

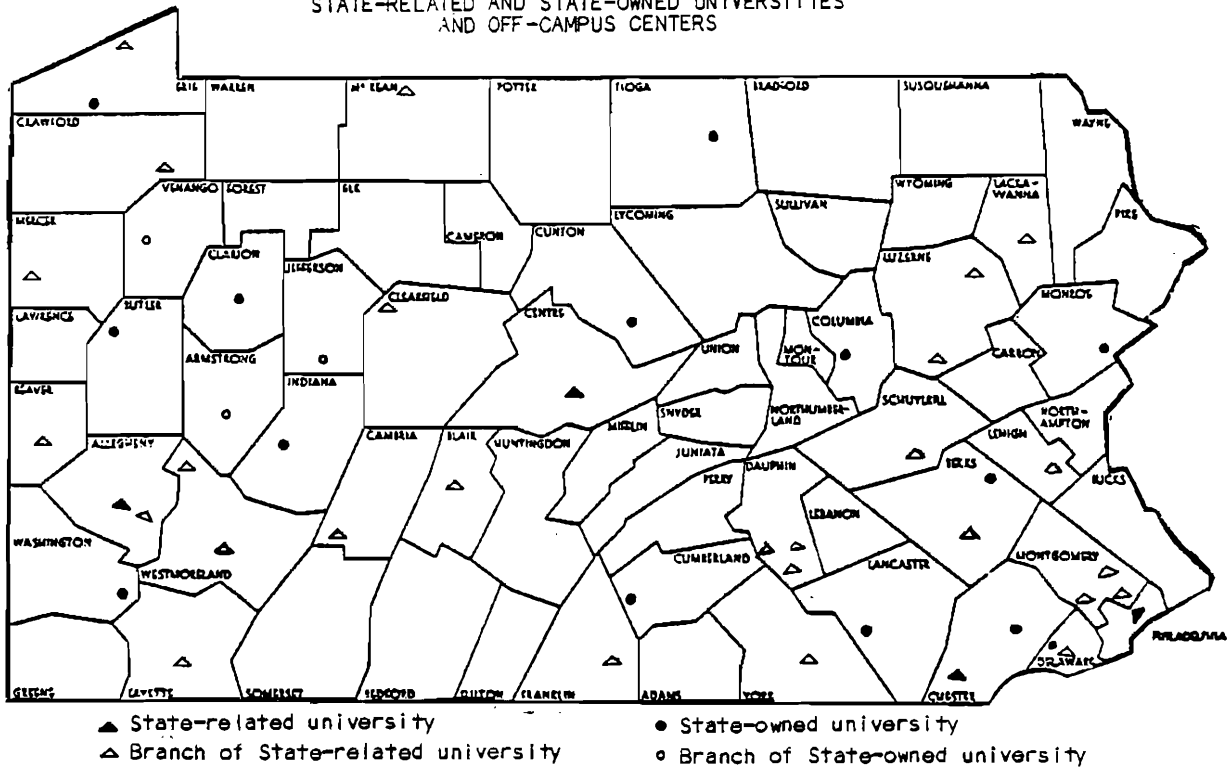
JAN 27 1989

INSTRUCTIONAL OUTPUT AND FACULTY SALARY COSTS OF THE STATE-RELATED AND STATE-OWNED UNIVERSITIES

Analysis of 1987-88 Data
Reported Under 1987 Appropriations Acts
and Public School Code

Staff Report
General Assembly of the Commonwealth of Pennsylvania
JOINT STATE GOVERNMENT COMMISSION
108 Finance Building
Harrisburg, Pennsylvania
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STATE-RELATED AND STATE-OWNED UNIVERSITIES
AND OFF-CAMPUS CENTERS



State-Related Universities

Penn State (Centre)

- Allentown Campus (Lehigh)
- Altoona Campus (Blair)
- Beaver Campus (Beaver)
- Behrend College (Erie)
- Berks Campus (Berks)
- Capitol Campus (Dauphin)
- Delaware Campus (Delaware)
- DuBois Campus (Clearfield)
- Fayette Campus (Fayette)
- Hazleton Campus (Luzerne)
- Hershey Medical Center (Dauphin)
- King of Prussia Center for Graduate Studies (Montgomery)
- McKeesport Campus (Allegheny)
- Mont Alto (Franklin)
- New Kensington (Westmoreland)
- Ogontz Campus (Montgomery)
- Schuylkill Campus (Schuylkill)

Penn State (Centre) (cont.)

- Shenango Valley Campus (Mercer)
- University Center at Harrisburg (Dauphin)
- Wilkes-Barre Campus (Luzerne)
- Worthington Scranton Campus (Lackawanna)
- York Campus (York)
- Pittsburgh (Allegheny)
- Bradford Campus (McKean)
- Greensburg Campus (Westmoreland)
- Johnstown Campus (Cambria)
- Titusville Campus (Crawford)
- Temple (Philadelphia)
- Ambler Campus (Montgomery)
- University Center at Harrisburg (Dauphin)
- Lincoln (Chester)

State-Owned Universities

- Bloomsburg (Columbia)
- California (Washington)
- Cheyney (Delaware)
- Clarion (Clarion)
- Venango Campus (Venango)
- East Stroudsburg (Monroe)
- Edinboro (Erie)
- Indiana (Indiana)
- Armstrong Campus (Armstrong)
- Punxsutawney Campus (Jefferson)

- Kutztown (Berks)
- Lock Haven (Clinton)
- Mansfield (Tioga)
- Millersville (Lancaster)
- Shippensburg (Cumberland)
- Slippery Rock (Butler)
- West Chester (Chester)

FOREWORD

This 16th annual report contains an analysis of the instructional outputs, instructional faculty salary costs, tuitions and appropriations for Pennsylvania's State-related and State-owned universities--the Commonwealth's public universities.

1987-88 output, salary cost, tuition and appropriation data provided by the universities and collected from other sources are summarized and significant changes from the previous year noted. Prior years' data for the same variables are presented and underlying trends pointed out. In a change from previous reports, this year's report utilizes full-time equivalent (FTE) students rather than student credit hours as the principal measure of instructional output.

Output and salary data are combined to form a measure of cost efficiency--FTE instructional faculty salary cost per FTE student. Tuition and appropriation data are combined to form a measure of cost sharing--the percentage of total instructional cost borne by taxpayers.

Finally, similar data for other sectors of higher education in Pennsylvania, for other states and for the U.S. are introduced to place the data and analysis for the Commonwealth's public universities into perspective.

DONALD C. STEELE
Research Director
Joint State Government Commission

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SUMMARY

1. In Fall 1987, 40 percent of the total number of full- and part-time students enrolled in institutions of higher education in Pennsylvania were enrolled in the Commonwealth's public universities: 133,369 students in the 4 State-related universities and 89,500 in the 14 State-owned universities. During 1987-88, student credit hour production was the equivalent of 116,602 full-time students for the State-related group, and 84,626 for the State-owned group. Overall student enrollments and full-time equivalent (FTE) students had total one-year increases of about 3 percent.
2. During the 1987-88 school year, the public universities conferred a total of 36,037 bachelor's and graduate degrees, not including medical degrees: 21,061 degrees by the State-related universities, and 14,976 by the State-owned universities. Total degrees had a one-year increase of 1 percent.
3. Since 1982-83, the total number of FTE students at the public universities has increased by about 7 percent (excluding Penn State, for which data are not comparable), despite a decrease in the Commonwealth's population of 18- to 24-year-olds of about 13 percent. This increase would appear to be attributable to a larger percentage of Pennsylvania's college-age population attending the Commonwealth's public universities, plus an increase in the enrollment of older students at these institutions.
4. In Fall 1987, the overall workweek of the full-time employed faculty at the public universities averaged 53 hours: 51.7 hours at the State-related universities, and 55.2 at the State-owned universities. Hours spent in classroom and individual instruction contact with students averaged 8.8 per week for the State-related group, and 11.6 per week for the

State-owned group. Since 1982-83, average workweeks for both faculty groups have remained nearly constant. Student contact hours have declined for the State-related group, but have remained unchanged for the State-owned group.

5. During the 1987-88 school year, the public universities employed 11,190 FTE instructional faculty: 6,735 faculty by the State-related universities, and 4,455 by the State-owned universities. The total FTE instructional faculty had a one-year increase of about 2 percent. The salary for this faculty of the two university groups averaged \$30,900 and \$34,500, respectively. The average salary had a one-year increase of 7 percent.
6. Since 1982-83, the average salary for the FTE instructional faculty has increased by about \$5,300 for the State-related universities (excluding Penn State), and about \$6,600 for the State-owned universities. The relative increase in average salary for the State-owned group has served to widen the gap in average salaries between the two groups of institutions.
7. During 1987-88, the ratio of FTE students to FTE instructional faculty averaged 17.3 for the State-related universities and 19.0 for the State-owned universities. From the previous year, these averages represent a 1 percent increase for the State-related group, and a 2 percent increase for the State-owned group.
8. For 1987-88, the instructional faculty salary cost per undergraduate level FTE student (undergraduate FTE salary cost) averaged \$1,512 for the public universities: \$1,331 for the State-related group, and \$1,736 for the State-owned group. At the master's level, FTE salary cost averaged \$3,102 and \$2,834 for the two groups, respectively. The undergraduate FTE salary cost had a one-year increase of 3 percent for the State-related group, and 4 percent for the State-owned group; master's FTE salary cost had one-year increases of 11 percent and 8 percent, respectively. FTE salary cost tends to decrease as the number of FTE students increase (at every academic level), and increase as academic levels increase.

9. Statistical analysis of 1987-88 data for the public universities indicates that the total cost savings from either decreasing FTE instructional faculty average salaries by \$1,000 or increasing average class (section) sizes by one student would be about \$11 million.

10. During fiscal year 1986, the total instructional cost per FTE student (FTE total instructional cost) at a public institution of higher education in Pennsylvania (including the public universities and community colleges) was \$6,638, the ninth highest in the nation. The higher FTE total instructional cost for Pennsylvania would appear to be largely explained by smaller enrollment per institution in Pennsylvania than in the U.S.

11. During 1987-88, main campus tuition and required fees for full-time in-State undergraduate students averaged \$3,118 at the State-related universities, and \$2,038 at the State-owned universities. These tuition and fees had one-year increases of 7 percent and 8 percent for the two groups, respectively.

12. For fiscal year 1987, the Commonwealth's General Fund appropriations to the public universities for instruction totaled \$649.4 million: \$355.5 million to the State-related universities, and \$293.9 to the State-owned universities. Total instructional appropriations had a one-year increase of 5 percent. The average appropriation per FTE student was \$3,050 for the State-related group, and \$3,470 for the State-owned group. Per student appropriations had one-year increases of 3 percent and 1 percent for the two groups, respectively. In addition to the appropriations made to the public institutions, the Commonwealth also appropriated funds from the General Fund to the Pennsylvania Higher Education Assistance Agency; about \$45 million of these funds went to students at the public universities through various PHEAA grant and matching fund programs.

13. Since 1982-83, on an FTE student basis, average tuition and fee revenues collected by the public universities have increased by a greater percentage than average direct Commonwealth appropriations. Hence, the percentage of total instructional revenues from taxpayers has decreased, causing the student share of instructional cost to increase for all of the public universities except Lincoln.

14. During fiscal year 1986, the average tuition at a public institution of higher education in Pennsylvania (including the public universities and community colleges) was \$2,715, more than 90 percent higher than the U.S. average. Total State and local appropriations per FTE student were \$3,373, over 26 percent lower than the U.S. average. Overall, Pennsylvania ranks 48th in the nation, with regard to the percentage of total instruction revenue which its public institutions of higher education receive in the form of taxpayer support. On an FTE student basis, total instructional costs in public institutions of higher education in Pennsylvania are higher than the national average. Since per student appropriations are lower than the national average, higher-than-average tuition fills the gap.

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I. INTRODUCTION

In Fall 1987, 230 institutions provided post-secondary education to students in Pennsylvania: 4 State-related universities, 14 State-owned universities, 14 community colleges, 11 private State-aided institutions and 187 private independent institutions. These public and private institutions offer students a wide range of choice with regard to size, location, programs, degrees and student charges.

In Fall 1987, 222,869 students were enrolled in the State-related and State-owned institutions--Pennsylvania's public universities--representing about 40 percent of the total enrollment in all of the Commonwealth's institutions of higher education. During fiscal year 1988, the public universities collected almost \$661 million in tuition and fees from students and received over \$649 million in direct appropriations for educational and general expenses from the Commonwealth (not including amounts allocated for the Board of Governors/Chancellor's Office and System Reserve of the State System of Higher Education). These appropriations represent about 86 percent of the total appropriations made specifically for instruction to all public institutions of higher education, and about 71 percent of the total appropriations made for all purposes to all institutions of higher education, in the Commonwealth. In addition, students enrolled in the public universities received over \$42 million in Pennsylvania Higher Education Assistance Agency (PHEAA) grants, plus about \$2.4 million in matching fund aid; these funds represent about 32 percent of the total financial aid given by PHEAA to students at all institutions of higher education in the Commonwealth.

A large proportion of Pennsylvania students and all Pennsylvania taxpayers therefore have an interest in the Commonwealth's public universities producing the highest quality instruction in the most cost-effective manner, as well as in how the cost of this instruction is shared between students and taxpayers.

This report addresses the important issues of cost efficiency and cost sharing. Using data reported by the individual State-related

II. INSTRUCTIONAL OUTPUT

For analyses of instructional output, two alternative measures of output are useful for different purposes. Full-time equivalent (FTE) students, computed from student credit hours produced, are the best measure by which to compare enrollments between institutions with differing full- and part-time student mixes. In addition, FTE students are helpful in analyzing production by academic level and program area, both of which are closely related to institutional missions and instructional costs.¹ Degrees conferred by student major, related to student interests and career objectives, is a useful measure by which to relate academic output to societal trends and economic conditions.

FULL-TIME EQUIVALENT (FTE) STUDENTS

In Fall 1987, Pennsylvania Department of Education data² indicate that 564,208 full- and part-time students were enrolled in the 230 public and private post-secondary institutions in the Commonwealth. Of this total, 222,869 students (40 percent) were enrolled in Pennsylvania's public universities: 133,369 students (24 percent) in the State-related universities, and 89,500 (16 percent) in the State-owned universities. Compared to Fall 1986, total enrollments at all of the Commonwealth's post-secondary institutions increased by 15,451 students (nearly 3 percent); at the public universities, enrollments rose by 6,099 students (almost an identical percentage increase).

During the 1987-88 school year, 5.88 million undergraduate and graduate student credit hours (SCH) were produced by the public universities: 3.38 million SCH (57 percent) by the State-related universities, and 2.50 million (43 percent) by the State-owned universities.³ This SCH production was the equivalent of 116,602 full-time students at the State-related institutions, and 84,626 at the State-owned institutions (table 1).⁴ The number of FTE students in the State-related group ranged from 60,861 at Penn State (main

campus plus branch campuses) to 1,303 at Lincoln, and in the State-owned group from 13,173 at Indiana to 1,520 at Cheyney.

The relationship between enrollments and FTE students depends upon the mix of full- and part-time students enrolled at the various individual institutions. In Fall 1987, according to data from the Pennsylvania Department of Education,⁵ the ratios of full-time to total students at Pennsylvania's public universities were as follows: Lincoln, 98 percent; Penn State, 77 percent; Pittsburgh, 65 percent; Temple, 65 percent; State-owned group, 79 percent. The mixes of full- and part-time students at the various institutions are related to program offerings, geographical location, local economic conditions, etc.

