associated with the graduate program in Policy Sciences. This program generated over 400 graduate SCH (see Table 12), but in the absence of large undergraduate enrollments, the cost of the freestanding graduate program is highlighted. The next highest costs per SCH are both in the College of Engineering (Chemical and Biochemical Engineering, $887; and Mechanical Engineering $736). Because faculty salaries must be competitive in a market where salaries are comparative high, it is to be expected that instructional costs will also be high. However, high enrollments can offset these market factors. In Computer Science and Electrical Engineering, the cost per SCH is only $267. Among the 29 departments listed in Table 13, 14 have costs per SCH less than $200.

Direct costs per FTE student. When costs are referenced to FTE students, the highest instructional costs are associated with Chemical and Biochemical Engineering ($22,639), Mechanical Engineering ($19,497), Policy Sciences ($18,379), and Theatre ($13,016). Twelve of the 29 departments have costs per FTE student that are less than $5,000. Because instructional costs involve more than just faculty personnel costs, there is not a simple relation between faculty salaries and the ratios in Table 13. Other factors, such as equipment, supplies, clerical and business staff, and departmentally supported travel, all contribute to these costs.

D. Expenditures

Examination of instructional costs must be balanced against expenditures for other purposes. Expenditures for research, the majority of which are supported by extramural funds, reflect the university's mission as a research university and the contributions of departments toward that mission. *The Delaware Study* also collects data on this aspect of institutional costs. The final two columns of Table 13 shown expenditures on research and public service, respectively, per full-time equivalent tenured/tenure-track faculty member. These expenditures include internally supported research, provided it is separately budgeted and not part of the instructional budget.

The two departments with the highest research expenditures per FTE T/TT faculty member are Chemistry and Biochemistry ($210,886) and Chemical and Biochemical Engineering ($205,425). Four additional departments have expenditure ratios exceeding $100,000: Computer Science and Electrical Engineering ($167,399), Physics, ($133,425); Education ($128,784), and Biological Sciences ($118,407). It is not surprising that the departments with the highest research expenditures are concentrated in the sciences and engineering. The high ratio for Education is notable, not because of the high level of funding per se, but because of the small number of tenured/tenure-track faculty (30%) against which it is normed.

E. Departmental Faculty Demographics

Age, gender, and race/ethnicity are demographic factors that characterize faculty, staff, and students, and that play a role in the allocation of faculty lines to departments and the recruitment of faculty candidates. Although diversity goals with respect to gender and race/ethnicity may influence who is selected for a particular position, the age distribution of the faculty members already within a department may influence decisions about authorization to recruit new faculty.

Age. In 2000, the Office of Institutional Research conducted a study of *The Graying of the UMBC Faculty* and reported that 15.0% of the UMBC full-time instructional faculty would be at least 60 years of age during that year. Among the tenured faculty, 24.4% met this criterion. As a follow-up to that study, we have updated the database and determined that for 2001 the corresponding statistics were

16.8% and 24.1%, and as of 2002 they have reached 21.5% and 30.8%, respectively. These data for 2001 and 2002 take into account retirements and resignations that have occurred, as well as additions to the tenured faculty from promotions and new hires.

Although these statistics for UMBC overall are similar to national averages, the potential impact on certain individual departments is cause for some alarm. Fifteen academic departments at UMBC currently have at least a third of their faculty aged 60 or older. This includes very small departments with fewer than five tenured faculty as well as large departments with fifteen or more. At least one small department has not hired a tenure-track faculty member for over 25 years. It is important for such departments to begin planning for the recruitment of new faculty in anticipation of retirements, and it is important for the administration to take this factor into account in allocating lines. If faculty members make their retirement plans known far enough in advance, it may be possible to prevent the vacancies that otherwise occur when a search is not initiated until after the faculty member has left the university.

Gender. The gender composition of the full-time faculty (instructional and research) from Fall 1992 through Fall 2002 is shown in Table 14. Over time, there has been an increase in the percentage of full-time faculty members who are female. Although this trend is apparent for most ranks, women are presently in the majority among Instructors and Lecturers and in the minority at each of the professorial ranks. In the tenure track, the percentage of female faculty members decreases with rank. Since most new hires in the tenure-track are made at the Assistant Professor level, it is not surprising that the percentage of women at that level is higher than at the higher ranks. If women are promoted and tenured at the same rate as men, it is reasonable to expect the percentages of women in the higher ranks to increase over time.

