

University of Illinois

BUDGET REQUEST FOR OPERATING AND CAPITAL FUNDS

Fiscal Year 1986



PREPARED FOR PRESENTATION TO THE
BOARD OF TRUSTEES
SEPTEMBER 20, 1984

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PREFACE

We are at a critical time in the history of our State and Nation--in a very real sense we stand at the doorstep of opportunity. The economy has begun recovery and attention is now being directed toward more fundamental questions: What kind of a nation do we wish to become? What kind of future do the people of Illinois want? And how can the intellectual strength and the economic vitality of Illinois be increased?

Only a few years ago one might have asked, "What does all of this have to do with education?" That question is not likely to be asked today, but if it were, the answer would be--"perhaps everything."

One recent study of the steps needed to revitalize the Mid-American economy over the next decade reached a principal conclusion that: "The challenge for the Midwest is to use its vast educational resources in a strategic way to help meet the region's needs for human capital in the future." The study went on to make recommendations for action by business and industry, financial institutions, labor unions, government, and educational institutions. The authors urged that state governments concentrate on the application of new technologies to help renew existing industry through the use of university resources. In the case of educational institutions, the study urged universities to develop closer working relationships with private industry and government; to improve programs for management training, technology applications, entrepreneurial training, and to improve the quality of education at all levels, particularly in mathematics and science.

While one might quote many other recent studies, the fact remains: We have entered into a fundamentally new era which will challenge our educational institutions at all levels to serve the people of Illinois and

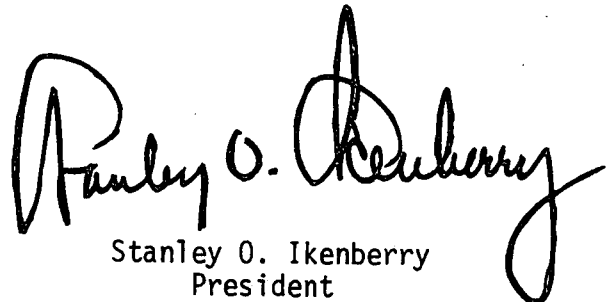
our society at large more effectively and decisively than ever before. The challenge confronting Illinois in the year ahead is the challenge of opportunity, the opportunity to build a new and stronger future for Illinois on the foundation of a great university, a strong system of higher education and a statewide system of elementary and secondary education. Education in Illinois can set the pace for the nation, and in so doing, build a stronger tomorrow.

I am pleased to recommend to the University of Illinois Board of Trustees and to the appropriate authorities, including the Governor, the leaders and members of the General Assembly and the Illinois Board of Higher Education a set of budget recommendations for the University of Illinois for 1985-86 which have been framed in the context of this broad challenge. It is essential that we continue to build on the achievements of the last two years to revitalize engineering education, modernize equipment, and deal with severe enrollment pressures facing students and faculty members in several key areas. But it is also important that we turn our attention to strengthening the basic academic offerings available to virtually all of our students in the College of Liberal Arts and Sciences and related areas.

Perhaps the most fundamental conclusion reached by the recent assessments of the quality of education in America is that the most fundamental ingredient--the most powerful determinant of quality education--is the teacher. All will be for naught if Illinois fails to make clear that this State is determined to attract and retain to the academic profession the very best talent available. Whether in the early formative years of elementary school, or in the most advanced research laboratory, excellent people create excellence. Competitive salaries are far from the total answer in meeting that challenge, but they are essential.

Perhaps the most urgent long range challenge facing Illinois is the need to revitalize and modernize the deteriorating facilities that now house many of our university programs. The average age of facilities at the University of Illinois is fifty years old. The longer the problem is ignored, the more difficult a solution becomes and the more severe the consequences. I urge that during the year ahead, the Governor and leaders of the General Assembly work with the Illinois Board of Higher Education and those of us in our universities to devise a realistic, workable program to address this problem and thereby change the future course of higher education in Illinois in fundamental ways. If this can be done, there is indeed room for optimism about the future. If we fail to do so, we have built the house on a bed of sand.

If the State of Illinois and its people are to prosper in the future, this State must be able to build on and draw upon the strength of the University of Illinois. We aspire to be the pre-eminent public university in the United States, just as the State of Illinois aspires to be the pivotal state, returning to a position of intellectual and economic leadership in America. The budget recommendations which follow are consistent with these aspirations and I recommend them to you for your consideration and support.



Stanley O. Ikenberry
President

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INTRODUCTION TO THE FISCAL YEAR 1986 OPERATING AND
CAPITAL BUDGET REQUEST

INTRODUCTION

General Perspectives for the Development of the FY 1986 Budget

The FY 1984 operating budget for the University of Illinois--like that for all other State-supported activities--evolved during a period of economic crisis which brought the State to a fiscal crossroads in determining minimally adequate levels of funding for social and human services. Ultimately the State's political leaders recognized that unusual action was required to make even the most basic level of support available and to make a modest investment in economic recovery. A temporary income tax and several other smaller tax adjustments were enacted after weeks of intense debate.

The entire budget process for the University--and the State--was characterized by uncertainty, by long debate over widely disparate funding alternatives, and by questions about the short-run and long-term economic vitality of Illinois. The process concluded with a budget for the University, augmented by substantial increases in support from students and their families, which permitted an element of fiscal stability to replace severe stress.

In contrast to the near chaos of the FY 1984 process, the development of the University's FY 1985 operating budget--and, again, that for the State as a whole--evolved far more normally than might have been thought possible after the uncertainty of the previous year. Very early in the process, it was clear that even without extension of the temporary tax measures initiated in FY 1984, the State's economy was likely to recover at least some of the ground lost to recession. That improvement, combined with the removal of many one-time costs from the FY 1984 budget, meant that the State would have a modest amount of new revenue to allocate.

Thus, the "doomsday" alternative which had faced all segments of Illinois' social and human services a year earlier was clearly not present for FY 1985. Absent that overall threat to basic services, public policy leaders were reluctant to take any action to extend existing temporary revenue measures or to devise alternative revenue approaches.

Attention therefore focused on the priority to be accorded higher education within the limits of available dollars. In total, higher education received an increment of \$62.6 million in General Revenue Funds (GRF)--a 6% increase, as compared to an increase of 4.2% in total GRF appropriations for the State as a whole. Excluding Retirement, higher education achieved a 5.4% increase in GRF support.

The University of Illinois was appropriated a 6.1% growth in General Revenue Funds, excluding retirement. Although final action has not been taken on all measures, it appears that higher education will receive a 12.1% share of the State's GRF for FY 1985. While this is far below the 13% to 16% share of GRF appropriations of a decade earlier, it continues to represent a welcome reversal of the slide in the priority accorded higher education in recent years.

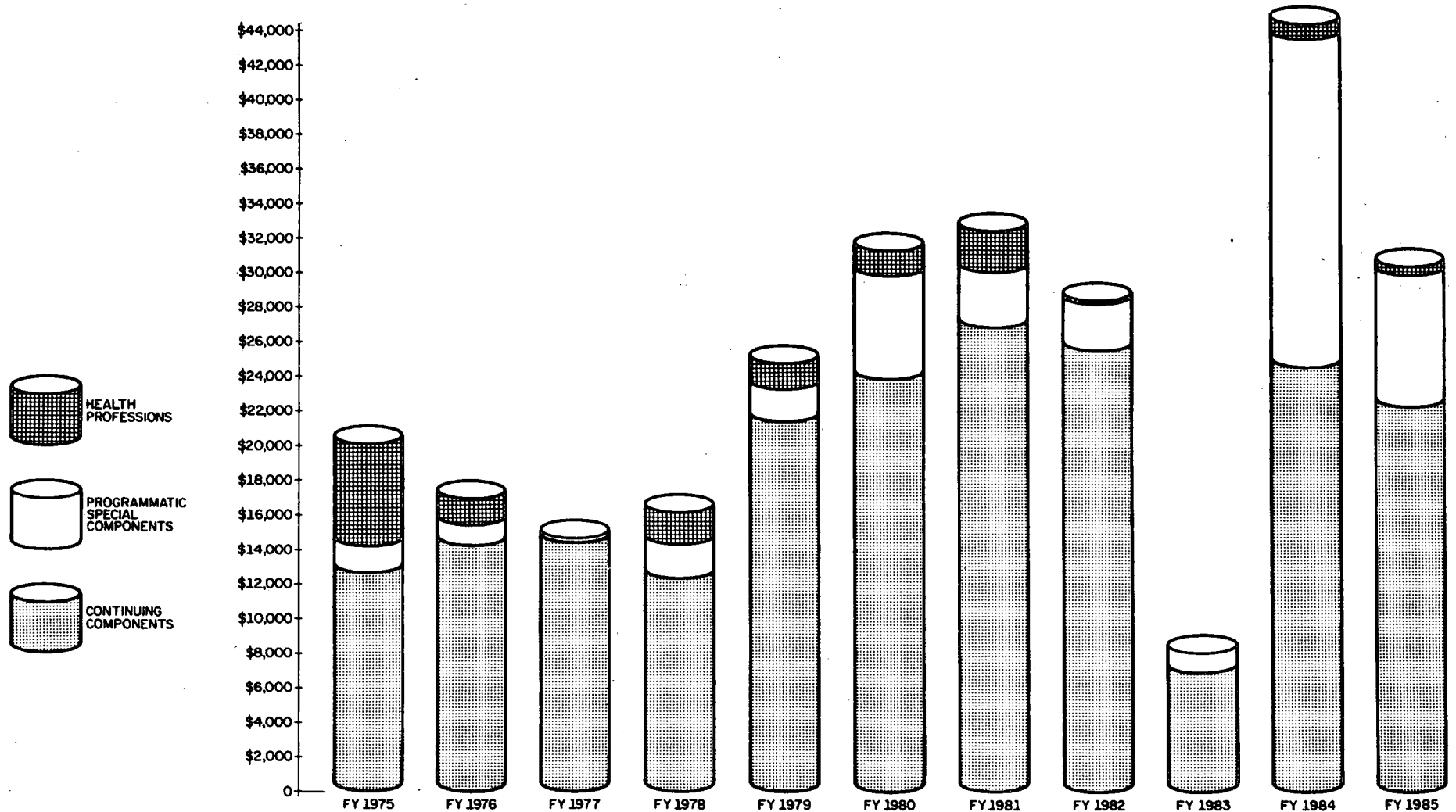
The University of Illinois received a net increment, including student tuition and fees, of \$30.4 million in appropriated funds for operations, along with another \$.6 million in a separate appropriation to cover recent fire damages at the Urbana campus. Because of relatively higher tuition increases, this represents a 7% increase over the FY 1984 base. Although this was below the 11% improvement achieved a year ago, it compares favorably with the increments achieved at the beginning of the 1980's, as shown in Figure 1, and it will allow the University to continue to regain fiscal strength and make improvements in the quality of its academic programs and services. Within these limits, the following priorities were addressed:

- Achieve salary increases which, on the average, will help the University avoid a decline in our competitive position to attract and retain top people.
- Continue the second year of the special Engineering Revitalization effort with \$2.4 million to improve inadequate staffing levels, modernize equipment, renovate facilities, and improve the competitive strength of salaries.
- Target the urgent need for equipment replacement and academic computer support with an infusion of \$1.0 million.
- Address severe problems in the areas of commerce and business administration, law, medicine, veterinary medicine, biotechnology and others, along with enhanced levels of support for graduate students and library acquisitions.

FIGURE 1

FY 1975-85 STATE INCREMENTAL FUNDS RECEIVED BY THE UNIVERSITY OF ILLINOIS
(GENERAL REVENUE, INCOME AND SPECIAL FUNDS EXCLUDING RETIREMENT, IBA AND CAPITAL GRF)
(DOLLARS IN THOUSANDS)

COMPONENT	FY 1975	FY 1976	FY 1977	FY 1978	FY 1979	FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985
PREVIOUS YEAR'S BASE	\$198,381.5	\$218,424.5	\$235,375.1	\$250,019.4	\$265,925.8	\$290,681.4	\$321,158.3	\$353,550.3	\$381,884.9	\$389,861.2	\$434,289.0
NET INCREMENT	20,043.1	16,950.7	14,644.3	16,140.0	24,755.6	31,279.3	32,391.9	28,334.6	7,976.3	44,427.8	30,429.3
NET INCREMENT AS A PERCENT OF PREVIOUS YEAR'S BASE	10.1%	7.8%	6.2%	6.5%	9.3%	10.8%	10.1%	8.0%	2.1%	11.4%	7.0%
CONTINUING COMPONENTS	12,680.0	14,230.7	14,488.0	12,347.1	21,422.9	23,803.4	26,840.1	25,461.0	6,913.0	24,579.1	22,248.7
PERCENT OF TOTAL INCREMENT	63.3%	84.0%	98.9%	76.5%	86.5%	76.1%	82.8%	90.4%	86.7%	55.3%	73.1%
PROG. & SPEC. COMPONENTS	1,586.1	1,220.0	156.3	2,001.4	1,859.7	6,008.4	3,242.0	2,733.2	1,138.3	18,998.7	7,680.6
PERCENT OF TOTAL INCREMENT	7.9%	7.2%	1.1%	12.4%	7.5%	19.2%	10.0%	9.6%	14.3%	42.8%	25.3%
HEALTH PROFESSIONS	5,777.0	1,500.0		1,791.5	1,473.0	1,467.5	2,309.8	140.4	-75.0	850.0	500.0
PERCENT OF TOTAL INCREMENT	28.8%	8.8%		11.1%	6.0%	4.7%	7.1%	0.5%	-1.0%	1.9%	1.6%



In addition to these salary and program-related funds, the FY 1985 budget is expected to provide adequate funding to respond to anticipated utilities price increases. The key budget deficiency in FY 1985 relates to the difficulty in meeting general cost increases in goods and services. No new monies were made available for this purpose. The deficiency is estimated to be in the range of \$3 to \$4 million, and therefore this area must be viewed as the major shortcoming in the FY 1985 budget. It is one which will take on added importance for the coming year.

Overall, however, the FY 1985 budget will continue the progress achieved last year in returning some degree of fiscal stability to the University's operation. Particularly in the area of academic program support, this year's budget will provide a second consecutive boost to improve staffing levels in the areas of severest enrollment pressure. This provides the foundation on which planning for FY 1986 takes place.

Illinois Focus on Education

There is growing evidence that the special importance of education at all levels is gaining prominence among the highest priorities of the State's leaders. It is becoming clearer that the State must address urgent educational needs at all levels if Illinois is to reach its full potential as a State. It is also recognized that Illinois' higher education resources cannot be allowed to deteriorate at the same time that elementary and secondary education is strengthened, lest secondary school experience lead only to a weakened higher education opportunity.

Equally encouraging are signs that leaders in the General Assembly and the Governor are approaching education reform in a realistic fashion, recognizing that improvements in the quality of education will require additional revenues beyond those now available to the State. Several new proposals were advanced in the recent Session, but came too late in the process to gain full consideration. The issue must be addressed more seriously in the year ahead.

It may well be that the rekindled interest in strengthening Illinois education will result in some reordering of priorities. Should economic growth continue, reductions in unemployment and the corresponding reductions in public assistance requirements may also serve to make additional funds available for education. These broad factors, plus the very real

recognition from the members of the General Assembly and the Governor of the special strengths of this University and other components of education in Illinois as vital assets in aiding economic and intellectual renewal and in restoring the long-term vitality to the State, combine to underline the importance of the FY 1986 budget request.

Priorities for FY 1986

A decade of funding inadequacy cannot be overcome in a year or two. The task of coping with base level deficiencies in areas of key importance such as equipment, library acquisitions and facilities rehabilitation while at the same time initiating new efforts to improve existing programs will require redoubled efforts.

For FY 1986 the University must focus on the following areas of fundamental importance:

- It is imperative that faculty and staff salaries become more closely competitive with those front-rank institutions with which the University must compete. Competition among institutions for top quality faculty and staff continues to intensify, as virtually every state attempts to strengthen education and improve its economic base. As a top quality university, Illinois is especially vulnerable to the loss of key individuals, both to other institutions and to industry. While compensation is by no means the sole factor affecting retention of top personnel, it is an important one; if the University expects to retain its well-documented quality, it must provide competitive compensation.
- Cost increases for goods and services must match inflation, and must provide for some restoration of lost purchasing power experienced over the past decade and a half, and especially in the very recent past. No general cost increase funds were available in FY 1983 or FY 1985, and this issue must be addressed in FY 1986.
- Funding levels for instructional equipment must be supplemented to meet the needs of programs in which state-of-the-art advances occur as frequently as every two to three years. Increasingly, the very substance of teaching and research is defined in significant part by the equipment available to faculty members and students.
- Special attention must be given to needs for academic computing support, some of which carry the potential to greatly enhance the University's support from major industrial sources and from the Federal government.
- Support is required to sustain the progress made during the first two years of the Engineering Revitalization program. New funds must be found for additional programs in areas of scientific and technological advances, for further development of education for the professions, and for areas of continued enrollment pressure.

- Recent criticism of national educational achievement by no means excludes higher education. The undergraduate educational experience at both campuses of the University can and should be strengthened by devoting more attention to the basic academic experiences which all undergraduates share. We should sharpen students' abilities to think logically and precisely; we should improve abilities to use language effectively in both written and oral communication; we should broaden and deepen understanding and application of mathematical concepts; we should heighten understanding of the sciences, history, and the social sciences. Such program priorities are well within our ability to define; but to implement them will require additional resources so teachers can spend more time working with students.

The FY 1986 Operating Budget Request

The FY 1986 operating budget request is shown in Table 1, and the specific programs included in the Expanded/Improved Academic Program category are identified in Table 2. The request was developed around the major areas of need just identified, along with recognition that the State of Illinois continues to require special help in restructuring its economy to become more sensitive to the changing nature of an increasingly technological society. The request includes the following highlights:

- Basic salary increases of 6%, supplemented by 2% for merit market and equity considerations. Inflation estimates for FY 1986 are now set at 6%. An additional 2% in funding is included to address special needs for recognition of merit, to adapt to external market forces, and to assure equity. This in addition will help close the gap between University of Illinois average salaries and the goal of at least third place ranking among Big Ten universities.
- Cost increases of 8% for most goods and services, including a 6% increment to match projected inflation and another 2% to provide partial recovery from the complete lack of general price increase support in FY 1985.
- Special cost increases of 15% for library acquisitions and 9% for energy-related supplies of fuel oil, natural gas, and electricity.
- \$2 million to continue to build an adequate base of support for equipment replacement.
- \$2 million to improve the University's academic computing capabilities. These funds will support expanded efforts in instructional computing as well as exciting new research possibilities in state-of-the-art areas of supercomputing which are expected to attract major funds from Federal and industrial sources.
- \$4 million to continue year III of the Engineering Revitalization Program. FY 1986 funds will focus primarily on additional staff needs, although other issues will also be addressed.

TABLE 1
FY 1986 OPERATING BUDGET REQUEST
(Dollars In Thousands)

I. Continuing Components	
A. Salary/Compensation Improvement	\$25,826.0
1. Annualization	(\$3,180.4)
2. FY 1986 Increase - 8%	(\$22,645.6)
B. General Price Increases - 8%	4,596.5
C. Library Acquisitions - 15%	932.2
D. Utility Price Increase - 9%	3,572.7
E. Operation and Maintenance for New Areas	<u>981.3</u>
Subtotal	\$35,908.7
% of FY 1985 Base*	(7.74%)
II. Programmatic Components	
A. Expanded/Improved Academic Programs	\$ 7,070.0
B. Academic Computing Support	2,000.0
C. Equipment Replacement	2,000.0
D. Engineering Revitalization	<u>4,000.0</u>
Subtotal	\$15,070.0
% of FY 1985 Base	(3.25%)
III. Special Services/Funding	
A. County Board Matching	300.0
B. Veterinary Diagnostic Laboratory	300.0
C. Cooperative Extension Programs	475.0
D. Fire Service Institute	<u>35.0</u>
Subtotal	\$ 1,110.0
% of FY 1985 Base	(.24%)
IV. Grand Total	\$52,088.7
% of FY 1985 Base	(11.23%)

*FY 1985 Base = \$463,718.2 excluding Retirement.

TABLE 2
FY 1986 EXPANDED/IMPROVED ACADEMIC PROGRAMS
(Dollars in Thousands)

	<u>Chicago</u>	<u>Urbana- Champaign</u>	<u>Central Administration</u>	<u>Total</u>
I. Science and Technology				
A. Biotechnology	\$ 550.0	\$ 650.0		\$1,200.0
B. Undergraduate Laboratories	200.0			200.0
C. Physics Microprocesses	200.0			200.0
D. Cognitive Science		400.0		400.0
E. Gerontology	345.0			345.0
Subtotal	<u>\$1,295.0</u>	<u>\$1,050.0</u>	<u>-0-</u>	<u>\$2,345.0</u>
II. Professional/Economic Development				
A. Public Agency Programs	125.0	100.0		225.0
B. Veterinary Medicine		750.0		750.0
C. Medical Cost Containment	155.0			155.0
D. Nursing	250.0			250.0
E. Pharmacy	85.0			85.0
F. Enrollment Shifts		450.0		450.0
G. Medical Residency Programs	150.0			150.0
H. Advanced Engineering Studies			300.0	300.0
Subtotal	<u>\$ 765.0</u>	<u>\$1,300.0</u>	<u>\$300.0</u>	<u>\$2,365.0</u>
III. Strengthening Basic Disciplines				
A. University Level Programs	\$ 800.0	\$1,000.0		\$1,800.0
B. High School Mathematics	150.0	120.0		270.0
C. High School Writing		140.0		140.0
D. High School Languages		150.0		150.0
Subtotal	<u>\$ 950.0</u>	<u>\$1,410.0</u>	<u>-0-</u>	<u>\$2,360.0</u>
IV. Total, Programmatic Components	<u>\$3,010.0</u>	<u>\$3,760.0</u>	<u>\$300.0</u>	<u>\$7,070.0</u>

- Strengthened academic programs organized around three major themes: Science and Technology, including a major effort in biotechnology and other programs in physics, cognitive science, and gerontology; Professional and Economic Development, including health professions advances in nursing, pharmacy and medical residencies; health care cost containment; veterinary medicine; commerce and business administration; and public agency development; and Strengthening Basic Disciplines, including new initiatives in basic undergraduate education, restoration of quality, and expanded efforts to help secondary schools improve programs in mathematics, writing, and foreign language instruction.

The total request for incremental operating funds for FY 1986 is \$52,088,700 and represents an 11.2% increase over the FY 1985 operating budget base of \$463,718,200 exclusive of Retirement. If the request presented here were appropriated in full, the University's FY 1986 operating budget would reach \$515,806,900.

Facilities Renovation Needs

In the preface to this document significant mention is made of the University's rapidly emerging need to address serious deficiencies in the rehabilitation and renovation of physical facilities. That need derives from two separate but closely related factors: academic program-driven requirements to reconfigure space to meet a changing program mix or to accommodate state-of-the-art changes in instructional and research programs (such as the advent of special "clean room" requirements in engineering, physics, and other science areas); and a growing backlog of deferred maintenance items or repair or replacement of major building systems such as providing electrical power upgrades to major laboratory facilities, roof replacement on a timely schedule, and so forth.

Most of these items would typically be identified as capital budget initiatives, but the University's capital budget has been virtually void of any remodeling or renovation funding for the past five years, and inadequate for at least a decade. The deteriorating state of teaching and research space has become as much a deterrent to the attraction and retention of top quality teachers, researchers, and students as are inadequate salaries and obsolete equipment. The traditional capital budget alternative has been too small in size and too slow in implementation to provide an effective solution to this growing problem. The time has come for the University to secure a portion of its recurring operating budget for the renovation of facilities, and that process must begin in FY 1986.

The construction of new facilities, or major remodeling activities which require the renovation of an entire building remain appropriate activities to be supported from traditional capital budget sources. Less extensive remodeling, renovation, or space realignment activities can easily be incorporated into the operating budget.

The University of Illinois is by no means alone in its need to secure some form of regular, recurring support for space remodeling and renovation needs. The physical plants of all higher education systems in Illinois are aging, and capital budget sources have been equally as ineffective for them as for the University of Illinois. A number of formula-driven approaches to providing operating budget support on the basis of replacement cost, total amount of State-supported space, or other criteria can be identified, including the Space Realignment, Renewal and Replacement concept already used by the Board of Higher Education in making its capital budget recommendations.

Since the need for recurring facilities remodeling and renovation funds is widespread throughout all higher education systems in Illinois, it seems appropriate to develop a program for its implementation on a Statewide basis, rather than within only one institution. For this reason, the University's FY 1986 operating budget does not contain a specific budget request for a facilities remodeling and renovation component. The need for such a program has grown to the point at which it is seriously affecting the recruitment and retention of faculty and staff. We urge the Board of Higher Education to develop a Statewide program to address this issue in FY 1986. While no specific funding requirements for such a program have been identified, a Statewide program of \$20 to \$40 million a year over a five year period is a realistic requirement.

To more fully describe the nature and range of the University of Illinois' space remodeling and renovation needs Appendix III contains examples of several different projects which have already been identified and which would be ideal candidates for funding from operating budget sources.

The Enrollment Picture

Much has been written about the potential for significant decline in college and university enrollments, due to population decreases in the traditional college-age group of 18-21 year olds. There is virtually no question that when viewing the State as a whole, enrollments in higher education will decline in the late 1980's and the 1990's. One recent publication from the Western Interstate Commission for Higher Education forecast a 30% decline in the number of high school graduates in Illinois between the 1981-82 and 1991-92 school years. Even a decline of this magnitude, however, is likely to have a differential impact upon colleges and universities in Illinois, depending upon demand for admission to various institutions. Fortunately, demand for entrance to many University of Illinois programs remains very strong both in Chicago and Urbana-Champaign.

The Chicago campus continues to attract a sizeable portion of its enrollment from a somewhat older age-group than the traditional 18-21 year old population, providing a broader range of potential students. This broader range of potential applicants, plus the continued operation of Program P.M., which provides access to both undergraduate and graduate education during the evening hours attractive to many potential students who must hold full-time employment while continuing their education, should serve to keep enrollments in Chicago reasonably stable for the immediate future. Enrollment at the Health Sciences Center has long been limited far more by the lack of resources than by a declining number of applicants, and demand for health professions programs is likely to continue to exceed the number of places available to accommodate new students. At Urbana-Champaign, a similar situation exists with respect to demand for admission. Enrollment levels have been constrained far more by resource limitations than by decline in well-qualified applicants. New efforts aimed at enhancing the diversity in the undergraduate student body by adding a slightly higher number of exceptionally well qualified students from outside the State are also underway. In addition, recent funding improvements in engineering and commerce and business administration at both Chicago and Urbana have made it possible to begin to offset the effects of forced enrollment reductions required in these areas in the face of overwhelming student demand several years ago. If adequate resources are made available, both campuses will be

able to surpass former enrollment ceilings in these areas.

Table 3 provides a review of overall enrollment patterns and projections. Within the overall totals, some shifting of enrollments is likely to continue, as student interests shift among various disciplines and vocational options. At the present time, however, enrollments in Chicago are expected to stabilize at approximately 20,000 at the University Center and roughly 4,800 at the Health Sciences Center. Enrollments at Urbana-Champaign will likely hold at 25,300 undergraduate and 7,450 graduate students.

FY 1986 CAPITAL BUDGET REQUEST

The FY 1986 Capital Budget Request is comprised of several components: Regular Capital Improvements, Energy Conservation, and Food for Century III. The Regular Capital Improvements component consists of those projects necessary to support the University's ongoing programmatic activities. The Energy Conservation/Fuel Conversion component is a group of projects designed to control accelerating utilities expenditures. Projects included in the Food for Century III component comprise the final phase of a multi-year program designed to complete the "critical mass" of facilities needed to enhance the University's food production research capabilities.

Regular Capital Request

The University's Regular Capital Budget Request for FY 1986 is \$44,810,000. This request contains projects designed to: (1) remodel and renovate facilities to accommodate changing academic programs, (2) maintain the structural integrity of existing facilities, (3) upgrade building systems, and (4) construct new buildings to address pressing University needs. A summary of FY 1986 capital projects in priority order is presented in Table 4.