From 1986-87 to 1987-88 total FTE students at the public universities increased by about 3 percent, the same as total enrollment.⁶ Therefore, the aggregate full- and part-time mix did not change appreciably. Higher-than-average one-year increases in FTE students were reported by California, Cheyney, East Stroudsburg, Edinboro, Kutztown, Lock Haven, Penn State, Slippery Rock and West Chester, and decreases in FTE students were reported by Lincoln.

Output by Academic Level

Tables 1 and 2 show one important dimension of diversity in the Commonwealth's public universities: the number of FTE students by academic level and division. These data indicate that the percentage distribution of FTE students during 1987-88 were as follows:

<u>Institution</u>	<u>Lower division</u>	<u>Upper division</u>	<u>Total under-graduate</u>	<u>Master's</u>	<u>First professional and doctor's</u>	<u>Total graduate</u>
Lincoln	68%	17%	85%	15%	0%	15%
Penn State	62	29	91	5	4	9
Pittsburgh	48	26	74	16	10	26
Temple	41	37	78	11	11	22
State-owned group	66	27	93	7	0	7

The distribution of FTE students by academic levels and divisions at the various institutions primarily reflects the missions and programs of the institutions. The mix between academic levels is especially important, since instructional salary cost per FTE student (FTE salary cost) differs significantly by level and division (see chapter IV of this report).

Output by Program Area

Tables 3A through 3E show another important dimension of diversity in FTE students: the number of FTE students by program area (CIP).⁷ These data indicate that in the State-related institutions and State-owned group about two-thirds of the undergraduate FTE students are in the following program areas:

<u>Institution</u>	<u>Program Areas</u>
Lincoln	Education, Letters, Mathematics, Social Sciences
Penn State	Business, Engineering, Letters, Mathematics, Physical Sciences, Social Sciences
Pittsburgh	Engineering, Health, Letters, Mathematics, Physical Sciences, Psychology, Social Sciences
Temple	Business, Communications, Education, Letters, Mathematics, Social Sciences, Visual and Performing Arts
State-owned group	Business, Education, Letters, Mathematics, Social Sciences, Visual and Performing Arts

Program diversity is related to differing academic missions, and can influence FTE salary cost (see chapter IV of this report).

DEGREES CONFERRED

During the 1987-88 school year Pennsylvania's public universities conferred 36,037 bachelor's and graduate degrees (not including medical degrees): 21,061 degrees (58 percent) by the State-related institutions, and 14,976 (42 percent) by the State-owned institutions (table 4).⁸ These degrees represent about one-half of the total bachelor's and graduate degrees (not including medical degrees) granted by all post-secondary institutions in the Commonwealth.⁹ The reported data indicate that degrees conferred in 1987-88 by type were divided as follows:

<u>Institution</u>	<u>Bachelor's degrees</u>	<u>Graduate degrees</u>
Lincoln	61%	39%
Penn State	82	18
Pittsburgh	60	40
Temple	64	36
State-owned group	87	13

Table 4 shows that, from 1986-87 to 1987-88, total bachelor's and graduate degrees conferred by the public universities increased by 1 percent; this increase reflects a small increase (less than 1 percent) in bachelor's degrees, and a 2 percent increase in graduate degrees.

FIVE-YEAR OUTPUT TRENDS

FTE Students

Between 1982-83 and 1987-88, total FTE students changed as follows at the public universities:

<u>Institution</u>	<u>Number</u>	<u>Percentage</u>
Lincoln	-48	-4%
Penn State	a	a
Pittsburgh	-502	-2
Temple	1,853	8
State-owned group	7,783	10

a. Noncomparable data.¹⁰

During this time, FTE undergraduate students, relative to FTE graduate students, have increased at the State-related universities, but decreased at many State-owned universities.

The five-year increase of 9,086 FTE students (7 percent) in Pennsylvania's public universities (excluding Penn State) occurred during a period when the Commonwealth's population of 18- to 24-year-olds was declining by some 197,000 persons (13 percent).¹¹ This increase would appear to be attributable to a larger percentage of Pennsylvania's college-age population attending the Commonwealth's

public universities, plus an increase in the enrollment of older students at these institutions.

Degrees Conferred

Between 1982-83 and 1987-88, total bachelor's, master's, first professional (excluding medical) and doctor's degrees conferred changed as follows at the public universities:

<u>Institution</u>	<u>Number</u>	<u>Percentage</u>
Lincoln	6	2%
Penn State	-1,335	-12
Pittsburgh	38	1
Temple	-22	<1
State-owned group	780	5

During this time, the number of bachelor's degrees granted by many of the Commonwealth's public universities has increased, relative to the number of graduate degrees granted.

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III. INSTRUCTIONAL FACULTY INPUT

The principal input into producing instructional output, whether measured by FTE students or degrees, is instructional faculty.¹² Other inputs, complementary to faculty in the instructional process such as plant, equipment and administration, are ordinarily not utilized in units directly assignable to specific instructional outputs. To avoid making an essentially arbitrary allocation of such inputs and their costs to instruction, instructional faculty and instructional faculty salary are the only input and cost measures considered in this report.

FULL-TIME EMPLOYED FACULTY AND WORKWEEK ACTIVITIES

In Fall 1987, 9,940 teaching and research faculty were employed full-time by Pennsylvania's public universities: 5,622 (57 percent) by the State-related institutions, and 4,318 (43 percent) by the State-owned institutions (table 5). This set of faculty represents a one-year increase of 87 persons (1.6 percent) for the State-related group, and 24 persons (.6 percent) for the State-owned group.¹³

Table 5 shows that in Fall 1987, the overall average reported workweek of the full-time employed faculty in the public universities was 53 hours: 51.7 hours for the State-related group, and 55.2 hours for the State-owned group. Total workweeks for faculty members in the two university groups were largely unchanged from Fall 1986.

A summary of table 5 indicates that faculty workweeks were divided into the following activities:¹⁴

<u>Workweek activity</u>	<u>Lincoln</u>	<u>Penn State</u>	<u>Pitts- burgh</u>	<u>Temple</u>	<u>State- owned group</u>
Instruction:					
Student contact	19.9%	17.1%	16.4%	17.3%	21.0%
Instructional support	<u>35.1</u>	<u>38.3</u>	<u>30.5</u>	<u>28.7</u>	<u>31.9</u>
Total	55.0	55.4	46.9	46.0	52.9
Noninstruction:					
Research	22.6	22.7	31.1	23.5	15.9
Other university service	<u>22.4</u>	<u>21.9</u>	<u>22.0</u>	<u>30.5</u>	<u>31.2</u>
Total	45.0	44.6	53.1	54.0	47.1

For the most part, these divisions of time by function also represent little change from the previous year.

Hours spent by the full-time employed faculty in classroom and individual instruction contact with students averaged 8.8 per week for the larger and more research-oriented State-related universities, and 11.6 per week for the State-owned universities. Average student contact hours for the two university groups were unchanged from Fall 1986.

FTE INSTRUCTIONAL FACULTY EMPLOYED AND AVERAGE SALARIES

In Fall 1987, 17,159 full- and part-time instructional faculty were employed by the Commonwealth's public universities: 12,227 full- and part-time instructional faculty (71 percent) by the State-related universities, and 4,932 (29 percent) by the State-owned universities. Compared to Fall 1986, the full- and part-time instructional faculty at the public institutions increased by 477 (3 percent).

During the 1987-88 school year, these ranked and nonranked instructional faculty were the equivalent of 11,190 full-time instructional faculty: 6,735 FTE instructional faculty (60 percent) at the State-related universities, and 4,455 (40 percent) at the State-owned universities (table 6). Compared to 1986-87, the FTE instructional faculty increased by 97 (over 1 percent) at the State-related institutions, and 94 (over 2 percent) at the State-owned institutions.¹⁵

The overall average instructional salary of the FTE instructional faculty in the public universities was \$32,300: \$30,900 for the State-related group, and \$34,500 for the State-owned group. These overall salaries represent increases of \$2,000 (6.9 percent) and \$2,400 (7.5 percent) for the two groups of institutions, respectively.¹⁶

Average salaries for the FTE instructional faculty at the State-related universities ranged from \$32,000 at Pittsburgh to \$21,400 at Lincoln, and at the State-owned universities from \$37,700 at Cheyney to \$32,800 at Bloomsburg.

The data in table 6 show that the State-owned universities tend to utilize relatively more higher ranked FTE instructional faculty--professors and associate professors--than do the State-related universities; Penn State, Pittsburgh and Temple provide a significant amount of instruction using instructors and nonranked persons (largely graduate teaching assistants).

RELATIONSHIP BETWEEN FTE STUDENTS AND FTE INSTRUCTIONAL FACULTY

The data in tables 1 and 6 can be combined to show the number of FTE students per FTE instructional faculty for the various public institutions. For the 1987-88 school year, ratios of FTE students to FTE instructional faculty were as follows:

<u>Institution</u>	<u>Ratio</u>
Lincoln	14.0
Penn State	18.5
Pittsburgh	16.1
Temple	16.3
State-owned group	19.0

From 1986-87 to 1987-88, the overall average ratio of FTE students to FTE instructional faculty increased by about 2 percent.

FIVE-YEAR INPUT TRENDS

Faculty Employed

Between Fall 1982 and Fall 1987, the total full-time employed faculty--the faculty set whose workweek activities are examined in this report--has increased by 91 (6 percent) at Pittsburgh, but decreased by 1 (1 percent) at Lincoln and 86 (7 percent) at Temple. For the State-owned universities as a group, the full-time employed faculty has increased by 143 (3 percent).

Between 1982-83 and 1987-88, the total FTE instructional faculty--the faculty set whose instructional outputs and salary costs

are the focus of this report--was unchanged at Lincoln, and decreased by 59 (3 percent) at Pittsburgh and 47 (3 percent) at Temple. At the State-owned group, the FTE instructional faculty increased by 302 (7 percent).

Considering these changes, the relative use of part-time faculty has increased at Lincoln, Temple, and the State-owned group but has decreased at Pittsburgh.

Full-Time Employed Faculty Workweek Activities

Between 1982-83 and 1987-88, the average workweeks for both the State-related and State-owned groups have remained approximately constant. During this time, average undergraduate student contact hours per week have decreased by 1.5 (14 percent) at Lincoln, 0.6 (11 percent) at Pittsburgh, and 0.5 (8 percent) at Temple, but have remained unchanged for the State-owned group. Decreases in classroom and individual instruction contact with students have been offset by increases in other faculty activities.

FTE Instructional Faculty Average Salaries

Between 1982-83 and 1987-88, the average instructional salary of the FTE instructional faculty has increased by \$3,000 (16 percent) at Lincoln, \$7,800 (32 percent) at Pittsburgh, \$6,400 (28 percent) at Temple and \$6,600 (24 percent) for the State-owned group. These increases in average salaries were caused by two separate factors at each of the individual institutions: (1) changes in the salaries of individual faculty members or groups; and (2) changes in faculty rank distributions. During the five-year interval, the percentage of FTE instructional faculty in the top two faculty ranks (professor and associate professor) has increased by 7 percent at Pittsburgh, but decreased by 38 percent at Lincoln, 9 percent at Temple, and 7 percent for the State-owned group. Over the past several years, a relative decline in the proportion of top-ranked faculty in the State-owned group has not helped to narrow the gap between the average instructional salary of the FTE instructional faculty for the State-owned group and the corresponding average salary of this faculty for the State-related group.

FTE Student to FTE Instructional Faculty Ratios

Between 1982-83 and 1987-88, the ratio of FTE students to FTE instructional faculty has changed as follows at the public universities:

<u>Institution</u>	<u>1987-88</u>	<u>1982-83</u>
Lincoln	14.0	14.5
Penn State	18.5	a
Pittsburgh	16.1	15.8
Temple	16.3	14.7
Bloomsburg	18.8	18.3
California	19.8	18.2
Cheyney	13.6	13.2
Clarion	19.7	18.6
East Stroudsburg	18.1	18.4
Edinboro	19.0	17.4
Indiana	19.1	19.9
Kutztown	19.0	19.7
Lock Haven	17.9	17.2
Mansfield	17.5	16.3
Millersville	18.9	18.8
Shippensburg	19.9	19.2
Slippery Rock	19.2	18.8
West Chester	20.1	18.8

a. Noncomparable data.

At many of the institutions, this output-input ratio has increased over the past five years.

IV. COST EFFICIENCY

Cost efficiency is the minimization of the input cost of producing a given level of output. In higher education the simplest measure of cost efficiency is instructional cost related to some measure of instructional output. In this report, the cost efficiency measure utilized for Pennsylvania's public universities is instructional faculty salary cost per FTE student.

INSTRUCTIONAL FACULTY SALARY COST PER FTE STUDENT (FTE SALARY COST)

By Academic Level

For the 1987-88 school year, the instructional faculty salary cost per undergraduate-level FTE student (undergraduate FTE salary cost) averaged \$1,513 for Lincoln, \$1,268 for Penn State, \$1,382 for Pittsburgh, \$1,441 for Temple, and \$1,736 for the State-owned group (table 7).

Table 7 shows that the instructional faculty salary cost per master's-level FTE student (master's FTE salary cost) averaged \$1,614 for Lincoln, \$2,808 for Penn State, \$3,608 for Pittsburgh, \$2,679 for Temple, and \$2,834 for the State-owned group.^{17,18}

FTE salary cost varies widely among the individual institutions; however, two important general relationships emerge from the data. First, FTE salary cost tends to vary inversely with the quantity (or scale) of output produced: for all academic levels (especially the lower and upper undergraduate divisions), average instructional faculty salary cost per FTE student tends to decrease as the number of FTE students increases. Second, FTE salary cost tends to vary directly with academic level: for all quantities (scales) of FTE students, FTE salary cost tends to increase as academic level increases.

Compared to 1986-87, the 1987-88 undergraduate instructional faculty salary cost per FTE student increased by \$31 (2 percent) at Penn State, \$34 (3 percent) at Pittsburgh, and \$96 (7 percent) at Temple, but decreased by \$281 (16 percent) at Lincoln. For the State-owned universities as a group, undergraduate FTE salary cost increased by \$74 (4 percent); larger-than-average one-year increases were computed for Bloomsburg, California, Indiana, Kutztown, Millersville, Shippensburg, and Slippery Rock, and decreases for Cheyney and West Chester.

By Program Area

In both types of public universities, FTE salary cost varies considerably by program area (tables 8A through 8E). Program areas (CIP) with substantially higher than average undergraduate FTE salary cost ("high-cost" CIP) include the physical sciences at Lincoln; agriculture, architecture and environmental design, engineering, health, library and archival sciences, multi/interdisciplinary studies, and trade and industrial at Penn State; education, health and library and archival sciences at Pittsburgh; and area and ethnic studies, health, law, and visual and performing arts at Temple. For the State-owned group, engineering, health, industrial arts, library and archival sciences, physical sciences, and trade and industrial are high-cost undergraduate CIP.

Tables 8A through 8E confirm that FTE salary cost tends to vary inversely with scales of output, and directly with academic levels.

DETERMINANTS OF COST EFFICIENCY

The appendix to this report presents a model of FTE salary cost determination. This model indicates that there are three variables which university administrators can control (at least to some extent) to influence FTE salary cost, or cost efficiency: FTE instructional faculty average salary, class (section) average size, and the number of classes (sections) offered per course.