Table 14: Gender Composition of the Full-time Faculty by Rank (% Female)

	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	'02
Professor	15.4	14.1	14.4	14.6	18.6	18.3	15.7	14.3	14.7	15.7	16.3
Associate professor	22.7	21.1	22.4	20.6	21.7	21.8	26.5	24.3	23.4	27.3	29.0
Assistant Professor	37.3	37.9	37.2	36.3	36.3	32.8	33.1	39.1	41.2	41.1	36.4
Instructor	52.6	60.0	57.9	58.6	52.2	52.4	45.8	52.4	56.0	60.9	63.6
Lecturer	50.0	45.5	45.5	46.2	57.9	65.2	54.8	58.1	58.3	59.3	58.3
Other	25.0	29.4	25.0	31.6	27.8	36.4	27.8	23.7	31.5	37.5	34.6
Total	28.9	29.0	28.8	27.6	28.1	28.2	28.2	29.6	31.6	34.1	32.8

Source: Office of Institutional Research.

UMBC is making a significant effort to diversify those disciplines in which women are greatly under-represented. The *Ad Hoc Committee on Gender Equity in Science, Mathematics, Information Technology and Engineering*, in its 2001 report, recommended that particular effort be made by the administration and the academic departments to diversity their faculty candidate pool and to identify and recruit qualified female candidates. A further effort in this direction will be the result of a newly awarded cooperative agreement between the National Science Foundation and UMBC as part of the Foundation's *ADVANCE* program. Over the next few years, several coordinated programs will be developed on campus to maximize the recruitment, and equally important, the retention of women faculty members in science, technology, and mathematics.

Race/Ethnicity. The racial/ethnic composition of the full-time faculty (instructional and research) from Fall 1992 through Fall 2002 is shown in Table 15. Although the numbers of faculty in all categories has increased since 1992, the greatest growth has been among the Asian and International faculty. The

size of the increase reflects at least two factors: the large numbers of Asian and international faculty in science, mathematics, and engineering, and the establishment and growth of UMBC's two largest research centers, JCET and GEST. The number of African American faculty members has grown from 20 in 1992 to 32 in 2002, but as a percentage of the total, African-American faculty now constitute only 4.7% of the full-time faculty.

Table 15: Racial/Ethnic Composition of the Full-time Faculty (%)

	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	'02
Native American	0.0	0.0	0.0	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.3
African American	5.7	6.4	6.3	6.7	6.5	6.1	5.8	6.0	6.2	5.5	4.7
Asian	6.6	5.8	7.7	6.7	7.6	7.9	8.7	8.6	8.2	10.1	11.2
Hispanic	0.6	0.6	0.5	0.6	0.8	1.0	1.2	1.2	1.3	1.1	1.0
White	83.4	84.5	82.2	83.8	82.6	82.2	75.6	73.6	73.1	70.3	68.0
International	3.7	2.8	3.3	1.9	2.3	2.5	8.5	10.4	11.1	12.8	14.7

Source: Office of Institutional Research.

In addition to examining trends over time in the gender and racial/ethnic make-up of the faculty, it is informative to consider UMBC's profile in relation to our peer institutions. Data are available for the full-time instructional faculty at UMBC's current peer institutions and are shown in Table 16. UMBC's percentage of female instructional faculty is among the highest of our peers (38.7%). This is comparable to the University of Delaware (38.5%) and only slightly lower than the University of California, Santa Barbara (39.3%). Among full-time faculty, UMBC ranks the highest with 36.7%. At 18.1%, UMBC's percentage of minority faculty ranks third highest among our institutional peers. Only the two University of California campuses rank higher.

Table 16: Gender and Minority Faculty at UMBC and Peer Institutions (Fall 2002)

	Instructional Faculty								
University	**Total**	**Female (%)**	**Minority (%)**	**Full-time**	**Female (%)**	**Minority (%)**	**Part-time**	**Female (%)**	**Minority (%)**
Arkansas, U. of, Main	840	31.7	12.5	791	30.7	12.8	49	46.9	8.2
California, U. of, Riverside	768	32.6	23.0	647	28.7	22.4	121	52.9	26.4
California, U. of, Santa	717	39.3	19.1	516	36.6	22.1	201	46.3	11.4
Clemson U.	1126	29.6	10.3	964	27.2	10.9	162	43.8	6.8
Delaware, U. of	1406	38.5	12.8	1119	34.4	13.6	287	54.4	9.8
Mississippi State U.	932	33.8	11.4	818	31.7	12.0	114	49.1	7.0
Oklahoma State U., Main	1122	29.7	9.6	964	27.1	10.2	158	45.6	6.3
Rhode Island, U. of	677	34.0	14.8	626	35.1	14.7	51	19.6	15.7
SUNY, Albany[1]	933	36.7	10.8	584	33.2	13.2	349	42.4	6.9
Wyoming, U. of	647	33.1	6.0	612	31.9	6.0	35	54.3	5.7
UMBC	763	38.7	18.1	471	36.7	18.0	292	41.8	18.2
Average of Peers	917	33.9	13.0	764	31.7	13.8	153	45.5	10.4

[1] Data for this institution were not available for 2002; data for 2001 were substituted.