The FY 1986 Capital Budget Request focuses on major and minor remodeling projects and the construction of new facilities. Examples of major remodeling projects at the Chicago campus include: installing a ventilation and air conditioning system in the Pharmacy Building; improving library space at the University Center Library and relocating the Office of Admissions and Records; remodeling three floors in the Clinical Sciences Building; upgrading the electrical service for the University administrative computer system at the Roosevelt Road Building; and the renovation of Chemistry Department space at the Science and Engineering Laboratory. At the Urbana-Champaign campus the remodeling projects are: the third phase of a multi-year program to renovate the interior of the English Building; remodeling Noyes Laboratory for the School of Chemical Sciences; remodeling Burrill

TABLE 4
UNIVERSITY OF ILLINOIS
FY 1986 CAPITAL REQUEST
PRIORITY LIST
(Dollars in Thousands)

Priority	Campus	Project	Category	FY 1986 Request	Cumulative Cost		
					University	Chicago	Urbana
1	C	Heating, Ventilation and Air Condition - Pharmacy Building	REMD	\$5,218.0	\$ 5,218.0	\$ 5,218.0	
2	C	Library Improvements	REMD/EQUIP	6,494.8	11,712.8	11,712.8	
3	U	Remodel the Former Veterinary Medicine Building for the Sciences	REMD	5,000.0	16,712.8		\$ 5,000.0
4	U	Computer Laboratory Addition	PLAN	1,100.0	17,812.0		6,100.0
5	U	English Building Remodeling	REMD	3,040.0	20,852.8		9,140.0
6	U	Life Sciences Laboratory Addition	BLDG	743.2	21,596.0		9,883.2
7	U	Mechanical Engineering Building Remodeling	PLAN	265.0	21,861.0		10,148.2
8	C	Electrical Upgrade of Administrative Computer Center	REMD	631.7	22,492.7	12,344.5	
9	U	SR ³ -I	REMD	3,429.9	25,922.6		13,578.1
10	U	SR ³ -I Equipment	EQUIP	377.6	26,300.3		13,955.7
11	C	Remodel Clinical Sciences Building	REMD	3,493.0	29,793.2	15,837.5	
12	U	Chemistry Laboratory Remodeling	REMD	634.0	30,427.2		14,589.7
13	C	Associated Health Sciences Remodeling	REMD	2,063.0	32,490.2	17,900.5	
14	U	Pilot Training Facility	BLDG/UTIL	818.3	33,308.5		15,408.0
15	C	SR ³ -I	REMD	2,163.9	35,472.4	20,064.4	
16	U	SR ³ -II	REMD	2,786.5	38,258.9		18,194.5
17	U	SR ³ -II-Equipment	EQUIP	137.0	38,395.9		18,331.5
18	C	Remodel Pharmacy Building (Phase I)	REMD	1,567.0	39,962.9	21,631.4	
19	C	SR ³ -II	REMD	3,267.8	43,230.7	24,899.2	

TABLE 4
UNIVERSITY OF ILLINOIS
FY 1986 CAPITAL REQUEST
PRIORITY LIST
(Dollars in Thousands)
(concluded)

Priority	Campus	Project	Category	FY 1986 Request	Cumulative Cost		
					University	Chicago	Urbana
20	C	Chemistry Department Remodeling - Science and Engineering Laboratories	PLAN	218.8	43,449.5	25,118.0	
21	U	Outdoor Instructional/ Recreation Facilities	SITE	75.0	43,524.5		18,406.5
22	C	SR ³ -III	REMD	924.3	44,448.8	26,042.3	
23	U	Pennsylvania Avenue Street Improvement	SITE	150.0	44,598.8		18,556.5
24	C	Physics High Bay Laboratories - Science and Engineering South	PLAN	211.2	44,810.0	26,253.5	

Hall Annex to accomodate laboratory space; and renewal of laboratory space in the Mechanical Engineering Building.

As in past years, the University is requesting Space Realignment, Renewal, and Replacement (SR³) projects for FY 1986. An important tenet of the SR³ concept is that for a campus, as a whole, minor remodeling work will be required on an annual basis to preserve the functional and structural integrity of campus buildings. Specific projects can vary from year to year, but some remodeling and renovation must be accomplished each year. Since insufficient State funds have been appropriated for SR³ projects in recent years, the need for this type of remodeling at each campus is critical in FY 1986.

Although the University has emphasized remodeling projects for FY 1986, there are cases when it is not possible to meet physical facilities needs without new construction. The University has included several building projects in the FY 1986 request after all rehabilitation and renovation options had been found inadequate. The new building projects are: planning the construction of an addition at the Digital Computer Laboratory at the Urbana-Champaign campus to meet increasing demands in computer-oriented instruction and research; and construction of a Pilot Training Facility to replace irreparable structures.

Energy Conservation

The University's Energy Conservation program received initial State support in FY 1981. Funds have been appropriated for the conversion of Abbott Power Plant to burn Illinois coal and for an additional group of smaller conservation projects. Once completed, these projects will benefit the University and the State by helping to control the rising cost of energy.

The FY 1986 request consists of 38 energy conservation projects. All energy conservation and fuel conversion projects have a payback period conservatively estimated at less than five years. Table 5 presents a summary of the FY 1986 energy conservation projects in priority order.

Table 5
FY 1986 Energy Conservation Request
Project Priority List
All University

Priority	Campus	Project	Payback	Project Cost	Cumulative Total
1	C-HSC	Light Fixtures & Controls - Steam Plant	1.00	\$ 49,000	\$ 49,000
2	C-HSC	Var. Air Vol. Fans w/economizer - Hosp. Add.	1.00	346,000	395,000
3	URB	Chiller Dr. Conv. - Vet. Med. Basic Sci. Bldg.	1.00	2,867,700	3,262,700
4	C-HSC	S1 & S2 Fans (Phase II) - College of Pharm.	1.00	103,300	3,366,000
5	URB	VAV - 19 Buildings	1.00	1,147,300	4,513,300
6	URB	Trap Util. Steam Main into Low Pressure Main	1.00	69,700	4,583,000
7	C-HSC	Vent. Start/Stop Ctls. - Coll. of Med. - West	1.00	33,300	4,616,300
8	URB	Nonessential Load Limiting by Remote Contrl.	1.11	1,392,900	6,009,200
9	C-HSC	Bldg. Equip. Automation - Coll. of Med. - East	1.39	257,800	6,267,000
10	URB	Abbott Efficiency Improvement	1.43	454,200	6,721,200
11	URB	Convrt. to VAV - Roger Adams Lab	1.53	424,900	7,146,100
12	C-HSC	Aux Chiller Unit - Coll. of Med. - Peoria	1.67	72,300	7,218,400
13	C-HSC	Steam Pipe Insulation - Steam Plant	1.78	167,800	7,386,200
14	C-HSC	Oxygen Trim Controls - Steam Plant	2.09	208,400	7,594,600
15	URB	Domestic Hot Water Retrofit	2.19	43,200	7,637,800
16	URB	HVAC Retrofit	2.27	681,300	8,319,100
17	URB	Radiation Zone Control	2.51	341,900	8,661,000
18	URB	Reheat Systems Zone Control	2.54	355,800	9,016,800
19	URB	Steam Metering Improvements	2.86	711,600	9,728,400
20	URB	Conversion to Ctrl. Fan System - Armory	2.94	91,600	9,820,000
21	URB	Install Air Curtains above Entry Ways	2.95	46,000	9,866,000
22	URB	Radiation Zone Control	2.96	711,600	10,577,600
23	URB	Summer/Winter Ventilation Rate	3.00	40,000	10,617,600
24	URB	Conv. from Cast Iron to Fin Tube Rad. - Ann. Sci.	3.01	325,600	10,943,200
25	URB	Radiation Zone Control	3.12	78,800	11,022,000
26	URB	Central Supervisory Control Expansion	3.16	605,600	11,627,600
27	URB	Temp. Control Remodel & Replacement	3.21	787,300	12,414,900
28	C-UC	HTHW Pipe Insulation, Util. Dist. System	3.23	93,900	12,508,800
29	URB	Domestic Hot Water Control	3.44	53,700	12,562,500
30	URB	Animal Room Ventilation	3.51	272,500	12,835,000
31	URB	Reheat System Zone Control	3.60	242,200	13,077,200
32	C-UC	Supply Air Temp. Reset	3.72	75,500	13,152,700
33	URB	Pipe Insulation	3.81	33,200	13,185,900
34	URB	Steam Absorb. Machine Control	3.91	151,000	13,336,900
35	URB	Domestic Hot Water Control	3.93	24,400	13,361,300
36	URB	Conversion to Zoned Vent. - Art & Design Bldg.	3.97	218,200	13,579,500
37	URB	Insulation on High Pressure Steam Mains	4.12	651,000	14,230,500
38	URB	Reheat System Zone Control	4.96	143,100	14,373,600

Food for Century III

Food for Century III was launched in 1976 with the primary objective of developing new techniques to increase agriculture production. To that end the University proposed an active construction program which would provide modern and sophisticated laboratory, greenhouse, animal holding, classroom, and office space, as well as sufficient acreage, for researchers from the Colleges of Agriculture and Veterinary Medicine. Some major projects included in the program, such as the Veterinary Medicine Basic Sciences Building and the Agricultural Engineering Sciences Building, are complete and planning for the Plant Sciences Greenhouse Complex is underway.

The development of these three benchmark projects exhibits the substantial State support received by the program. Only a single major project remains to be implemented--the construction and remodeling of a major animal and dairy sciences research facility. Therefore, the focus of the FY 1986 Food for Century III Request is the planning and design of a building addition to the current Animal Sciences Laboratory and remodeling of the existing facility. It is expected that the joint occupancy of a major research facility by two allied departments will foster opportunities for interdisciplinary research.

Two additional equipment requests will be included in the FY 1986 request. The laboratory equipment and animal holding cages for the Plant Sciences Greenhouse Complex and the Veterinary Medicine Animal Room Facilities are needed to complete the respective projects. Table 6 presents the funds required for Food for Century III for FY 1986 and FY 1987.

TABLE 6
UNIVERSITY OF ILLINOIS
FY 1986
FOOD FOR CENTURY III PROGRAM
(Dollars in Thousands)

<u>FY 1986 Priority</u>	<u>Project Name</u>	<u>Total Cost</u>	<u>FY 1984 Appropriations</u>	<u>FY 1985 Appropriations</u>	<u>FY 1986 Request</u>	<u>FY 1987</u>
1.	Plant Sciences Greenhouse Complex					
	Planning	\$ 650.0	\$ 650.0			
	Building	8,666.1		\$ 8,666.1		
	Utilities	600.0		600.0		
	Equipment	450.0			\$ 450.0	
	(Project Subtotal)	(10,566.1)	(650.0)	(9,466.1)	(450.0)	
2.	Veterinary Medicine Animal Room Facilities					
	Remodeling	2,700.0	1,200.0	1,500.0		
	Equipment	300.0		150.0	150.0	
	(Project Subtotal)	(3,000.0)	(1,200.0)	(1,650.0)	(150.0)	
3.	Animal and Dairy Sciences Laboratory					
	Planning	1,000.0			1,000.0	
	Remodeling	2,700.0				\$ 2,700.0
	Building	12,463.0				12,463.0
	Utilities	300.0				300.0
	Equipment	900.0				900.0
	(Project Subtotal)	(17,363.0)			(1,000.0)	(16,363.0)
	TOTAL COST	\$30,929.1	\$1,850.0	\$11,116.1	\$1,600.0	\$16,363.0

FISCAL YEAR 1986 OPERATING BUDGET REQUEST

INTRODUCTION

Table 7 presents an historical summary of the Board of Trustees Operating Budget Requests from FY 1975 through FY 1985. As discussed in the previous section, and as can be seen in Table 7, the current year's new revenues continue the improvement over past years in the total amount of new funds received by the University. On the other hand, the University's requests for FY 1984 and FY 1985 were significantly larger than any in the past decade, reflecting the damage incurred when the FY 1983 increment was substantially below the amount needed even to meet unavoidable cost increases. Seen in a three year context, the FY 1984 and FY 1985 increments represent a three-year compounded annual increase of approximately 4.5%--much more modest growth than the FY 1984 and FY 1985 figures alone would suggest.

Following the format of recent budget request documents, the FY 1986 Operating Budget Request is presented in three major sections: Continuing Components--those activities necessary to maintain the University's current level of operation, Programmatic Components--those new, expanded, and improved efforts which will enable the University better to respond to the demands for its services; and Special Services/Special Funding Components--those activities carried out at the University by direct legislative mandate, often with specifically dedicated funds to support them, but which are outside the traditional instructional, research, and service areas. Table 8 displays the full incremental request, while Table 9 identifies individual programs included in the request.

In addition to these major sections, three appendices are included. Appendix I presents FY 1986 Retirement funding needs. Appendix II includes technical data for the calculation of incremental needs for continuing components. Appendix III provides examples of the remodeling and renovation needs which must be met on a regular, recurring basis with operating budget support if the University is to return its physical facilities to an effective level of operation to meet the requirements of up-to-date teaching and research programs.

TABLE 7
University of Illinois
History of the Operating Budget Action FY 1975 - 1985
(Dollars in Thousands)

	(1) Previous Year's Base ¹	(2) University Request	(3) IBHE Rec.	(4) Allocation of Gov. Budget	(5) Legislative Action	(6) Governor's Action	(7) Final	(7 ÷ 1) % Final of Previous Base	(7 ÷ 2) % Final Of System Request
FY 1975	\$198,381.5	\$22,800.2	\$16,743.0	--	\$27,523.0	\$20,043.0	\$20,043.1	10.1%	87.9%
FY 1976	218,424.5	32,343.5	23,899.4	--	29,375.8	16,950.7	16,950.7	7.8	52.4
FY 1977	235,375.5	26,780.3	21,233.3	\$10,064.5	15,950.7	10,172.5	14,644.3	6.2	54.7
FY 1978	250,019.4	31,036.0	23,305.4	16,551.6	17,423.0	15,906.3	15,906.3	6.4	51.3
FY 1979	265,925.8	34,106.6	26,415.5	24,568.1	24,799.6	24,755.6	24,755.6	9.3	72.6
FY 1980	290,681.4	37,473.3	28,320.4	27,550.8	31,279.3	31,279.3	32,188.6 ²	11.1 ²	85.9
FY 1981	321,158.3 ³	41,086.4 ⁴	33,830.6	32,391.9	34,688.3	32,391.9	32,391.9	10.1	78.8
FY 1982	353,550.3	47,995.7	41,307.8	28,164.6 ⁵	28,164.6	28,164.6	28,334.6 ⁶	8.0	59.0
FY 1983	381,884.9	48,733.5	34,627.5	3,935.7	9,622.5 ⁷	7,976.2 ⁷	7,976.2 ⁷	2.1	16.4
FY 1984	389,861.2	61,587.8	43,695.0	-1,941.6	43,427.8	43,427.8	44,427.8 ⁸	11.4	72.1
FY 1985	433,288.9 ⁹	58,580.2	35,675.4	24,989.3	30,429.3	30,429.3	30,429.3	7.0	51.9

¹Excludes Retirement and IBA.

²Includes non-recurring funds of \$401.00 for flood damages and \$508.3 for Division of Services for Crippled Children override; percentage without these funds is 10.8.

³Excludes non-recurring funds of \$401.0 flood damage, \$508.3 DSCC override. FY 1981 funding no longer includes an appropriation of \$802.4 for Refunds.

⁴BOT printed request of \$40,445.4 plus DSCC price and salary increases of \$641.0.

⁵Represents amount in Governor's Revised Budget. Governor's original recommendation was \$28,563.3.

⁶Includes an additional \$170.0 appropriated to the University from Real Estate Research and Education Fund in HB 774.

⁷Excludes \$1.0 million for lease/purchase of Chicago Medical School facility.

⁸Includes \$1.0 million for operation of Chicago research and technology facility.

⁹Base does not include \$1.0 million for operation of Chicago technology facility, since it was nonrecurring.

TABLE 8
FY 1986 OPERATING BUDGET REQUEST
(Dollars In Thousands)

I. Continuing Components	
A. Salary/Compensation Improvement	\$25,826.0
1. Annualization	(\$3,180.4)
2. FY 1986 Increase - 8%	(\$22,645.6)
B. General Price Increases - 8%	4,596.5
C. Library Acquisitions - 15%	932.2
D. Utility Price Increase - 9%	3,572.7
E. Operation and Maintenance for New Areas	<u>981.3</u>
Subtotal	\$35,908.7
% of FY 1985 Base*	(7.74%)
II. Programmatic Components	
A. Expanded/Improved Academic Programs	\$ 7,070.0
B. Academic Computing Support	2,000.0
C. Equipment Replacement	2,000.0
D. Engineering Revitalization	<u>4,000.0</u>
Subtotal	\$15,070.0
% of FY 1985 Base	(3.25%)
III. Special Services/Funding	
A. County Board Matching	300.0
B. Veterinary Diagnostic Laboratory	300.0
C. Cooperative Extension Programs	475.0
D. Fire Service Institute	<u>35.0</u>
Subtotal	\$ 1,110.0
% of FY 1985 Base	(.24%)
IV. Grand Total	\$52,088.7
% of FY 1985 Base	(11.23%)

*FY 1985 Base = \$463,718.2 excluding Retirement.

TABLE 9
FY 1986 EXPANDED/IMPROVED ACADEMIC PROGRAMS
(Dollars in Thousands)

	<u>Chicago</u>	<u>Urbana- Champaign</u>	<u>Central Administration</u>	<u>Total</u>
I. Science and Technology				
A. Biotechnology	\$ 550.0	\$ 650.0		\$1,200.0
B. Undergraduate Laboratories	200.0			200.0
C. Physics Microprocesses	200.0			200.0
D. Cognitive Science		400.0		400.0
E. Gerontology	345.0			345.0
Subtotal	<u>\$1,295.0</u>	<u>\$1,050.0</u>	<u>-0-</u>	<u>\$2,345.0</u>
II. Professional/Economic Development				
A. Public Agency Programs	125.0	100.0		225.0
B. Veterinary Medicine		750.0		750.0
C. Medical Cost Containment	155.0			155.0
D. Nursing	250.0			250.0
E. Pharmacy	85.0			85.0
F. Enrollment Shifts		450.0		450.0
G. Medical Residency Programs	150.0			150.0
H. Advanced Engineering Studies			300.0	300.0
Subtotal	<u>\$ 765.0</u>	<u>\$1,300.0</u>	<u>\$300.0</u>	<u>\$2,365.0</u>
III. Strengthening Basic Disciplines				
A. University Level Programs	\$ 800.0	\$1,000.0		\$1,800.0
B. High School Mathematics	150.0	120.0		270.0
C. High School Writing		140.0		140.0
D. High School Languages		150.0		150.0
Subtotal	<u>\$ 950.0</u>	<u>\$1,410.0</u>	<u>-0-</u>	<u>\$2,360.0</u>
IV. Total, Programmatic Components	<u>\$3,010.0</u>	<u>\$3,760.0</u>	<u>\$300.0</u>	<u>\$7,070.0</u>

CONTINUING COMPONENTS

SALARY AND COMPENSATION INCREASES
(\$25,826,000)

The quality of the programs offered by a university is affected by the strength of financial support for research and teaching facilities, libraries, support staff and faculty. While no single element of this mix alone can sustain high quality academic programs, there is no doubt that faculty and staff represent the keystone of the enterprise. Salaries and fringe benefits which are competitive with peer institutions are essential to retain highly productive employees and to recruit new talent. Erosion in the competitiveness of salaries and fringe benefits increases the number of high quality employees who accept more attractive offers at other institutions or in the private sector, reduces the ability to attract the best-qualified candidates for vacant positions, and reduces both the productivity and morale of the remaining staff. These trends, if continued over a number of years, have damaging long-term consequences and can render a return to competitiveness extremely difficult. An institution characterized by academic excellence generally requires several decades of concentrated effort to attain its stature, but deterioration can set in quickly. The restoration of stature and reputation may require another extended interval of rebuilding.

At a minimum, a salary and compensation program should insure the preservation of purchasing power as well as the attainment and maintenance of a competitive position relative to peer institutions or peer groups. The pursuit of quality, however, requires support above and beyond mere preservation and maintenance levels. Several national studies and surveys dealing with the qualitative evaluation of programs and research at American institutions of higher education consistently give high ratings to the University of Illinois. The quality and accomplishments of its faculty, staff, students and alumni are widely acknowledged. In order for the University to continue to be a dynamic and influential force in higher education, support must be provided which reflects an ongoing commitment to academic excellence and a continued growth in the prestige and reputation of the University's programs.

The nature of the academic and public sector market place is such that it is relatively easy for individual faculty and staff to determine whether

or not their compensation is "competitive." This is in contrast to the private sector, where data on individual compensation may be relatively difficult to obtain. While the University cannot make salary and compensation comparisons for each individual, it does perform numerous analyses annually to determine its overall competitive standing among appropriate peer groups. Cash salary and compensation paid to academic employees are assessed through comparisons with Big Ten and other peer institutions, while nonacademic salary comparisons are made with equivalent employee groups outside the University.

Faculty Salaries and Compensation

The quality and reputation of the University's programs mandate that salaries for faculty rank among the top three of Big Ten institutions, and the University has endeavored to achieve that ranking for several years.

The salary gap to third place in the Big Ten, which more than doubled in FY 1983 (from 2.8% in FY 1982 to 6.6% in FY 1983) was reduced to 4.3% in FY 1984. Although this was a substantial improvement over the FY 1983 level, the University still finds itself farther behind third place than in the four years preceding FY 1983 when the percent gap ranged from 1.2% to 2.8%. The University's average faculty salary relative to third place in the Big Ten for FY 1979 to FY 1984 is presented below.

	<u>FY 1979</u>	<u>FY 1980</u>	<u>FY 1981</u>	<u>FY 1982</u>	<u>FY 1983</u>	<u>FY 1984</u>
Illinois	\$23,249	\$25,181	\$27,592	\$30,171	\$31,640	\$34,563
Third Place	23,676	25,479	28,012	31,021	33,733	36,048
\$ Difference	427	298	420	850	2,093	1,485
% Difference	1.8%	1.2%	1.5%	2.8%	6.6%	4.3%

Note: Salaries represent full-time budgeted faculty, all ranks combined.

It should be noted that the average salaries shown above for FY 1982 and FY 1983 have been adjusted to represent rate increases in effect during those years rather than actual cash increases. FY 1983 was a particularly problematic year due chiefly to a mandated reduction of \$8 million in the University budget base, staff reductions and a delay in the implementation of mid-year salary increase. Although the average salary rate for budgeted full-time faculty increased by 4.9% in that year, the actual cash increase received by University employees amounted to only 1.2%.

Table 10 displays average salaries of faculty at Big Ten institutions for FY 1983 and FY 1984. The University ranked fourth among Big Ten institutions in FY 1984, an improvement of one place over the FY 1983 ranking. This is attributable to an overall 9.2% increase in average salary versus a 5.2% increase for the other Big Ten institutions. Note, however, that the top three institutions had salary increases averaging nearly 8%; thus the University's 9.2% increase permitted only modest improvement. The 9.2% includes incremental state funds for salary increases of 7.5% (calculated on 95% of the Personal Services base), internal reallocation of approximately 1%, and a special salary increment for engineering programs averaging an additional 6%.

Although inflation has abated recently, large discrepancies experienced in previous years between State funding increases for salaries and the rate of inflation have resulted in diminished purchasing power for University employees. In the climate of a strong national economic recovery and improving State revenues, an opportunity now exists to prevent further erosion in real purchasing power and to recover a small portion of the losses in purchasing power experienced during the years of high inflation.

Although the University's average salary increases for FY 1984 exceeded the Big Ten average, faculty compensation, defined as cash salary plus employer contributions to fringe benefits, ranks in eighth place in the Big Ten in FY 1984, and the distance to third place is 9.8%. Current projections for FY 1985 indicate that this ranking will likely remain the same and the percent gap should not change significantly.

The FY 1985 University appropriation provides a general salary increase program which includes a 5% increment (calculated on 95% of the Personal Services Base). Additional tuition revenues will provide another .5% increase designed to meet special merit, market or equity concerns for individuals or groups. A second increment equal to .5% of the Base will be provided for: a) special merit, market or equity concerns, or b) additional staff in areas of severe enrollment demand. These increases, coupled with internal reallocation, should result in an overall average increase in salaries of between 6% and 7% for most disciplines. The FY 1985 appropriations also include \$2.4 million to fund the second year of the Special Engineering Program. Within this amount are salary enhancement funds which will permit the College of Engineering to maintain its competitive position

TABLE 10
Average Salaries FY 1983-FY 1984
BIG TEN INSTITUTIONS

(9-month basis)

Institution	FY 1983		FY 1984		% Increase
	Weighted Average Salary	RANK	Weighted Average Salary	RANK	
ILLINOIS	31,640*	5	34,563	4	9.2%
I	28,542	10	30,138	10	5.6%
C	32,861	4	32,824	7	-0.1%
F	33,867	1	36,371	2	7.4%
H	30,279	9	31,789	8	5.0%
A	30,987	7	33,250	5	7.3%
X	33,809	2	36,823	1	8.9%
E	33,733	3	36,048	3	6.9%
B	31,340	6	33,108	6	5.6%
J	30,591	8	30,648	9	0.2%
MEAN	31,765		33,556		5.6%
MEAN LESS ILLINOIS	31,779		33,444		5.2%

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Source: University of Minnesota Comparison of Average Salaries and Fringe Benefits.

*RATE effective April 1, 1983

Data represents total institutions' full-time faculty, excluding clinical departments, whose primary responsibilities are teaching, research or public service. Weighted to the distribution of faculty rank and term of appointment at the University of Illinois.

Distances to 3rd Place--Average Salaries

	<u>FY 1983</u>	<u>FY 1984</u>
ILLINOIS	\$31,640	\$34,563
3rd Place	\$33,733	\$36,048
\$ Difference	\$ 2,093	\$ 1,485
% Difference	6.6%	4.3%

in the market for qualified faculty. It is expected that salary increases for Engineering faculty will average approximately 9% for FY 1985.

Current information indicates that the increase in FY 1985 salaries at other Big Ten institutions will average approximately 6.5%, and the University's ranking therefore is not expected to change from fourth place. The gap to third place also should not change significantly, although the precise percent of the gap will not be calculable until final information on FY 1985 salaries by faculty rank is received from other Big Ten institutions.

Salary increases tied to inflation projections of 6% represent the best current estimates for other Big Ten institutions for FY 1986. An increment of this magnitude plus an additional 2% to gain ground on third place and concomitantly to restore a small portion of the purchasing power lost during the years of high inflation represents the minimum requirement for the University of Illinois in FY 1986.

Nonacademic Salary Comparisons

For nonacademic staff, annual salary comparisons are normally made with employers outside the University who are most directly competitive for the services of those individuals. In some cases, comparisons are made with local employers; in other cases, broader comparisons are made if the market for particular employee skills is statewide or greater. The composite survey of the market, which compares the salary range midpoints for University of Illinois Step Plan grades and market midpoints for comparable employment levels, is incomplete at this time. However, preliminary market data show increases ranging from 0 to 10% with the majority of the increases falling in the lower half of this range. Therefore, a 4% increase in the average salary of employees in relevant market groups is being assumed at this time.

The data in the table that follows compare selected University of Illinois grade midpoints with estimated market midpoints:

<u>Grade/ Location</u>	<u>UI FY 1984 Midpoint</u>	<u>Projected Market as of 9/1/84</u>	<u>UI FY 1985 Grade Midpoints</u>	<u>% Behind Market</u>
5 Chicago	\$10,425	\$11,830	\$10,740	10.1%
5 Urbana	9,631	11,330	9,923	14.2%
14 (both)	15,480	18,135	15,945	13.7%
19 (both)	20,019	23,785	20,622	15.3%
33 (both)	41,400	49,995	42,641	17.2%

In addition to market comparisons among competing employers, salary comparisons between nonacademic employees and State of Illinois Code Departments are reviewed annually to gain a general impression of relative equity among University of Illinois employees and their counterparts in State government. Based upon data compiled by the Board of Higher Education, the following comparison can be made:

Salary Deficiencies Between University of Illinois
Nonacademic Employees and State of Illinois
Code Department Employees, FY 1980 - FY 1984

	<u>FY 1980</u>	<u>FY 1981</u>	<u>FY 1982</u>	<u>FY 1983</u>	<u>FY 1984</u>
Chicago Campus				- 8.57%	- 5.58%
University Center	- 4.93%	- 5.09%	- 7.52%		
Health Sciences Center	- 4.63%	- 2.69%	- 2.83%		
Urbana-Champaign Campus	-18.76%	-20.41%	-20.44%	-20.99%	-17.40%

For FY 1985, the overall salary increase for nonacademic employees on the Step Plan is expected to match the increase for academic salaries of between 6% and 7%. This increase will be comprised of a 3.0% "market movement" increase, a 4% step increase for eligible employees (approximately 80% of those on the Step Plan) and limited additional funds for superior performance raises.