FTE Instructional Faculty Average Salary

FTE instructional faculty average salaries tend to vary directly with faculty ranks (see table 6). Since faculty ranks also tend to correlate positively with academic levels, faculty average salaries tend to vary directly with academic levels.¹⁹ Therefore, FTE instructional faculty average salary has a positive effect on FTE salary cost by academic level.

Class (Section) Average Size

Class (section) average sizes tend to vary inversely with academic levels: lower-division undergraduate classes are generally larger in size than upper-division classes, and upper-division classes typically larger than master's level classes (table 9). Thus class (section) average size has a negative effect on FTE salary cost by academic level.

Number of Classes (Sections) Offered per Course

The number of classes (sections) offered per course tends to vary inversely with academic levels, but positively with the number of FTE students at each academic level. On balance, the number of classes (sections) offered per course has a positive effect on FTE salary cost by academic level.²⁰

REGRESSION ANALYSIS OF COST EFFICIENCY

The model of FTE salary cost in the appendix can be statistically validated and quantitative estimates of the various control variables made using the technique of multiple regression analysis. The regression equation which results from the model is:²¹

$$\ln Y = \ln b_0 + b_1 \ln X_1 + b_2 \ln X_2$$

where:

Y = instructional faculty salary cost per FTE student (\$)

X₁ = FTE instructional faculty average salary (\$)

X₂ = class (section) average size

b₀, b₁ and b₂ are regression coefficients to be estimated from the data; ln is the natural logarithm.

Separate regressions were estimated for the State-related and State-owned university groups, using 1987-88 school year data for the lower- and upper-divisions and various CIP for each university.²² The coefficient estimates obtained for the control variables are as follows:

Control variable	State-related universities		State-owned universities	
	Lower division	Upper division	Lower division	Upper division
ln X ₁	.80	.82	1.19	1.55
ln X ₂	-.84	-.62	-.73	-.85

All of the coefficient estimates are statistically significant at the 5 percent confidence level or better, and all have the expected sign: FTE salary cost is positively correlated with FTE instructional faculty average salary, and negatively correlated with class (section) average size. The model displays considerable explanatory power: the regressions explain from 58 to 75 percent of the variation in FTE salary cost across program areas, depending upon institutional type and academic level.

The quantitative values of the coefficients indicate that, for example, in the lower division of the State-related universities, a 1 percent increase in the average instructional salary of the FTE instructional faculty (with all other control variables held constant) could be expected to increase FTE salary cost by .80 percent. Conversely, a 1 percent increase in class (section) average size (all else equal) could be expected to decrease FTE salary cost by .84 percent. For a given percentage change in faculty salary, the percentage impact on FTE salary cost would be expected to be greater for the State-owned group than the State-related group; for a given percentage change in class size at the lower division, the opposite is true.

These regression results can be used to estimate the overall reductions in FTE salary cost which could be expected to result from several feasible policy actions by university administrators:

Policy action	State-related universities [\$000]		State-owned universities (\$000)		Total (\$000)
	Lower division	Upper division	Lower division	Upper division	
<u>Decrease</u> FTE instructional faculty average salaries by \$1,000	\$2,300	\$2,000	\$3,000	\$3,300	\$10,600
<u>Increase</u> class (section) average sizes by one student each	\$2,200	\$1,800	\$2,300	\$4,700	\$11,000

In other words, for the public universities, the total cost savings from either decreasing FTE instructional faculty average salaries by \$1,000 or increasing average class (section) sizes by one student would be about \$11 million.

FIVE-YEAR COST-EFFICIENCY TRENDS

Between 1982-83 and 1987-88, average instructional faculty salary cost per FTE undergraduate student (undergraduate FTE salary cost) has increased by \$254 (20 percent) at Lincoln, \$250 (22 percent) at Pittsburgh, \$115 (9 percent) at Temple, and \$303 (21 percent) for the State-owned group. Master's level FTE salary cost has increased by \$324 (25 percent) at Lincoln, \$979 (37 percent) at Pittsburgh, and \$37 (1 percent) for the State-owned group but decreased at Temple by \$25 (1 percent).

For the most part, the five-year increases in FTE salary cost are primarily related to increases in FTE instructional faculty average salaries. However, at Lincoln (at the master's level), and at many of the State-owned universities (at the undergraduate level), the increases are also due in part to decreases in class average sizes.

INTERSTATE COMPARISON OF COST EFFICIENCY

Due to insufficient data, it is presently not possible to compare the cost efficiency of public institutions of higher education in the various states, with cost efficiency defined by the FTE salary cost measure developed above. However, data are available to make interstate comparisons based on a cost measure related to FTE salary cost: total instructional cost per FTE student (FTE total instructional cost). The FTE total instructional cost measure includes the instructional faculty salaries contained in FTE salary cost as defined above, but also includes other related costs, allocated to instruction. Thus, FTE total instructional cost is more comprehensive than FTE salary cost, but contains an element of arbitrariness not present in FTE salary cost (see introduction to chapter III of this report).

For fiscal year 1986, the U.S. weighted average total instructional cost per FTE student, computed for all publicly controlled institutions of higher education, was \$6,079 (table 10). The total instructional cost per FTE student for all of Pennsylvania's

public institutions--including the public universities and community colleges--was \$6,638, about 9 percent higher than the U.S. average and ninth highest in the nation.

The higher-than-average FTE total instructional cost for Pennsylvania would appear to be largely explained by the smaller average size (scale) of the Commonwealth's public colleges and universities: the average number of FTE students per public campus is about 15 percent lower in Pennsylvania than in the U.S.

V. COST SHARING

For the most part, the instructional costs of Pennsylvania's public universities are covered by tuition and fee revenues collected from students plus monies appropriated by the General Assembly. Tuition and fees are not necessarily borne totally by students; students receive financial assistance from many sources. The Commonwealth gives financial aid to students at its public universities in two forms: grants under the State Higher Education Grant Program, and loans from or student employment by the public universities under various State Matching Fund programs. These financial aid programs, administered by the Pennsylvania Higher Education Assistance Agency (PHEAA) and funded through the General Fund Budget, assist students in paying tuition plus other college-related expenses. PHEAA also administers Federal interest-subsidized and payment-guaranteed loans from private lenders under the State Guaranteed Student Loan and PLUS programs. Properly computed student and public shares of the total cost of instruction at the Commonwealth's public universities must consider all of these factors.

STUDENT TUITION AND FEES

Tuition and Fees for Full-Time Students

Tuition and required fees for students at the State-related universities are determined by the individual institutions. A single tuition for students at the State-owned universities is set by the State System of Higher Education; required student fees are set by the individual institutions.

Pennsylvania Department of Education data²³ indicate that, for the 1987-88 academic year, tuition and fee charges for in-State full-time undergraduate students at the State-related universities ranged from \$3,564 (Temple) to \$2,130 (Lincoln), and for in-State full-time graduate students from \$4,202 (Pittsburgh) to \$2,500

(Lincoln) (table 11). For students at the State-owned universities, the basic tuition for Pennsylvania residents was \$1,830 for both full-time undergraduates and graduates; required student fees for in-State full-time undergraduates ranged from \$290 (California) to \$74 (East Stroudsburg), and for in-State full-time graduates from \$290 (California) to \$60 (Bloomsburg). At Lincoln, tuition and fees for nonresident full-time undergraduates exceeded those for residents by about 47 percent, and for graduates by about 60 percent. At Penn State and Pittsburgh, tuition and fees for nonresident full-time undergraduates and graduates were approximately double those for residents. At Temple, the out-of-State premium was about 75 percent for full-time undergraduates and about 25 percent for graduates. At the State-owned universities, nonresident undergraduates paid about 70 percent more, but nonresident graduates only about 11 percent more, than Pennsylvania residents.

Table 11 shows that Lincoln's tuition and fees did not change from the previous year. In all categories, Penn State's tuition and fees rose by 10 percent. Pittsburgh's undergraduate tuition and fees increased by 8 percent, and graduate tuition and fees by 9 percent. In all categories, Temple's tuition and fees rose by 6 percent. At the State-owned universities, the basic tuition charge for in-State full-time undergraduates and graduates had a one-year increase of about 9 percent; required student fees for in-State undergraduates increased by an average of 3 percent, and for in-State full-time graduates by an average of 8 percent.

Tuition and Fee Revenues Collected

During fiscal year 1988, tuition and fee revenues collected by the Commonwealth's public universities from students totaled \$660.6 million: \$481.3 million (73 percent) by the State-related universities, and \$179.3 million (27 percent) by the State-owned universities (table 12). These tuition and fee revenues represent one-year average increases of 11 percent for the State-related group and 14 percent for the State-owned group.

Table 12 shows that per FTE student tuition and fee revenues varied considerably among the public institutions, from \$4,490 (Pittsburgh) to \$2,740 (Lincoln) in the State-related group, and from \$2,650 (Cheyney) to \$1,960 (California) in the State-owned group. On an FTE student basis, collections for the two groups each increased by an average of 9 percent over the previous year.

COMMONWEALTH APPROPRIATIONS

Direct Appropriations to the State-Related Universities and the State System of Higher Education for Educational and General Purposes

During fiscal year 1988, appropriations made to the public universities from the Commonwealth's General Fund Budget for educational and general (instructional) purposes totaled \$649.4 million: \$355.5 million (55 percent) to the individual State-related universities, and \$293.9 million (45 percent) to the State System of Higher Education for distribution to the individual State-owned institutions according to an allocation formula (table 13).²⁴ These appropriations represent about 86 percent of the total appropriations made specifically for instruction to all public institutions of higher education, and about 71 percent of the total appropriations made for all purposes to all institutions of higher education, in the Commonwealth. Total appropriation revenues increased by 5 percent for the State-related group and 6 percent for the State-owned group over the previous year.

Table 13 indicates that per FTE student appropriation or allocation revenues also varied substantially among the individual institutions. Direct appropriations per FTE student ranged from \$5,280 (Lincoln) to \$2,350 (Penn State). SSHE allocations per FTE student ranged from \$8,160 (Cheyney) to \$3,020 (West Chester). Per FTE student appropriations increased by an average of 3 percent over the previous year, and per FTE student allocations by an average of 1 percent.

As FTE students increase both Commonwealth appropriations and SSHE allocations per student tend to decrease. This inverse relationship indicates that both the State appropriation process and the SSHE allocation process recognize economies of scale in the instructional process.

Appropriations to the Pennsylvania Higher Education Assistance Agency for Financial Aid to the Commonwealth's Public University Students

The Governor's Executive Budget shows that, for fiscal year 1988, Commonwealth appropriations from the General Fund to the Pennsylvania Higher Education Assistance Agency totaled over \$139 million; of this amount, PHEAA data²⁵ indicate that about \$45 million, or approximately 32 percent, was used for grant and matching fund programs for students enrolled at Pennsylvania's public universities. The financial aid from PHEAA for fiscal year 1988 to the public universities and their students increased by 9 percent over fiscal year 1987.

During academic year 1987-88, the Pennsylvania Higher Education Assistance Agency awarded over \$28 million (average academic-year award \$1,151) to 27,465 undergraduates (26 percent of the fall full-time undergraduate enrollment at the State-related universities, and over \$14 million (average award \$752) to 21,170 undergraduates (26 percent of the fall full-time undergraduate enrollment) at the State-owned universities, under the State Higher Education Grant Program. The awards to State-related university students amounted to about 27 percent and to State-owned university students about 14 percent of the total dollar value of the grants made to students in all institutions of higher education in Pennsylvania under this grant program. These awards need not be repaid to PHEAA.

During academic year 1987-88 PHEAA disbursed State funds as allocations to institutions and aid to students in the total amounts of \$1,248,632 to the State-related universities and \$1,129,488 to the State-owned universities under the State Matching Fund Program. These funds were used by the institutions for Perkins Loans (NDSL), nursing student loans, and as matching funds for various work-study programs, internships, etc.

In the same year PHEAA administered federal interest-subsidized and payment-guaranteed loans by private lenders to students at the public universities, under the State Guaranteed Student Loan and PLUS programs. At the present time, data on the numbers and amounts of student loans for 1987-88 are not available.

COST SHARING

For 1987-88, the ratio of Commonwealth appropriations to total revenues from tuition, fees plus appropriations--total instructional revenues--was 66 percent for Lincoln, 37 percent for Penn State, 43 percent for Pittsburgh, and 50 percent for Temple (table 14). The percentage of Commonwealth support for instructional activities was unchanged from the previous year for Temple, increased by 5 percent for Lincoln, and decreased by 2 percent for Pittsburgh and 8 percent for Penn State.

For the same year, the ratio of SSHE allocations to total instructional revenue varied by State-owned institution, ranging from 75 percent for Cheyney to 59 percent for West Chester. Allocations to the State-owned universities averaged 62 percent of total instructional revenues, a 3 percent decrease from 1986-87.

Per FTE student, PHEAA grants and matching funds ranged from \$262 at Penn State to \$212 at Lincoln, and from \$251 at Indiana to

\$100 at West Chester. On an FTE student basis, the PHEAA aid in these programs averaged 6 percent of tuition and fee revenues collected for the State-related universities, and 9 percent for the State-owned institutions.

FIVE-YEAR COST-SHARING TRENDS

Between 1982-83 and 1987-88, the average tuition and fee revenues collected per FTE student have increased by 23 percent at Lincoln, 72 percent at Pittsburgh, 40 percent at Temple, and 38 percent for the State-owned universities as a group. Over the same interval, the average direct Commonwealth educational and general appropriation per FTE student has increased by 60 percent at Lincoln, 37 percent at Pittsburgh, and 27 percent at Temple. The average Department of Education allocation (before fiscal year 1984) and SSHE allocation (since fiscal year 1984) per FTE student has increased by 16 percent for the State-owned university group.

The more rapid growth of tuition and fee revenues relative to appropriation and allocation revenues, on a per student basis, has served to decrease the share of total instructional revenue from taxpayers for all of Pennsylvania's public universities except Lincoln:

<u>Institution</u>	<u>1987-88</u>	<u>1982-83</u>
Lincoln	66%	60%
Penn State	37	a
Pittsburgh	43	49
Temple	50	52
Bloomsburg	62	65
California	63	71
Cheyney	75	77
Clarion	63	67
East Stroudsburg	60	65
Edinboro	63	67
Indiana	60	63
Kutztown	60	64
Lock Haven	67	70
Mansfield	69	72
Millersville	61	64
Shippensburg	61	66
Slippery Rock	62	64
West Chester	59	62

a. Noncomparable data.

During the same interval, the number of students receiving PHEAA grants decreased to about 26 from about 31 percent of the fall full-time undergraduate students at the State-related universities, and to about 26 from about 29 percent of these students at the State-owned universities. The average full-year grant amount per recipient increased to \$1,151 from \$814 (41 percent), and to \$752 from \$600 (25 percent), respectively, for the two groups of schools. The percentage of total student charges covered by PHEAA grants (i.e., tuition, fees, room and board) remained at about 18 percent during this time.

INTERSTATE COMPARISON OF COST SHARING

The Higher Education General Information Survey (HEGIS) data²⁶ show that during fiscal year 1986 the average tuition revenue per FTE student in all of Pennsylvania's public institutions--including the public universities and community colleges--was \$2,715, over 90 percent higher than the U.S. average for all public institutions of higher education (table 15). In 25 states the average tuition for public institutions was higher than the U.S. average. In only three states, however, was the average per student tuition higher than that in Pennsylvania.