Source: *Common Data Set 2002-2003*

F. Academic program review

The outcomes of periodic academic program reviews should also provide guidance in the allocation of faculty to departments and programs. It is to be expected that such reviews will, appropriately, identify resources needed by the department to correct weaknesses and enhance program quality. These reviews are based on extensive self-study and now both undergraduate and graduate programs incorporate external reviewers and site visits. If program reviews are to be meaningful, there must be a mechanism for the evaluation and incorporation of recommendations emanating from them into the budgeting process. This is an aspect of processes currently underway to more closely link planning with budgeting.

G. Institutional Values

In addition to the more easily quantifiable factors influencing faculty allocations, there should also be a place in the decision-making process to incorporate institutional values. For example, UMBC's vision statement describes its intent to uphold the values of "the tradition of the liberal arts academy." This factor might contribute to allocation of a faculty line in the arts or humanities. A commitment to diversity might lead to a decision to seize a unique opportunity to hire an individual from an under-represented minority group. Although institutional values will often work in concert with other criteria, reinforcing allocation decisions based upon them, they may also play an independent role in some faculty hiring decisions.

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Appendix A: University of Maryland Baltimore County Peer Performance Data

University	SAT 25th/75th %ile	% minority of all undergraduates	% African-American of all undergraduates	Avg. (4-yr.) second-year retention rate	Six-year graduation rate**	Six-year graduation rate all minorities**	Six-year graduation rate African Americans**	Passing rate on Praxis II exam*	Alumni giving rate
UMBC	1110-1280	36.8%	16.0%	83%	54%	55%	58%	88%	10.1%
Arkansas, U. of, Main	22-28	12.8%	6.4%	77%	45%	30%	26%		19.0%
California, U. of, Riverside	940-1190	68.1%	5.6%	86%	64%	74%	54%	100%	8.8%
California, U. of, Santa Cruz	1030-1260	30.7%	2.1%	85%	63%	61%	50%		49.1%
Clemson U.	1090-1280	10.0%	7.4%	84%	69%	60%	60%		20.2%
Delaware, U. of	1080-1240	11.2%	6.0%	87%	72%	67%	62%		11.4%
Mississippi State U.	N/A	21.4%	19.2%	78%	50%	38%	36%		11.9%
Oklahoma State U., Main	21-26	14.7%	3.3%	83%	53%	39%	36%		11.8%
Rhode Island, U. of	990-1190	11.8%	3.9%	78%	58%	49%	41%		13.9%
SUNY, Albany	1020-1210	22.1%	8.7%	84%	62%	61%	58%	99%	38.4%
Wyoming, U. of	20-26	6.5%	0.9%	76%	53%	43%	35%		20.1%
Average of Peers	**1025-1228**	**20.9%**	**6.4%**	**81.8%**	**59%**	**52%**	**46%**	**100%**	**20.5%**

					UMBC institution-specific indicators		
University	Total R&D expenditures (000s)	Total R&D expenditures per FT faculty	Avg. annual % growth (5-yr.) in federal R&D expenditures	Awards per 100 F-T faculty (5 yrs.)	Rank in IT bachelor's degrees awarded	Rank in ratio of invention disclosures to $million R&D expenditures	Ratio of FTE students/ F-T faculty
UMBC	$26,044	$75,272	36.8%	4.95	1st	1st	24.8
Arkansas, U. of, Main	$70,817	$103,685	4.1%	1.76	2nd	6th	18.8
California, U. of, Riverside	$81,056	$170,286	-3.2%	3.05	8th	na	23.9
California, U. of, Santa Cruz	$56,212	$139,139	-0.1%	4.70	6th	na	27.7
Clemson U.	$114,016	$137,534	1.8%	2.03	3rd	7th	17.7
Delaware, U. of	$74,711	$82,010	7.6%	2.84	9th	5th	18.5
Mississippi State U.	$127,377	$165,210	12.3%	1.32	5th	8th	19.2
Oklahoma State U., Main	$83,397	$102,077	6.7%	1.83	4th	2nd	19.9
Rhode Island, U. of	$47,043	$75,998	2.6%	1.67	10th	3rd	18.5
SUNY, Albany	$82,792	$162,656	30.7%	2.41	6th	na	21.3
Wyoming, U. of	$42,940	$81,326	1.9%	3.33	10th	4th	18.8
Average of Peers	**$78,036**	**$121,992**	**6.4%**	**2.49**			**20.4**

N/A - Data not available

*** Comparison of Praxis II scores across institutions is not advisable. Depending on institutional requirements, the exam may be required at different times in a student's education. At some institutions, Praxis II is a graduation requirement; at other institutions it is not. Because of these institutional differences, comparison of Praxis II passing rates across institutions may not be valid.**

****1995 cohort information not available for two institutions: U. of Arkansas and SUNY Albany. Used 1993 cohort information for these.**