For FY 1986 salary increase funding will be requested to keep pace with the projected level of inflation and to reduce a portion of the gap between the University and external market salaries.

PRICE INCREASES

Although inflation has abated from the double digit trend experienced during the early 1980's, it continues to represent a significant expense which must be funded if the University's current level of operations and services are to be maintained. At the departmental level ongoing instructional and research programs depend heavily upon laboratory and office supplies and other consumable goods. At the campus and University levels basic support services such as operation of the physical plant, purchasing and payroll activities, and student admissions and records functions are affected by inflationary growth in the cost of essential goods and services. During recent years, the price of utilities and library acquisitions has been especially susceptible to inflationary pressures.

To maintain an acceptable standard of operation and respond to the differential effects of inflation on various operating budget components, the University separately analyzes each expense category and prepares its annual budget request to reflect actual and projected price differentials. The differential price increase categories include utilities and library materials in addition to price increases for general goods and services.

During the past decade, the State has recognized the need for differential support in the University's operating budget appropriation: utilities price increases have been provided at a differential rate since FY 1975. Separate increases for library acquisitions were provided during the period of FY 1978 through FY 1980 and the University's FY 1985 operating budget appropriation contains a differential library price increase amounting to 10 percent.

For FY 1986, the University is again requesting differential price increases for utilities and library collections and a general price increase for all other goods and services.

General Price Increases (\$4,596,500)

Requirements for general price increase funding are determined through a comparison of the University's past funding levels with inflation, which is quantified by several commonly used economic indicators. In addition to historical comparisons which focus on cumulative gains and losses to inflation, the University also relies upon economic forecasts to project the

impact of inflation on prices during the budget year. Collectively these analyses yield a general price increase request which, if funded, would permit the University to regain some of its losses to inflation and maintain purchasing power during the budget year.

The three price increase metrics used to assess the annual impact of inflation are all based on a "market basket" model which combines several differentially weighted cost components into a single index. Although all three indices share a common model, there are differences in the market basket compositions and in their sensitivity to various segments of the economy. The first index, the Gross National Product Implicit Price Deflator, defines that portion of the overall GNP growth that is attributable to factors other than real growth in the production of goods and services by businesses and industry. The second indicator, the Consumer Price Index (CPI) measures the change in prices paid by urban households for items such as food, housing, and transportation.

Finally, the Higher Education Price Index (HEPI) measures changes in the levels of general expenditures made by colleges and universities from current funds for items supporting instructional programs and departmental research activities. Sponsored research and auxiliary enterprises expenditures are excluded from the HEPI. Specifically, the index measures price changes for items such as data processing; communications; transportation; supplies and materials; and books and periodicals.

Table 11 lists the annual University appropriations for general price increases and annual increases reported for the GNP Deflator, CPI and HEPI for the period FY 1977-1985. The FY 1985 and FY 1986 projections for the inflation indicators are provided as reported by Chase Econometrics. Figure 2 provides a graphical comparison of these four factors and illustrates the strong relationship between the three inflation indices and the pronounced difference between inflationary trends and University appropriations during the nine year period. For FY 1985, the University appropriation bill contains no incremental funding for general goods and services price increases -- only a differential increase for library acquisitions -- which further exacerbates University attempts to arrest the loss in purchasing power.

A review of the compounded inflation rates, as displayed in Figure 3, confirms that a wide disparity exists between actual University appropriations and the inflation experienced for the period FY 1977-1984. Based on

TABLE 11
UNIVERSITY OF ILLINOIS PRICE INCREASE APPROPRIATIONS FOR GENERAL EXPENSE ITEMS
VS. INFLATIONARY TRENDS

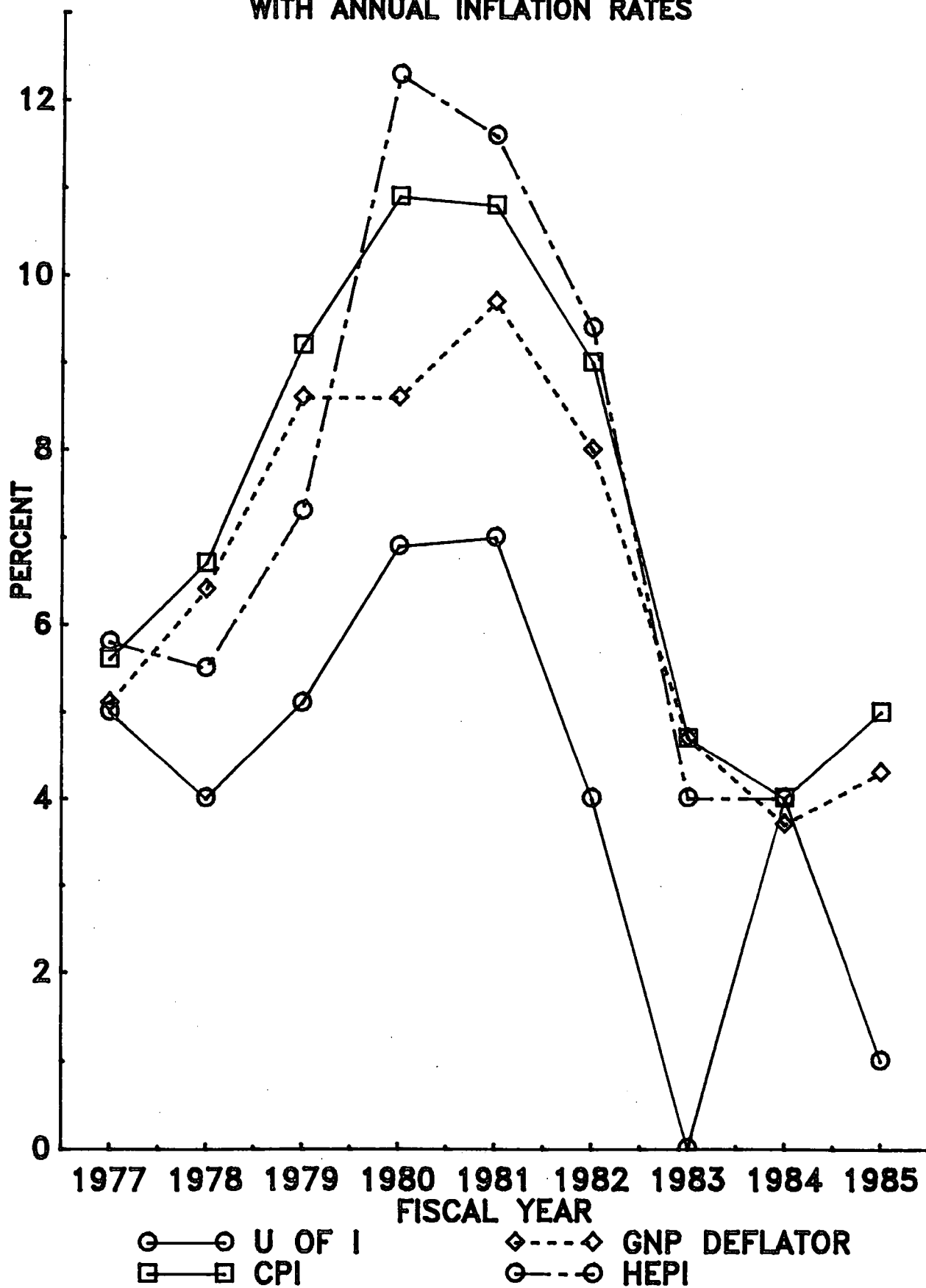
<u>Fiscal Year</u>	<u>U. of I. Price Increase Appropriations¹</u>	<u>Gross National Product-Implicit Price Deflator</u>	<u>Consumer Price Index - All Items Less Energy</u>	<u>Higher Education Price Index - Contracted Services and Supplies</u>
1977	5.0%	5.1%	5.6%	5.8%
1978	4.0%	6.4%	6.7%	5.5%
1979	5.1%	8.6%	9.2%	7.3%
1980	6.9%	8.6%	10.9%	12.3%
1981	7.0%	9.7%	10.8%	11.6%
1982	4.0%	8.0%	9.0%	9.4%
1983	0.0%	4.7%	4.7%	4.0%
1984	4.0%	3.7%	4.0%	4.0%
1985	1.0% ³	4.3% ²	5.0% ²	
<u>Compounded % Increase</u>				
1977-1984	42.0%	69.7%	79.4%	77.6%
<u>Projections</u>				
1986		5.2% ²	5.8% ²	

¹Reflects appropriations for general items and library increases.

²Based on Chase Econometric projections.

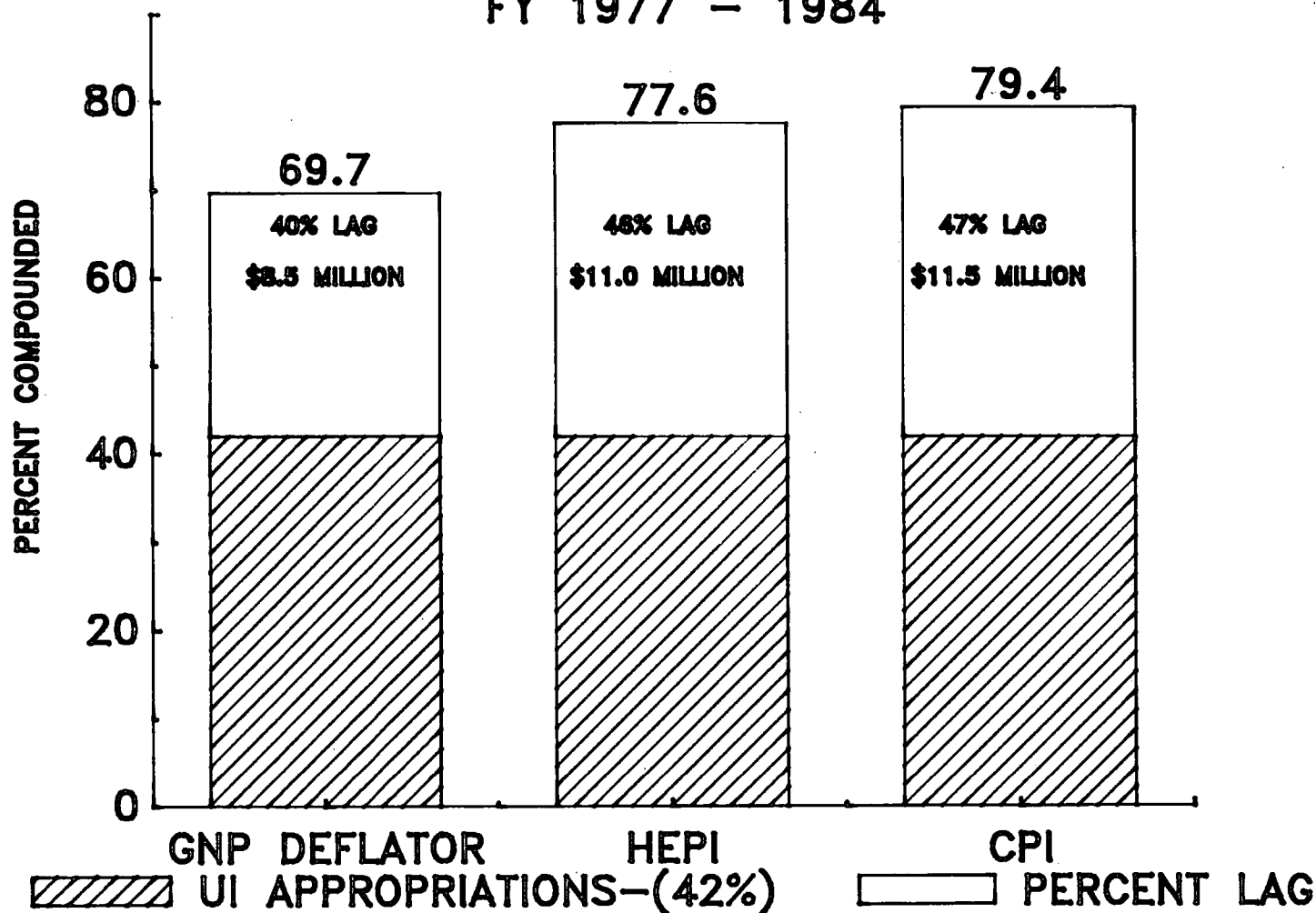
³Weighted estimate to reflect FY1985 appropriation for 0% general price increase and 10% library increase.

FIGURE 2
COMPARISON OF UI GENERAL PRICE INCREASE APPROPRIATIONS
WITH ANNUAL INFLATION RATES



NOTE: EXCLUDES ENERGY PRICE INCREASES.

FIGURE 3
CUMULATIVE IMPACT OF INFLATION
UI GENERAL PRICE INCREASE APPROPRIATIONS VS. INFLATION INDICATORS
FY 1977 - 1984



NOTE: EXCLUDES ENERGY PRICE INCREASES.

the indicators during this eight year period, University appropriations lagged inflation by an amount ranging between approximately \$8.5 to \$11.5 million.

For the FY 1986 request, the general price increase segment of the budget contains dual objectives. The first is to obtain funding sufficient to prevent further losses in purchasing power; the second is to seek partial recovery from past losses that have resulted in erosion of the funding base. Chase Econometrics projects the CPI to increase approximately 6 percent during FY 1986. Therefore the FY 1986 budget request includes a proposed funding increase of 6% to keep pace with inflation and an additional request of 2% to compensate, in part, for the effects of persistent underfunding during the past decade, particularly the zero increase in FY 1985.

Utilities (\$3,572,700)

Energy cost increases continue to have a major impact on the University of Illinois budget. Despite a concerted and successful effort by the University to reduce energy costs through conservation, the FY 1985 utilities budget is eight times greater than FY 1971 utilities expenditures. A significant portion of the growth in energy costs is attributable to high rate increases imposed by utility companies. As a result, an increasingly larger portion of the State funded budget must be spent on utilities needs.

Although the astronomical rate hikes of the late 1970's and early 1980's have subsided, utility companies continue to request substantial increases for fossil fuels on an annual basis. In FY 1984, the average price for electricity at the Urbana-Champaign campus increased 25% over the average FY 1983 price. While the Chicago campuses experienced only a 6% increase in electricity prices, the price for fuel oil rose 11% over the FY 1983 average cost. Since FY 1976 the University has managed its utilities budget centrally, which has helped to abate the impact of these significant price fluctuations. Central management and energy conservation efforts, however, help only to avoid even higher price escalations, and they cannot completely remove the impact of steady growth in energy costs.

As in previous years, the campuses continue to alter their mix of boiler fuel to utilize the least expensive fuels available. These practices serve to maximize energy savings. For example, at the present time, natural gas is approximately 10% less expensive than #6 fuel oil; hence, the Chicago

campus is burning the more economical fuel component. The Urbana-Champaign campus will remain dependent on natural gas as its primary fuel source through all of FY 1985 and FY 1986. By FY 1987 the coal conversion project at the Abbott Power Plant will likely be completed and the Urbana-Champaign campus will be able to burn a less expensive fuel source to generate steam and electricity.

The implementation of operational measures and construction of energy saving capital projects have been successful in avoiding millions of dollars in energy costs, yet, escalating utilities costs will continue to require a major portion of the University's operating budget. At this time, the uncertainty of the world oil market, in addition to the ambiguity surrounding natural gas price increases if and when Congress passes decontrol legislation, make it difficult to predict fuel cost increases with certainty. However, both scenarios could lead to significant price increases and prove very costly for the University. On the other hand some utility companies appear to be becoming sensitive to competitive pricing for natural gas versus other fuel sources, which may ultimately help to check price increases, at least temporarily. With consideration of the political factors affecting fuel price increases, as well as local and regional variation in energy costs, several resources were used to develop price projections for FY 1986, including: national and state economic indices, information gathered from the respective utilities companies and consumer agencies, and consultations with the power plant administrators. Based on the information gathered on energy prices, the estimated utilities need for FY 1986 is 9% above projected FY 1985 utility requirements.

Library Price Increases (\$932,200)

The Library of the University of Illinois at Urbana-Champaign is the third largest academic research library in the country, with holdings close to 6.5 million volumes. Not only does the library provide essential support to academic programs and research activities on the campuses, but it is a major research and reference facility for the State of Illinois. In order to serve these ends, the library must maintain a diverse and current collection. However, rising costs in library materials in the last several years have hindered the purchase of new material. If the University is to uphold its status as an outstanding research library, it is essential that adequate funding be provided for acquisitions.

As illustrated in Figure 4, the University of Illinois Library budget has lagged far behind price increases for periodicals and monograph materials. Despite some differential price increase treatment, State funded price increases have averaged 7% annually since FY 1978, while actual price increases for library material showed an average increase of 9.6% during this period. In addition to the detrimental impact which the disparity between library cost increases and State appropriations for library material has on general library acquisitions, periodical purchases have been severely curtailed due to rapid price increases for that material item. Annual increases for American periodical subscriptions have averaged approximately 12% since 1977. Moreover, prices for technical periodicals, an area in which the University of Illinois purchases heavily, have risen at an even faster rate. During the same period, price increases for Chemistry, Mathematics, Physics, and Engineering material averaged 13% percent, which make these materials the four most expensive subscription rates among twenty-four periodical classifications. Periodical purchases already account for 50% of the library acquisitions budget, forcing the library to purchase fewer periodicals and implement reductions in other library materials.

Another accepted index of a library's financial health is total expenditures per volume held. Although the Library of the University of Illinois at Urbana-Champaign is the third largest academic research library in the country, last year it was thirteenth among its peer institutions in amount expended per volumes held. In fact, in FY 1983 the average expenditure per volume held by 75 academic libraries was \$3.03, while the University of Illinois spent \$1.86 per volume held. Furthermore, the University Library is in sixteenth place among research libraries in materials and binding expenditures.

These trends cause the University of Illinois Library to fall further behind its peer institutions in terms of library expenditures and acquisitions. Figure 5 compares the University of Illinois Library material expenditures since 1969 with the library material expenditures of the University of California - Berkeley, University of California - Los Angeles, University of Michigan, Stanford University and University of Texas. At the end of FY 1982, Illinois and Michigan were approximately equal in cumulative expenditures, however, in the last year, Michigan has forged ahead. Both

FIGURE 4

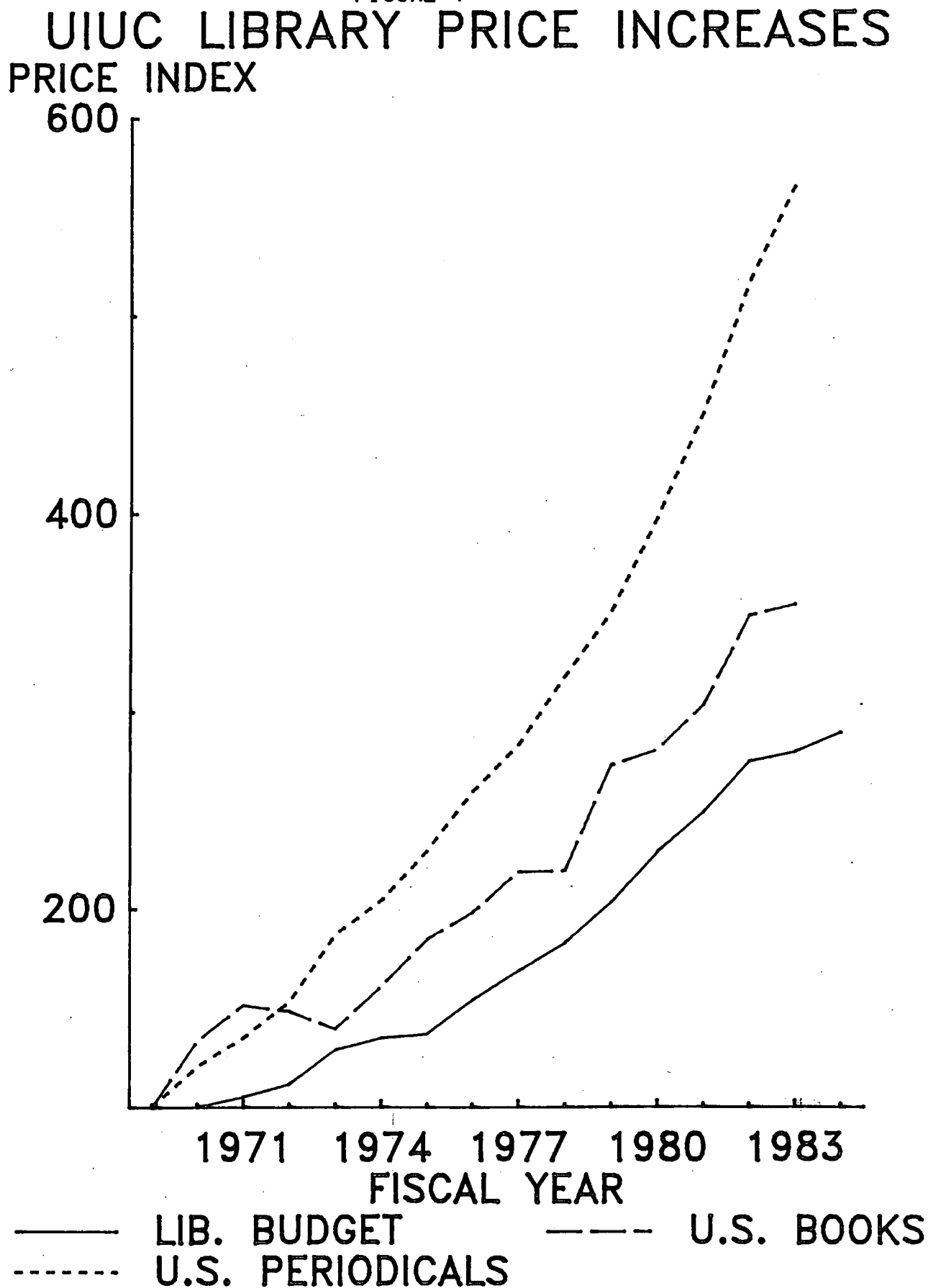
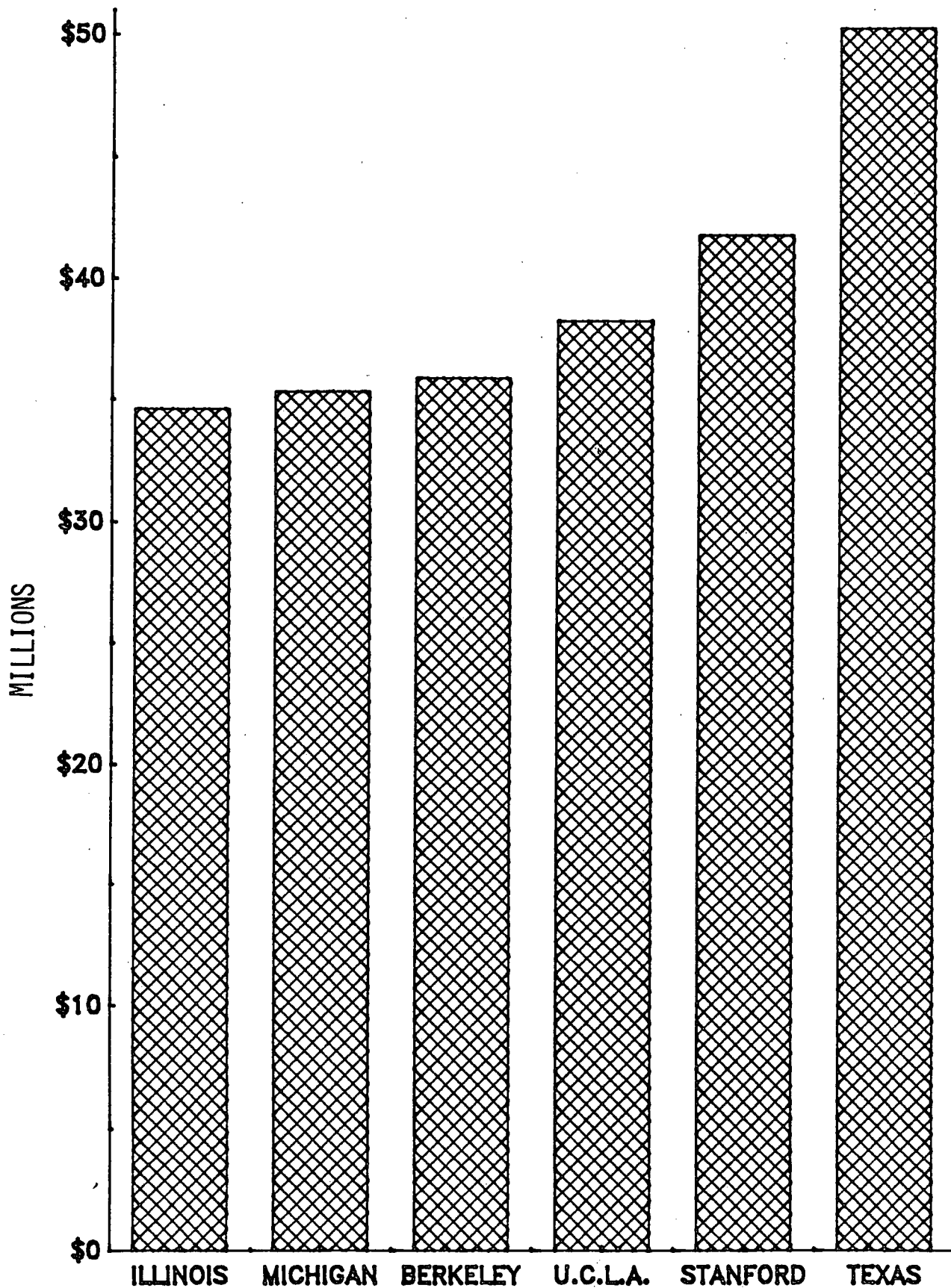


FIGURE 5
CUMULATIVE LIBRARY MATERIAL EXPENDITURES
FY 1969-FY 1983



institutions fall significantly behind the California and Texas universities. The deficiency in library material funds at the University of Illinois Library indicates that other institutions will surpass the University Library in size and academic quality.

The library deficiency analysis presented on Table 12 compares State funded library price increases since 1978 with the library materials price index compiled in Halstead's, "Inflation Measures for Schools and Colleges." The FY 1978 acquisitions base is used as a benchmark since it is the last year in which library funding can be called adequate. A "required" acquisitions budget can be projected from that year by taking that original FY 1978 amount and inflating it incrementally by the annual library materials price index. The required base figures were then compared to the incremental State funds received for library materials in FY 1979 through FY 1985. The analysis shows that the difference between State funds received for library material and the required base results in a \$941,500 deficiency for the University as a whole.

If severe budgetary stress continues on the University's libraries it will affect students and faculty alike. Research resources will be diminished, damaging both the quality of education University students receive and making the University of Illinois a less attractive option for productive scholars in all disciplines. The University Library's ability to serve as a state-wide resource will also diminish, impacting educational and research activities throughout the entire state. Not only must the FY 1986 budget provide adequate resources to maintain existing acquisition rates, but some element of recovery from past losses should be introduced if the quality of this crucial educational resource is to be maintained. A price increase rate of 15% has therefore been set.