On the other hand, the HEGIS data show that total Commonwealth and local direct appropriations to Pennsylvania's public institutions amounted to \$3,373 per FTE student, over 26 percent lower than the U.S. average. Thirty-three states made direct appropriations to public higher education which were lower than the national average. In only three states, however, was the average per student appropriation lower than that in Pennsylvania. Overall, Pennsylvania ranks 48th in the nation, with respect to the percentage of total instructional revenue which its public institutions of higher education receive in the form of direct taxpayer support.

Of course, direct appropriations for instructional purposes are not the only source of public support for higher education; appropriations for financial aid must also be considered. However, for fiscal 1986, reliable State and local financial aid data are not available for interstate comparisons. In addition, in any comparisons between states, varying institutional mixes--medical schools, research universities; four-year institutions, two-year institutions, etc.--play a large role in determining statewide revenues and costs.

However, the data clearly show that, on an FTE student basis, total State and local support to all publicly controlled institutions of higher education in Pennsylvania is considerably lower than, and total instructional costs somewhat higher than, the national averages. Higher-than-average tuition tends to fill the gap.

APPENDIX: MODEL OF FTE SALARY COST DETERMINATION

Average instructional faculty salary cost per student credit hour, at each academic level and in each program area can be expressed by the following model:

$$\frac{\text{Instructional FTE faculty salaries}}{\text{Student credit hours}} = \left\{ \begin{array}{l} \text{Number of FTE} \\ \text{instructional faculty} \\ \text{Number} \\ \text{of} \\ \text{courses} \end{array} \right\} \times \left\{ \begin{array}{l} \text{Average} \\ \text{course} \\ \text{(assigned)} \\ \text{credit} \\ \text{value} \end{array} \right\} \times \left\{ \begin{array}{l} \text{FTE instructional faculty} \\ \text{average salary} \\ \text{Number} \\ \text{of classes} \\ \text{Number} \\ \text{of courses} \end{array} \right\} \times \left\{ \begin{array}{l} \text{Average} \\ \text{class size} \end{array} \right\}$$

Instructional faculty salary average cost per FTE student, or FTE salary cost, equals the cost per student credit hour times 30 for undergraduate students, and times 24 for graduate students.

The two terms on the right-hand side of this equation illustrate the two different kinds of factors which determine FTE salary cost.

The components of the first term are approximately constants or constant relationships. In the short run, neither the number of faculty per course nor the average assigned credit per course can readily be varied by university administrators to influence FTE salary cost.

The second term contains control variables: instructional faculty average salary, class (section) average size, and the number of classes (sections) per course. To at least some degree, each of these variables can be controlled by administrators to affect FTE salary cost. Adjustments in the number of classes (sections) per course are an alternative to permitting average class size to change with changes in enrollment.

This model is the basis for the multiple regression analysis of FTE salary cost in chapter IV of this report.

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FOOTNOTES

¹In a change from previous reports, this year's report utilizes full-time equivalent (FTE) students rather than student credit hours (SCH) as the principal measure of instructional output. However, since FTE students are computed from SCH (see footnote 4), the use of FTE students affects only the absolute sizes of output and cost efficiency numbers, not their relative sizes. For comparisons of institutions across various sectors of higher education, the FTE student measure is the most commonly used measure. An historical time series for FTE students at the Commonwealth's public universities, as well as for most other data presented in this report, is available from the staff of the Joint State Government Commission.

²Pennsylvania Department of Education, Higher Education Fall Enrollments, 1987.

³Unless otherwise noted, all data in this report apply to the indicated school year, which includes the summer term preceding the academic year, plus the fall and spring terms of the academic year. For example, the 1987-88 school year includes the summer and fall terms of 1987 plus the spring term of 1988.

⁴Full-time equivalent students are calculated by dividing undergraduate student credit hours by 30 and graduate student credit hours by 24.

⁵See footnote 1.

⁶The data and analysis presented in this report are affected by methodology changes or data revisions for several of the institutions. Current-year data for Pittsburgh include a change in the method of reporting course (assigned) credit hours (CCH) for cross-listed courses; this change serves to decrease the number of CCH reported, and to increase the class sizes of affected program areas. One-year changes for Cheyney are based on a major revision of 1986-87

student credit hour (SCH), CCH and salary data; these revisions affect one-year quantity and dollar changes. One-year changes for Clarion are based on a revision of 1986-87 SCH and CCH data; these revisions affect one-year quantity and dollar changes.

⁷Tables 3A through 3E employ the Classification of Instructional Programs (CIP) taxonomy. This classification scheme, introduced by the U.S. Department of Education's National Center for Education Statistics in 1981, replaces the HEGIS taxonomy. This report utilizes an aggregation of two-digit CIP, each of which corresponds to one or more academic departments or program areas within individual institutions. The CIP groupings are used to facilitate comparisons between institutions, given the large array of departments and programs which exist in the Commonwealth's public universities.

⁸All of the public universities also award associate degrees. These degrees are not included in this report.

⁹This ratio is an approximation, based on data for several prior years, since current-year degree data for community colleges, and private State-aided, independent, and other institutions in the Commonwealth are not available at this time.

¹⁰In 1983-84, Penn State's data on FTE students (or student credit hours), FTE faculty and faculty salaries were affected by two major reporting changes: a change in the university's academic calendar (to two semesters from three terms in the academic year and to a shorter summer term); and improved data collection procedures which permitted the first-time inclusion of activities related to the university's continuing education credit program. Since then Penn State's data are comparable to current year data from the other institutions, but are noncomparable to prior years' data from Penn State and the other institutions. Therefore, output, input and cost five-year trends for Penn State are not included in this report.

¹¹U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 1024, State Population and Household Estimates, With Age, Sex, and Components of Change: 1981 to 1987, U.S. Government Printing Office, Washington, D.C., 1988, table 6.

¹²For fiscal year 1986, instructional faculty salaries reported comprised about 40 percent of total HEGIS instructional expenditures for the State-related group, and about 62 percent for the State-owned

group. HEGIS data provided by the Pennsylvania Department of Education.

¹³Faculty who are employed by the public universities full time, and who are engaged in teaching, research or both, comprise the set of faculty whose workweek activities are reported by the universities, and summarized in table 5. Note that this is not the same set of faculty whose numbers and instructional salaries are included in table 6. See also footnote 15.

¹⁴Instructional support is synonymous with course preparation and evaluation. Other university service includes public service, institutional support and student support.

¹⁵Full-time instructional faculty, plus the full-time equivalency of part-time instructional faculty, comprise the set of faculty whose instructional salaries are reported by the universities, and summarized in table 6. Note that this is not the same set of faculty whose workweek activities are included in table 5. See also footnote 13.

¹⁶In Caveat: Average instructional salaries are computed by dividing each institution's total instructional salaries for each academic rank by the respective number of FTE faculty. Therefore, changes in average salaries do not necessarily correspond to general salary changes for all faculty members in a given institution. Average salary changes also reflect changes in the rank distributions of faculty.

¹⁷In previous reports, cost efficiency was measured by instructional faculty salary cost per student credit hour produced (SCH cost). FTE salary cost (the present report) and SCH cost (previous reports) are related as follows: undergraduate FTE salary cost equals 30 times undergraduate SCH cost; master's FTE cost equals 24 times master's SCH cost. For 1987-88, the undergraduate SCH cost averaged \$50 for Lincoln, \$42 for Penn State, \$46 for Pittsburgh, \$48 for Temple, and \$58 for the State-owned group. Master's SCH cost averaged \$67 for Lincoln, \$117 for Penn State, \$150 for Pittsburgh, \$112 for Temple, and \$118 for the State-owned group.

¹⁸First professional FTE salary cost averaged \$1,484 for Pittsburgh and \$2,642 for Temple. Doctoral FTE salary cost averaged \$8,861 for Penn State, \$8,337 for Pittsburgh and \$5,227 for Temple.

¹⁹The positive relationship between faculty ranks and academic levels is not strictly monotonic for either the State-related or State-owned facilities. However, the degree of positive correlation is strong for both groups.

²⁰Administrators can change the number of classes (sections) offered per course as an alternative to permitting changes in class size to occur as student demands vary. Thus class (section) average size and the number of classes (sections) offered per course are negatively correlated.

²¹This regression equation is a logarithmic transformation of the linear FTE salary cost equation derived in the appendix. The transformed equation is used to account for nonlinearities between the X's and the Y. Notice that the regression equation does not include the number of classes (sections) as an explanatory variable. As noted above, variations in the number of classes and class average size are alternative policy actions. Therefore, inclusion of both variables in the regression would be both conceptually and statistically incorrect.

²²The actual regression data are not included in this report. These data and all other regression details are available from the staff of the Joint State Government Commission.

²³See table 11 for source.

²⁴The Commonwealth appropriation to the State System of Higher Education included here does not include amounts appropriated for either the Board of Governors/Chancellor's Office or the System Reserve. Over the years, "educational and general" appropriations have been expanded to include appropriation categories which had previously been separate line items in the General Fund Budget. In this report, total educational and general appropriations are regarded as "instructional" and used for comparisons, because these appropriations are available to the public institutions for general instructional purposes.

²⁵Data provided by the Pennsylvania Higher Education Assistance Agency.

²⁶See table 15 for source.

TABLES

Table 1

FULL-TIME EQUIVALENT STUDENTS BY ACADEMIC LEVEL¹
 1987-88, CHANGE FROM 1986-87 AND FIVE-YEAR AVERAGE ANNUAL RATE OF CHANGE (1982-83 to 1987-88)

Institution	Total				Undergraduate				Graduate ²			
	FTE students	One-year change	Percentage change		FTE students	One-year change	Percentage change		FTE students	One-year change	Percentage change	
			One-year	Five-year			One-year	Five-year			One-year	Five-year
			change	average			change	average			change	average
State-related												
Lincoln	1,303	-18	-1%	-1%	1,108	-7	-1%	a	195	-11	-5%	-3%
Penn State	60,861	2,263	4	b	55,177	1,911	4	b	5,684	352	7	b
Pittsburgh	28,792	88	a	a	21,302	113	1	a	7,490	-25	a	-2
Temple	25,646	494	2	2	19,933	447	2	4%	5,713	47	1	-3
Total	116,602	2,827	2	b	97,520	2,464	3	b	19,082	363	2	b
State-owned												
Bloomsburg	6,781	159	2	2	6,381	143	2	2	400	16	4	3
California	5,544	437	9	5	5,083	360	8	5	461	77	20	12
Cheyney	1,520	106	7	-3	1,402	77	6	-4	118	29	33	42
Clarion	5,958	101	2	2	5,554	75	1	1	404	26	7	18
East Stroudsburg	4,728	318	7	3	4,183	288	7	2	545	30	6	22
Edinboro	6,105	497	9	2	5,757	463	9	2	348	34	11	2
Indiana	13,173	147	1	a	12,281	130	1	a	892	17	2	7
Kutztown	6,334	266	4	4	6,024	241	4	4	310	25	9	8
Lock Haven	2,834	129	5	2	2,834	129	5	2	na	na	na	na
Mansfield	2,606	26	1	a	2,460	16	1	-1	146	10	7	9
Millersville	6,589	151	2	2	5,868	24	a	1	721	127	21	10
Shippensburg	5,958	118	2	2	5,459	105	2	2	499	13	3	a
Slippery Rock	6,586	263	4	3	6,306	268	4	3	280	-5	-2	3
West Chester	9,910	897	10	3	8,987	775	9	2	923	122	15	9
Total	84,626	3,615	4	2	78,579	3,094	4	2	6,047	521	9	8
All institutions	201,228	6,442	3	b	176,099	5,558	3	b	25,129	884	4	b

1. Data for each year represent the summer term preceding the academic year plus the academic year. Full-time equivalent students are calculated by dividing undergraduate student credit hours by 30 and graduate student credit hours by 24.

2. In addition to the master's level, graduate for Penn State, Pittsburgh, Temple and Indiana includes first professional (excluding medical) and/or doctor's levels.

a. Rounds to less than 1 percent.

b. In 1983-84, Penn State's data on FTE students were affected by two major reporting changes: a change in the university's academic calendar (to two semesters from three terms in the academic year, and to a shorter summer term); and improved data collection procedures, which permitted the first-time inclusion of activities related to the university's continuing education credit program. Since then Penn State's data are comparable to current year data from the other institutions, but are noncomparable to prior years' data from Penn State and the other institutions.

na. Not applicable.

SOURCE: Reports provided by the individual institutions, 1983 to 1988.

Table 2

FULL-TIME EQUIVALENT STUDENTS BY ACADEMIC DIVISION AND LEVEL¹
 1987-88, CHANGE FROM 1986-87 AND FIVE-YEAR AVERAGE ANNUAL RATE OF CHANGE (1982-83 to 1987-88)

Institution	Lower division			Upper division			Master's			First professional and doctor's ²		
	FTE students	Percentage change One-year	Five-year average	FTE students	Percentage change One-year	Five-year average	FTE students	Percentage change One-year	Five-year average	FTE students	Percentage change One-year	Five-year average
State-related												
Lincoln	885	-1%	-1%	223	a	2%	195	-5%	-3%	na	na	na
Penn State	37,645	3	b	17,532	6%	b	2,967	11	b	2,717	2%	b
Pittsburgh	13,959	-1	a	7,343	3	1	4,639	2	-2	2,851	-4	-2%
Temple	10,522	1	3	9,411	3	4	2,783	1	-4	2,930	a	-2
Total	63,011	2	b	34,509	4	b	10,584	4	b	8,498	-1	b
State-owned												
Bloomsburg	4,488	2	3	1,893	4	-1	400	4	3	na	na	na
California	3,497	10	3	1,586	2	11	461	20	12	na	na	na
Cheyney	1,101	10	-3	301	-8	-6	118	33	42	na	na	na
Clarion	4,012	a	1	1,542	6	3	404	7	18	na	na	na
East Stroudsburg	3,186	8	3	997	5	-2	545	6	22	na	na	na
Edinboro	4,067	9	1	1,690	8	4	348	11	2	na	na	na
Indiana	8,289	2	a	3,992	a	a	892	2	7	c	c	c
Kutztown	4,181	5	4	1,843	1	3	310	9	8	na	na	na
Lock Haven	2,012	6	a	822	3	8	na	na	na	na	na	na
Mansfield	1,799	2	-1	661	-3	a	146	7	9	na	na	na
Millersville	4,355	-1	a	1,513	3	7	721	21	10	na	na	na
Shippensburg	3,974	3	2	1,485	a	2	499	3	a	na	na	na
Slippery Rock	4,702	4	3	1,604	5	4	280	-2	3	na	na	na
West Chester	6,341	9	2	2,646	11	4	923	15	9	na	na	na
Total	56,004	4	1	22,575	4	2	6,047	9	8	na	na	na
All institutions	119,015	3	b	57,084	4	b	16,631	6	b	8,498	-1	b

1. Data for each year represent the summer term preceding the academic year plus the academic year. Full-time equivalent students are calculated by dividing undergraduate student credit hours by 30 and graduate student credit hours by 24.

2. Excludes medical school data.

a. Rounds to less than 1 percent.

b. In 1983-84, Penn State's data on FTE students were affected by two major reporting changes: a change in the university's academic calendar (to two semesters from three terms in the academic year, and to a shorter summer term); and improved data collection procedures, which permitted the first-time inclusion of activities related to the university's continuing education credit program. Since then Penn State's data are comparable to current year data from the other institutions, but are noncomparable to prior years' data from Penn State and the other institutions.

c. Included in master's level.

na. Not applicable.

SOURCE: Reports provided by the individual institutions, 1983 to 1988.

Table 3A

LINCOLN UNIVERSITY
 NUMBER AND PERCENTAGE DISTRIBUTION OF FULL-TIME EQUIVALENT STUDENTS¹
 BY ACADEMIC DIVISION AND LEVEL AND CIP CLASSIFICATION
 1987-88

CIP Classification	Total	Percent- age of total	Lower division	Percent- age of total	Upper division	Percent- age of total	Graduate ²	Percent- age of total
Agriculture	--	--	--	--	--	--	--	--
Architecture and environmental design	--	--	--	--	--	--	--	--
Area and ethnic studies	--	--	--	--	--	--	--	--
Business	116	9%	40	5%	76	34%	--	--
Communications	--	--	--	--	--	--	--	--
Computer and information sciences	--	--	--	--	--	--	--	--
Consumer, personal and miscellaneous services	--	--	--	--	--	--	--	--
Education	218	17	190	21	28	13	--	--
Engineering	--	--	--	--	--	--	--	--
Foreign languages	63	5	53	6	10	4	--	--
Health	--	--	--	--	--	--	--	--
Home economics	--	--	--	--	--	--	--	--
Industrial arts	--	--	--	--	--	--	--	--
Law	--	--	--	--	--	--	--	--
Letters	163	12	151	17	12	5	--	--
Liberal/general studies	--	--	--	--	--	--	--	--
Library and archival sciences	--	--	--	--	--	--	--	--
Life sciences	75	6	66	7	9	4	--	--
Mathematics	158	12	148	17	10	4	--	--
Military sciences	--	--	--	--	--	--	--	--
Multi/interdisciplinary studies	5	a	5	1	--	--	--	--
Parks and recreation	--	--	--	--	--	--	--	--
Personal and social development	--	--	--	--	--	--	--	--
Philosophy, religion and theology	35	3	35	4	--	--	--	--
Physical sciences	91	7	70	8	21	9	--	--
Psychology	47	4	32	4	15	7	--	--
Public affairs and protective services	195	15	--	--	--	--	195	100%
Social sciences	139	11	96	11	43	19	--	--
Trade and industrial	--	--	--	--	--	--	--	--
Visual and performing arts	--	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--	--
Total ³	1,303	100	885	100	223	100	195	100

1. Data represent the summer term preceding the academic year plus the academic year. Full-time equivalent students are calculated by dividing undergraduate student credit hours by 30 and graduate student credit hours by 24.

2. Graduate includes master's level only.

3. Because of rounding, CIP detail may not sum to total.

a. Rounds to less than 1 percent.

SOURCE: Reports provided by Lincoln University, 1988.

Table 3B

THE PENNSYLVANIA STATE UNIVERSITY
 NUMBER AND PERCENTAGE DISTRIBUTION OF FULL-TIME EQUIVALENT STUDENTS¹
 BY ACADEMIC DIVISION AND LEVEL AND CIP CLASSIFICATION
 1987-88

CIP Classification	Total	Percent- age of total	Lower division	Percent- age of total	Upper division	Percent- age of total	Graduate ²	Percent- age of total
Agriculture	738	1%	142	a	473	3%	123	2%
Architecture and environmental design	577	1	265	1%	305	2	7	a
Area and ethnic studies	214	a	108	a	82	a	24	a
Business	7,345	12	2,880	8	3,824	22	641	11
Communications	855	1	360	1	474	3	21	a
Computer and information sciences	1,455	2	1,123	3	216	1	116	2
Consumer, personal and miscellaneous services	--	--	--	--	--	--	--	--
Education	4,684	8	1,988	5	1,397	8	1,299	23
Engineering	5,536	9	1,474	4	2,882	16	1,180	21
Foreign languages	1,948	3	1,598	4	248	1	102	2
Health	548	1	165	a	360	2	23	a
Home economics	1,022	2	634	2	273	2	115	2
Industrial arts	--	--	--	--	--	--	--	--
Law	--	--	--	--	--	--	--	--
Letters	6,124	10	4,450	12	1,432	8	242	4
Liberal/general studies	72	a	50	a	22	a	--	--
Library and archival sciences	8	a	3	a	4	a	1	a
Life sciences	2,922	5	2,132	6	589	3	201	4
Mathematics	6,122	10	5,175	14	736	4	211	4
Military sciences	142	a	74	a	68	a	--	--
Multi/interdisciplinary studies	872	1	524	1	263	2	85	1
Parks and recreation	186	a	38	a	125	1	23	a
Personal and social development	--	--	--	--	--	--	--	--
Philosophy, religion and theology	874	1	735	2	102	1	37	1
Physical sciences	5,079	8	4,110	11	485	3	484	9
Psychology	1,892	3	1,373	4	363	2	156	3
Public affairs and protective services	1,130	2	359	1	530	3	241	4
Social sciences	7,225	12	5,114	14	1,854	11	257	5
Trade and industrial	364	1	364	1	--	--	--	--
Visual and performing arts	2,927	5	2,407	6	425	2	95	2
Other	--	--	--	--	--	--	--	--
Total ³	60,861	100	37,645	100	17,532	100	5,684	100

1. Data represent the summer term preceding the academic year plus the academic year. Full-time equivalent students are calculated by dividing undergraduate student credit hours by 30 and graduate student credit hours by 24.

2. Graduate includes master's and/or doctor's levels.

3. Because of rounding, CIP detail may not sum to total.

a. Rounds to less than 1 percent.

SOURCE: Reports provided by The Pennsylvania State University, 1988.

Table 3C

UNIVERSITY OF PITTSBURGH
 NUMBER AND PERCENTAGE DISTRIBUTION OF FULL-TIME EQUIVALENT STUDENTS¹
 BY ACADEMIC DIVISION AND LEVEL AND CIP CLASSIFICATION
 1987-88

CIP Classification	Total	Percent- age of total	Lower division	Percent- age of total	Upper division	Percent- age of total	Graduate ²	Percent- age of total
Agriculture	--	--	--	--	--	--	--	--
Architecture and environmental design	--	--	--	--	--	--	--	--
Area and ethnic studies	166	1%	111	1%	51	1%	4	a
Business	2,384	8	365	3	835	11	1,184	16%
Communications	39	a	8	a	25	a	6	a
Computer and information sciences	1,089	4	604	4	251	3	234	3
Consumer, personal and miscellaneous services	--	--	--	--	--	--	--	--
Education	1,861	6	261	2	515	7	1,085	14
Engineering	1,930	7	582	4	812	11	536	7
Foreign languages	916	3	700	5	164	2	52	1
Health	2,994	10	340	2	1,151	16	1,503	20
Home economics	120	a	--	--	87	1	33	a
Industrial arts	--	--	--	--	--	--	--	--
Law	886	3	--	--	b	a	886	12
Letters	3,218	11	2,018	14	1,001	14	199	3
Liberal/general studies	--	--	--	--	--	--	--	--
Library and archival sciences	142	a	2	a	3	a	137	2
Life sciences	803	3	552	4	175	2	76	1
Mathematics	1,868	6	1,552	11	206	3	110	1
Military sciences	17	a	13	a	4	a	--	--
Multi/interdisciplinary studies	250	1	153	1	80	1	17	a
Parks and recreation	--	--	--	--	--	--	--	--
Personal and social development	--	--	--	--	--	--	--	--
Philosophy, religion and theology	634	2	498	4	87	1	49	1
Physical sciences	2,227	8	1,728	12	161	2	338	5
Psychology	1,689	6	1,213	9	367	5	109	1
Public affairs and protective services	1,189	4	150	1	347	5	692	9
Social sciences	3,352	12	2,320	17	845	12	187	2
Trade and industrial	--	--	--	--	--	--	--	--
Visual and performing arts	1,018	4	791	6	175	2	52	1
Other	--	--	--	--	--	--	--	--
Total ³	28,792	100	13,959	100	7,343	100	7,490	100

1. Data represent the summer term preceding the academic year plus the academic year. Full-time equivalent students are calculated by dividing undergraduate student credit hours by 30 and graduate student credit hours by 24.

2. Graduate includes master's, first professional (excluding medical) and/or doctor's levels.

3. Because of rounding, CIP detail may not sum to total.

a. Rounds to less than 1 percent.

b. Rounds to less than 1 full-time equivalent student.

SOURCE: Reports provided by University of Pittsburgh, 1988.

Table 3D

TEMPLE UNIVERSITY
 NUMBER AND PERCENTAGE DISTRIBUTION OF FULL-TIME EQUIVALENT STUDENTS¹
 BY ACADEMIC DIVISION AND LEVEL AND CIP CLASSIFICATION
 1987-88

CIP Classification	Total	Percent- age of total	Lower division	Percent- age of total	Upper division	Percent- age of total	Graduate ²	Percent- age of total
Agriculture	105	a	86	1%	19	a	--	--
Architecture and environmental design	--	--	--	--	--	--	--	--
Area and ethnic studies	137	1%	66	1	65	1%	6	a
Business	3,678	14	1,063	10	2,009	21	606	11%
Communications	1,243	5	542	5	581	6	120	2
Computer and information sciences	520	2	208	2	211	2	101	2
Consumer, personal and miscellaneous services	--	--	--	--	--	--	--	--
Education	2,652	10	731	7	751	8	1,170	20
Engineering	970	4	324	3	621	7	25	a
Foreign languages	644	3	362	3	238	3	44	1
Health	1,633	6	123	1	790	8	720	13
Home economics	2	a	2	a	b	a	--	--
Industrial arts	--	--	--	--	--	--	--	--
Law	1,320	5	10	a	7	a	1,303	23
Letters	2,148	8	1,434	14	599	6	115	2
Liberal/general studies	263	1	215	2	44	a	4	a
Library and archival sciences	--	--	--	--	--	--	--	--
Life sciences	665	3	217	2	227	2	221	4
Mathematics	1,298	5	962	9	280	3	56	1
Military sciences	9	a	6	a	3	a	--	--
Multi/interdisciplinary studies	--	--	--	--	--	--	--	--
Parks and recreation	117	a	34	a	54	1	29	1
Personal and social development	--	--	--	--	--	--	--	--
Philosophy, religion and theology	746	3	460	4	211	2	75	1
Physical sciences	880	3	556	5	258	3	66	1
Psychology	1,125	4	559	5	356	4	210	4
Public affairs and protective services	720	3	193	2	285	3	242	4
Social sciences	3,240	13	1,702	16	1,206	13	332	6
Trade and industrial	--	--	--	--	--	--	--	--
Visual and performing arts	1,531	6	664	6	598	6	269	5
Other	--	--	--	--	--	--	--	--
Total ³	25,646	100	10,522	100	9,411	100	5,713	100

1. Data represent the summer term preceding the academic year plus the academic year. Full-time equivalent students are calculated by dividing undergraduate student credit hours by 30 and graduate student credit hours by 24.

2. Graduate includes master's, first professional (excluding medical) and/or doctor's levels.

3. Because of rounding, CIP detail may not sum to total.

a. Rounds to less than 1 percent.

b. Rounds to less than 1 full-time equivalent student.

SOURCE: Reports provided by Temple University, 1988.

Table 3E

STATE-OWNED UNIVERSITIES
 NUMBER AND PERCENTAGE DISTRIBUTION OF FULL-TIME EQUIVALENT STUDENTS¹
 BY ACADEMIC DIVISION AND LEVEL AND CIP CLASSIFICATION
 1987-88

CIP Classification	Total	Percent- age of total	Lower division	Percent- age of total	Upper division	Percent- age of total	Graduate ²	Percent- age of total
Agriculture	--	--	--	--	--	--	--	--
Architecture and environmental design	--	--	--	--	--	--	--	--
Area and ethnic studies	--	--	--	--	--	--	--	--
Business	9,573	11%	4,177	7%	5,019	22%	377	6%
Communications	2,298	3	1,205	2	1,002	4	91	2
Computer and information sciences	1,860	2	1,437	3	338	1	85	1
Consumer, personal and miscellaneous services	--	--	--	--	--	--	--	--
Education	16,369	19	6,348	11	6,492	29	3,529	58
Engineering	248	a	82	a	138	1	28	a
Foreign languages	2,258	3	1,947	3	276	1	35	1
Health	1,393	2	336	1	888	4	169	3
Home economics	578	1	259	a	299	1	20	a
Industrial arts	171	a	117	a	47	a	7	a
Law	3	a	--	--	--	--	3	a
Letters	8,798	10	7,510	13	1,050	5	238	4
Liberal/general studies	180	a	174	a	6	a	--	--
Library and archival sciences	246	a	51	a	53	a	142	2
Life sciences	3,703	4	3,006	5	562	2	135	2
Mathematics	5,721	7	4,937	9	669	3	115	2
Military sciences	301	a	223	a	70	a	8	a
Multi/interdisciplinary studies	221	a	136	a	29	a	56	1
Parks and recreation	335	a	187	a	131	1	17	a
Personal and social development	116	a	93	a	23	a	--	--
Philosophy, religion and theology	1,529	2	1,393	2	124	1	12	a
Physical sciences	4,360	5	3,853	7	426	2	81	1
Psychology	4,545	5	3,067	5	1,073	5	405	7
Public affairs and protective services	1,135	1	540	1	543	2	52	1
Social sciences	12,976	15	10,302	18	2,383	11	291	5
Trade and industrial	24	a	5	a	19	a	--	--
Visual and performing arts	5,537	7	4,489	8	905	4	143	2
Other	145	a	129	a	8	a	8	a
Total ³	84,626	100	56,004	100	22,575	100	6,047	100

1. Data represent the summer term preceding the academic year plus the academic year. Full-time equivalent students are calculated by dividing undergraduate student credit hours by 30 and graduate student credit hours by 24.

2. Graduate includes master's level at all institutions except Lock Haven and doctor's level at Indiana.

3. Because of rounding, CIP detail may not sum to total.

a. Rounds to less than 1 percent.

SOURCE: Reports provided by the individual State-owned institutions, 1988.