TABLE 12
UNIVERSITY OF ILLINOIS LIBRARY DEFICIENCY
(Dollars in Thousands)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
1. Acquisitions Base	3,193.0							
2. State Funded Price Increase ¹		10%	15%	7%	4%	0	4%	10%
3. "Theoretical" Base (1 x 2) ²		3,512.3	4,039.1	4,321.9	4,494.8	4,494.8	4,674.6	5,142.1
4. Halstead Library Material Price Index ³		10.4%	15.0%	9.9%	8.0%	14.8%	4.0%	5.9% ⁴
5. "Required Base (1 x 4)		3,525.1	4,053.8	4,455.2	4,811.6	5,523.7	5,744.7	6,083.6
6. Deficiency (5 - 3)		12.8	14.7	133.3	316.8	1,028.9	1,070.1	941.5

¹For 1978 and 1980, special price increases for library acquisitions were received. After FY 1980, only the general price increase amount was available.

²Represents prior year's base times state funded increase rate. Does not include reallocation.

³Kent Halstead, "Inflation Measure's for Schools and Colleges"

⁴A 1985 Index for library material was unavailable at this time, thus, Chase Econometric's estimated inflation rate for the year was applied.

OPERATION AND MAINTENANCE OF NEW AREAS
(\$981,300)

Funds are requested each year for operation and maintenance costs associated with the addition of new or significantly remodeled State supported space on the campuses. The needs for these funds vary according to the operating requirements of each facility. The FY 1986 request is outlined in Table 13. The individual components of the request are described below.

Chicago Campus

Lions Eye Research Institute - The Lions of Illinois contributed \$5 million to the University for the construction of an eye research institute at the Chicago campus. The facility includes several laboratories and a clinic designed specifically for ophthalmologic research. Important areas of eye research currently conducted by the Department of Ophthalmology include: diabetic mellitus, diabetic retinopathy, and sickle cell retinopathy. Given that clinical eye research is a central component of training residents in the field of ophthalmology, this facility will serve direct instruction, as well as advanced eye research. Approximately \$145,900 was received for operating the building for seven months of FY 1985. An additional \$140,000 is required to finance the operation of the structure for the final five months of its initial year of operation.

1140 South Paulina - In July 1984 the State of Illinois Department of Mental Health and Developmental Disabilities completed the vacation of an office building at 1140 South Paulina Street. Presently, the ownership of the building will be transferred to the Board of Trustees of the University of Illinois. The structure will be used to physically consolidate the Personnel Services units from the combined Chicago campuses, which were functionally consolidated on September 1, 1980. An amount of \$265,000 will be required to operate the 48,600 gross square feet building for FY 1986.

Hunt Building - The critical shortage of engineering research space on the Chicago campus has deterred the College of Engineering in its efforts to attract new top-quality faculty while retaining existing staff. To address this immediate space need the University has recently purchased a 26,000 GSF

facility from the Robert W. Hunt Company. The building, which was designed as an industrial soil testing laboratory, will be renovated to house the Department of Chemical Engineering. The remodeled structure will provide laboratories and offices for 11 FTE faculty, additional offices for 25 FTE staff, and three classrooms. Based on a review of the building's mechanical systems and campus O & M expenditure data for similar research facilities, an amount of \$236,300 will be needed to operate the building during FY 1986.

Urbana-Champaign Campus

Auditorium - In FY 1983 the University received a private donation for the major renovation of the Auditorium and construction of an approximately 9,000 gross square foot backstage addition. Interior remodeling will include installation of an air conditioning and ventilation system, significant upgrading of audience and stage lighting, reupholstering theater and lecture seating, and carpeting. The backstage addition will support the maximum utilization of the stage for instructional and theatrical events. It is expected that the remodeling activities will enhance the Auditorium's use as an instructional area for large lectures and exams, while continuing to serve the campus as an entertainment center. \$320,000 above existing bare-level support will be needed for the operation of the Auditorium in FY 1986.

Nuclear Physics Office Buildings - To address a severe space shortage suffered by the Department of Nuclear Physics, four prefabricated buildings were constructed in an area adjacent to the Nuclear Physics Laboratory. The buildings will provide 3,200 gross square feet of office and conference space for Department faculty and staff. \$20,000 will be required to fund operation of the buildings for FY 1986.

TABLE 13
FY 1986 REQUEST FOR OPERATION AND MAINTENANCE
SUPPORT FOR NEW AREAS

<u>Campus/Building</u>	<u>Gross Square Feet</u>	<u>Total Unit Cost (\$/GSF)</u>	<u>Date of Occupancy</u>	<u>No. of Months Funding</u>	<u>Annual Cost</u>	<u>FY 1986 Amount</u>
CHICAGO						
Lions Eye Research Institute	45,000	\$7.47	December 1, 1984	5	\$ 336,000	\$ 140,000
1140 South Paulina	48,600	5.45	July 1, 1984	12	265,000	265,000
Hunt Building	26,000	9.08	July 1, 1985	12	236,300	236,300
URBANA-CHAMPAIGN						
Auditorium	52,500	6.10	July 1, 1985	12	320,000	320,000
Nuclear Physics Office Buildings	3,200	6.25	February 1, 1984	12	20,000	20,000
Total						\$ 981,300

PROGRAMMATIC REQUESTS

PROGRAMMATIC REQUESTS

The programmatic emphases of the FY 1986 budget request are derived from the basic, long-term institutional role of the University in the State and at the same time are influenced by the impact of social, economic and political forces the University must confront in the immediate future. Reaffirmation of the importance of quality and an emphasis on the revitalization of the State's economy are familiar themes for the University of Illinois. The University has always stressed quality in its teaching and research and a continued commitment to public service. The support needed to accomplish these developmental goals will permit the University to respond to societal demands, to continue and to expand its leadership role in the creation of new knowledge through research, and to apply that knowledge through instruction and public service. Requested funds will provide the University with the necessary flexibility to keep programs current, initiate new program emphases, meet enrollment pressure in specific areas of study, and maintain its research and public service leadership.

The expanded/improved programs developed and presented for approval for FY 1986 fall into three major categories: (1) Scientific and Technological Advances, (2) Professional and Economic Development, and (3) Strengthening Basic Instruction at All Levels of Illinois Education. These themes encompass a diverse set of programs aimed at enhancing educational quality for the students and serving the critical needs of the State.

The nation's lagging productivity and increased international competition in highly technical areas have been reported widely. The internal revitalization of the colleges and departments in science and technology will have important external implications as it assures high quality graduates and the conduct of essential research. Enhanced science and technology programs, especially those in engineering and the physical and biological sciences, have a direct impact on the revitalization of the Illinois economy through the application of University expertise and its base of knowledge to specific problem areas in the State.

The programs included in Scientific and Technological Advances represent the next phase of the University's continuing response to the diverse needs of the State's high technology development goals. For example,

interdisciplinary programs in biotechnology and cognitive science can contribute both basic and applied research to help shift the Illinois economy from traditional heavy industry to high technology industry.

The second programmatic theme, Professional and Economic Development, renews the University's commitment to professional education with expanded and improved programs designed to meet the demands of the new technologies and institutional structures, and addresses the changing roles of professionals throughout the State. The programs described under Professional and Economic Development include support for Veterinary Medicine, Nursing, Pharmacy, Commerce and Public Administration. These service "industries" also contribute to the social and economic well-being of Illinois citizens. As the quality of life and length of life increase, effective means must be sought to control health care costs and optimize service delivery. With its unique educational, research and health care assets, the University can help to provide the human resources and skills needed to meet these new challenges.

While the revitalization of science and technology is essential to the University, the State and the Nation, and even though new resources directed to that end relieve some of the fiscal pressures on other programs, it cannot become the sole programmatic priority for Fiscal Year 1986. The goal of strengthening the overall educational experience for Illinois students at all levels must be accomplished in two ways. Support must be restored to the academic core disciplines within the University, and coordinated plans to improve the quality of instruction at the high school level must be developed. Both campuses of the University of Illinois are committed to improving the expertise of the State's teachers. Illinois needs a capable and well-educated labor force to participate in the rapid move toward technologically sophisticated industries and businesses. Particular emphasis is needed on strengthening mathematics and writing instruction in Illinois high schools.

The third major category of expanded/improved programs in FY 1986 is comprised of a series of innovative programs designed to strengthen basic instruction at all levels of Illinois education. Factors contributing to strengthened student competence and excellence at the University level and addressed in the FY 1986 budget request include the creation of manageable class sizes to maximize direct faculty-student learning relationships,

increased financial support for top quality graduate students, laboratory development and support, and innovative core curricula in the humanities, basic sciences and mathematics. University interactions with high school teachers will take place through in-service workshops, consulting visits to the high schools, and campus residential programs. These activities will generate many new teaching materials and methods for improving high school instruction. The use of microcomputer technology as an effective tool in the learning process will also be explored.

Funds totaling \$2.0 million to support academic computing activities have been added to the FY 1986 request to enable the University to meet several specific needs for the acquisition and maintenance of computer equipment. Urbana-Champaign items include funds needed to fulfill a cost-sharing commitment to the National Science Foundation for supercomputer development and resource requirements for academic computing equipment donated by the IBM Corporation. The Chicago request includes funds for the expansion of the Academic Computer Center network on campus.

In addition, the University's acute need for equipment recovery funds is reflected in a separate \$2.0 million request for FY 1986.

The FY 1986 budget request also includes funds for the third phase of the University's program to revitalize the Colleges of Engineering at both campuses.

The specific expanded/improved programs identified in the FY 1986 budget request are outlined in Table 14.

Table 14
FY 1986 Expanded and Improved Programs
(Dollars in Thousands)

	<u>Chicago</u>	<u>Urbana- Champaign</u>	<u>Central Administration</u>	<u>Total</u>
I. Scientific and Technological Advances				
A. Interdisciplinary Research in Biotechnology	\$ 550.0	\$ 650.0		\$1,200.0
B. Undergraduate Instructional Laboratories	200.0			200.0
C. Physics-Microprocesses in Semi-Conductor Devices	200.0			200.0
D. Research in Artificial Intelligence/Cognitive Science		400.0		400.0
E. Gerontology	<u>345.0</u>	<u> </u>		<u>345.0</u>
Subtotal	\$1,295.0	\$1,050.0		\$2,345.0
II. Professional and Economic Development				
A. Public Agency Administration	125.0	100.0		225.0
B. Veterinary Medicine		750.0		750.0
C. Containing Health Care Costs	155.0			155.0
D. College of Nursing	250.0			250.0
E. Pharm. D. for Practicing Pharmacists	85.0			85.0
F. Accommodating Enrollment Shifts in Critical Areas		450.0		450.0
G. Medical Residency Programs in Illinois	150.0			150.0
H. Office for Advanced Engineering Studies	<u> </u>	<u> </u>	<u>300.0</u>	<u>300.0</u>
Subtotal	\$ 765.0	\$1,300.0	\$300.0	\$2,365.0
III. Back-to-Basics: Strengthening Basic Instruction at All Levels of Illinois Education				
A. University Level Programs	800.0	1,000.0		1,800.0
B. Program Support for Elementary and Secondary Schools				
1. Mathematics Education	150.0	120.0		270.0
2. Writing Instruction		140.0		140.0
3. Computer-Assisted Instruction in Foreign Languages	<u> </u>	<u>150.0</u>		<u>150.0</u>
Subtotal	\$ 950.0	\$1,410.0		\$2,360.0
TOTAL EXPANDED/IMPROVED PROGRAMS	\$3,010.0	\$3,760.0	\$300.0	\$7,070.0*

*The programmatic total excludes separate requests for Academic Computing (\$2.0 million), Equipment Replacement (\$2.0 million), Special Engineering (\$4.0 million) and \$1,110,000 for the program-related research and service activities in the Special Services/Funding component.

SCIENTIFIC AND TECHNOLOGICAL ADVANCES

INTERDISCIPLINARY RESEARCH IN BIOTECHNOLOGY
(\$1,200,000)

The Biological Sciences are in the beginning stages of revolutionary change which will produce a veritable explosion of new knowledge, affecting all disciplines within biology from evolutionary theory to biochemistry. More importantly, profound changes are already occurring in the industrial, agricultural, pharmaceutical and social applications of biological knowledge. These changes offer numerous opportunities for faculty in Biotechnology to work with researchers and faculty members from a wide array of disciplines on projects that are of critical importance. The application of this research is important not only to the biotechnology industry, but to engineering firms, pharmaceutical companies and industrial laboratories.

The University of Illinois is ideally suited to mount an outstanding program in biotechnology. The productive vitality of scientific research at Urbana-Champaign and the tremendous potential for growth of high technology industry in the Chicago area provide developmental cores for establishing a formal University program in the burgeoning field of biotechnology. The focal points of current activities at Urbana-Champaign are the Colleges of Agriculture and Veterinary Medicine and the Schools of Chemical Sciences and Life Sciences within the College of Liberal Arts and Sciences. Various research efforts on the Chicago campus include faculty in the Department of Biological Sciences at the University Center and the Colleges of Medicine and Pharmacy at the Health Sciences Center. Successful applications of biotechnology, which include studies of genetic materials at the subcellular level, will depend on close cooperation between scientists concerned with the basic research and technologists interested in applications to plant and animal sciences and to medicine. The funds for the FY 1986 budget request described below will provide important resources for faculty and students in Biotechnology and help to assure that the University can continue to attract external support in this economically important research field.

Chicago Program
(\$550,000)

Laboratory for Cell, Molecular and Developmental Biology

In the FY 1985 budget request the Department of Biological Sciences at the University of Illinois at Chicago proposed the establishment of a Laboratory for Cell, Molecular and Developmental Biology (CMDB) as the most effective way to coordinate the research and teaching efforts in the new and emerging areas of biology and biotechnology. This proposal was approved and funding support of \$118,000 has been provided for FY 1985. The present proposal represents the second phase of this development and follows closely the description provided in the initial budget request. The CMDB provides a much needed vehicle to focus the most productive efforts of the faculty who supervise the research training of graduate students in cell, molecular and developmental biology. The CMDB serves to bring faculty and students together in the most promising areas of research in microbiology, physiology, ecology, entomology, plant sciences, vertebrate biology, mammalian tissue culture, and evolutionary and population genetics. The presence of the Laboratory for Cell, Molecular and Developmental Biology at UIC helps to attract highly qualified students to the campus. In addition, it assures that they will receive excellent training from nationally recognized instructors and with state-of-the-art equipment. The graduates in this field will become an important resource for the development of biotechnology and related industries in Illinois.

The Department of Biological Sciences has identified a core of thirteen individuals among its present faculty whose major research interests and efforts are in cell, molecular and developmental biology. About two-thirds of these faculty are directly engaged in recombinant DNA research and one-third are focusing their research in molecular aspects of development (e.g., RNA metabolism and protein synthesis). Faculty participation in the CMDB will eventually include members of other departments, such as Chemistry and Bioengineering, as well as members of the College of Medicine. Although the CMDB Laboratory is designed as a research unit, it will also serve in a significant teaching role, particularly at the doctoral level, which depends heavily on maintaining a productive research

environment. The presence of creative faculty and top-quality students engaged in this research will serve to attract additional external funding support for the laboratory. The program will also be attractive to scientific and industrial interests which rely on the proximity of a rich academic resource base.

The most urgent need for rapid establishment of national visibility in cell, molecular and developmental biology is the recruitment of well established scientists. Therefore, the highest priority has been placed on attracting two senior faculty, one of whom will assume the duties of director of the CMDB. The anticipated funding for FY 1985 will also permit the hiring of the technical support staff for the CMDB. The FY 1986 request of \$200,000 will provide funds for three additional junior faculty, two support staff, operating expenses, and much needed equipment. Equipment needed to support the research directions of the CMDB includes items such as oligonucleotide synthesizers, peptide synthesizers, high performance liquid chromatography equipment and supporting measurement and control devices. To be efficient and effective, such equipment must be state-of-the-art, and it must be maintained at optimal operating levels. For FY 1986, the separate components of the proposed budget for CMDB are outlined below:

Cell, Molecular and Developmental Biology
(dollars in thousands)

<u>Faculty</u>	<u>Staff</u>	<u>Expenses</u>	<u>Equipment</u>	<u>Total</u>
90.0	30.0	30.0	50.0	200.0

Biotechnology in Medicine and Pharmacy

In the period since World War II, human understanding of the fundamentals of health and disease and advances in technology have revolutionized the practice of health care and led to the creation of important new industries. Some diseases, especially infectious diseases such as small pox, have virtually disappeared as major threats, and the secrets of many more complex diseases, such as cancer, are beginning to be unlocked. Results of interdisciplinary research in genetics, immunology, and the

neurosciences (among others) will enable us to manage and perhaps conquer afflictions such as cancer, sickle cell anemia, and schizophrenia. Examples of major industries benefitting from biomedical/biotechnological discoveries include the agricultural industry, in which genetics has revolutionized dairy and meat production; the chemical industry, which has developed new biodegradable detergents from work with enzyme biochemistry; and the food industry, where freeze-drying has become a significant method of food preservation. University of Illinois at Chicago faculty are deeply engaged in extending these frontiers of scientific and technological knowledge and in developing practical applications for their discoveries. Faculty efforts are focused in three functional areas: interdisciplinary basic science, clinical and commercial applications, and technological innovations.

In FY 1984, \$100,000 was allocated to the Colleges of Medicine and Pharmacy for the Pharmacokinetics Laboratory. This modest sum was matched with reallocated College funds and used to hire staff and provide laboratory supplies. The primary focus of the laboratory was basic research. Success in that area, however, has led to an increased interest by Pharmacy firms in the faculty's research. In the past year, the dollar value of proposals submitted for funding by outside agencies has quadrupled. More than \$200,000 in project awards already have been confirmed. Further, practical applications of basic research have developed in collaboration with clinical fields, including dermatology and cardiology. For example, outside sources are sponsoring tests for several hypertensive drugs such as diltiazem and labetalol and for further elucidation of pharmacokinetics of aspirin. Just as basic research can lead to contracts for clinical applications, so also can clinical applications produce new areas of interest in basic research. For instance, the fee-for-service work performed by faculty in the Pharmacokinetics Lab for the State Racing Board has suggested some exciting new areas for basic research in describing and defining compounds in the blood. This growth and intellectual excitement will continue to produce new ideas and contracts as the Pharmacokinetics Lab develops a sound reputation with local industries.

In FY 1985, new funds of \$281,700 will be matched with College resources and will enable faculty in Medicine and Pharmacy to expand their

work, primarily in fostering interdisciplinary basic sciences and in developing the third functional area, technological innovations. Funds reallocated by Medicine and Pharmacy will be used to modernize space, while the new State funds will support additional faculty and technicians.

Basic discoveries, such as the elucidation of the double helix structure of DNA, are the fundamental building blocks of the biotechnology industry. At the Health Sciences Center, key areas of research include immunology, especially in characterizing the cell communication process; eukaryotic genetics, particularly genetic cloning; the basic biochemistry of cell regulation and chemical production; and the microbiology of bacterial and viral development. New program funds received in FY 1984 and 1985 have been allocated to support basic science work in these fields, and have produced excellent results.

The investments of FY 1984 and FY 1985 in basic science research show great promise for clinical and commercial application, but modest sums of new support in FY 1986 will be required to advance the research activities further so that commercial firms will be convinced of the potential results private investment might bring. The experience of the Pharmacokinetics Lab mentioned above, and the Center for Genetics, whose researchers have developed, on the average, \$125,000 each in outside funding, demonstrates the impact that a modest level of additional State support can have. Recurring support for these activities must be provided by the institution so that commercial developers have some level of assurance that there is a basic core of faculty committed to the research activity in which they have a particular interest.

To provide basic laboratory support, technical staff, and some new faculty and postdoctoral personnel, to bring these and other innovative ideas to the commercial and clinical applications point, new funds totaling \$275,000 are requested in FY 1986. This basic support will allow the Health Sciences Center faculty to advance their research work to the point of increasing commercial funding support in the years to come. The most important benefit of this type of clinical applications research, however, is to reduce significantly the time it takes to convert new scientific discoveries to useful products, and to enable graduate students to follow an idea from its basic science discovery through its clinical application.

In applied technology, collaboration between the Colleges of Pharmacy and Engineering is developing rapidly. The College of Pharmacy has already received a small grant from a manufacturer interested in developing robotics technology for drug distribution. The use of robots to count pills, measure drug dosage levels, and do dozens of other routine, tedious tasks which are common to pharmaceutical manufacturing and pharmacy practice should further revolutionize the fields. With some additional support in FY 1986, the Colleges' joint efforts in this area could lead to substantial contracts and a leading national role in the field. Funds needed for this effort total \$75,000 to hire a technician and a key faculty member to concentrate on the robotics project. Other potential developments in the robotics field include the possibility of creating rooms in which series of diagnostic and clinical tests may be performed in a matter of minutes without the need for direct staff intervention and support. Physical exams by computers and robotic support may not be so far in the future, as the full range of possibilities for tomographic and magnetic resonance scanning are developed.

The FY 1986 request for biotechnology in Medicine and Pharmacy totals \$350,000, an amount that should be matched many times over by external sources in the years to come. An estimated additional need for \$200,000 to \$250,000 to sustain the work in interdisciplinary basic science, clinical applications and technological innovations is anticipated over the next three years. This investment will most certainly increase outside funding and, more importantly, contribute to substantial health care and environmental benefits, as scientific discoveries are transformed into commercial products and clinical applications.

The FY 1986 budget components for Biotechnology in Medicine and Pharmacy are outlined below:

7.0 FTE Faculty	\$260,000
3.0 FTE Nonacademic Staff	45,000
Expense	<u>45,000</u>
Total	\$350,000

Urbana-Champaign Program
(\$650,000)

The Urbana-Champaign segment of the University's biotechnology initiative consists of two principal elements: (1) an on-going campus-wide interdisciplinary research effort, and (2) an interdisciplinary program in environmental toxicology.

The interdisciplinary biotechnology research program at Urbana-Champaign is designed to accomplish several goals:

1. to begin new research and teaching initiatives in biotechnology;
2. to provide the faculty and support personnel needed to expand research activities;
3. to develop a campus-wide program of research seminars, shared resources, and curriculum enhancement;
4. to provide a state-funded base for acquisition of substantial external support for research;
5. to provide state support for a new Biotechnology Center that will form the nucleus of a proposed industrial affiliates program in biotechnology.

Many elements of the biotechnology program are already in place and are operating. The focal points of current activities are the Colleges of Agriculture and Veterinary Medicine and the Schools of Chemical Sciences and Life Sciences. Much of the basic work in molecular genetics occurs in the Departments of Microbiology, Botany, Entomology, and Genetics and Development. Several faculty in the Department of Biochemistry are involved with research concerning the chemical nature and properties of genetic materials.

The possible results of the interdisciplinary biotechnological research being proposed are tremendously numerous and varied.

1. Microbial fermentation can be used to convert waste materials such as corn cobs or paper into useful products such as methane. Fermentation can also be used to produce a variety of commercially-important chemicals, as well as more complex biological compounds. As new techniques for genetic manipulation of organisms begin to be applied to fermentation processes,

biological production of compounds will become economically competitive with present chemical synthetic methods.

2. Genetic engineering is being employed to modify the genetic characteristics of plant systems that are of great importance in Illinois, such as soybeans and corn. Desirable characteristics such as herbicide resistance, drought tolerance and high production will, when such research has reached a successful state of completion, be obtainable to a degree heretofore unknown.
3. Chemically reactive estrogen derivatives designed to react with DNA are being developed as receptor-carried cytotoxic agents to improve the selectivity in the treatment of hormone-responsive breast cancer. New vaccines and diagnostic techniques for human and animal diseases will undoubtedly appear as a product of this research.

Research activities in biotechnology extend across the campus and the basis for a strong, campus-wide program in biotechnology is already in place. As a means of planning for additional activities in this area, the following steps have been taken:

1. A campus-wide Committee on Biotechnology Initiatives, with membership from the colleges and schools previously mentioned, has been appointed by the Vice Chancellor for Research. Among its activities has been the preparation of a comprehensive inventory of faculty and staff resources devoted to biotechnology research in plant and animal sciences.
2. Faculty groups in the Colleges of Agriculture and Veterinary Medicine have established interdepartmental seminar programs and have identified areas in which additional research expertise is needed.
3. Joint efforts are underway between the Department of Agronomy in the College of Agriculture and the School of Life Sciences in the College of Liberal Arts and Sciences to strengthen programs in biotechnology applied to plant sciences. The intensive involvement of United States Department of Agriculture scientists with adjunct University appointments is particularly noteworthy.

4. A Biotechnology Center funded in large measure from external sources has been established. The Center is campus-wide in character and has about sixty faculty members. Center members form the core of an industrial affiliates program, designed to attract the participation of companies that have an interest in biotechnology and its applications.
5. A Cell Science Center has been created to house large expensive instrumentation essential for modern cell studies. The Center is staffed using funds provided in the FY 1985 appropriation.
6. A second central facility, devoted to recombinant DNA technology, has also been established. This center also contains expensive but essential instrumentation and is staffed by skilled personnel, who were funded from new resources provided for FY 1985.

Although biotechnology research at UIUC is vigorous and developing rapidly, key personnel are required in several areas to promote the continued progress of individual program elements. The following are representative of research areas that require new faculty expertise:

1. DNA mechanisms,
2. immunogenetics,
3. molecular biology in the area of food and animal sciences, and
4. applications-oriented bioengineering research on yeasts and fungi.

New resources are needed to mount a research program that will attract substantial external support over a period of several years, culminating in the establishment of a major research center of international importance. In FY 1984, state funds were requested for the five-year period from FY 1985 to FY 1989. The budget for FY 1985 included funds for directors of the Recombinant DNA Laboratory and the Cell Science Center, and for additional nonacademic personnel, as well as other general program expenses.

The FY 1986 state-funded budget for the Urbana-Champaign portion of the biotechnology program is outlined below:

Academic Staff

2.00 FTE Professors	120,000
3.00 FTE Postdoctoral Research Associates	60,000
1.00 FTE Graduate Research Assistants	12,000

Nonacademic Staff

2.00 FTE Laboratory Technicians	45,000
2.00 FTE Medical Technologists	32,000
1.00 FTE Secretary	11,000

Expense

Commodities	30,000
Contractual Services	20,000
Travel	4,000
Telecommunications	<u>6,000</u>

TOTAL	\$ 340,000
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Interdisciplinary Program in Environmental Toxicology

Illinois ranks as the second largest producer of toxic wastes in the United States. The Illinois Hazardous Waste Task Force declared on April 12, 1984 that toxic wastes threaten Illinois with "the most massive environmental problem in its history." The three state scientific surveys of the Department of Energy and Natural Resources are beginning to focus on problems relating to toxic wastes, and the Illinois Environmental Protection Agency is establishing a major new program for toxicity testing. On a national level, the 1980 Harris Poll demonstrated that 86% of the public favored retaining the Clean Air Act or making it even stricter, and 83% believed that the government should perform pre-market screening of chemicals for safety. The results were described as "the most overwhelming and clearest mandate ever recorded." The importance of the health-related aspects of environmental toxicology has increased dramatically with public concern over PBB's in Michigan, PCB's in the Great Lakes, dioxin in Missouri, formaldehyde and lead in the environment, and EDB contamination of foods.

The demand for trained personnel in this area is very real. The Toxic Substances Control Act of 1976 requires that industries provide massive amounts of toxicological data regarding all their chemical products to the EPA. To review and to evaluate these data, EPA has had to expand its staff. Consequently, there is a critical need for trained professional environmental toxicologists, especially at the Ph.D. level.

When EPA first opened its doors in 1970, advertisements were placed for 2,000 professional toxicologists. Yet, even now, the Society of Toxicology has only 1,800 members. The placement office of this Society reports that it has employment requests for more than 100 professional positions each year. The personnel department of EPA (Research Triangle Park, NC) reports that there is presently a critical shortage of toxicologists especially in the area of health effects, and EPA is experiencing difficulties in obtaining the services of professional toxicologists in inhalation toxicology and human exposure to toxic substances in drinking water.

The National Institute of Environmental Health Sciences (NIEHS) reports that a survey of the requirements indicates a deficit of about 10 professional toxicologists each year and that it experiences difficulty in competing with the chemical industry for qualified individuals. NIEHS reported that training programs supported by this agency are producing only about 50 professional toxicologists each year, an inadequate number.