Table 4

DEGREES CONFERRED¹
 1987-88, CHANGE FROM 1986-87 AND FIVE-YEAR AVERAGE ANNUAL RATE OF CHANGE (1982-83 to 1987-88)

Institution	Total				Bachelor's				Graduate ²			
	Degrees	One-year change	Percentage change One-year	Five-year average	Degrees	One-year change	Percentage change One-year	Five-year average	Degrees	One-year change	Percentage change One-year	Five-year average
State-related												
Lincoln	255	51	25%	a	156	20	15%	-2%	99	31	46%	5%
Penn State	9,565	-62	-1	-2%	7,851	-216	-3	-3	1,714	154	10	a
Pittsburgh	6,269	-23	a	a	3,738	4	a	1	2,531	-27	-1	-1
Temple	4,972	152	3	a	3,176	125	4	1	1,796	27	2	-2
Total	21,061	118	1	-1	14,921	-67	a	-1	6,140	185	3	-1
State-owned												
Bloomsburg	1,330	83	7	a	1,160	93	9	a	170	-10	-6	-1
California	913	43	5	6	767	22	3	5	146	21	17	8
Cheyney	193	-10	-5	-8	170	-4	-2	-9	23	-6	-21	-7
Clarion	1,051	6	1	1	894	-14	-2	1	157	20	15	4
East Stroudsburg	756	-36	-5	a	644	-29	-4	-1	112	-7	-6	3
Edinboro	907	-7	-1	-1	819	35	4	1	88	-42	-32	-9
Indiana	2,514	-125	-5	-2	2,118	-159	-7	-3	396	34	9	2
Kutztown	1,005	-70	-7	4	907	-56	-6	5	98	-14	-12	-1
Lock Haven	468	22	5	2	468	22	5	2	na	na	na	na
Mansfield	441	-21	-5	3	391	-15	-4	2	50	-6	-11	7
Millersville	1,250	92	8	2	1,126	94	9	3	124	-2	-2	-3
Shippensburg	1,517	151	11	4	1,173	114	11	5	344	37	12	2
Slippery Rock	1,171	-13	-1	4	1,069	3	a	5	102	-16	-14	-4
West Chester	1,460	24	2	2	1,251	40	3	2	209	-16	-7	-2
Total	14,976	139	1	1	12,957	146	1	1	2,019	-7	a	a
All institutions	36,037	257	1	a	27,878	79	a	a	8,159	178	2	-1

1. Data for each year represent the summer term preceding the academic year plus the academic year.

2. Graduate includes master's at all institutions except Lock Haven, first professional (excluding medical) and doctor's at Pittsburgh and Temple, and doctor's at Penn State and Indiana.

a. Rounds to less than 1 percent.

na. Not applicable.

SOURCE: Reports provided by the individual institutions, 1983 to 1988.

Table 5

WORKWEEK ACTIVITIES OF FULL-TIME EMPLOYED FACULTY BY TYPE OF ACTIVITY
1987-88, AND PERCENTAGE CHANGE FROM 1986-87

Institution	Full-time ¹ employed faculty head count	Average weekly hours ²											
		Under- graduate	Student contact		Instruc- tional support	Percent- age change	Research	Percent- age change	Other university service	Percent- age change	Total work- week	Percent- age change	
			Percent- age change	Graduate	Percent- age change								
State-related													
Lincoln	68	9.3	-9%	.8	-25%	17.8	-6%	11.5	-14%	11.4	14%	50.8	-5%
Penn State	2,803	6.9	-3	1.9	6	19.8	-2	11.7	3	11.3	a	51.6	a
Pittsburgh	1,626	4.7	-2	3.8	-2	15.8	a	16.1	a	11.4	2	51.8	a
Temple	1,125	5.7	-3	3.2	2	14.8	6	12.1	-3	15.7	4	51.5	2
Total	5,622	6.1	-3	2.7	2	17.6	a	13.1	1	12.2	2	51.7	a
State-owned													
Bloomsburg	338	10.4	-3	.8	7	16.3	-4	8.3	7	16.8	-3	52.6	-2
California	259	10.7	4	1.0	-4	17.0	6	7.3	1	18.8	a	54.8	3
Cheyney	118	10.8	6	1.0	39	15.7	10	6.5	-17	12.8	-9	46.8	-1
Clarion	326	10.4	-2	.6	-2	17.2	a	8.1	-2	15.5	7	51.8	1
East Stroudsburg	241	10.1	-3	.8	-7	18.1	-5	9.6	1	17.8	7	56.4	a
Edinboro	303	12.4	4	.7	6	19.4	1	7.0	-5	14.8	4	54.3	1
Indiana	691	10.6	-1	1.2	11	17.6	-1	10.6	3	18.3	2	58.3	1
Kutztown	305	11.7	-1	.4	2	16.8	-5	8.2	7	16.2	-2	53.3	-1
Lock Haven	172	11.2	-3	na	na	16.6	-6	7.6	5	18.2	4	53.6	a
Mansfield	173	9.6	-4	.3	-11	18.6	-8	10.0	3	16.5	-11	55.0	-6
Millersville	314	11.1	3	.6	12	16.4	5	9.0	-3	16.5	-1	53.6	1
Shippensburg	317	9.7	2	1.0	-8	17.0	a	7.8	2	16.6	1	52.1	1
Slippery Rock	347	11.2	-2	.6	15	18.6	-1	9.1	-1	16.3	a	55.8	-1
West Chester	414	10.4	0	1.3	8	19.2	2	9.8	3	20.2	-3	60.9	a
Total	4,318	10.8	0	.8	5	17.6	a	8.8	1	17.2	a	55.2	a
All institutions	9,940	8.0	-2	1.9	3	17.6	a	11.2	1	14.3	1	53.0	a

1. The number of full-time employed faculty for 1987-88 represents those reported by each school for the fall term.

2. Average calculated using only those full-time employed faculty in the fall who reported a complete workweek of 100 hours or less.

a. Rounds to less than 1 percent.

na. Not applicable.

SOURCE: Reports provided by the individual institutions, 1987 and 1988.

Table 6

AVERAGE INSTRUCTIONAL SALARIES OF FULL-TIME EQUIVALENT INSTRUCTIONAL FACULTY AND PERCENTAGE DISTRIBUTION BY RANK¹
1987-88
(Dollars in thousands)

Institution	FTE instructional faculty		Average instructional salary		Professor		Associate professor		Assistant professor		Instructor		No rank ²	
	Number	Percentage change 1986-87 to 1987-88	Amount	Percentage change 1986-87 to 1987-88	Average instructional salary	Percentage of faculty	Average instructional salary	Percentage of faculty	Average instructional salary	Percentage of faculty	Average instructional salary	Percentage of faculty	Average instructional salary	Percentage of faculty
State-related														
Lincoln	93	-7%	\$21.4	3%	\$29.3	12%	\$25.4	9%	\$21.1	45%	\$19.6	17%	\$15.9	17%
Penn State	3,282	2	31.2	6	50.6	15	38.0	17	30.5	26	21.0	18	22.5	24
Pittsburgh	1,790	a	32.0	9	48.1	20	34.8	28	26.9	20	17.5	11	25.3	21
Temple	1,570	3	29.5	6	43.7	27	34.2	23	27.9	15	16.0	14	17.1	21
Total	6,735	1	30.9	7	47.5	19	35.9	21	28.9	22	19.2	15	21.9	23
State-owned														
Bloomsburg	361	5	32.8	5	42.2	26	34.4	30	27.6	32	22.4	12	na	0
California	280	9	36.1	10	44.9	39	37.6	32	29.1	15	14.6	14	27.7	a
Cheyney	112	-6	37.7	4	43.8	36	37.8	44	29.1	12	23.3	7	15.4	1
Clarion	302	a	34.7	8	42.3	33	35.1	29	29.1	30	23.1	8	23.4	a
East Stroudsburg	261	4	32.9	6	40.3	40	32.1	30	24.6	23	20.6	7	na	0
Edinboro	322	1	34.8	7	40.6	46	33.5	27	27.5	22	23.2	5	36.1	a
Indiana	691	1	33.2	6	41.5	33	34.1	27	27.8	28	20.3	11	21.8	1
Kutztown	334	2	35.7	9	44.5	29	35.9	35	29.7	29	24.1	7	35.0	a
Lock Haven	158	1	37.4	8	45.2	37	36.4	39	28.9	19	23.8	5	20.2	a
Mansfield	149	-4	35.3	10	44.4	32	36.1	30	29.5	29	18.8	9	na	0
Millersville	349	0	34.2	12	42.5	32	35.6	33	27.5	26	19.4	9	na	0
Shippensburg	300	1	35.9	8	42.7	42	34.4	32	28.7	20	23.5	6	na	a
Slippery Rock	343	4	35.2	8	43.3	39	35.1	23	28.4	29	23.8	9	26.7	a
West Chester	493	5	33.1	5	41.8	26	35.1	34	27.5	28	20.2	11	33.3	1
Total	4,455	2	34.5	7	42.5	34	35.0	31	28.0	26	20.9	9	25.7	a
All institutions	11,190	2	32.3	7	44.8	25	35.5	25	28.5	23	19.7	13	22.0	14

1. Average instructional salaries are calculated by dividing the total instructional salaries paid to all staff members in the respective rank categories by their total full-time equivalency in the instructional function. One full-time equivalent faculty represents one full-time workload for two terms (one academic year). The summer term is treated as one term or one-half the academic year. Data for each year represent the summer term preceding the academic year plus the academic year.

2. The full-time equivalency of nonranked faculty members is based on the time spent in instruction by all nonranked personnel, including lecturers, administrators, librarians, research staff and graduate assistants.

a. Rounds to less than 1 percent.

na. Not applicable.

SOURCE: Reports provided by the individual institutions, 1987 and 1988.

Table 7

AVERAGE INSTRUCTIONAL FACULTY SALARY COST PER FULL-TIME EQUIVALENT STUDENT BY ACADEMIC DIVISION AND LEVEL¹
1987-88, CHANGE FROM 1986-87 AND FIVE-YEAR AVERAGE ANNUAL RATE OF CHANGE (1982-83 to 1987-88)

Institution	Undergraduate						Master's					
	Lower division	Percentage change		Upper division	Percentage change		Total undergraduate	Percentage change		Total master's	Percentage change	
		One-year	Five-year average		One-year	Five-year average		One-year	Five-year average		One-year	Five-year average
State-related												
Lincoln	\$1,266	-17%	5%	\$2,497	-12%	2%	\$1,513	-16%	4%	\$1,614	-11%	5%
Penn State	1,013	a	b	1,816	4	b	1,268	3	b	2,808	9	b
Pittsburgh	1,064	7	5	1,986	-3	4	1,382	3	4	3,608	11	7
Temple	1,216	8	3	1,692	6	1	1,441	7	2	2,679	15	a
Total	1,062	3	b	1,823	3	b	1,331	3	b	3,102	11	b
State-owned												
Bloomsburg	1,439	9	4	2,356	3	6	1,711	6	5	2,350	18	4
California	1,401	8	2	2,392	17	1	1,710	11	3	3,072	4	-1
Cheyney	2,268	-9	6	4,313	2	7	2,707	-8	6	3,680	-20	-10
Clarion	1,363	a	4	2,573	7	6	1,699	4	5	2,514	32	-6
East Stroudsburg	1,491	4	5	3,034	6	6	1,859	4	5	1,494	-4	-4
Edinboro	1,555	a	3	2,285	a	1	1,769	0	2	2,971	-3	-1
Indiana	1,188	3	4	2,327	8	6	1,558	5	5	4,278	13	3
Kutztown	1,305	5	5	3,096	8	8	1,853	6	6	2,476	9	2
Lock Haven	1,641	5	2	3,167	5	5	2,084	4	4	na	na	na
Mansfield	1,271	1	2	3,683	5	5	1,919	2	4	3,722	27	4
Millersville	1,406	9	4	2,795	8	6	1,764	9	6	2,182	6	3
Shippensburg	1,540	9	5	2,194	2	4	1,718	6	5	2,784	7	3
Slippery Rock	1,431	6	3	2,735	8	5	1,762	7	4	3,444	27	4
West Chester	1,328	a	6	2,061	-3	-1	1,544	-1	3	2,630	3	-1
Total	1,405	4	4	2,559	5	4	1,736	4	4	2,834	8	a
All institutions	1,223	4	b	2,114	4	b	1,512	4	b	3,005	10	b

1. The average instructional faculty salary cost per full-time equivalent student for each level is calculated as follows: the instructional salary for each rank is assigned by level according to the percentage distribution of the course (assigned) credits within each rank. The salary determined by this method for each rank is summed by level and divided by the total full-time equivalent students at that level. In the case of individual instruction, one course (assigned) credit is attributed to every three student credit hours produced in individual instruction.

a. Rounds to less than 1 percent.

b. In 1983-84, Penn State's data on instructional salaries and full-time equivalent students were affected by two major reporting changes: a change in the university's academic calendar (to two semesters from three terms in the academic year, and to a shorter summer term); and improved data collection procedures, which permitted the first-time inclusion of activities related to the university's continuing education credit program. Since then Penn State's data are comparable to current year data from the other institutions, but are noncomparable to prior years' data from Penn State and the other institutions.

na. Not applicable.

SOURCE: Reports provided by the individual institutions, 1983 to 1988.

Table 8A

LINCOLN UNIVERSITY
 AVERAGE INSTRUCTIONAL FACULTY SALARY COST PER FULL-TIME EQUIVALENT STUDENT¹
 BY ACADEMIC DIVISION AND LEVEL AND CIP CLASSIFICATION
 1987-88

CIP classification	Undergraduate			Graduate		
	Lower division	Upper division	Total under-graduate	Master's	First professional	Doctor's
Agriculture	--	--	--	--	--	--
Architecture and environmental design	--	--	--	--	--	--
Area and ethnic studies	--	--	--	--	--	--
Business	\$1,045	\$1,111	\$1,088	--	--	--
Communications	--	--	--	--	--	--
Computer and information sciences	--	--	--	--	--	--
Consumer, personal and miscellaneous services	--	--	--	--	--	--
Education	1,282	2,675	1,461	--	--	--
Engineering	--	--	--	--	--	--
Foreign languages	1,437	3,210	1,712	--	--	--
Health	--	--	--	--	--	--
Home economics	--	--	--	--	--	--
Industrial arts	--	--	--	--	--	--
Law	--	--	--	--	--	--
Letters	1,138	3,067	1,278	--	--	--
Liberal/general studies	--	--	--	--	--	--
Library and archival sciences	--	--	--	--	--	--
Life sciences	1,122	3,711	1,438	--	--	--
Mathematics	961	3,460	1,114	--	--	--
Military sciences	--	--	--	--	--	--
Multi/interdisciplinary studies	1,197	--	1,197	--	--	--
Parks and recreation	--	--	--	--	--	--
Personal and social development	--	--	--	--	--	--
Philosophy, religion and theology	1,049	--	1,049	--	--	--
Physical sciences	2,368	4,363	2,818	--	--	--
Psychology	1,164	2,744	1,671	--	--	--
Public affairs and protective services	--	--	--	\$1,614	--	--
Social sciences	1,306	3,079	1,850	--	--	--
Trade and industrial	--	--	--	--	--	--
Visual and performing arts	--	--	--	--	--	--
Other	--	--	--	--	--	--
Total	1,266	2,497	1,513	1,614	--	--

1. The average instructional faculty salary cost per full-time equivalent student for each level is calculated as follows: the instructional salary for each rank is assigned by level according to the percentage distribution of the course (assigned) credits within each rank. The salary determined by this method for each rank is summed by level and divided by the total full-time equivalent students at that level. In the case of individual instruction, one course (assigned) credit is attributed to every three student credit hours produced in individual instruction.

SOURCE: Reports provided by Lincoln University, 1988.

Table 8C

UNIVERSITY OF PITTSBURGH
 AVERAGE INSTRUCTIONAL FACULTY SALARY COST PER FULL-TIME EQUIVALENT STUDENT¹
 BY ACADEMIC DIVISION AND LEVEL AND CIP CLASSIFICATION
 1987-88

CIP classification	Undergraduate			Graduate		
	Lower division	Upper division	Total undergraduate	Master's	First professional ²	Doctor's
Agriculture	--	--	--	--	--	--
Architecture and environmental design	--	--	--	--	--	--
Area and ethnic studies	\$1,489	\$1,699	\$1,555	\$10,746	--	\$7,300
Business	1,135	1,222	1,196	1,366	--	15,392
Communications	537	2,084	1,711	1,068	--	--
Computer and information sciences	1,037	2,281	1,402	2,104	--	6,761
Consumer, personal and miscellaneous services	--	--	--	--	--	--
Education	1,067	2,841	2,245	2,324	--	6,001
Engineering	1,624	2,008	1,848	3,590	--	7,155
Foreign languages	1,496	2,897	1,762	4,780	--	10,354
Health	2,674	2,431	2,486	7,648	--	19,946
Home economics	--	1,620	1,620	3,928	--	15,008
Industrial arts	--	--	--	--	--	--
Law	--	--	--	4,852	\$1,485	--
Letters	1,177	1,198	1,184	4,438	--	8,743
Liberal/general studies	--	--	--	--	--	--
Library and archival sciences	1,184	3,556	2,733	2,733	--	7,343
Life sciences	1,134	2,378	1,433	6,968	--	10,886
Mathematics	999	2,320	1,154	2,970	--	16,396
Military sciences	--	--	--	--	--	--
Multi/interdisciplinary studies	1,051	1,961	1,364	7,961	--	4,045
Parks and recreation	--	--	--	--	--	--
Personal and social development	--	--	--	--	--	--
Philosophy, religion and theology	983	2,761	1,247	5,874	--	12,882
Physical sciences	890	3,495	1,111	5,769	--	8,425
Psychology	398	1,322	613	4,743	--	6,922
Public affairs and protective services	626	1,465	1,211	3,179	--	4,661
Social sciences	1,004	2,156	1,312	6,845	--	9,786
Trade and industrial	--	--	--	--	--	--
Visual and performing arts	1,025	2,640	1,317	6,489	--	10,302
Other	--	--	--	--	--	--
Total	1,064	1,986	1,382	3,608	1,485	8,337

1. The average instructional faculty salary cost per full-time equivalent student for each level is calculated as follows: the instructional salary for each rank is assigned by level according to the percentage distribution of the course (assigned) credits within each rank. The salary determined by this method for each rank is summed by level and divided by the total full-time equivalent students at that level. In the case of individual instruction, one course (assigned) credit is attributed to every three student credit hours produced in individual instruction.

2. Excludes full-time equivalent dental students.

SOURCE: Reports provided by University of Pittsburgh, 1988.

Table 8B

THE PENNSYLVANIA STATE UNIVERSITY
 AVERAGE INSTRUCTIONAL FACULTY SALARY COST PER FULL-TIME EQUIVALENT STUDENT¹
 BY ACADEMIC DIVISION AND LEVEL AND CIP CLASSIFICATION
 1987-88

CIP classification	Undergraduate			Graduate		
	Lower division	Upper division	Total undergraduate	Master's	First professional	Doctor's
Agriculture	\$1,793	\$2,100	\$2,029	\$3,257	--	\$8,697
Architecture and environmental design	1,414	2,253	1,863	11,367	--	10,446
Area and ethnic studies	904	2,727	1,691	2,976	--	13,700
Business	978	1,406	1,222	2,057	--	7,337
Communications	476	1,934	1,304	4,773	--	5,543
Computer and information sciences	1,555	2,172	1,655	3,706	--	10,091
Consumer, personal and miscellaneous services	--	--	--	--	--	--
Education	896	2,133	1,407	1,499	--	6,740
Engineering	2,323	1,974	2,092	3,292	--	9,393
Foreign languages	1,104	2,277	1,262	3,696	--	5,128
Health	1,006	2,678	2,152	5,938	--	6,146
Home economics	582	1,822	955	3,198	--	8,862
Industrial arts	--	--	--	--	--	--
Law	--	--	--	--	--	--
Letters	1,070	1,582	1,195	3,611	--	8,342
Liberal/general studies	1,291	848	1,155	--	--	--
Library and archival sciences	5,147	--	5,147	--	--	--
Life sciences	749	1,568	926	6,261	--	8,974
Mathematics	980	1,908	1,095	3,243	--	9,379
Military sciences	--	--	--	--	--	--
Multi/interdisciplinary studies	1,250	3,276	1,927	2,479	--	13,494
Parks and recreation	704	2,086	1,761	4,055	--	20,173
Personal and social development	--	--	--	--	--	--
Philosophy, religion and theology	926	1,957	1,052	5,428	--	13,213
Physical sciences	1,184	2,225	1,293	6,052	--	10,315
Psychology	497	1,708	751	2,721	--	7,992
Public affairs and protective services	830	1,867	1,448	2,029	--	10,533
Social sciences	731	1,320	888	3,290	--	10,621
Trade and industrial	2,094	--	2,094	--	--	--
Visual and performing arts	814	3,322	1,190	6,734	--	9,456
Other	--	--	--	--	--	--
Total	1,013	1,816	1,268	2,808	--	8,861

1. The average instructional faculty salary cost per full-time equivalent student for each level is calculated as follows: the instructional salary for each rank is assigned by level according to the percentage distribution of the course (assigned) credits within each rank. The salary determined by this method for each rank is summed by level and divided by the total full-time equivalent students at that level. In the case of individual instruction, one course (assigned) credit is attributed to every three student credit hours produced in individual instruction.

SOURCE: Reports provided by The Pennsylvania State University, 1988.

Table 8D

TEMPLE UNIVERSITY
 AVERAGE INSTRUCTIONAL FACULTY SALARY COST PER FULL-TIME EQUIVALENT STUDENT¹
 BY ACADEMIC DIVISION AND LEVEL AND CIP CLASSIFICATION
 1987-88

CIP classification	Undergraduate			Graduate		
	Lower division	Upper division	Total undergraduate	Master's	First professional	Doctor's
Agriculture	\$1,692	\$2,110	\$1,767	--	--	--
Architecture and environmental design	--	--	--	--	--	--
Area and ethnic studies	1,884	2,366	2,122	\$3,098	--	\$4,813
Business	1,021	1,351	1,237	1,932	--	6,759
Communications	819	1,436	1,138	3,277	--	5,687
Computer and information sciences	1,179	1,976	1,580	2,229	--	6,457
Consumer, personal and miscellaneous services	--	--	--	--	--	--
Education	1,144	1,523	1,336	1,591	--	3,975
Engineering	1,541	1,965	1,820	7,460	--	--
Foreign languages	1,678	2,009	1,810	2,145	--	3,937
Health	2,281	1,942	1,986	3,992	\$4,336	13,240
Home economics	1,927	1,845	1,922	--	--	--
Industrial arts	--	--	--	--	--	--
Law	1,789	3,833	2,636	2,505	1,881	--
Letters	1,210	1,460	1,283	3,839	--	6,138
Liberal/general studies	1,047	1,142	1,063	1,305	--	1,606
Library and archival sciences	--	--	--	--	--	--
Life sciences	539	1,093	822	5,020	3,024	7,264
Mathematics	1,370	2,020	1,516	3,863	--	6,292
Military sciences	--	--	--	--	--	--
Multi/interdisciplinary studies	--	--	--	--	--	--
Parks and recreation	1,444	2,126	1,861	1,781	--	4,103
Personal and social development	--	--	--	--	--	--
Philosophy, religion and theology	1,210	1,457	1,288	5,806	--	7,765
Physical sciences	1,028	1,642	1,223	6,568	--	7,835
Psychology	664	1,594	1,025	1,842	--	4,580
Public affairs and protective services	1,196	1,822	1,569	2,713	--	1,466
Social sciences	1,139	1,771	1,401	2,756	--	5,582
Trade and industrial	--	--	--	--	--	--
Visual and performing arts	2,086	2,608	2,331	5,118	--	6,643
Other	--	--	--	--	--	--
Total	1,216	1,692	1,441	2,679	2,642	5,227

1. The average instructional faculty salary cost per full-time equivalent student for each level is calculated as follows: the instructional salary for each rank is assigned by level according to the percentage distribution of the course (assigned) credits within each rank. The salary determined by this method for each rank is summed by level and divided by the total full-time equivalent students at that level. In the case of individual instruction, one course (assigned) credit is attributed to every three student credit hours produced in individual instruction.

SOURCE: Reports provided by Temple University, 1988.

Table 8E

STATE-OWNED UNIVERSITIES
 AVERAGE INSTRUCTIONAL FACULTY SALARY COST PER FULL-TIME EQUIVALENT STUDENT¹
 BY ACADEMIC DIVISION AND LEVEL AND CIP CLASSIFICATION
 1987-88

CIP classification	Undergraduate			Graduate		
	Lower division	Upper division	Total undergraduate	Master's	First professional	Doctor's ²
Agriculture	--	--	--	--	--	--
Architecture and environmental design	--	--	--	--	--	--
Area and ethnic studies	--	--	--	--	--	--
Business	\$1,111	\$1,535	\$1,342	\$2,465	--	--
Communications	1,282	2,123	1,664	3,368	--	--
Computer and information sciences	1,376	2,723	1,632	2,707	--	--
Education	1,478	2,528	2,009	2,171	--	--
Engineering	2,756	3,215	3,045	982	--	--
Foreign languages	1,740	4,259	2,053	2,565	--	--
Health	2,338	3,619	3,267	4,052	--	--
Home economics	1,330	2,382	1,894	5,034	--	--
Industrial arts	3,783	5,197	4,186	11,424	--	--
Law	--	--	--	1,177	--	--
Letters	1,514	2,690	1,658	4,216	--	--
Liberal/general studies	378	412	379	--	--	--
Library and archival sciences	2,059	3,116	2,600	1,884	--	--
Life sciences	1,517	4,189	1,938	7,032	--	--
Mathematics	1,412	2,696	1,565	4,460	--	--
Military sciences	--	--	--	--	--	--
Multi/interdisciplinary studies	1,695	2,032	1,754	1,150	--	--
Parks and recreation	1,644	2,530	2,010	5,316	--	--
Personal and social development	1,592	2,746	1,818	--	--	--
Philosophy, religion and theology	1,235	3,236	1,399	4,808	--	--
Physical sciences	1,931	7,222	2,459	6,995	--	--
Psychology	1,063	2,270	1,376	2,538	--	--
Public affairs and protective services	1,227	2,004	1,617	1,966	--	--
Social sciences	1,144	2,532	1,405	4,478	--	--
Trade and industrial	2,694	4,716	4,302	--	--	--
Visual and performing arts	1,580	4,444	2,061	7,387	--	--
Other	1,686	6,515	1,959	2,557	--	--
Total	1,405	2,559	1,736	2,834	--	--

1. The average instructional faculty salary cost per full-time equivalent student for each level is calculated as follows: the instructional salary for each rank is assigned by level according to the percentage distribution of the course (assigned) credits within each rank. The salary determined by this method for each rank is summed by level and divided by the total full-time equivalent students at that level. In the case of individual instruction, one course (assigned) credit is attributed to every three student credit hours produced in individual instruction.

2. Doctor's at Indiana included in master's.

SOURCE: Reports provided by the individual State-owned institutions, 1988.

Table 9

AVERAGE CLASS SIZE IN CLASSROOM INSTRUCTION BY ACADEMIC DIVISION AND LEVEL¹
 1987-88, CHANGE FROM 1986-87 AND FIVE-YEAR AVERAGE ANNUAL RATE OF CHANGE (1982-83 to 1987-88)

Institution	Undergraduate									Master's		
	Lower division			Upper division			Total undergraduate			Percentage change		
	Class size	One-year	Five-year average	Class size	One-year	Five-year average	Class size	One-year	Five-year average	Class size	One-year	Five-year average
State-related												
Lincoln	21	11%	0%	11	0%	4%	18	12%	1%	13	8%	-1%
Penn State	31	0	a	28	0	a	30	0	a	15	7	a
Pittsburgh	32	10	1	27	17	2	30	11	2	18	12	1
Temple	25	-4	1	23	5	4	24	0	2	13	0	2
Total	30	3	a	26	4	a	28	0	a	15	0	a
State-owned												
Bloomsburg	23	-4	-2	16	0	-2	21	0	-1	12	-14	0
California	29	-3	1	18	0	4	25	0	2	10	0	5
Cheyney	20	18	-1	10	11	-5	16	14	-2	8	33	7
Clarion	35	6	1	17	0	-2	27	4	-1	13	-19	9
East Stroudsburg	28	0	-1	16	7	-2	24	4	-1	19	12	12
Edinboro	27	8	2	18	6	2	24	9	2	10	11	5
Indiana	31	0	0	17	-6	-1	25	0	0	7	0	3
Kutztown	30	7	-2	14	0	-2	23	5	-2	13	8	0
Lock Haven	28	4	2	17	6	0	24	4	1	na	na	na
Mansfield	28	8	2	8	0	-2	16	0	-2	8	14	3
Millersville	25	-4	-1	13	0	-4	20	-5	-3	12	9	-2
Shippensburg	28	0	0	21	0	0	26	0	1	12	0	2
Slippery Rock	29	0	0	15	0	-1	23	0	-1	10	-9	0
West Chester	25	0	-1	17	6	8	22	0	2	10	0	9
Total	28	4	0	16	0	0	23	0	0	11	0	4
All institutions	29	4	a	21	5	a	26	4	a	13	0	a

1. Average class size for each level is calculated by dividing total classroom student credit hours by total classroom course (assigned) credits.

a. In 1983-84, Penn State's data on classroom student credit hours and classroom course (assigned) credits were affected by two major reporting changes: a change in the university's academic calendar (to two semesters from three terms in the academic year, and to a shorter summer term); and improved data collection procedures, which permitted the first-time inclusion of activities related to the university's continuing education credit program. Since then Penn State's data are comparable to current year data from the other institutions, but are noncomparable to prior years data from Penn State and the other institutions.

na. Not applicable.

SOURCE: Reports provided by the individual institutions, 1983 to 1988.

Table 10

TOTAL INSTRUCTIONAL COST PER FULL-TIME EQUIVALENT STUDENT
BY STATE¹
ALL PUBLICLY CONTROLLED INSTITUTIONS OF HIGHER EDUCATION
FISCAL YEAR 1986

State ²	Instructional cost per FTE student	Rank
Alaska	\$10,727	1
Wyoming	8,266	2
Vermont	7,556	3
New York	7,389	4
Delaware	7,263	5
Kentucky	6,728	6
Idaho	6,661	7
South Carolina	6,655	8
PENNSYLVANIA	6,638	9
California	6,478	10
Indiana	6,426	11
Tennessee	6,351	12
Arkansas	6,344	13
Rhode Island	6,211	14
Iowa	6,192	15
New Jersey	6,184	16
Michigan	6,183	17
Ohio	6,139	18
Wisconsin	6,106	19
Maryland	6,074	20
Utah	6,058	21
Texas	6,050	22
Maine	6,039	23
Oregon	5,982	24
North Carolina	5,977	25
Georgia	5,968	26
North Dakota	5,965	27
Colorado	5,959	28
Minnesota	5,932	29
Virginia	5,887	30
Kansas	5,839	31
Washington	5,752	32
Mississippi	5,742	33
Alabama	5,709	34
South Dakota	5,618	35
Arizona	5,613	36
Hawaii	5,603	37
Florida	5,557	38
Missouri	5,517	39
Connecticut	5,468	40
Nevada	5,414	41
Nebraska	5,400	42
West Virginia	5,327	43
Illinois	5,322	44
Montana	5,245	45
New Hampshire	5,228	46
Massachusetts	5,076	47
New Mexico	5,066	48
Louisiana	4,820	49
Oklahoma	4,438	50
U.S. average	6,079	

1. Direct instructional costs for each state include Instruction, Student Services, and Scholarships and Fellowships. Allocatable costs include Libraries, Academic Support, Instructional Support, Plant Operation and Mandatory Transfers. The latter costs are allocated to instruction on the basis of the ratio of each state's direct instructional costs to its total costs, where total costs equal direct instructional costs plus direct noninstructional costs (Public Service and Research).