In 1980, the National Research Council conducted a survey and published a report on Specific Veterinary Manpower Needs Through 1990. This and a similar report by the Philadelphia College of Pharmacology and Sciences cited the critical shortage of Ph.D. toxicologists. In addition, an article in the February 1981 issue of Industrial Chemical News reported an acute need for toxicologists in industry.

The University of Illinois at Urbana-Champaign has impressive research faculty and facilities available to carry out an effective interdisciplinary program in environmental toxicology. Since 1975, the Institute for Environmental Studies has administered the Environmental Toxicology Program. This existing program has provided effective training for M.S. and Ph.D. students and postdoctoral trainees by offering a strong background in the characterization and evaluation of toxic substances in the environment, environmental mutagenesis and carcinogenesis, and environmental management. More recently, several new scientists, whose research interests are closely related to the health aspects of environmental toxicology, have joined the faculty of various departments. Effective coordination of the expertise represented by this growing number of faculty members

could now provide an even more impressive program for this campus. The Animal Poison Control Center in the Department of Veterinary Biosciences is establishing a data base of animal exposures that can be utilized as an indicator of potential public health hazards. To satisfy the concerns of the public and to increase the University's involvement in studying the biological effects of toxins, the University will expand the Environmental Toxicology Program to focus on the health effects of toxic substances in the environment.

The basic objectives of the program are as follows:

1. to conduct fundamental research on the effects of toxins on humans as well as on other animals, plants and microbes;
2. to educate and to prepare students to fill the current and projected shortage of professionals competent in this field, through new courses, seminars, and dissertation research taught by faculty working at the forefront of their fields;
3. to develop, to enhance, and to coordinate UIUC environmental toxicology faculty members to serve as informational resources to Federal, State, and local authorities and to the public at large.

Environmental toxicology is, by definition, an interdisciplinary area of study. At Urbana-Champaign, the program is conducted within the Colleges of Agriculture, Engineering, Liberal Arts and Sciences, Medicine, Veterinary Medicine, and the Institute for Environmental Studies. Because the Institute is organized outside the traditional departmental structure of the University, it is in a unique position to foster and to support interdisciplinary programs. The Institute has already done this most successfully for other programs, some of which complement the health related thrust of this proposed program.

The Environmental Toxicology Program proposed will increase the cadre of core faculty who are fully committed to environmental toxicology and who are capable of coordinating the participation of the many other UIUC faculty whose contributions are essential to this broad interdisciplinary program. The new faculty will fill existing gaps in the health-related aspects of environmental toxicology. The requested funding will further provide continuity of programmatic support to sustain a cohesive and effective graduate training program of national stature and to attract increased support from government and private sources.

Five faculty positions for the improvement and expansion of the Environmental Toxicology Program are requested:

1. A behavioral toxicologist will study the psychological and neurological effects of exposure to low levels of toxins. Research on acute and delayed neurotoxicity is currently being conducted by Program faculty. The behavioral toxicologist will complement this research area by identifying and quantifying abnormal behavioral responses induced by environmental toxins.
2. An immunotoxicologist is needed to study the defense mechanisms of the body against toxic insult. Currently little research in immunotoxicology is being conducted at the Urbana-Champaign campus. Research in this area is extremely important, for it is believed that toxins that impair the immune system may lead to increased susceptibility to disease.
3. An analytical toxicologist will develop methods for the detection and identification of toxins in the body. Environmental chemists in the Program work primarily on the analysis of toxic agents in environmental samples. An analytical toxicologist will develop complementary analysis of biological tissues.
4. A pulmonary or inhalation toxicologist will study the entry of air-borne toxins into biological systems. Research on the toxicology of aerosols and the pathology of pulmonary response to toxins is being conducted by Program faculty. An inhalation toxicologist will integrate these efforts and perform research on the physiology of respiratory function in the presence of toxins.
5. A biostatistician or epidemiologist will study the impacts of environmental toxins and their relation to the etiology of environmentally related disease.

Established on joint appointments (generally 75% Institute of Environmental Studies, 25% appropriate department), these faculty will unify and invigorate the Environmental Toxicology Program. Each new faculty member will develop courses in his or her discipline, develop a disciplinary research program, conduct collaborative research to augment the interdisciplinary nature of the Environmental Toxicology Program, and educate graduate students to become the toxicologists of the next decade.

An expanded Environmental Toxicology Program will place the University of Illinois at the forefront of toxicologic research in the United States, enabling UIUC to compete successfully for extramural funding in research and graduate education. The proposed program expansion will provide the foundation for a National Institute of Health (NIH) training grant in Environmental Toxicology.

The FY 1986 state-supported budget for the proposed program expansion is as follows:

Academic Staff

5.00 FTE Faculty members	\$ 150,000
5.00 FTE Graduate Assistants	70,000

Nonacademic Staff

1.00 FTE Secretary	15,000
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Expense

Commodities	35,000
Contractual Services	12,000
Travel	3,000

Equipment

Annual Renewal and Replacement	<u>25,000</u>
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TOTAL	\$ 310,000
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UNDERGRADUATE INSTRUCTIONAL LABORATORIES
(\$200,000)

The FY 1986 request for funds for the undergraduate instructional laboratories is the final portion of a three year program to upgrade and replace instructional items in the labs. Most of the laboratories at University Center were constructed and equipped in the years 1965 to 1970. The intensive use of the labs over the years has taken a heavy toll on the facilities and equipment. The obsolescence of many common instructional items, such as balances, microscopes and oscilloscopes further reduces the value of training received in these laboratories. Intensive use of the labs and increased enrollment in most undergraduate science courses accelerate the wear and breakage factors for equipment and supplies. In addition, replacement costs for glassware and chemicals have far exceeded the general price increases from the State in the last decade.

The campus operates a total of 44 undergraduate science laboratories with 1,431 student stations. These laboratories are scheduled for course work on the average of eighteen hours per week, and some are open to students outside of regularly scheduled hours. During Fall Quarter, 1983, more than 6,000 students registered for laboratory courses offered by the Departments of Biology, Chemistry, Geology and Physics. This figure represents more than one-third of the undergraduate population registered for the Fall Quarter. During FY 1983 and FY 1984, approximately 19,000 students registered for laboratory classes each year.

Recent incremental State funds which have been directed to undergraduate instructional laboratories have allowed the Departments to increase their expenditures per student registration by nearly 45% since FY 1979. Although prices for much of the glassware and chemicals have doubled in that same time, the additional funds helped to relieve the critical problem that faced these Departments.

	<u>FY 1979</u>	<u>FY 1982</u>	<u>FY 1984</u>
Annual Course Registrations for Science Labs	18,650	18,773	18,639
Expenditures per Registration	27.58	32.51	39.56
% Change in Expenditures		+17.9%	+43.4%

This third portion of the request provides the final \$200,000 needed for laboratories and will bring the amount available for scientific supplies into line with actual price increases by FY 1987.

DEPARTMENT OF PHYSICS - MICROPROCESSES
IN SEMI-CONDUCTOR DEVICES
(\$200,000)

The Physics Department of the University of Illinois at Chicago has directed a major effort to establish a facility for the study of the physics of microprocesses at semi-conductor interfaces. The research effort has received sustained and growing support from agencies of the federal government, including the Defense Advanced Research Projects Agency (DARPA), the Navy and the Air Force. Research and equipment grants awarded to the two principal researchers in this area over the past three fiscal years totaled more than \$3 million dollars. The work of the principal Department researchers in this field is recognized both nationally and internationally. Important technological applications for the semi-conductor industry can be made from the results of this work. Texas Instruments, Honeywell and North American Rockwell have direct programs with the Department at this time. All three of these companies contract with Illinois firms to apply some of the technological innovations from this research. Eltron Research Corporation of Illinois is also directly involved with the Department's work in the study of the physics of microprocesses.

The research effort at the Chicago campus focuses on the future generation of devices constructed entirely in Ultra High Vacuum. Each step in the processing of the devices is computer driven and implemented by robots. The program at UIC will generate a basic understanding of the microscopic interactions taking place at device interfaces in order to develop a theoretical model for the important II-VI semiconductors used in advanced infrared imaging devices. A similar effort aimed at III-V semiconductors applicable to high speed computer technology is ongoing at the California Institute of Technology, also under the sponsorship of DARPA. The device characterization component of the UIC effort is a unique contribution to the national research program. Moreover, studies at UIC in Ultra High Vacuum growth are aimed at establishing the feasibility of industrial production of these devices.

During FY 1984, the campus undertook a major effort to remodel the laboratory used in this research. A clean room was developed in order to

allow the growth of heterojunctions and superlattices. These structures can now be studied during the growth process, through the use of molecular beam epitaxy. This technique operates in ultra high vacuum and provides the ultra clean surfaces and interfaces which are needed for this research.

Graduate students are particularly attracted by the opportunity to use advanced research equipment. For students who have a particular interest in solid state physics, the Ultra High Vacuum Laboratory housed in the Clean Room is a unique facility in this area for their research. In addition, the Excimer Lasers at UIC provide a similar unique opportunity for students to use the latest equipment in their graduate studies. The nature of Physics research and the high cost of advanced research facilities, has resulted in a steady move toward large group efforts. The proximity of the National Accelerator Laboratory (Fermi Lab) is an added advantage to UIC students. The focus of the research on this campus and the availability of state-of-the-art equipment attract both highly qualified graduate students and national and international industrial groups.

The current research endeavors constitute a logical base for an expanded program of national magnitude aimed at providing standards for the semiconductor industry. The expanded research program will contribute significantly to the support of plans to revitalize Illinois technology and industry. These research efforts can be expected to continue to attract funds from external sources, including federal research grants. Two corollary benefits of high priority within the University are the opportunities to provide excellent training for graduate students and to foster a supportive environment for faculty research in other areas.

This important research effort requires State financial support beyond the present limits of the Physics Department budget. The FY 1986 request is the first phase of a multi-year plan to provide adequate funding to support this program. Highly skilled technicians are needed to operate the precision instruments and to perform the complex tasks that are used in this type of research. Computer programming support is needed to conduct the research and analyze the results. In addition, operating expenses for the use and maintenance of the equipment and the laboratory must be provided.

The separate components of the FY 1986 budget request are outlined below:

MICROPROCESSES IN SEMI-CONDUCTOR DEVICES
(Dollars in Thousands)

<u>Staff</u>	<u>Equipment</u>	<u>Expenses</u>	<u>Total</u>
125.0	50.0	25.0	200.0

RESEARCH IN ARTIFICIAL INTELLIGENCE/COGNITIVE SCIENCE
(\$400,000)

Artificial intelligence (AI) is the most rapidly-growing aspect of computer science. Many people believe that an intensive development of AI will be the hallmark of the next phase of development of computer science. If Illinois is to play a major role in the computer science industry in the next generation, it must develop a reputation for frontier research in this area. In addition, the demand for computer scientists trained in AI is very intense, and the capacity of the University of Illinois to produce well-trained graduates of its computer science programs, at levels ranging from the B.S. through the Ph.D., is an essential aspect of the State's capacity to attract high-tech industry to Illinois.

The long-term goal of studies in AI is to make it possible for computers to perform tasks that require the intelligent use of knowledge. Ultimately, this capacity should allow computers and computer-controlled devices (e.g., scientific or industrial robots) to perform tasks for which humans are inherently unsuited (e.g., tasks that are too dangerous and/or cognitively or physically impossible).

Recently, interactions between AI, cognitive psychology, theoretical linguistics, and other disciplines have given rise to a field called Cognitive Science, a critical aspect of which is the search for an understanding of cognition, be it real or abstract, human or machine. The goal of Cognitive Science is to develop intelligent devices that can augment human capabilities in important and constructive ways and to understand the principles of intelligent, cognitive behavior in the hope that they will lead to a better understanding of the human mind, of teaching and learning, and of mental abilities. Thus, Cognitive Science is necessarily an interdisciplinary endeavor to which theories about learning, experiments, and computer models all make unique contributions. New advances will require a high degree of interaction between researchers from such disciplines as computer science, engineering, linguistics, psychology, and even philosophy.

The development of next generation work stations, for use with supercomputers, is one example of the need for AI/Cognitive Science development. The development of increased cooperative interactions with major

corporations, such as IBM, Texas Instruments, AT&T Information Systems, Gould, and others, will depend on the University's capacity to develop a broadly-based, high-quality program of research and instruction in AI/Cognitive Science.

A growing number of universities in this country are making multi-million dollar commitments to programs that focus on AI and Cognitive Science. Many of these institutions are among the nation's best in computer science and/or the relevant behavioral sciences (e.g., Carnegie Mellon, MIT, Stanford, Texas). Their willingness to respond to the AI/Cognitive Science challenge is likely to contribute to the maintenance of their positions of preeminence and is bound to help them attract and to retain top quality faculty and students. These gains, in turn, are likely to affect the attractiveness of the states or regions surrounding those institutions as locations for new industry that will make use of new developments in AI/Cognitive Science. Given the exceptional strengths of the University of Illinois in these areas, it would seem prudent for the State to develop a competitive effort.

Currently, there are more than two dozen faculty members at UIUC who could immediately become involved in the proposed new program. These people come from several departments and units including Computer Science, Electrical Engineering, Linguistics, Philosophy, Psychology, The Center for the Study of Reading, the School of Clinical Medicine, and the Coordinated Science Laboratory. Total external support for research at Illinois that has an AI/Cognitive Science orientation is currently about \$2.0 million per year.

Research specialties of current faculty in the area of AI/Cognitive Science include the following: research on "expert systems" (e.g., systems for modeling human medical diagnosis); computer models of language, text comprehension, and learning; computer vision; research into knowledge representations, memory, reasoning and judgment; and automatic programming and automatic theorem proving.

Interested faculty at the Urbana-Champaign campus and a supportive administration are moving rapidly to develop a campus-wide AI/Cognitive Science organizational structure. The AI/Cognitive Science program will concern itself with language, perception, reasoning, and learning. The

existence of a formal program and organizational structure will provide the essential elements for recruiting faculty and graduate students.

New resources are needed to mount a research program that will attract substantial external support over a period of several years, culminating in the establishment of a major research center of international importance. A director for the program will be required along with three faculty members, essential supporting staff, expense funds, and a substantial recurring amount for the purchase of computer equipment.

The details of the FY 1986 operating budget are shown below:

Academic Staff

1.00 FTE Director, AI/Cognitive Sciences Program	\$ 75,000
3.00 FTE Assistant Professor	120,000
1.00 FTE Computer Software Specialist	25,000
1.00 FTE Computer Maintenance Specialist	30,000

Nonacademic Staff

2.00 FTE Secretary	24,000
1.00 FTE Electronics Technician	20,000

Expense

Commodities	30,000
Contractual Services	16,000

Equipment

60,000

TOTAL	\$ 400,000
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GERONTOLOGY
(\$345,000)

By the turn of the century, more than 35 million people in the U.S. will be over 65 years of age. Medical centers can, and should, for both ethical and practical reasons, do whatever possible to ensure that the elderly are able to remain healthy and independent as long as possible. At the Chicago campus, a group of faculty from a wide variety of disciplines is working to develop health care models, curricular changes, and research projects aimed at improving the quality of life for the elderly. Their substantial effort, accomplished primarily with reallocated resources, has now reached a point where new State funds are required for further programmatic success. Faculty from all of the colleges in the health sciences at Chicago have been developing a model of an integrated system of health and medical care for the aged which will serve as a laboratory for education and research and a demonstration center for clinical excellence.

The developing model encompasses a complete range of health care alternatives integrated into a system of comprehensive care. The alternatives include intensive, acute care in a tertiary hospital when necessary, but only when necessary. More often, the care will take place in an intermediate care facility, an outpatient setting, or, to the maximum extent possible, in the patient's home. Movement from one level of the system to another will be coordinated by a health care team, and interdisciplinary consultation and continuity of care will be provided at all stages. This flexible, cooperative model will enable the patient to preserve the greatest amount of personal freedom and dignity and will keep the costs of medical care at the lowest possible level.

Building these components into an integrative model will require several years' effort. The process has begun on several levels, but is understandably more advanced where the resources are already available to faculty. For example, the University of Illinois Hospital and Clinics now provide, through the Diagnostic Clinic, access to an Interdisciplinary Assessment Unit. An elderly person coming to the clinic will have his or her case evaluated by a team of health care workers. An individualized care program will be designed and the health care team will follow the patient's

progress, with adjustments made to the care plan as appropriate. The Interdisciplinary Assessment Units are able to function effectively because of the close association of the Hospital and Clinics with the academic programs at the Chicago campus. Since the University does not own a comparable clinical site for intermediate or long term care, affiliations with external sites must be developed. In January of 1984, the University's Board of Trustees authorized negotiations for an instructional nursing home site. Thus, at some point in the future, a long-term care clinical program for the elderly will also become an integral part of the academic program.

Plans are also underway to establish an ambulatory day center on campus. Considerable faculty effort will be required to plan the center, and suitable space for housing the program must be found. Development of the day center will include a health promotion and disease prevention unit, another part of the model, for which outside funds are presently being sought. The emphasis on health promotion and disease prevention is to assist older people in achieving the goal of living as independent individuals as long as possible.

Although the initial focus has been on the establishment of models of clinical care financed by revenues obtained through patient care, the clinical programs must be linked to teaching and research. Instructional curricula are being revised to provide all students with clinical experience in caring for older people. Research activity will be very important in evaluating the various program models; research results may lead to still other health care prototypes.

The task of integrating gerontology into the didactic elements of the various curricula is progressing. College curriculum committees have spent many hours in assembling program modules and courses. New funding support is needed in several Colleges for clinical scientists committed to the field of Gerontology. The Colleges of Dentistry, Medicine, and Associated Health Professions all need faculty members to plan and supervise clinical instruction so that the work already begun can be extended. These clinical faculty will help to expand the Interdisciplinary Consultation Service and to develop clinical experiences in the long term care facility which will be affiliated with the University. The College of Pharmacy needs funds to hire a pharmacist-gerontologist with special expertise in the medical and pharmacological problems of the elderly. The College of Nursing has already hired

a gerontologist with funds provided for the program in FY 1984. By FY 1986, the College of Nursing will require one additional faculty member and a research assistant to help manage and supervise clinical placements for nursing students studying Gerontology. The total need for clinical education directors and support staff in FY 1986 is \$345,000. A similar amount will be necessary in FY 1987 to complete the staffing for the Colleges described.

The budget components of the FY 1986 request for Gerontology are summarized as follows:

6.0 FTE Academic Staff	\$240,000
4.0 FTE Nonacademic Staff	60,000
Expense	<u>45,000</u>
Total	\$345,000

PROFESSIONAL AND ECONOMIC DEVELOPMENT

PUBLIC AGENCY ADMINISTRATION
(\$225,000)

The University, in its academic programming over the past several years, has placed great emphasis on those programs which enhance the economic development of the State and region. The primary emphasis has been on the promotion of research activities and educational programs in the areas of science and technology and business. Graduates of these programs are better educated and trained for positions in the private sector and are able to contribute significantly to the enhancement of Illinois commerce and industry.

Comparable attention has yet to be directed, however, to the public sector. If Illinois is to be successful in a revitalization of its industry and economy, government at both the State and local levels must be an important participant in this endeavor. Innovative ways must be found to enhance the environment within which these economic developments take place. Governmental activity is a major factor in securing a supportive climate for business. In addition, governmental agencies at all levels must use their financial resources wisely to ensure that economic vitality is promoted in their jurisdictions and that the benefits from these new efforts are managed effectively. The University programs described below represent an appropriate vehicle for addressing the need for capable public administrators.

The Chicago Program
(\$125,000)

The Masters Program in Public Agency Administration (PAA), which admitted its first students in 1977, has been quite successful in serving public sector administrators who seek further academic training. All of the courses for this program have been offered during evening hours. Program P.M. has been a natural home for the program because the Chicago metropolitan area includes many public agencies and nonprofit organizations

whose personnel desire career advancement but who are not able to attend classes during the day.

The PAA program has graduated 56 students since its inception. Thirty of the students worked with public agencies before starting the program and they remained with them after graduation (many received promotions after receiving their degrees). The data that are available on the other graduates indicate that they accepted offers from a wide variety of public agencies and non-profit organizations. Students from the program serve as city finance directors, planning directors and managers for Federal and State agencies.

This proposal seeks new resources for the expansion of the Public Agency Administration Program in two ways. First, an area of concentration in economic development/financial management would be established and outreach activities by the program faculty, students, and staff would be enhanced. These outreach undertakings would come through an expansion of the Program's interactions with the Center for Urban Economic Development (CUED), a successful applied research/public service center with many established relationships in Chicago's professional community. The Program also has an interested and active external advisory committee, consisting of high level practitioners who occupy strategic positions with City, County, State, and Federal agencies. Members of this advisory council are in a position to facilitate various outreach activities of the PAA Program. The Program concentration in economic development, together with enhanced outreach activities with public agency decision-makers, would actively involve the PAA faculty, staff, and students in the promotion of economic development for the Chicago area and the State as a whole.

Second, new resources would allow the expansion of the Public Agency Administration Program to the daytime hours which would appeal to the full-time student. Although some full-time students have been recruited (they normally comprise less than 25% of the total enrollment in the Program), experience has shown that many potential full-time students are reluctant to choose an evening schedule. Funding is being sought in this request to offer an additional 80 quarter hours of instruction, the Program's full requirement, each year. The highly structured nature of the curriculum (68 hours in required courses with only three electives) requires that

expansion be undertaken in a way that allows the creation of an additional section for every required course. At full capacity, a second cohort of approximately seventy students will be accommodated. The PAA Program receives over 400 requests for information each year. Approximately one half of the inquiries come from potential full-time students, yet on the average only ten full-time students are admitted in the Fall Quarter. With the additional funds, a full-time day program could be offered to these students, along with opportunities for internship with local public agencies and field experience with CUED.

The expansion of the Masters in Public Agency Administration Program in FY 1986 will require resources totaling \$125,000. The request includes \$112,000 to fund 5.0 FTE faculty and \$13,000 for operating expenses.

The Urbana-Champaign Program
(\$100,000)

Recognizing the need for a program to develop graduates who will provide leadership in public sector administrative positions, the Political Science Department at UIUC has taken the initial steps to provide such a program by reallocating scarce resources in the face of rising enrollments in its various programs. The announcement of the Master of Arts in Public Administration (MAPA) Program has been met with great enthusiasm. Already 26 students are enrolled and an additional 23 have been admitted for Fall, 1984. The quality of the students is outstanding; all 42 applicants for the forthcoming semester had grade point averages ranging from 4.50 - 4.98 on a 5.00 scale.

If the Department of Political Science is to enhance its existing MAPA Program by expanding the enrollments, and by placing its students in appropriate internships, and, ultimately, upon graduation, into professional positions, it must increase its teaching capacity and complete cooperative arrangements with other campus units that will provide important courses for students in the Program. Funding is requested in FY 1986 for a permanent program director and three new faculty members to fill critical positions in the following areas:

1. Program Director. Responsible for recruitment, counseling, intern placement and supervision, career placement, and overall program leadership. This person will organize "senior practitioner seminars" and increase cooperation and coordination with the six or more public-oriented graduate programs on campus. The director will also offer seminars from the core course listing.
2. Public budgeting and financial management (with emphasis on national and state government). Research and teaching topics: budgeting process techniques, resource allocation strategies; revenue sources and administration, fund management, and administration of public debt.
3. Public management. Research and teaching topics: general system theory and public organizations; styles of public entrepreneurship, personnel management, public participation, ethics, and management tools and stratagems.
4. Intergovernmental relations. Research and teaching topics: analysis of policy making resource allocations, service delivery, communications, agenda setting, and consequences of the intergovernmental systems.

The MAPA Program's visibility on and off campus has grown in recent years. A ranking of graduate programs in public administration and public policy listed Illinois in third place in terms of scholarly productivity. Its graduates and students have won prestigious awards, fellowships, internships, and administrative positions. The Program has made great strides in developing new arrangements, such as the joint JD/MAPA Program and the new MBA/MAPA Program. Units such as accounting, engineering, urban and regional planning, agriculture, and others provide at least potentially, bits and pieces of what might be conceived of as a broad training program. Also, efforts need to be made to attract more public administrators from governmental agencies in Springfield and from the Federal government to the campus to participate in seminars, workshops, and classes; already the list of such persons who have contributed to the MAPA Program is extensive and impressive.

The additional funding required to establish the MAPA Program on a permanent basis at the Urbana-Champaign campus is outlined as follows:

Academic Staff

1.00 FTE Director	\$ 45,000
1.00 FTE Assistant Professor	28,000
.50 FTE Graduate Assistant	5,000

Nonacademic Staff

1.00 FTE Secretay	13,000
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Expense

Commodities	6,000
Contractual Services	2,000
Travel	<u>1,000</u>

TOTAL	\$100,000
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COLLEGE OF VETERINARY MEDICINE
(\$750,000)

Until 1976 the College of Veterinary Medicine was denied full accreditation primarily because of its weakness in research and clinical activities. A new dean was recruited at that time and was charged to bring the College to a level of quality consistent with that of the rest of the campus and consistent with the importance of animal science and medicine in one of the nation's leading agricultural states.

At the same time, the College of Veterinary Medicine was given high priority in the Food for Century III capital construction program. Some of the best facilities in the world have now been provided to house this College. As a result of that construction program and the promise of commensurate operating funds, first-class new members of the teaching faculty were recruited--people with strong commitments to research. These scientists and clinicians were recruited because of the promise of the new facilities and because of the decision to build operating support to match. As a result of this recruiting drive, the University of Illinois College of Veterinary Medicine is now ranked fifth or sixth nationally among veterinary colleges in the generation of extramural research funds. However, the College lacks the faculty and staff depth necessary to sustain this effort and to deliver on its commitments of top quality veterinary education.

New colleges of veterinary medicine are opening in several states, and there is fierce competition for the best faculty members. The College is requesting funds over the next four years for the addition of faculty and staff to achieve and to sustain a level of excellence which will assure its place among leading colleges of veterinary medicine. This program will improve the professional veterinary curriculum and will expand the graduate training and research programs to address acute shortages of specialty-trained veterinarians in many of the disciplines required in veterinary colleges and industrial positions. The funds requested in FY 1986 will be used in the following areas:

1. The intensive animal agriculture herd health programs will be expanded with emphasis on computerized systems for disease surveillance and on the intensive study of livestock environmental, nutritional, and disease management systems using clinical epidemiology and biostatistics.
2. Further development and expansion of the College's biotechnology and bioengineering programs are contemplated. The College will develop sensitive diagnostic systems for the early detection of disease utilizing hybridoma-monoclonal antibody procedures and biotechnology where appropriate. Programs will be expanded in the areas of immuno-genetics, molecular virology and bacteriology, embryology, and embryo transfer research and will develop the use of procedures such as ultrasonography for the diagnosis of pregnancy and infertility in animals. Planning is also underway for the expansion of comparative research programs dealing with diseases of importance to man, such as hyperthermia research for cancer therapy and malarial vaccine production.
3. Faculty expertise will be added in molecular pharmacology and toxicology to support the College's efforts in the establishment of the National Center for Animal Poisoning as part of the USDA National Emergency Preparedness Program.
4. The College will place more emphasis on educating and preparing veterinary students in effective herd health programs dealing with food animal production systems, and on training graduate students to fill professional positions in areas of acute shortage such as biotechnology, toxicology, pharmacology and reproduction of food animals.

Many of the diseases that reduce production in the modern intensive livestock industry are intimately associated with new housing and management systems. Careful study of the complex interactions among disease agents, animals, and environment are now possible through epidemiological and biostatistical methods. Computerized herd health records now make it feasible for clinical faculty and diagnosticians to analyze effectively the masses of data that are being collected.

New strategies for disease diagnosis and control are based on biotechnology and biomedical engineering. Monoclonal antibodies and ELISA procedures are being developed for a number of viral, bacterial, and parasitic diseases. The genetic analysis of virulence factors of viruses, bacteria, and protozoa is opening new methods for the control of diseases in both man and food animals. Modifying or enhancing the immune response via immunogenetics is another important facet of disease control.

An associate professor will be recruited to study in the area of genetic manipulation of mammalian embryos. A faculty member in clinical theriogenology and an academic professional trained in drug/hormone radioimmunoassay procedures will be added in the animal reproduction programs. An adjunct clinical professor with expertise in swine herd health and surgical and nonsurgical embryo transfer techniques is also needed. A faculty member in molecular pharmacology and an academic professional chemist will be added to the pharmacology/toxicology group to strengthen the College's efforts in the establishment of a National Center for Animal Poisoning. A faculty member in immunogenetics and academic professionals in the area of virology and bacteriology will strengthen the College's programs in biotechnology dealing with respiratory and enteric diseases. A faculty member with expertise in equine medicine (respiratory and enteric diseases of the foal) will provide additional clinical depth. An academic professional in computer programming for the epidemiological program, and an engineer responsible for the maintenance and remodeling of the College's new modern physical plant and for the maintenance of major equipment are also required. Two veterinary technical support personnel will be added to the staff of the Teaching Hospital to support the clinical teaching programs.

Ten new teaching associates and three teaching assistants will assist in a number of veterinary professional and graduate student laboratories. They will work in areas dealing with embryo transfer, respiratory diseases, biotechnology, toxicology, pharmacology, immunogenetics, and molecular virology where major deficiencies in teaching assistant support now exist. Faculty in these areas will provide extramural research funds to support the graduate research projects of these individuals.

The College's record for attracting outside research funds over the past six years is shown below.

ANNUAL RESEARCH EXPENDITURES
(In thousands)

FY 1979	\$ 1,155.7
FY 1980	1,428.8
FY 1981	2,125.2
FY 1982	2,270.4
FY 1983	3,285.9
FY 1984 (Estimate)	3,992.3

It is fully expected that the College can match every new operating dollar provided by the State in new incremental program funds with another dollar of research support from outside agencies. The current climate for outside funding in many areas of biotechnology, toxicology, and animal research is very promising.

When compared to the three leading veterinary colleges in the United States, the University of California-Davis, the University of Pennsylvania, and Cornell University, Illinois has approximately 80% of the faculty numbers, 65% of the state-appropriated support and 35% of the nonacademic support staff that is found at each of the other institutions. In FY 1985 it is expected that Illinois will have about \$18,670 in state funds per student equivalent as compared to an average of \$26,538 per student equivalent at the other three institutions.

Illinois ranks first in the nation in the export of agricultural commodities, is second in the production of crops, and is ninth in the production of livestock. Nationally, crop and livestock sales have an annual value of approximately \$70.0 billion each. Almost every national food animal commodity organization has consistently listed economic loss related to death and disease as the most significant problem facing its particular industry. Animal diseases cost the American farmer, and thus the American public, nearly \$17.5 billion annually. Diseases account for about 20% of the economic losses in production potential.

Livestock sales in Illinois totalled \$2.4 billion in 1982. Income loss to Illinois livestock producers during that year because of disease was nearly \$480.0 million.

The College is the primary and, in a number of instances, the only organization in Illinois with the capacity to address the problem of animal disease losses for animal owners in Illinois. The total funds requested for program improvement represent approximately .6 of 1% of the annual losses sustained by the Illinois livestock industry because of disease problems.

Approximately \$3.0 million in new state funds are needed to add the faculty and other supporting resources required to sustain excellent programs and to support the College at a level comparable to that realized by peer institutions. The College is seeking \$750,000 per year in new funds for the next four years to accomplish its goals. The relationship between the numbers of students served, the outside funds generated, and the increased state funds needed is indicated on the following two tables.

The first increment of \$750,000 will be spent in FY 1986 as follows:

Academic Staff

1.00 FTE Associate Professor	\$ 50,000
4.00 FTE Assistant Professors	160,000
.33 FTE Adjunct Clinical Professor	16,000
10.00 FTE Teaching Associates	152,000
3.00 FTE Teaching Assistants	36,000
10.00 FTE Academic Professionals	172,000

<u>Wages</u>	4,000
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Expenses

Commodities for Teaching Hospital and laboratory deficiencies	105,000
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Equipment

Teaching Equipment	<u>55,000</u>
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TOTAL	\$ 750,000
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CONTAINING HEALTH CARE COSTS
(\$155,000)

Rising health care costs are a major concern to most Americans. Averaging \$1,365 per person in 1982, health care costs accounted for 10.5% of the Gross National Product, and there is every indication that the percentage will continue to rise. Faculty in the health professions disciplines at the Chicago campus can help Illinois citizens find ways to cut those costs through appropriate research and demonstrations projects.

A multi-year, three-pronged interdisciplinary attack on the problem can yield significant results. The three areas to be addressed are: operational inefficiencies in health care delivery, health care payment mechanisms, and health promotion and disease prevention. Faculty from all the clinical programs at Chicago will participate in this effort over the next three years. Time will be provided in instructional curricula to discuss these fundamental issues with students. Major investigations into each of the three study areas will be launched in FY 1986.

Eliminating inefficiencies in the health care system is an important component in the attempt to contain costs. For example, it has demonstrated that by making home care possible for ventilator-dependent children, the Division of Services for Crippled Children has saved the State and Federal governments millions of dollars that would have been spent to keep the children in acute or long-term care settings. Similarly, in fields such as otolaryngology and ophthalmology, faculty are demonstrating how care can be provided in ambulatory settings instead of hospitals. The resulting savings can be documented and demonstrated to other health care providers.

The Center for Health Services Research is cooperating with the Chicago and Illinois Departments of Public Health to eliminate inefficiencies in the delivery of health care to pregnant women who are at high risk. The system being developed will encourage better care in the last trimester of pregnancy and insure easy, immediate access to medical records when women arrive at a hospital in preparation for childbirth. Immediate access to the data contained in a medical record is imperative for treating high risk women effectively, to save lives and to reduce costs. The School of Public Health and the College of Associated Health Professions are seeking funds in FY 1986 to extend this study and initiate other, similar efforts. For

example, efficiency in auxiliary systems, such as laboratories and medical records offices, is important to reduce costs under the new medical reimbursement system. Studies by researchers from the College of Associated Health Professions and the School of Public Health can improve understanding and performance in those areas.

In the second area, health care payment mechanisms, the recent move to a completely different Medicaid reimbursement system has changed the focus of health care management. Responsibility for health care costs is fixed jointly on physicians and health care administrators. "Costing systems," or systems to identify accurately the cost components of each health care procedure, must be developed if costs are to be controlled. The reimbursement changes must be understood and evaluated for effectiveness. Evaluations of new health care financing systems will be used to revise instructional curricula. Ultimately, new systems will not be useful if health care professionals are not educated and trained to be sensitive to costs. The University of Illinois at Chicago has the unique combination of resources to develop the costing systems, test them in the Hospital and ambulatory clinics, evaluate their effectiveness, and demonstrate their use to others. The School of Public Health and the Center for Educational Development will work with the Hospital, the College of Medicine, the School of Business and others in the development and implementation of these new "costing" models. Additional funds will be required for staff to complete the study teams.

The School of Public Health will participate in all three areas, but will take the leadership role in health promotion and disease prevention programs. Two epidemiologists and a health policy analyst will conduct studies to quantify and document further the benefits which accrue if people avoid unhealthy activities such as smoking, over-indulgence in food or drink, and sedentary habits. The economic results of immunization, screening, and preventive care programs such as prenatal education classes will also be demonstrated and widely disseminated. Faculty of the other Colleges will be involved in these efforts. Educational and media programs will be developed to assist people in changing to healthier life styles. In FY 1986, funds will be required for additional faculty.

To expand the University's cost containment program efforts in FY 1986, resources totaling \$155,000 are needed. In considering the costs, it must be noted that one successful demonstration, such as the DSCC effort, can

literally save millions. Through a modest investment in these efforts, the University of Illinois can become one of the nation's leaders in health care economics.

The FY 1986 budget request includes the following components:

4.0 FTE Faculty	\$120,000
1.0 FTE Nonacademic Staff	15,000
Expense	<u>20,000</u>
Total	\$155,000

COLLEGE OF NURSING:
INNOVATIVE MODELS IN NURSING EDUCATION
(\$250,000)

The University of Illinois at Chicago College of Nursing has played an important national role in the development of curricular models to help answer important problems in nursing education. Through bold new initiatives, the College has been meeting the challenges posed by the changing needs of nursing education in Illinois, especially in the Board of Higher Education's high priority areas of baccalaureate and master's degree education. This work has been accomplished primarily with Federal grants and with reallocated funds. In FY 1986, new State funds are needed to establish continuing support for the College's considerable achievement.

In baccalaureate education, the College of Nursing embarked on an innovative experiment to address two of today's most vexing problems in nursing education: 1) the increased educational requirements for entry into the profession and the impact on the many non-degree educational programs now in existence; and 2) the need to provide baccalaureate nursing programs in a variety of geographic settings.

The College of Nursing entered into an innovative contractual arrangement with the Evanston Hospital, Evanston, Illinois, whereby the College converted the Evanston Hospital certificate program into a University of Illinois baccalaureate program. In the process, the College assisted in the further development of a self-paced curriculum model that the Evanston Hospital had initiated in its Learning Resources Center. Evanston Hospital, a large and complex community hospital and an excellent environment for nursing clinical education, became a teaching site for students at all levels of study. The College has appointed qualified staff of the Learning Resources Center to its faculty. Faculty at the Learning Resources Center and the Health Sciences Center have continued the development of "course modules" and are exploring the usage of audio-visual support for instruction.

The ultimate plan, to develop a self-paced, self-study, cost effective undergraduate curriculum in locations where no permanent baccalaureate program exists, is nearly complete. Twenty modules have been completed and are being used in programs throughout the State. The availability of the

modularized units of instruction in the Quad Cities and other areas will allow nurses to upgrade their professional skills at their own pace and in geographically convenient locations.

The award-winning Evanston project is a considerable success, and the College now seeks the funds to make the arrangement permanent. The total cost of the project is shared by the College and by Evanston Hospital. New State funds in FY 1986 are needed for faculty support and for costs associated with the now fully equipped Learning Resources Center. The fully staffed program includes approximately 12 FTE faculty and will enroll 60-75 FTE students.

The College's masters' degree initiative addresses the need in Illinois for nurses prepared for leadership roles. Highly educated and skilled nurses are needed both as faculty in educational institutions and as leaders in the practice setting. In 1982, a new masters' program in adult health nursing was approved for the College by the Illinois Board of Higher Education. The program was planned and started at Urbana-Champaign with a three-year Federal grant. The final year of Federal grant support was to be FY 1984; but because the program has been highly successful, it is likely Federal funding will be extended through FY 1985. In FY 1986, however, new State funds will be required to provide continuous support for the program.

The masters' program is designed to prepare nurses for careers in hospitals, nursing homes, clinics and individual homes, and educational institutions. Students who complete the program will be exposed to clinical experiences in a variety of health care settings in the Urbana-Champaign area, an area with a rich, diverse base of health care environments.

As with any new program, development plans for the masters program are being adjusted to reflect actual operating experiences. The original plan envisioned predominant attendance by part-time students. Experience to date has shown a higher than anticipated student preference to enroll full-time. Accordingly, the College has revised enrollment estimates and faculty recruitment plans. Another required adjustment has been the need to revise salary estimates. The competition for scarce nursing faculty with doctoral preparation has increased estimated faculty costs by approximately \$5,000 per FTE.

Plans now call for an eventual enrollment of 30 students, or approximately 20 full-time equivalents. New State funds will be required to

provide continuous support for the program in FY 1986 and beyond. FY 1986 resource requirements will support faculty and graduate assistants; additional support needed will be provided from reallocated resources of the College.

The proposed budget for FY 1986 is outlined below:

4.0 FTE Faculty	\$140,000
1.0 FTE Graduate Assistants	10,000
1.0 FTE Nonacademic Staff	15,000
Expense	<u>85,000</u>
Total	\$250,000

PHARM.D. FOR PRACTICING PHARMACISTS
(\$85,000)

Beginning with the 1984 entering class, the College of Pharmacy will implement its revised curriculum leading to the Doctor of Pharmacy degree. The curriculum was developed in response to the dramatic expansion of knowledge concerning drugs and drug delivery systems, and to the public's increasing demand for safe and effective drug therapies. Practicing pharmacists, like other practicing health professionals, must refine and upgrade their knowledge and skills to provide effective assistance to patients requiring drug therapy.

The College of Pharmacy requests funds in FY 1986 to extend the new Doctor of Pharmacy program to practicing pharmacists at various sites throughout the State of Illinois. The most effective and efficient way to deliver the program to practicing pharmacists is to develop mechanisms for assessing the knowledge and skill levels of each individual practitioner so that an individualized instructional program can be developed. In addition, non-traditional methods of delivering instructional content and providing clerkship experiences must be identified and tested, including the development of computer-based instructional modules which can be used by practicing pharmacists in either pharmacy or home settings. Practicing pharmacists who enroll in the program will be expected to pay tuition rates at a level sufficient to generate funds to cover direct and indirect instructional program costs. Recurring funds of \$85,000 will be required, however, to support the development of the instructional modules and to provide overall direction and supervision of program operations. This responsiveness to the educational needs of existing pharmacists will also permit the College to expand the range of clinical experiences available to undergraduates.

The proposed FY 1986 budget components are described below:

2.0 FTE Faculty	\$70,000
Expense	<u>15,000</u>
Total	\$85,000

ACCOMMODATING ENROLLMENT SHIFTS IN CRITICAL AREAS
(\$450,000)

During the past several decades student interests have tended to shift from physical education, the fine arts, and many areas in liberal arts and sciences to physics, engineering, computer science, mathematics, accounting, business administration, economics, finance, and agriculture. The campus administration has attempted to respond to these shifts in student preferences and has reallocated hundreds of thousands of dollars to the high-demand units to support the burgeoning enrollments. However, because the University has never received sufficient funds to meet inflationary increases in costs, it became apparent several years ago that it would be impossible to transfer enough funds to the high-growth units to meet the demand for increased faculty, support staff, and related costs. In fact, it was clear that the units in question were suffering from serious underfunding and from overenrollment.

In an effort to provide some remedial action, the campus administration did a study that determined how much it would cost to reduce the extremely high teaching loads (as measured by instructional units generated per FTE academic staff) to levels which would approximate average teaching loads for the past twenty years. At the same time, it set enrollment ceilings in the critical areas and even reduced enrollments in some units in an attempt to restore some balance between student enrollments and resources. Student transfer and admission quotas are not popular with either those students who are denied access or to those administering them, but it was determined that further growth could not be permitted unless attendant increases in resources were provided.

Since students are admitted on the basis of "best-qualified-first," the entrance standards for these high-demand units have risen steadily as the demand has grown. The mean high school rank of entering freshmen in most of these areas is now well above the 90th percentile, and the mean ACT scores for the group range from 26 upward, depending on the discipline involved. The pressures have become intense as students seek admission in those areas which they believe will provide them with the best job opportunities upon graduation.

Fortunately, the State has recognized the severity of this problem and has contributed some incremental funds to begin to ease the situation over the past several years. A portion of the funds provided for engineering revitalization has helped to reduce instructional loads in physics, engineering, and computer science. Additional dollars will be required for that purpose again in FY 1986. An amount is still needed to eliminate the current deficiency in the College of Commerce, the College of Agriculture, and the Department of Mathematics at the Urbana-Champaign campus.

The FY 1986 budget request of \$450,000 will be distributed as follows:

College of Agriculture

(\$112,600)--Funds will be used to hire 3.00 FTE faculty at a cost of \$102,000. In addition, \$10,600 will be used to finance general wages and expenses.

College of Commerce and Business Administration

(\$266,800)--A total of \$254,300 will be used to employ 5.00 FTE faculty, 4.00 FTE graduate assistants, and 1.50 FTE nonacademic support staff. The remaining \$12,500 will be used for expenses and wages.

Department of Mathematics

(\$70,600)--Funds totaling \$69,970 will permit the addition of 2.00 FTE faculty, 0.7 FTE graduate assistants and .50 FTE nonacademic support staff. The remaining \$630 will pay for wages and expenses.

MEDICAL RESIDENCY PROGRAMS IN ILLINOIS
(\$150,000)

The Medical Education Committee of the Illinois Board of Higher Education (IBHE) has reaffirmed the State's commitment to lower the numbers of Illinois medical graduates leaving the State to practice elsewhere. A lack of first-year residency positions is particularly troublesome in Peoria, Rockford, and Urbana-Champaign, in view of the presence of undergraduate medical education in those communities. New and improved residency programs in these communities must be developed to attract and retain graduates of existing Illinois educational programs. A number of affiliated hospitals in these communities lack full-time directors of medical education and faculty to create and conduct residency programs.

While most of the support for residencies in regional programs must come from affiliated hospitals, a minimum level of support from the University is needed to sustain program development and to insure that the quality of the educational components of the program is monitored closely. Thus, the College of Medicine has begun to implement a multi-year plan to provide needed support for graduate medical education at each of its regional sites. In FY 1984, the College allocated \$150,000 to Peoria to strengthen existing residency programs in pediatrics, surgery, emergency medicine, internal medicine, psychiatry, and family practice. This modest investment has resulted in enhanced university-hospital cooperation to improve the design of the educational component of the residency programs.

In FY 1986, \$100,000 is requested to support Rockford's and Urbana's residency programs. The development of new primary care residencies in internal medicine currently underway in Rockford and Peoria will strengthen the undergraduate medical education program, improve ties to the community, and keep graduates in the State. The requested funds will provide salary support for the residency program director and needed faculty.

An additional \$50,000 is requested to support faculty positions for the developing internal medicine residency in Urbana-Champaign. The development of this residency, for the reasons stated above, is a major priority of the College's program at Urbana-Champaign. Another \$50,000 will be needed for

Urbana in FY 1987 to complete the College's plan for the development of strong regional residency programs.

The FY 1986 budget request totals \$150,000 to hire 3.0 FTE faculty.

OFFICE FOR ADVANCED ENGINEERING STUDIES
(\$300,000)

The ability to attract and retain industry has a direct impact upon the economy of the State of Illinois. Universities and colleges can play a vital role by providing (1) a supply of qualified engineering and technology graduates, (2) a means by which practicing engineers can continually update their skills, and (3) an opportunity for industries to obtain technological advice and consultation, or to conduct research related to their specific needs.

To aid in the accomplishment of these goals, the Office for Advanced Engineering Studies (OAES) will offer four major programmatic components: (1) continuing professional education in engineering and related fields; (2) access to consultants with the expertise required by local businesses and industry; (3) collaborative efforts with industry, to solve industrial problems through research; and (4) technical assistance opportunities which are designed to update and/or upgrade the skills of community college faculty and the technical programs at those institutions. The OAES will have its headquarters in the Colleges of Engineering at Chicago and Urbana, but will operate through satellite facilities in communities with demonstrated needs in engineering education and research. The first such satellite office has been established in Rockford.

Funding available in FY 1984 created opportunities for the University to sequence courses leading to a master of science degree in Theoretical and Applied Mechanics and Mechanical Engineering. Enrollments in degree credit courses numbered more than 100 for FY 1984. Similarly, for the first time in several years, the development of non-credit short courses in areas determined by Rockford engineers was made possible. Four short courses were held in FY 1984 with an average of nearly 17 enrollments per course. In addition, the Professional Engineer Review Series was attended by 32 students. With the employment of a full-time coordinator in June 1984, pre-registrations for Fall 1984 already exceed the number of Rockford area engineers enrolled through the Urbana campus during the whole of last year. These data provide substantial evidence that the University's efforts, through OAES, to meet the continuing professional engineering education needs of the Rockford area community are on the right track.

The development of cooperative (University and industry) research projects and the conduct of programs which meet community college faculty needs were also achieved in FY 1984. The goal for FY 1986 will be to expand these efforts into new geographic areas.

The needs for the kinds of services and programs provided by OAES is recognized statewide. Expansion of OAES activities will be incremental and will focus on areas where the University determines it can best meet expressed needs. The intention is to keep Illinois engineers on the "cutting edge" through continuing professional engineering education and cooperative research activities that will permit Illinois industry to assume a leadership role in the economic development of the state.

To move this expansion forward, funds are requested in FY 1986 to develop the OAES effort in the Chicago western suburbs, an area where industry and high technology are in need of the services and programs of OAES. The University of Illinois at Chicago will assume primary responsibility, with significant backup support from the Urbana-Champaign campus, for this major effort. Advanced degree opportunities in civil, chemical, mechanical and electrical/computer science engineering will be made available in five locations, all designed to develop superior industrial/business capability in Illinois. Further, more immediate industry needs for educational programs will be met by offering short courses and seminars for engineers in the area. Other geographical areas, such as Quad Cities, Springfield, and Peoria, will also be considered, but the primary effort will focus on the western suburbs of Chicago. Additional professional staff and increases in support for continuing professional engineering education and cooperative research opportunities will be required to mount these expanded efforts.

Funds requested to expand the OAES program in FY 1986 are distributed as follows:

<u>Component</u>		<u>Amount</u>
1. Continuing Professional Education		\$ 75,000
2. Access to Consultants		10,000
3. Cooperative Fundamental Research		40,000
Each project at approximately \$40,000		
4. Technical Assistance to Community Colleges		
(Summer Institute for engineering faculty)		16,000
5. Equipment - etc.		52,000
electronic blackboards, videotapes, etc.		
6. Staffing/Office		
a) Professional staff	\$55,000	
b) Technical/clerical	16,000	
c) Supplies, wages, travel	36,000	
		<u>107,000</u>
TOTAL		\$300,000

BACK-TO-BASICS: STRENGTHENING BASIC INSTRUCTION
AT ALL LEVELS OF ILLINOIS EDUCATION

BACK-TO-BASICS:

STRENGTHENING BASIC INSTRUCTION AT ALL LEVELS OF ILLINOIS EDUCATION
(\$2,360,000)

Many complaints have appeared in the press and elsewhere about recent high school and college-level graduates. It is said that they do not write well, nor are they effective oral communicators. It is complained that they are competent in only one language (English), and vast improvement is needed even there. They do not understand social processes in their own culture, let alone those of others. Many, especially those with technical orientations, are considered to have been insufficiently exposed to the arts and humanities. Receiving most prominent attention, of course, is the belief that these graduates are not well trained in the sciences, mathematics, and computing.

These complaints are not without foundation. Over the last twenty years, Scholastic Aptitude Tests measuring comprehension in reading and mathematics have declined nationwide with a fifty point drop in verbal tests and a thirty-two point drop in mathematics. The scores reached their low point in 1980 and 1981, and for the last several years have stabilized at about those levels. According to a 1982 Gallup youth poll, 89% of all recent high school graduates felt that the most serious deficiency in their schooling was the lack of help for students struggling with reading and mathematics. This year, the National Commission on Excellence in Education reported that only one-fifth of the nation's students can write a persuasive essay.

As an employer of our youth, it is perhaps American business which best understands the need to improve the deficiencies in basic skills. As reported in a recent study by the U. S. Chamber of Commerce, 35% of the corporations surveyed provide training in the basic skills for their employees. AT&T alone spends over six million dollars a year to train 14,000 employees in basic competencies in reading and mathematics. American business is also concerned with our ability to develop in college graduates an awareness of and ability to think critically about major human and social questions and to be able to effectively solve problems within both the corporate and civic communities. Rocco J. Morono, President of New Jersey Telephone, has said that if the situation of under-education is not

improved, we may have to confront a divided society of information "haves" and "have-nots" with all the accompanying repercussions this fragmentation will bring.

Concerned with these developments, national education associations, foundations, and educators have recently been engaged in a "back to the basics" campaign, designed to strengthen basic instruction at all levels of education. The 1983 National Science Board's Report on Education in Mathematics, Science and Technology recommended a "return to the basics" not only in scientific and technological literacy but also in reading, writing, oral communications and computational skills. The Report observed that

"already the quality of our manufactured products, the viability of our trade, our leadership in research and development, and our standards of living are strongly challenged. Our children could be stragglers in a world of technology. We must not let this happen; America must not become an industrial dinosaur. We must not provide our children a 1960 education for a twenty-first century world."

For Fiscal 1986, the University of Illinois requests additional State support for programs designed to strengthen the overall educational experience for Illinois students at all levels. In addition to specific programs for improving the quality of instruction at the high school level, the University seeks support for a restoration of the academic core disciplines within the University and for new initiatives in strengthening basic instruction at the baccalaureate level.

Although it is generally acknowledged that the University of Illinois does a good job in teaching basic skills, it is clear that there is room for improvement, and that in the past decade there has been a deterioration in the quality of instruction in a number of these basic areas. Why has this deterioration occurred? The principle reason is that for the past decade it has been rare for budgetary allocations to keep pace with inflation. This has made it necessary to reallocate funds to cover basic costs and to meet "productivity improvement" requirements; levels of service have been cut back in nearly all areas. Even though the University of Illinois has looked first to service and support units as a source of reallocable dollars, inevitably the academic units also have suffered. Staffing levels have dropped, especially that of teaching assistants; section sizes have

increased; supplies and equipment for teaching are purchased less often and in smaller quantities.

The result is a deterioration of the quality of undergraduate education which shows itself in many ways. Larger classes have led to a reduction in the amount of writing the students are required to do. Homework assignments in fields such as mathematics cannot be monitored with the same care as before. Laboratories tend toward written or oral description of experiments, or computer simulations of them, due to a lack of adequate equipment and supplies. A recent upsurge of interest in foreign languages can be accommodated only with class sizes so large that the amount of individual recitation must be curtailed. The list of such problems is nearly endless; and to make matters worse, these erosions have occurred at the very time the basic teaching core is being called upon to help in overcoming a decline in the level of basic skills which high school graduates bring with them to college.

The University is not proposing to establish remedial programs in certain core disciplines. Nor is it proposing a return to the scholastic curriculum which was typified by a single-minded pursuit of intellectual virtues. What is being proposed is a baccalaureate level program which will emphasize and strengthen the skills of all students in the basic disciplines, whether they are pursuing an artistic, literary, scientific, or technical program of study. A three-pronged approach to the achievement of these goals is proposed: 1) the Restoration of Instructional Quality through the reduction of class sizes to maximize direct faculty-student learning relationships, including an increase in the frequency of writing assignments, and through increased support for undergraduate laboratory instruction; 2) implementation of Undergraduate Instructional Initiatives, a series of innovative curricular offerings in the humanities, basic sciences, social sciences, and mathematics; and 3) the provision of Program Support for Elementary and Secondary Schools as an extension of the University's commitment to improving the expertise of the State's teachers and to strengthening mathematics, writing, and foreign language instruction in Illinois.

This University and this State and Nation cannot afford to allow further deterioration of these core experiences. The country is slipping behind in many fields of science and technology and the humanizing features

of a University education are likewise being eroded by the insidious and ubiquitous effects of inadequate funding over a long period of time.

With proper support for exemplary programs, the University of Illinois can play a leadership role in fostering a new standard of academic excellence. The programs which follow and are listed below represent a partial answer to that challenge.

Total FY 1986 Program Requirements
Back-to-Basics
(Dollars in Thousands)

I. Restoration of Instructional Quality	\$ 700.0
II. Undergraduate Instructional Initiatives	1,100.0
III. Program Support for Elementary and Secondary Schools	560.0
A. Mathematics Education	
1. Chicago	(150.0)
2. Urbana-Champaign	(120.0)
B. Writing Instruction	(140.0)
C. Computer-Assisted Instruction in Foreign Languages	<u>(150.0)</u>
TOTAL	\$2,360.0

I. RESTORATION OF INSTRUCTIONAL QUALITY
(\$700,000)

At a time when the basic teaching core is being called upon to help overcome a decline in the quality and intensity of education at the pre-college level, the University and the State cannot afford to allow further deterioration of these core experiences in higher education. Intrinsic to this effort is the maintenance of manageable class size, an avoidance of the large lecture section so as to maximize direct faculty-student and student-student relationships in the learning environment. An increase in class size means fewer written assignments or laboratory exercises, and less individual attention to detail because the instructor has a fixed amount of time available for instruction. An appropriate solution at the initial undergraduate level is the addition of faculty and teaching associates to assume instructional and supervisory roles and the restoration of teaching assistant positions to permit a reduction in class size and an increase both in written assignments and in individual review. A new investment in basic education would produce dividends for virtually all students regardless of major.