2. Arranged in descending order with regard to instructional cost per FTE student.

SOURCE: Data provided by the Education Information Branch, U.S. Department of Education, Washington, D.C., September 1987.

Table 11

ACADEMIC YEAR TUITION AND REQUIRED FEES FOR FULL-TIME STUDENTS BY ACADEMIC LEVEL AND RESIDENCE
1987-88, CHANGE FROM 1986-87 AND FIVE-YEAR AVERAGE ANNUAL RATE OF CHANGE (1982-83 to 1987-88)

Institution	Undergraduate						Graduate ¹					
	In-State			Out-of-State			In-State			Out-of-State		
	Tuition and required fees	Percentage change		Tuition and required fees	Percentage change		Tuition and required fees	Percentage change		Tuition and required fees	Percentage change	
	One-year	Five-year average		One-year	Five-year average		One-year	Five-year average		One-year	Five-year average	
State-related												
Lincoln	\$2,130	0%	4%	\$3,130	0%	3%	\$2,500	0%	7%	\$4,000	0%	6%
Penn State ^{2,3}	3,292	10	11	6,610	10	11	3,510	10	11	7,016	10	11
Pittsburgh ^{2,3}	3,486	8	10	6,836	8	10	4,202	9	12	8,322	9	12
Temple ³	3,564	6	7	6,222	6	6	3,938	6	7	4,922	6	6
Average	3,118	7	8	5,700	7	8	3,538	7	9	6,065	7	10
State-owned												
Bloomsburg	1,990	9	5	3,426	6	5	1,890	9	5	2,100	9	8
California	2,120	8	6	3,556	6	6	2,120	8	7	2,330	8	9
Cheyney	2,030	8	5	3,466	6	5	2,010	8	5	2,220	8	7
Clarion	2,038	8	5	3,474	6	5	1,984	8	5	2,194	8	7
East Stroudsburg	1,904	2	3	3,340	2	4	1,900	5	5	2,110	5	7
Edinboro	2,120	9	6	3,556	6	6	2,096	8	6	2,306	8	8
Indiana ⁴	2,054	8	5	3,490	6	5	1,978	8	5	2,188	8	8
Kutztown	2,022	9	5	3,458	7	6	1,902	10	6	2,112	10	9
Lock Haven	1,995	8	5	3,431	6	5	na	na	na	na	na	na
Mansfield	2,055	8	5	3,491	6	5	1,930	8	5	2,140	9	7
Millersville	2,040	13	6	3,476	9	6	1,934	14	6	2,144	13	9
Shippensburg	2,066	8	5	3,502	6	5	1,960	8	5	2,170	8	8
Slippery Rock	2,116	10	5	3,552	7	6	2,116	12	7	2,326	12	10
West Chester	1,985	10	5	3,421	7	5	1,897	9	5	2,107	9	8
Average	2,038	8	5	3,474	6	5	1,978	9	5	2,188	9	8

1. Graduate excludes first professional level.
2. Main campus data only.
3. Average cost for most programs; fees vary with programs.
- na. Not applicable.

SOURCE: Pennsylvania Department of Education, Tuition and Required Fees and Room and Board Charges at Institutions of Higher Education in Pennsylvania, 1982-83, and Basic Student Charges at Institutions of Higher Education, 1986-87 and 1987-88.

Table 12

TUITION AND FEE REVENUES RELATED TO FULL-TIME EQUIVALENT STUDENTS¹
1987-88, CHANGE FROM 1986-87 AND FIVE-YEAR AVERAGE ANNUAL RATE OF CHANGE (1982-83 to 1987-88)

Institution	Tuition and fee revenues			Tuition and fee revenues per FTE student			
	Amount (in millions)	Percentage change One- year	Five-year average	Amount	One-year change	Percentage change One- year	Five-year average
State-related							
Lincoln	\$3.6	-3%	4%	\$2,740	\$-40	-1%	5%
Penn State	239.7	15	14	3,940	390	11	a
Pittsburgh	129.4	9	14	4,490	340	8	14
Temple	108.6	8	10	4,230	230	6	8
Total	481.3	11	13	4,130	340	9	a
State-owned							
Bloomsburg	13.7	11	9	2,020	160	9	6
California	10.8	21	15	1,960	210	12	8
Cheyney	4.0	28	5	2,650	420	19	9
Clarion	12.2	11	10	2,050	170	9	8
East Stroudsburg	11.2	16	12	2,370	190	9	8
Edinboro	12.6	16	10	2,070	130	7	8
Indiana	27.5	12	10	2,090	210	11	9
Kutztown	13.9	13	12	2,200	170	8	7
Lock Haven	6.1	14	9	2,140	170	9	6
Mansfield	5.8	10	9	2,240	180	9	9
Millersville	14.1	11	9	2,130	170	9	6
Shippensburg	12.6	10	10	2,110	160	8	8
Slippery Rock	13.7	15	10	2,080	200	11	6
West Chester	21.1	16	11	2,130	110	5	7
Total ²	179.3	14	10	2,120	180	9	8
All institutions ²	660.6	12	12	3,280	260	9	a

1. FTE students include in-State and out-of-State undergraduate and graduate students.

2. Excludes University Center.

a. In 1983-84, Penn State's data on FTE students were affected by two major reporting changes: a change in the university's academic calendar (to two semesters from three terms in the academic year, and to a shorter summer term); and improved data collection procedures, which permitted the first-time inclusion of activities related to the university's continuing education credit program. Since then Penn State's data are comparable to current year data from the other institutions, but are noncomparable to prior years' data from Penn State and the other institutions.

SOURCE: FTE students - reports provided by the individual institutions, 1983 to 1988; tuition and fee revenues - data provided by the individual State-related institutions, 1983 to 1988, the Pennsylvania Department of Education, Bureau of Budget and Management, 1983, and the State System of Higher Education, Commonwealth of Pennsylvania, 1984 to 1988.

Table 13

STATE APPROPRIATIONS FOR INSTRUCTION RELATED TO FULL-TIME EQUIVALENT STUDENTS¹
 1987-88, CHANGE FROM 1986-87 AND FIVE-YEAR AVERAGE ANNUAL RATE OF CHANGE (1982-83 to 1987-88)

Institution	Appropriations			Appropriations per FTE student			
	Amount (in millions)	Percentage One- year	Five-year average	Amount	One-year change	Percentage One- year	Five-year average
State-related							
Lincoln ²	\$6.9	8%	11%	\$5,280	\$460	10%	12%
Penn State ³	142.8	5	7	2,350	30	1	a
Pittsburgh ³	98.6	5	7	3,420	150	5	7
Temple	107.2	5	7	4,180	120	3	5
Total	355.5	5	7	3,050	80	3	a
State-owned							
Bloomsburg	22.4	5	5	3,310	100	3	3
California	18.2	6	4	3,270	-90	-3	-1
Cheyney	12.4	3	3	8,160	-330	-4	7
Clarion	20.6	7	5	3,460	170	5	3
East Stroudsburg	16.7	6	5	3,530	-60	-2	2
Edinboro	21.1	5	5	3,460	-140	-4	3
Indiana	41.9	5	6	3,180	130	4	6
Kutztown	20.7	7	7	3,270	90	3	2
Lock Haven	12.5	7	5	4,400	70	2	3
Mansfield	12.9	6	5	4,940	230	5	5
Millersville	22.3	5	6	3,390	100	3	4
Shippensburg	20.0	7	4	3,360	140	4	2
Slippery Rock	22.3	8	7	3,390	120	4	4
West Chester	29.9	5	6	3,020	-130	-4	3
Total ⁴	293.9	6	6	3,470	40	1	3
All institutions ⁴	649.4	5	6	3,230	70	2	a

1. Appropriations include funding for educational and general purposes only.

2. Excludes appropriation for desegregation.

3. Includes appropriation for Titusville campus.

4. Excludes amount of appropriation allocated to Board of Governors/Chancellor's Office and System Reserve.

a. In 1983-84, Penn State's data on FTE students were affected by two major reporting changes: a change in the university's academic calendar (to two semesters from three terms in the academic year, and to a shorter summer term); and improved data collection procedures, which permitted the first-time inclusion of activities related to the university's continuing education credit program. Since then Penn State's data are comparable to current year data from the other institutions, but are noncomparable to prior years' data from Penn State and the other institutions.

SOURCE: FTE students - reports provided by the individual institutions, 1983 to 1988; appropriations - Governor's Executive Budget, 1984-85 and 1988-89, data provided by the Pennsylvania Department of Education, Bureau of Budget and Management, 1983, and the State System of Higher Education, Commonwealth of Pennsylvania, 1984 to 1988.

Table 14

TUITION AND FEE REVENUES, STATE APPROPRIATIONS AND STUDENT AID PER FULL-TIME EQUIVALENT STUDENT¹
1987-88, CHANGE FROM 1986-87 AND FIVE-YEAR AVERAGE ANNUAL RATE OF CHANGE (1982-83 to 1987-88)

Institution	Per FTE student			Ratio of Appropriations to total			Student aid per FTE student ²
	Tuition and fee revenues	State appropriations	Total	Percentage	Percentage change One-year Five-year average		
State-related							
Lincoln	\$2,740	\$5,280	\$8,020	66%	5%	2%	\$212
Penn State	3,940	2,350	6,290	37	-8	a	262
Pittsburgh	4,490	3,420	7,910	43	-2	-2	260
Temple	4,230	4,180	8,410	50	0	-1	236
Total	4,130	3,050	7,180	42	-5	a	255
State-owned							
Bloomsburg	2,020	3,310	5,330	62	-2	-1	177
California	1,960	3,270	5,230	63	-5	-2	246
Cheyney	2,650	8,160	10,810	75	-5	-1	214
Clarion	2,050	3,460	5,510	63	-2	-1	235
East Stroudsburg	2,370	3,530	5,900	60	-3	-2	113
Edinboro	2,070	3,460	5,530	63	-3	-1	202
Indiana	2,090	3,180	5,270	60	-3	-1	251
Kutztown	2,200	3,270	5,470	60	-2	-1	129
Lock Haven	2,140	4,400	6,540	67	-3	-1	182
Mansfield	2,240	4,940	7,180	69	-1	-1	237
Millersville	2,130	3,390	5,520	61	-3	-1	138
Shippensburg	2,110	3,360	5,470	61	-2	-2	150
Slippery Rock	2,080	3,390	5,470	62	-2	-1	218
West Chester	2,130	3,020	5,150	59	-3	-1	100
Total ³	2,120	3,470	5,590	62	-3	-1	184
All institutions ³	3,280	3,230	6,510	50	-2	a	225

1. FTE students include in-State and out-of-State undergraduate and graduate students. Tuition and fees are based on revenues collected by the individual institutions. State appropriations include funding for educational and general purposes only.

2. Includes grants and matching funds. Does not include student loans.

3. Appropriations exclude amount allocated to Board of Governors/Chancellor's Office and System Reserve.

a. In 1983-84, Penn State's data on FTE students were affected by two major reporting changes: a change in the university's academic calendar (to two semesters from three terms in the academic year, and to a shorter summer term); and improved data collection procedures, which permitted the first-time inclusion of activities related to the university's continuing education credit program. Since then Penn State's data are comparable to current year data from the other institutions, but are noncomparable to prior years' data from Penn State and the other institutions.

SOURCE: FTE students - reports provided by the individual institutions, 1983 to 1988; tuition and fee revenues - data provided by the individual State-related institutions, 1983 to 1988, the Pennsylvania Department of Education, Bureau of Budget and Management, 1983, and the State System of Higher Education, Commonwealth of Pennsylvania, 1984 to 1988; appropriations - Governor's Executive Budget, 1984-85 and 1988-89, and data provided by the Pennsylvania Department of Education, Bureau of Budget and Management, 1983, and the State System of Higher Education, Commonwealth of Pennsylvania, 1984 to 1988; student aid - data provided by the Pennsylvania Higher Education Assistance Agency, November 1988.

Table 15

TUITION REVENUE, STATE AND LOCAL APPROPRIATIONS PER FULL-TIME EQUIVALENT STUDENT
BY STATE
ALL PUBLICLY CONTROLLED INSTITUTIONS OF HIGHER EDUCATION
FISCAL YEAR 1986

State ¹	Per FTE student			Percentage of appropriations to total	Rank
	Tuition revenue	State and local appropriations	Total		
Alaska	1,210	11,414	12,624	90	1
Wyoming	798	7,426	8,224	90	2
Hawaii	819	5,994	6,813	88	3
North Carolina	772	5,283	6,055	87	4
Oklahoma	666	3,905	4,571	85	5
California	923	5,200	6,123	85	6
Texas	1,009	4,915	5,924	83	7
New Mexico	930	4,451	5,381	83	8
Florida	1,045	4,578	5,623	81	9
Arkansas	1,134	4,887	6,021	81	10
West Virginia	1,025	4,244	5,269	81	11
Alabama	1,218	4,811	6,029	80	12
Nevada	1,079	4,173	5,252	79	13
South Carolina	1,481	5,646	7,127	79	14
Georgia	1,457	5,509	6,966	79	15
Idaho	1,293	4,876	6,169	79	16
Kentucky	1,468	5,434	6,902	79	17
New York	1,524	5,554	7,078	78	18
Utah	1,267	4,572	5,839	78	19
Massachusetts	1,171	4,165	5,336	78	20
Mississippi	1,278	4,481	5,759	78	21
Kansas	1,322	4,557	5,879	78	22
Louisiana	1,209	4,165	5,374	78	23
Tennessee	1,318	4,532	5,850	77	24
Montana	1,035	3,496	4,531	77	25
Illinois	1,214	3,868	5,082	76	26
Arizona	1,383	4,325	5,708	76	27
Nebraska	1,365	4,148	5,513	75	28
Washington	1,334	4,024	5,358	75	29
Oregon	1,479	4,330	5,809	75	30
Iowa	1,580	4,563	6,143	74	31
Wisconsin	1,613	4,478	6,091	74	32
New Jersey	1,730	4,795	6,525	73	33
Connecticut	1,487	4,107	5,594	73	34
North Dakota	1,448	3,910	5,358	73	35
Missouri	1,496	3,973	5,469	73	36
Maryland	1,819	4,586	6,405	72	37
Maine	1,631	4,100	5,731	72	38
Minnesota	1,623	3,964	5,587	71	39
Virginia	1,843	4,390	6,233	70	40
Rhode Island	1,838	4,236	6,074	70	41
Indiana	1,982	4,201	6,183	68	42
South Dakota	1,683	3,318	5,001	66	43
Michigan	1,997	3,916	5,913	66	44
Ohio	2,230	3,822	6,052	63	45
Colorado	2,145	3,496	5,641	62	46
Delaware	2,886	3,736	6,622	56	47
PENNSYLVANIA	2,715	3,373	6,088	55	48
New Hampshire	3,097	2,346	5,443	43	49
Vermont	4,535	2,217	6,752	33	50
U.S. average ²	1,427	4,569	5,996	76	

1. Arranged in descending order with regard to percentage of appropriations to total.

2. Includes the District of Columbia, not separately shown.

SOURCE: Data provided by the Education Information Branch, U.S. Department of Education, Washington, D.C., September 1987.