In Chicago, funds will be used principally in English and in Mathematics. In these core disciplines, the class sizes of introductory courses have increased by approximately 50% since 1974. The average size of a 100-level English section has grown from 16.7 students in 1974 to 25.0 students in 1983. Enrollment at the undergraduate level in Mathematics has more than doubled since Fall, 1978. The average section size for introductory (100-level) Mathematics courses has increased from 58.2 in 1974 to 87.2 in 1983. At the same time, the Department of Mathematics lost key faculty members to other universities and to corporations because the Department was unable to match offers which were 40% to 100% higher than their current salaries.

Additional funds must be provided to assure that academic excellence and dedicated teaching continue. Freshman composition and introductory mathematics are critical preparatory areas that impart fundamental skills essential to all students across all the disciplines. By providing funds for additional teaching personnel, this program will help to assure the

effectiveness of other instructional initiatives aimed at consolidating student competence in the academic core.

In Urbana-Champaign, funds will be used in a wider array of disciplines. As is the case in Chicago, class sizes have grown rapidly in recent years. For example, there has been a 25% increase in class sizes in rhetoric and enrollments in speech communication and foreign languages have mushroomed. In psychology, section sizes have remained about the same, but instructors have been assigned a 50% increase in the number of sections taught by each, thereby reducing the amount of contact and individual attention that can occur.

In political science, class sizes dropped in the mid-1970's, resources were withdrawn, and now that enrollments have increased, funds have not been available to restore the earlier, more favorable teaching situation. In sociology, undergraduate courses previously taught by a combination of lectures and laboratories now are conducted in large lecture sections only. Funds which would restore the small, personalized laboratory experience would greatly improve the overall quality of instruction.

In the biological sciences some courses which should include a laboratory experience are taught by lecture only, while in others laboratory section sizes were increased and undergraduate students were employed as teaching assistants rather than graduate students as a cost-cutting mechanism. In general chemistry, many times experiments in laboratories are chosen more on the basis of an avoidance of costs than on their quality as instructional devices, fewer teaching assistants can be hired to aid in the instructional process, and students are forced to double up on certain expensive pieces of equipment, producing delays and frustration.

In summary, the FY 1986 request for the University-wide restoration of instructional quality addresses severe chronic support problems and their consequences. On the Chicago campus, the emphasis in FY 1986 will be placed on improvements in the core disciplines of English and Mathematics. The Urbana-Champaign campus will also utilize "Restoration of Quality" funds for programs most crucial to the re-establishment of core competencies in the general student's academic experience. In FY 1986, the Urbana-Champaign program will address critical needs in the areas of Rhetoric, Speech Communication, Sociology, Political Science, General Biology and Chemistry and Foreign Languages. However, deficits which have been accumulating over

the past decade cannot be eliminated in a single year. As a result, the University has developed a two-year plan to support the systematic revitalization of core disciplines in the Colleges of Liberal Arts and Sciences at both campuses. The University requirements for the restoration of instructional quality in FY 1986 total \$700,000. In FY 1987, additional funds will be requested to support additional projects designed to strengthen the academic core.

II. UNDERGRADUATE INSTRUCTIONAL INITIATIVES (\$1,100,000)

The University of Illinois proposes a plan to strengthen and refine the instructional quality of the academic core. The program at each campus is designed to serve unique target populations, yet will ultimately support a broad spectrum of students who will benefit from the intensive and personalized instruction permitted by renewed support of the curricula. The constituent elements of the plan are all aimed toward providing students with the essential tools that are needed for further, more independent exploration of the core disciplines.

Chicago Program

The focus of the Chicago campus proposal is to strengthen and consolidate student competence in four areas of the academic core: 1) linguistic ability, the capacity to read with understanding, to write coherently, and to speak with logic and precision; 2) mathematical understanding, the ability to analyze and to use quantitative data in any discipline and with some degree of computer literacy; 3) proficiency in the basic concepts of the social and behavioral sciences to provide an awareness of and an ability to think critically about major human and social questions; and 4) a grasp of scientific method, its place in intellectual history, and its applicability to data collection and experimentation. This will be accomplished by involving students in rigorous writing and computational skill programs and in restructuring the general education requirements through the development of a core curriculum which would not only increase the students' knowledge of the subjects, but also improve their skills in analyzing and comprehending.

The plan is designed to serve several target populations in its first few years in order to refine and enhance its basic outline, for example students in the honors college and those in teacher education curricula. Then, in 1989 entering freshmen will be required to complete this new program. These target populations have been chosen to represent a spectrum of

academic readiness and declared majors. In FY 1986, one or more of the target groups would be initiated to the new plan for general education, while the remaining students would be phased in, along with the evaluation program, over a four-year period. With adequate resources, there are a number of sequences that might be undertaken during the experimental years.

In developing the core curriculum, the Office of Academic Affairs would bring together the deans of the undergraduate colleges, the Dean of the Honors College, and a cohort of senior faculty to construct and reconfigure courses and course sequences. Their efforts will produce new learning approaches in the social sciences, biological and natural sciences, and the humanities. These core courses will not only increase the students' grasp of the subject matter and improve their ability to analyze and comprehend their environment, but also will require more written assignments and mathematical and computer exercises than is now the case in the current curriculum.

This intensive and personalized instruction can only be provided in a setting of manageable class sizes. The smaller section sizes maximize direct faculty- student and student-student contact, which are so critical in the learning process. During FY 1986, a number of sections in the core courses - e.g. freshman composition and introductory mathematics - will have smaller enrollments (even smaller than those accomplished through the "Restoration of Quality" Program previously mentioned in this document) in order to provide adequate preparation for students in the critical areas of reading, writing and mathematics. These skills are fundamental for all students across all the curriculum. Additionally, the campus plans to strengthen student competence in general computer skills, such as word processing and personal information data bases.

A significant feature of this program is its focus on linguistic ability. The Chicago campus has had extensive experience, through both its academic support programs and its Department of English, in dealing with students who are inadequately prepared to do the kind of reading and writing that university work requires of them. The Writing Center has effectively provided individualized instruction for hundreds of students each quarter who need to improve their writing and editing skills. During the past few years, the Department of English has expanded its participation with local

schools in improving reading and writing skills at the elementary and secondary level.

One aspect of this proposal provides the resources to coordinate and expand the activities at the Chicago campus to improve linguistic skills. The Department of English will coordinate the activities that relate to the training and re-training of teachers in this area. In addition, they will help identify and teach the inadequately prepared students who need specific help in pursuing their undergraduate education. They will direct the research efforts at the doctoral level that are devoted to discovering solutions to the widespread inability of entering college students to comprehend and to use the language. The faculty and staff will be centrally involved in evaluating the effectiveness of the program. The results of their evaluation will be shared, through publication, with a wide audience of university and secondary school educators. This budget proposal allows the Department of English to hire faculty and staff to coordinate these efforts and to increase the staff and equipment available at the Writing Center.

The University cannot, in four short years, make up for twelve years of neglect in the language arts, logic, mathematics, and sciences. What the University can do is to take a broad spectrum of students, who will be in a position to benefit from intensive, personalized, baccalaureate level instruction, and give them the essential tools for further, more independent exploration of one or more of the four "core" areas outlined above.

Urbana-Champaign Program

Science, Technology and Society

While the curriculum at Urbana-Champaign is oriented superbly to train both scientists and engineers for specific occupations, the general student (whether in or out of technical fields) has little exposure to the systematic study of how science and technology have transformed society in the twentieth century. As a response to this need, the Urbana-Champaign campus developed a Science, Technology and Society program to provide a critical understanding of the methods by which science and technology shape the world

and serve human purposes. The program will provide for the introduction and elaboration of undergraduate courses which address from a scholarly point of view, significant policy and value issues which we face in an increasingly technological, highly interdependent world. Examples of the many topics for inquiry are: the limits of genetic engineering; chemical control of behavior; availability and control of information in a computer-based age; moral dilemmas created with birth control and the ability to detect defects in fetuses; the existence and meaning of nuclear weapons; and the competing values of science and creationism. Although the curriculum will not be designed to serve technical purposes or majors, it will be of value to all students regardless of major or concentration. Course work will serve the needs of the General Education curriculum and will draw on faculty with expertise in engineering, physical sciences, biological sciences, social sciences, and the humanities. An investment has been made in course development, but teaching expertise is lacking in some areas, as are the funds needed for faculty, teaching assistants and resource support.

Undergraduate Student Honors Program

Although the Urbana-Champaign campus has had a James Scholar Program for many years, the academic substance of that program has been very sparse. The Vice Chancellor for Academic Affairs has charged two separate committees to review the realities of the current James Scholar Program and to make recommendations concerning the potential of an honors program at UIUC. As a result of those two studies, strong recommendations have been made that the campus should support an honors program along the following lines.

Approximately 75 freshmen would be selected each year to produce a continuing group of 300 honors scholars. The proposed program will be administratively attached to the Office of the Vice Chancellor for Academic Affairs and will be operated by a faculty director and an Honors Commission consisting of 10 senior faculty members from various fields. Commission members will regularly and actively advise the honors students, set standards for their selection and retention, provide honors tutorials, teach honors course work, develop non-credit seminars, select honors courses and student research projects for funding, and direct external award activities.

The participation of senior faculty from a wide range of disciplines demonstrates the campus' commitment to involve the best faculty in an academic program geared to challenge the true capabilities of the brightest

students. Active, personal advising of honors students will be provided by members of the Honors Commission, among others. Tutorial arrangements for students seeking proficiency credit for lower level courses will encourage further study at a more advanced level in fields outside the major. Small classes, especially at the lower level and taught by senior people, strengthens the continued faculty involvement and interest in the lower division undergraduate curriculum.

Funds requested for the Undergraduate Student Honors Program will support faculty participation in Honors Commission activities and teaching and will match jointly-funded expenses of special honors courses at the college and department levels.

The proposed campus Honors Program is important in attracting the very best students to UIUC and in providing the level of challenge demanded by such students who enroll here now. Many institutions that are peers of UIUC offer such honors opportunities to their top students, giving them a decided advantage in recruiting, and providing a form of education to these students that a campus with our resources should, indeed, be providing.

International Education

Throughout the University, greater attention is being focused on international issues. This trend is quite evident in the Urbana-Champaign campus in the Colleges of Agriculture, Commerce and Business Administration, and Engineering, as well as in the traditional Liberal Arts and Sciences disciplines. The result is a distinct demand for special types of instruction both in the traditional European foreign languages programs and in the study of the history, languages and anthropology of the developing countries of the world. Unlike the general need to reduce class sizes as described under the Restoration of Instructional Quality proposal, the funds requested here focus on specialized courses in foreign languages and area studies.

For example, due to the increased interest of students in Commerce and Business Administration, programs in French and in German have been designed to provide instruction for non-majors who plan to enter international business. As a result of this demand, new courses in the cultures of other nations and courses oriented specifically to economic and business systems are needed.

The General Education requirements were changed three years ago to include a requirement in a non-western culture. Courses in areas such as Africa, the Middle East, and East Asia have experienced increases in enrollment. The Urbana-Champaign campus currently enrolls more students in major African languages than does any other institution in the country. Enrollments in Asian Studies and demands for courses in the history, values, and religions of non-western nations have also risen.

In some of these areas assistance has been provided through support obtained from Federal Grants to four areas centers (Asian Studies, African Studies, Latin American and Caribbean Studies, and Russian and East European Studies). For example, a significant percentage of our African language instruction is paid directly from federal grants. Unfortunately, these funds are slowly being cut back and cannot be relied upon to support continuing basic instruction. One of the costs of previous budget base reductions in LAS has been the removal of faculty in international instruction areas. Renewed support for these programs is essential.

The critical areas of need are the following: Islamic culture and religion; African political systems; East European political systems; Latin American history; African languages and literature; and Asian culture and religious systems. Additional teaching assistant help is needed in Asian languages and African languages, and funding of the operational expenses is required to cover the incremental costs of maintaining the additional faculty and TAs.

Summary of FY 1986 Resource Requirements

Many of the initiatives described for each campus require a two-year implementation schedule to permit adequate evaluation and measurement of proposed changes, and, in the case of the Chicago program, to extend the program to a broader spectrum of students. In FY 1986, the University will require \$1.1 million to begin the first phase of Undergraduate Initiatives. Additional funds will be requested in FY 1987 to complete these projects and to expand the program to other proposals which have been and are being developed to strengthen the academic core.

III. PROGRAM SUPPORT FOR ELEMENTARY AND SECONDARY SCHOOLS (\$560,000)

In recent months, organizations such as the Carnegie Foundation for the Advancement of Teaching and the National Commission on Excellence in Education have called for improvements in the academic standards of secondary schools by requiring more education in mathematics and science and by supporting innovative programs to retain teachers and to promote curriculum evaluation. To address these issues, the University proposes to implement special programs in FY 1986 to improve the quality of pre-college instruction in mathematics, writing, and foreign languages, and to provide academic enrichment for the State's high school teachers. The programs described below contain elements which focus on the need to update teacher skills and to enhance the learning experiences of students.

Mathematics Education - (\$270,000)

In addition to offering baccalaureate and master's programs in teacher education, the Department of Mathematics, Statistics, and Computer Science at the Chicago campus has cooperated for many years with the elementary and secondary schools of the Chicago area in a variety of projects designed to improve the effectiveness of teaching in the schools and to enrich the mathematics education of selected groups of pre-college students. The Department offers on-campus courses to gifted eighth graders; a number of extension courses, in cooperation with the Office of Continuing Education, for inservice mathematics teachers; and the use of the recently established Microcomputer Laboratory for teacher training courses and for the development of educational software. Mathematics also participates in the Board of Education Adopt-a-School program. The Department prepares diagnostic exams for use in Illinois schools to help students determine the mathematics coursework they will need for their college major or for the career which they intend to pursue. The newest of the endeavors is a program for the re-training of Chicago public elementary and secondary school teachers, with an emphasis on the use of microcomputers. Inaugurated in the Summer of 1984, the program will continue through the school year in the form of follow-up sessions to be held on campus every third week.

Recently, the Council on Basic Education in conjunction with the Chicago Board of Education selected the Department to be one of approximately a dozen departments at universities across the country which will serve as regional centers for mathematics education. The renewed interest in elementary and secondary education is beginning to require a growing share of the Department's resources, yet the phenomenal growth in the number of undergraduate majors in computer science (almost 900 in FY 1984) has already stretched those resources beyond the limit.

To respond adequately to the new needs while maintaining its other major programs, funds are requested in FY 1986 to assist in the coordination of all of the activities on behalf of pre-university education (including the teacher education degree programs). Activities will include the development of pre-college curricula more responsive to the needs of today and tomorrow and more effective in educating students who can compete with their counterparts in public systems of education elsewhere in the world. Programs will be developed for the training of new teachers and, through summer and year-long institutes, for the inservice re-training of teachers in elementary and secondary schools. The Department will undertake research in the learning and teaching of mathematics, with an emphasis on projects that can have an immediate effect on the schools. The impact of new technology (particularly microcomputers) on the learning and teaching of mathematics will be investigated and recommendations made as to the potential applications of this technology in the schools.

The FY 1986 budget request for Mathematics Education at the Chicago campus includes the following separate components:

Chicago Program For Mathematics Education
(Dollars in Thousands)

<u>Faculty</u>	<u>Staff</u>	<u>Expenses</u>	<u>Total</u>
110.0	30.0	10.0	150.0

During the past two years, the mathematics departments of the state universities in Illinois have been engaged in a cooperative program to develop and to field test a diagnostic examination of college preparatory mathematics for high school juniors. The purpose of this examination is to

provide high school juniors with a measure of their mathematical preparation for college-level study so that they can correct any weaknesses identified by the examination during their senior year in high school. The Department of Mathematics at Urbana-Champaign proposes to begin to make this diagnostic testing service available to all high school juniors in the State of Illinois.

An alarming number of students entering Illinois universities are not adequately prepared for required college-level courses in mathematics. These students devote a significant portion of their freshman year in college to the study of pre-calculus mathematics, either because they neglected to take enough mathematics in high school or because they did not master the material in courses that they did take. All state universities and colleges are forced to commit a large share of their scarce financial and instructional resources to the teaching of these mathematics courses.

The examination package developed last year consists of a trigonometry test and a test covering elementary and advanced algebra and plane geometry. Reports of results and interpretive information for the algebra- geometry test will be sent to participating high schools within one month of the date that the answer sheets are returned so that students can use the test results for planning their senior-year course programs. Information on the trigonometry test administered later in the junior year will also be provided to facilitate interpretation of test results.

The algebra-geometry test report, which will be sent to each participating high school, will include a cumulative test score and three subscores in elementary algebra, plane geometry, and advanced algebra. The high schools will also receive information concerning university performance standards for broad categories of college majors (e.g., engineering-physical science, business, elementary education, etc.), and diagnostic recommendations for further study of mathematics during the senior year of high school for each student who takes the test.

Strong evidence exists to support the assertion that a university-sponsored college preparatory mathematics test for high school juniors can motivate students to take more mathematics in high school and can also lead to other improvements in high school-university mathematics articulation. During the period between 1965 and 1977, officials at Ohio State University (OSU) observed a disturbing decline in the mathematics placement scores for

students entering that university. One of the factors contributing to this decline was the large numbers of students who did not elect to take a full program of college preparatory mathematics in high school.

In an effort to influence high school students' course election, OSU began in 1977 to offer high schools in Ohio the opportunity to administer its mathematics placement test to their college-intending juniors. The number of high schools participating in this program has increased each year since the program's inception. Nearly 27,500 students from 600 high schools participated in the 1982-83 program. Students who participated in the program as juniors in high school and who later enrolled at Ohio State University scored significantly higher on the mathematics placement test than students entering from non-participating high schools. The Ohio program demonstrates that a voluntary, state university sponsored testing program for high school juniors can result in significant improvement in the college preparation of high school students and can lead to cooperative high school-university projects to improve college preparatory education.

The proposed budget relating to this Urbana-Champaign program is as follows:

Pre-College Mathematics Diagnostic Testing
(Dollars in Thousands)

<u>Faculty</u>	<u>Staff</u>	<u>Expenses</u>	<u>Total</u>
30.0	45.0	45.0	120.0

Development Program to Strengthen Writing Instruction in Illinois High Schools - (\$140,000)

Each Spring the Department of English at Urbana-Champaign brings groups of several dozen high school English instructors to campus for seminars dealing with instruction in writing. These participants have emphasized their need for greater training in the teaching of writing, especially with techniques involving the use of computers. The teachers have indicated that many of their students will have serious problems when faced with college writing assignments. They have also frequently requested that staff from UIUC visit their high schools to discuss and to evaluate student papers in

the classroom. In the past, the English Department has been able to send some faculty and graduate assistants to visit high school teachers and classrooms, and the high school instructors readily attested to the value of those visits.

The general low level of writing proficiency among high school students and the inadequacy of writing instruction are widely acknowledged. A command of the English language is essential for success and mobility in American society. To promote a vigorous new approach to these problems, the Department of English at UIUC proposes to conduct special instructional and developmental programs for high school teachers in FY 1986 and beyond in order to disseminate current knowledge about writing and to advance the use of microcomputer technology as an effective tool in the process of writing. Programs will concentrate on intensive reinforcement of teachers' own writing skills, on developing results-oriented curriculum units, and on the effective integration of computer technology into school writing programs. The Department of English will conduct the following activities:

1. a four-week summer institute for a selected group of twenty-five high school teachers of English and writing;
2. brief workshops and short courses for teachers of writing during the academic year, both on campus and at school sites around the State; and
3. follow-up consultations for the implementation of curriculum units developed for individual school writing programs.

These activities will be directed toward the following objectives:

1. Teachers will study writing (including their own) as a complex process, through actual writing practice, analysis, and revision. As a result, they can extend their own understanding of this process from the writer's to the instructor's point of view.
2. The essential role of rewriting and revision in the writing process and in the teaching of writing will be emphasized.
3. Knowledge and skill in the use of microcomputers in writing instruction will be developed, particularly as effective tools for revision.
4. Instructional strategies and models for secondary school writing programs will be formulated, demonstrating the value and use of new technologies in developing mature writing skills.

The campus programs will be centered in Department of English facilities, particularly in the new microcomputer rhetoric classroom. Equipment funds are requested for computer printers. Other funds will be required for food and lodging for participants, for instructional staff, for consultation and teaching visits to schools, and for relevant software and supplies. Teachers' travel costs related to either the institute or the shorter programs will be paid by the participating high schools.

The FY 1986 state-supported budget for this program at the Urbana-Champaign campus will be distributed as follows:

Development Program in Writing Instruction
(Dollars in Thousands)

<u>Faculty</u>	<u>Staff</u>	<u>Expenses</u>	<u>Total</u>
74.0	10.0	56.0	140.0

Integration of Computer-Assisted Instruction (CAI) into the Foreign Languages Programs of Illinois High Schools - (\$150,000)

Although Illinois high schools are investing in microcomputers in increasing numbers, it has been difficult for foreign language programs to take advantage of the potential of CAI for two reasons: (1) high quality foreign language software is not readily available, and (2) foreign language teachers have received less training than mathematics and science teachers in CAI techniques. As a result, foreign language instructors have had less opportunity to integrate CAI into their instructional programs.

The demand for training of this type is extensive and increasing. At foreign language teachers' conferences, CAI workshops given by the Language Learning Laboratory (LLL) staff are oversubscribed. Teacher participants at these workshops have expressed a need for training to enable them to develop flexible lesson designs that can be adapted for particular needs. The Illinois Foreign Language Teachers' Association, the Central States Conference on Teaching Foreign Languages, and the American Council on the Teaching of Foreign Languages, have all requested LLL to sponsor workshops in this area. The American Council on the Teaching of Foreign Languages has

asked LLL staff to edit a regular feature in the council's journal on the topic of CAI in foreign languages. These requests are a reflection of the perceived need in this area and of the unique and nationally recognized expertise available from the Language Learning Laboratory.

In May, 1984 the State Board Citizens Panel on Foreign Language and International Studies recommended to the Illinois State Board of Education that the Board should promote the development of CAI for foreign language and international studies. Paul Griffith, ISBE Coordinator of Foreign Language Programs, has urged the LLL to take the initiative in sharing its CAI expertise in a variety of training contexts to benefit high school language teachers and program supervisors. The Language Learning Laboratory is eager to accept this challenge and proposes two complementary projects to meet the needs that have been expressed.

The first project that LLL is proposing will provide developmental training and consulting to high schools through workshops and short courses in order to build instructional expertise throughout the State. Within this project, LLL will conduct the following activities:

1. work with the Illinois Foreign Language Teachers Association and other state organizations to identify key school personnel in districts that support language program improvement and to advise these teachers and administrators concerning hardware systems, authoring languages, and commercial lesson materials most appropriate to their needs;
2. conduct in-service workshops to demonstrate materials and software, to train teachers in advanced techniques that will allow them to create flexible computer lesson drivers for course content of their choice, and to advise them in developing interactive computer/audio and computer/video lessons; and
3. consult with schools and foreign language teachers on curricular needs, and on integration of CAI into different teaching programs and pedagogical approaches.

The second project being proposed will offer residential research and development internships for periods of one or two semesters at the Language Learning Laboratory for a small number of experienced materials developers. These individuals will have a major positive impact on programs in their schools when they return home. In this project, LLL will support a small

group of selected high school teachers as Research Associates in residence in LLL for either one semester or one year. The Research Associates will be teachers with appropriate foreign language and programming experience, who are devoted to completing significant projects in materials development. Research Associates will work closely with LLL staff and with faculty in the foreign language departments at UIUC.

After completion of their projects, the high school teachers will continue their work on the computer facilities in their schools and will also continue to have access to the facilities and staff of the Language Learning Laboratory.

The LLL has been producing foreign language computer-assisted instruction since 1968 and has undertaken a wide range of research and development in virtually every aspect of language instruction for which technology provides support. The LLL has a major PLATO installation with hundreds of hours of foreign language lessons, a microcomputer laboratory for teaching courses in foreign language lesson design and programming, two audio labs, and two video studios. The Laboratory has the necessary experience, facilities, and expertise to carry out the proposed projects. The budget request for this program will fund the additional personnel and expense costs needed to support the workshops and internships.

The FY 1986 state-supported budget for this Urbana-Champaign program is distributed as follows:

Computer-Assisted Instruction in Foreign Languages
(Dollars in Thousands)

<u>Faculty</u>	<u>Staff</u>	<u>Expenses</u>	<u>Total</u>
40.0	72.0	38.0	150.0

ACADEMIC COMPUTING

ACADEMIC COMPUTING
(\$2,000,000)

This proposal addresses the future of academic computing at the University of Illinois. The University's computing capabilities are as technically advanced as any in the country, yet the growing demand for computer access and services has led to the development of a number of initiatives at both campuses designed to cope with this ever-changing technology in a systematic, compatible and economical fashion. The programs described below include funding of cost-sharing commitments at Urbana-Champaign and support for the dramatically increasing computer workload at Chicago.

Campus Computer Support
(\$1,000,000)

Chicago Program -- \$500,000

The Computer Center of the University of Illinois at Chicago now serves approximately 25,000 students and 3,000 faculty and staff. The growing demand for computer access and services has quadrupled the workload on the present system in less than five years. In order to address the future needs of the users of the Computer Center at UIC, the campus has developed an integrated plan for the remainder of the 1980's. The development of the Academic Data Network (ADN) has given users wide access to all of the computer resources from almost every location on campus. Instructional computing is now fully interactive. An interactive system is in place for faculty research and statistical analysis. Text processing and manuscript formatting are routine. The electronic mail system allows instant communication with others on campus or colleagues at other universities (through the national network, BITNET). The five year plan which the campus has developed stresses key areas of growth, while assuring compatibility with the system that is now in operation. The plan allows flexibility to

permit a rapid response to the many dramatic changes taking place so quickly. The need to maintain a state-of-the-art system is critical, but, nonetheless, the focus must remain on future compatibility and economical acquisitions.

One area that will certainly need to be addressed in the next five years is the support of various types of computer equipment on campus. The Computer Center plans to increase the variety of devices that can be supported by the ADN and the central facility. These devices range from terminals and printers to microcomputers and plotters. Equipment which is acquired for instructional and research purposes becomes a greater asset when connected to and supported by the central computing facility. The connection expands the capabilities of the specific piece of equipment and provides access to a whole new range of data and resources within the Computer Center.

Along with this support to remote devices, the Computer Center plans to increase its support for instructional computing services. A critical shortage exists in the availability of terminals for student use. Particularly during the final weeks of the quarter, students wait in long lines to use terminals at the two main Computer Labs. The Computer Center would like to expand the number of terminals at these sites, while adding new terminals in the Library, the Student Centers, the residence halls, and some of the classroom buildings.

New services outlined in the five year plan are designed to enhance the capabilities of the Academic Data Network. The Library Circulation System is now available to ADN users. Other bibliographical retrieval systems will also be added. Special hardware and software for scientific users are currently under review. New "Expert Systems" which provide special research data bases are now available in areas that are of particular interest to faculty. In addition, the Computer Center plans to provide moderately priced graphics terminals and plotting devices, which can be used for both instruction and research.

Finally, detailed plans have been formulated to address the "computer literacy" needs of both students and staff at UIC. The establishment of a computer learning center is proposed in order to provide both classroom and laboratory facilities to address these needs in a systematic manner.

Although a number of one and two hour seminars are now offered by the Computer Center, this format does not provide the kind of in-depth training and hands-on experience that are needed to effectively use the ADN system. Much of the current "learning" is done through the slow and painful trial and error method. The Computer Learning Center would provide specialized workshops, consultants, resource equipment, and special lectures and fellowships on state-of-the-art computer applications. The Center would also be a resource for academic units to offer their own workshops in specialized or advanced areas.

The Academic Data Network is an efficient, economical and flexible system. Power can be added or re-distributed in a cost-effective manner, and the system allows for choices as new technologies evolve. The FY 1986 budget request is designed to improve the services of the ADN and to increase the number of staff needed to effectively serve all users. Users of the Computer Center must be able to receive hands-on training and fast responses to their questions concerning research or instructional activities. A recent survey of the CIC institutions (the Big 10 and the University of Chicago) found that the median size of the staff at academic computer centers was 76.0 FTE with a median budget of \$4.0 million. The current size of the staff at UIC is 31.0 FTE, with an operating budget of less than \$2.0 million. The Computer Center is experiencing a critical shortage of staff that must be addressed with this request. The funds requested for FY 1986 will provide new student terminals, along with equipment that will be needed for the learning center. These funds will help assure the continued growth of a flexible and economical computer system to serve the entire University community.

In addition to the general needs of the Academic Data Network, a number of "specialty" areas in the health sciences require critical attention, especially in the use of computer-assisted design systems and the unique clinical databases maintained by various departments of the College of Medicine. The funding of these specialized needs is essential to the Health Sciences Center's role as a prominent leader in health research and education.

Urbana-Champaign Program--\$500,000

The University of Illinois at Urbana-Champaign is undertaking a number of initiatives aimed at "computerizing" the campus. Some of these initiatives are in the advanced planning stages, e.g., the designation of the campus as a supercomputer center and the development of a telecommunications system that will satisfy current audio needs and future video and data transmission needs. Other initiatives are already underway. These include an equipment grant, estimated at \$12.5 million, from the IBM Corporation. The grant will be awarded over a three-year period and will be used to support innovative applications of computers in the instructional process. Negotiations are underway with a second manufacturer for a similar gift.

Equipment gifts are important to the campus and provide a way for the University to incorporate current computing technologies into the instructional and research processes. It is important for graduates to be trained in the use of state-of-the-art computer hardware and software. As a major research university, it is equally important for the Urbana-Champaign campus to devise strategies for meeting faculty needs for research computers. The capabilities of the current generation of computers has had a dramatic impact on the work of researchers in every field, and an institution that does not attempt to address the computer needs of its faculty will soon lose its best people. The computer has become an essential tool for both teaching and research.

Fortunately, most major computer manufacturers have responded to this interest by creating special discount and grant programs. The \$12.5 million grant of equipment that the Urbana-Champaign campus recently received is an example of this kind of activity. However, a key element in negotiating these gifts is the institution's ability to support the equipment once it is on campus, i.e., provide training for the faculty, maintain the equipment, install necessary cables, purchase software, and provide security. The support requirements total approximately 10% of any grant.

When the University received the IBM equipment grant in FY 1985, the State agreed to provide \$500,000 for support activities associated with the first \$5.0 million grant. An additional \$500,000 is needed in FY 1986 to

support costs associated with the second \$5.0 million installment of equipment.

The proposed budget for the use of the \$500,000 is shown below:

Academic Staff

3.00 FTE Technical Assistants	\$ 60,000
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Expense

Commodities	400,000
Contractual Services	<u>40,000</u>

TOTAL	\$ 500,000
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A Center for Scientific
and
Engineering Supercomputing
(\$1,000,000)

In many disciplines faculty are discovering that large-scale computer simulations are an indispensable tool. These disciplines include astrophysics, high energy and many-body physics, materials and biomolecular research, atmospheric sciences, computer-aided design, structural analysis, computer science and fluid dynamics. Many of these problems have been and still are beyond the reach of computers currently available. The technology and the theory that are required to create a network of cooperating computers are now being developed. This activity is giving birth to the multiprocessors or supercomputers which will make it possible to handle the large-scale research problems of heretofore intractable complexity.

The University of Illinois at Urbana-Champaign has long been a leader in computer design and construction. The famous ILLIAC series of computers was designed and/or built at Illinois during the 1950's and 60's, and in recent years, the Urbana-Champaign campus has become the focal point for the most exciting and innovative research in the area of supercomputer architecture, software, and algorithm development. For example, the Cray X-MP, one of the most advanced supercomputers currently being designed and produced in the United States was designed by a former Ph.D. student of the Laboratory for Advanced Supercomputers in the Department of Computer Science.

Department faculty have enjoyed close working relationships with all of the supercomputer manufacturers in the United States, including Cray, ETA (the supercomputer subsidiary of CDC), Control Data Corporation itself, and Denelcor. Computer Science faculty have worked closely as consultants on important new development efforts in the field of array processors and parallel processor computers, e.g., the new Star Technologies advanced array processor.

The University currently has a proposal before the National Science Foundation for a major national center which would involve funding from the NSF to the extent of \$43.0 million over a five-year period. This proposal calls for cost-sharing from the University and there is a strong commitment from Cray Research to furnish state-of-the-art supercomputer hardware at very advantageous prices over the period of the grant.

The University is prepared to make a dramatic and decisive move toward realizing a major breakthrough in computing in American universities. The proposed national center will bring together, in a university setting, many of the world's best scientists, engineers, computer designers and computational algorithm developers. They will have at their disposal the best computational facility that current technology permits. They will interact in seminars and in their work, sharing expertise and insights. As a result of the academic environment this center will produce, the University fully expects major breakthroughs in scientific and engineering problems, new computer algorithms, software, designs, and theory, and the preparation of an entire new generation of researchers and graduate students skilled in the use of supercomputers. The proposal submitted to the National Science Foundation is designed to bring to the University the most advanced supercomputer that can be made readily accessible to scientific and engineering researchers. This supercomputer will possess extremely high-speed processing capabilities over a wide range of applications, yet remain compatible with a mature and widely-used software base. The supercomputer will be part of a fully integrated system including adequate mass storage, graphics and hard copy facilities and a high-speed work station network.

Currently, only national laboratories possess such integrated supercomputer facilities. The national center proposed for the University of Illinois will be modeled on the best elements present in these national

laboratories and will be developed with close cooperation with the staffs of those facilities. The Center will be a dedicated basic research facility used intensively to solve scientific and engineering research problems which require large-scale computer simulations.

The supercomputer will be used continuously by approximately 25 to 50 research groups at the Urbana-Champaign campus. For each Illinois professor in these research groups, there are an average of two off-campus collaborators and three graduate students who will also be active users. The facility will be available to outside users through a Visitor's Program that is an integral part of the proposal submitted to the National Science Foundation. The Visitor's Program will bring to the Center world leaders in applying supercomputers to frontier fields and allow them to use a portion of the Center's supercomputer time.

As mentioned earlier, the proposal to the National Science Foundation requires cost-sharing by the University. To match the expected \$43.0 million in support from NSF, the University will allocate a total of \$800,000 from campus resources for each year of the five-year funding period. In addition, the NSF commitment requires the University and the State of Illinois to provide additional resources, to the extent of \$1.0 million in the first year of the grant, \$2.0 million in the second year, \$3.0 million in the third year, and \$4.0 in the fourth year and each year thereafter.

The funds contributed by the University and the State will go toward site development and toward basic research which is essential to the further development of the national supercomputer facility. Heavy emphasis will be placed upon basic research relating to the design of supercomputer architectures, to software associated with the so-called parallel processor machines, and to the design and construction of the Cedar multiprocessor system. The proposed budget, when combined with existing University resources and with Federal and industrial resources, will provide the University with a Center for Scientific and Engineering Supercomputing that will gain rapid international recognition and attention.

The FY 1986 cost-sharing commitment related to the NSF proposal is outlined below.

Academic Staff

2.00 FTE Professors	\$ 120,000
3.00 FTE Assistant Professors	120,000
2.00 FTE Software Developers	140,000
1.00 FTE Computer Engineer	70,000

Nonacademic Staff

3.00 FTE Secretarial Positions	50,000
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<u>Expense</u>	250,000
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<u>Equipment</u>	<u>250,000</u>
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TOTAL	\$ 1,000,000
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SPECIAL ENGINEERING

SPECIAL ENGINEERING PROGRAM
(\$4,000,000)

Introduction

The economic well-being of Illinois is dependent upon the State's ability to attract and to retain high-technology industry and to restore the competitive position of the State's extensive base of mature industry. A major focus to insure achievement of this goal is to provide industry with an adequate source of highly qualified engineering graduates. While Illinois has enjoyed an outstanding reputation for engineering education in its public universities, the twin crises of faculty shortages and outdated laboratories threaten the State's capacity to respond to the accelerated growth of high technology.

These mounting crises are prevalent in engineering colleges all across the United States. Inadequate funding for faculty salaries and laboratory equipment has resulted in under-staffed and poorly-equipped schools. According to the American Association of Engineering Societies, the rapid growth in undergraduate enrollment demand--an increase of 58% for the period of 1975-1980--has prompted many universities to limit their engineering enrollments and has thrown into question the quality of their programs because of faculty shortages.

Advancements in fields such as computer-aided design and compute-raided manufacturing, micro-electronics, robotics and other high-technology areas have left many U.S. engineering schools behind the times in relation to current professional practice. A report by the Ad Hoc Working Group on Scientific Instrumentation of the National Research Council has stated that the result of equipment deficiencies and laboratory obsolescence is a well-documented and growing trend for experimental researchers to leave university laboratories for employment in industrial laboratories. This trend is usually attributed to the fact that higher salaries are paid in industry than in the universities. While this phenomenon does contribute to faculty shortages, strong private-sector employment incentives also stem from the fact that industrial laboratories are often better equipped and that industry allocates a high proportion of its research budget to new instrumentation.

President Reagan's science advisor, George A. Keyworth II, met with more than 50 government, higher-education, and industry leaders in New York in 1982 to develop a plan to combat these problems. The recommendations of the participants called on universities to improve salaries for faculty members, to increase stipends for engineering graduate students, to develop programs in which graduate students could gain experience in industrial research, to increase spending on instructional and research equipment, to increase the numbers of faculty, and to increase research and instructional quality. Universities were asked to find creative ways for interested faculty and Ph.D. candidates to conduct research on subjects that might attract industrial involvement and might expand collaborative, program-focused research with industry. The meeting participants also recommended that State and Federal governments increase their support of graduate students and research. States, especially, were seen as the key to providing the resources needed to create stimulating and competitive educational and research environments at the universities.

Some states, most notably in the Sun Belt region, have already taken steps to address the problems in their engineering schools. The University of Texas at Austin has established 32 new faculty chairs, each endowed for \$1.0 million. Sixteen of these are in the areas of computer engineering, microelectronics, computer-aided design and manufacturing, and materials engineering; the balance are in science and mathematics. The University of California system has instituted a differential salary scale for engineering faculty. The goal is to achieve a 25% differential for engineering salaries. Furthermore the salary increase in that university system for all faculty members will average close to 15% for FY 1985. It is apparent from these examples that the University of Illinois not only faces continued competition from peer institutions and from the private sector, but also must compete with institutions in states which are trying to build reputations for their engineering schools in order to attract high-technology industry as well.

The FY 1986 budget request described below represents the third phase of the University program designed to insure that the Colleges of Engineering at Urbana-Champaign and Chicago will be able to assume their appropriate roles in the coordinated effort of the State to attract and expand high technology industry in Illinois.

Chicago Program - (\$1,375,000)

The College of Engineering of the University of Illinois at Chicago is now at a critical point in its development. Attention must be given to the resource requirements of the College in relation to the increasing demand for study at both the undergraduate and graduate levels and the steadily increasing quality of the students applying for admission to programs in the College. The teaching and research programs of the College of Engineering at Chicago are gaining national recognition and respect. The College has demonstrated the ability to attract outstanding faculty, and these faculty continue to be very productive in attracting significant amounts of funding and donor support for their research programs. Yet this same success is straining the resources of the College beyond present capacity to sustain effective teaching and research.

The needs of the College of Engineering were articulated in the FY 1984 and FY 1985 budget requests in the Special Engineering Program proposals. In each of these budget documents additional funding of \$1.3 million was requested to aid the College in reducing a high student/faculty ratio, to provide the level of support staff (teaching assistants, technicians, professional and clerical support) necessary to sustain the research productivity of the faculty, and to remodel existing space into enough research laboratories to allow the present faculty to adequately maintain research programs. State funds totaling \$800,000 were provided in FY 1984 and \$600,000 has been appropriated for FY 1985. In addition, the College received in FY 1984 \$68,000 in equipment funds through the special matching program administered by the IBHE. These much needed resources have enabled the College to add 16.0 FTE faculty lines over a three-year recruiting period, increase the FTE graduate assistants, and provide a modest amount of equipment for instruction and research.

The third phase of the multi-year budget proposal within the Special Engineering Program will provide for additional faculty, support staff, and equipment needed to support the student demand for high-quality training, the demand by Illinois industry for highly trained personnel and the research so important for the growth of high technology in the industrial sector. Without this additional support the College of Engineering, faced as it is with problems of faculty shortages, increasing student

enrollments, and outdated equipment, will find it increasingly difficult to respond to the industrial demands for its output--both in well trained personnel and basic research development.

This third phase of the Special Engineering Program at Chicago is budgeted at \$1,375,000 and is an integral part of a multiyear program designed to attain specific goals in terms of faculty quality, student-faculty ratios, overall undergraduate and graduate enrollment targets, and research productivity. These funds will be used 1) to increase the number of faculty so that enrollments may be increased in both undergraduate and graduate programs, 2) to maintain an adequate number of graduate assistantships at stipends which will make the College competitive for the best among graduate students, 3) to provide the technical and professional support staff necessary for a larger and more productive faculty, and 4) to replace outdated equipment and acquire state-of-the-art equipment for instruction and research, especially in the high technology, high demand areas of computer science, electrical engineering, and robotics research.

Faculty Recruitment. The strength of the College of Engineering is largely attributable to its ability to recruit and retain outstanding faculty. Despite the much publicized shortage of engineering faculty across the nation and the increasing competition from industry, the College of Engineering at Chicago has shown that it can recruit outstanding faculty in the critical areas of electrical engineering and computer science. With the support provided by the additional funding in FY 1984 the College was able to recruit ten new assistant and associate professors. With the additional support provided in FY 1985 the College will again add six to eight new faculty. The College will continue to lose faculty, however, as other prestigious universities attract some of the top senior faculty with higher salaries, and with offers of better equipment, lower teaching loads, and superior research laboratories. Nevertheless, the net gain for the College is substantial (with internal reallocation, the gain is 21.0 FTE) and the potential for the future makes further investment in faculty lines an important part of the total plan for the College.

In order to respond to the increasing enrollment demand, the College plans to increase undergraduate enrollment from 2,452 in Fall, 1983 to 2,800 by Fall, 1986, with additional growth planned for Fall, 1987. At the same time graduate enrollment is anticipated to grow from 562 in Fall, 1983

to approximately 700 by Fall, 1986. The College is presently faced with a student/faculty ratio of more than 18 to 1, at least 50% higher than found at comparable engineering programs with a graduate and research component across the country. If the College is to meet the enrollment targets established for Fall, 1986 and maintain quality in its instruction and research programs, this ratio must be brought more nearly into line with the national norm. The accomplishment of this goal will require an increase in FTE faculty from the 99.0 anticipated for Fall, 1984 to approximately 110.0 FTE by Fall, 1986. This budget proposal will provide funds for 10.0 to 12.0 FTE additional faculty by Fall, 1985, allowing the College to continue its enrollment expansion plans in an orderly fashion while gradually reducing the student/faculty ratio.

Graduate Assistants and Support Staff. As enrollment and FTE faculty increase, the need for support personnel will grow. Graduate assistantships provide needed support for the instructional programs. Adequate stipend levels are essential to attract the best graduate students. If the College is to become competitive for the best graduate students, the number of assistantships and the average stipend must be increased. Presently the average salary for a graduate assistant on half-time appointment is less than \$5,000. The current budget proposal will provide funds to increase this figure and to add a number of assistantships in the College as graduate enrollment increases. The overall target is to provide the College with approximately 75.0 FTE graduate assistants by Fall, 1987.

As the faculty increase in number and research productivity, the College faces a growing shortage in technical and professional personnel. This growing research capacity requires supporting services provided by well-trained laboratory technicians, competent accountants, technical writers, and clerical support personnel. Although some of this support can be funded through the research programs, a continuous and reliable professional staff is absolutely necessary to sustain growth of the funded research activities of the faculty. Funds to provide these services are included in this budget request.

Equipment. A key element of engineering education is student exposure to observation and measurement in the laboratory setting. The quality of the laboratory experience is directly related to the adequacy of the

research equipment and instrumentation available. Prior to FY 1984 the principal source of funding for equipment in the College was through research contacts and gifts or grants; indeed, the College of Engineering had no State funds for equipment in its recurring base budget until FY 1984 when the first phase of the Special Engineering Program allocated \$150,000. The FY 1986 budget proposal for the Chicago program will provide an additional \$150,000 in equipment funds.

Urbana-Champaign Program- (\$2,625,000)

The College of Engineering at Urbana-Champaign is ranked among the top four engineering schools in the United States. The College has a key contribution to make in the State's efforts to strengthen its industrial base. Yet, in spite of its preeminence in the field, the UIUC College of Engineering is beset with serious problems which have accumulated over the past decade.

1. The instructional load of the College increased dramatically in recent years, and the College remains understaffed by approximately 25%.
2. Although faculty salaries are presently competitive with those offered at peer institutions, engineering salaries at those peer institutions are increasing rapidly--more so than those in most other disciplines--providing a rapidly moving target.
3. Graduate assistant salaries have fallen far below those presently offered to young engineers in research contracts supported by a number of funding agencies.
4. The College has been unable to purchase much of the modern equipment needed to remain abreast of technological changes that have taken place in industry.
5. Many of the facilities of the College have become outdated and inappropriate for modern research and instruction.

To address these problems, the University has developed a multi-year plan to support the systematic revitalization of engineering programs. The principal objectives of the third phase of the request in FY 1986 are as follows:

1. to keep engineering faculty salary levels competitive with those at peer institutions in order to retain current faculty and to aid in attracting new top quality faculty;
2. to enhance graduate assistant salaries to attract outstanding graduate students;
3. to add faculty and graduate assistants to reduce student/faculty ratios so that enrollment levels may be maintained; and
4. to replace outdated equipment.

Salary and Staff Enhancement. The competition for excellent faculty has intensified in recent years because of the decline in the number of doctoral graduates electing academic careers and as a result of the attractive salaries offered to existing faculty by industry and by peer institutions. Salary enhancements are crucial if the University is to recruit new faculty and to retain current professors with established records in research. College salaries must remain competitive with those offered at peer institutions.

New funds are also needed to attract well-qualified graduate assistants. Current stipend levels average less than 30% of the average annual starting salary rates offered by industry to people with similar education and experience. Several funding agencies have already begun to offer half-time stipends of \$12,000 or more per year and a number of those assistantships are held by graduate students at Urbana-Champaign. To remain competitive in acquiring qualified graduate students, the College must increase its assistantship salary base.

As more and more Illinois students have sought admission to the engineering curriculum, enrollments have grown to the point where in FY 1983 the Urbana-Champaign program ranked first nationwide with a total of 2,045 engineering degrees conferred. The continued pressures to maintain high enrollment levels have resulted in increased faculty workloads. To restore the student/faculty ratio to appropriate levels, additional faculty are required, along with a corresponding increase in technical and other support personnel.

The FY 1984 and FY 1985 allocations to the College for salary enhancement and for increases in faculty and staff levels have begun to offset the basic funding shortages in those areas. However, the existing

shortages of qualified doctoral graduates and technicians will not permit the recruitment of sufficient new faculty and staff in a single year. As a result, additional funds are needed in FY 1986 to continue the College's recruitment efforts.

Equipment Replacement. A key element of engineering education is student exposure to observation and measurement in the laboratory setting. The quality of the laboratory experience is directly related to the adequacy of the research equipment and instrumentation that is available. Over the past several years, the University has been unable to keep pace with the rising costs of increasingly sophisticated technical equipment. High priority must be given to laboratory modernization if the University is to sustain relevant instruction and research based on current technology. Up-to-date equipment would also make the engineering programs more attractive to highly qualified faculty and top graduate students.

The Association of Independent Engineering Colleges indicated in a 1978 study that the annual replacement cost of instructional engineering equipment averaged \$1,500 per baccalaureate degree granted--a figure that corresponds to \$3,500 per degree by FY 1986. The study was based on an average lifetime of approximately 6.5 years for instructional equipment. Using a similar obsolescence approach, based on the more conservative estimate of an 8-year average lifetime for engineering equipment, the College's equipment replacement needs were calculated at \$1,460 per baccalaureate degree to provide adequate instructional equipment for engineering students in FY 1986. With approximately 1,450 B.S. degrees conferred each year in engineering at UIUC, the total annual equipment replacement need was estimated at \$2.1 million in FY 1986. Prior to FY 1984, the equipment base for the College of Engineering approximated \$250,000. In FY 1984 and FY 1985 an additional \$329,000 was allocated to the College for equipment replacement as a part of the Special Engineering Program allocation. In FY 1984, the State of Illinois established a program of matching grants to fund undergraduate instructional equipment. Appropriations to fund these grants in FY 1984 totalled \$242,000. If appropriations continue according to plan (\$1,500,000 in total for FY 1986), the College would receive \$726,000 in matching funds in FY 1986,

leaving an unmet need of approximately \$700,000. Therefore, a State-funded allocation of \$350,000 is required for each of the next two fiscal years.

Total FY 1986 Program Requirement

The specific elements of the FY 1986 budget request for the special engineering program are summarized below.

SPECIAL ENGINEERING PROGRAM
(Dollars in Thousands)

	<u>Salary Competition</u>	<u>Additional Faculty & Staff</u>	<u>Equipment</u>	<u>Total</u>
Chicago	\$100.0	\$1,125.0	\$150.0	\$1,375.0
Urbana-Champaign	<u>400.0</u>	<u>1,875.0</u>	<u>350.0</u>	<u>2,625.0</u>
TOTAL	\$500.0	\$3,000.0	\$500.0	\$4,000.0

EQUIPMENT REPLACEMENT

EQUIPMENT REPLACEMENT
(\$2,000,000)

For several years the University has been seriously concerned with its inability to provide up-to-date instructional equipment. A large portion of the existing equipment base has become obsolete due to normal deterioration, and rapid technological change has accelerated the obsolescence of much of the equipment which supports teaching and research activities.

The problem of obsolete equipment affects the entire university. Disciplines on both campuses are encountering shortages of state-of-the-art technology for instructional activities. Lack of video equipment, computer terminals, microcomputers and current software are causing problems in student access and, more importantly without hands-on experience students will be at a distinct disadvantage in the job market.

Difficulty in funding requests for equipment has affected both campuses. Examples of equipment deficiencies include the need to equip two new laboratories at the Chicago campus, one in Education for elementary and secondary science education and, the second in Health, Physical Education and Recreation for coronary stress and cardiac rehabilitation. Both laboratories will contribute to the enhancement of education for University of Illinois' students preparing for careers as teachers and therapists.

The need to replace outdated and obsolete medical equipment has become particularly acute. Both Dentistry and Anatomy need substantial funding (approximately \$1.0 million is required over a four year period) to replace outmoded and deteriorating dental units and cadaver tanks.

The Urbana-Champaign campus is also experiencing equipment funding shortfalls, both large and small. Ranging from a new telescope in Astronomy to new musical instruments in Fine and Applied Arts, a vast array of equipment must be purchased to assist instructional activities. For example, the Music Department has approximately three hundred pianos and funds to replace only one on an annual basis. The Colleges of Liberal Arts and Sciences was able to fund one-half of their FY 1985 equipment requests, thus compounding the problems to be faced in FY 1986.

The problem of teaching and research equipment obsolescence which faces the University of Illinois and other major research universities is

increasing, particularly as Federal funds for equipment purchases have failed to keep pace with inflation. Recently, in a National Science Foundation survey of 43 major research universities, including the University of Illinois at Urbana-Champaign, 26% of the academic research equipment was classified as obsolete and no longer being used for research. As technological advances in equipment design have vastly expanded the depth and range of scientific inquiry, much scientific equipment has become controlled by, or linked directly to, computers, allowing experimental results to be identified and measured with a precision and speed previously not possible. This advance in equipment technology has had two important ramifications. First, the useful life of the most advanced equipment has shortened, and second, in some cases, the cost of necessary operation and maintenance for certain equipment has increased dramatically.

It should be noted that as the inability to replace obsolete equipment grows, it has a direct effect upon the recruitment and retention of faculty members for whom up-to-date equipment is an integral part of their teaching. Poor research equipment hampers researchers in making valuable contributions and undermines their capacity to generate grants. There have been instances in which top faculty members have been recruited away from the University, not only with offers of substantial salary increases, but with additional offers for establishing and equipping new research laboratories.

The estimated value of obsolete equipment exceeds available equipment funds by approximately \$10.0 million. Incremental State appropriations in FY 1980, FY 1981, FY 1984 and FY 1985 have helped to begin to ease the University's basic equipment replacement problem. However, the cumulative deficiency continues, and it poses an ever greater threat to program quality and faculty development. It is estimated that continued incremental allocations of \$2.0 million will be required for approximately four years to bring the University equipment base to an adequate level.

SPECIAL SERVICES/SPECIAL FUNDING COMPONENTS

SPECIAL SERVICES/FUNDING COMPONENTS

Budget requests for essential services provided by the University of Illinois are summarized in this section. These services are outside the University's core function of instruction. As such, the resource requirements of these services should not compete for educational funding. The FY 1986 request for funds to support these activities total \$1,110,000. The specific programs requested in this section are outlined in Table 15.

Included in the special services request are County Board Matching Funds, Veterinary Medicine Diagnostic Laboratory, Cooperative Extension Service, and Fire Service Institute. The Cooperative Extension Service request consists of two distinct programs, Soil and Water Conservation, and Economic Development in Illinois, which share the same commitment to improving the State's economy and quality of life.

The Division of Services for Crippled Children anticipates a sufficient increase in Federal funds for FY 1986 to achieve service levels comparable to those in place prior to the FY 1983 cutbacks. As a result, the FY 1986 budget request for Special Services programs does not include a deficiency-driven supplement for DSCC.

TABLE 15
FY 1986 SPECIAL SERVICES/FUNDING REQUESTS
(Dollars in Thousands)

A. County Board Matching Funds	\$ 300.0
B. Veterinary Medicine Diagnostic Laboratory	300.0
C. Cooperative Extension Programs	475.0
Soil and Water Conservation	(\$280.0)
Economic Development for Illinois	(195.0)
D. Fire Service Institute	<u>35.0</u>
Total	\$1,110.0

COUNTY BOARD MATCHING
(\$300,000)

Under the County Cooperative Extension Law, which was amended by the General Assembly in 1979, the State, through the University of Illinois, is required to provide appropriations from the Agricultural Premium Fund (APF) to match allocations from county sources in support of county Extension work. The state money supplements county funds, and the law provides for a matching rate of 50/50.

County or multi-county Extension councils are established according to guidelines approved by the University of Illinois Board of Trustees. The councils submit budgets to the appropriate county governing board. The county executive councils forward proposed county or multi-county budgets to the Director of the University of Illinois Cooperative Extension Service for review and approval. Local funds are paid to the University of Illinois to be held in county trust accounts and are used with the APF matching funds in a manner consistent with the approved budgets. Trust funds are used to pay local costs, such as rent, utilities, some salaries, program materials, and local travel of the more than 100 county Extension offices.

The State Agricultural Premium Fund (APF) allocations for the fiscal years 1979-1984 and the requested allocations for fiscal years 1985 and 1986 are shown in Table 16. The increase in the APF state matching fund allocations for fiscal years 1979-1984 is provided for in the County Cooperative Extension Law (1963, as amended in 1979).

Incremental funds for FY 1986 are requested in the amount of \$300,000 to comply with the 50% matching requirement of the amended state law. The requested increase will permit the matching of anticipated revenues to be received from the counties. Note that the University may only match the funds actually received up to the limit appropriated by the State. Should local allocations to the trust accounts not reach the anticipated levels, the University may receive no more than an amount sufficient to match the funding level actually received from the counties.

TABLE 16
AGRICULTURAL PREMIUM FUND
COUNTY BOARD MATCHING

<u>Year</u>	<u>County Sources</u>	<u>APF State Match</u>	<u>Change in APF Allocations</u>	<u>Total Budget¹</u>
1978-79	\$2,351,400 (75%)	\$ 783,800 (25%)		\$ 3,135,200
1979-80	2,539,500 (70%)	1,088,300 (30%)	\$304,500	3,627,800
1980-81	2,546,700 (65%)	1,371,300 (35%)	283,000	3,918,000
1981-82	2,550,000 (60%)	1,700,000 (40%)	328,700	4,250,000
1982-83	2,600,000 (55%)	2,127,300 (45%)	427,300	4,727,300
1983-84	2,800,000 (50%)	2,800,000 (50%)	672,700	5,600,000
1984-85	3,090,000 (50%)	3,090,000 (50%)	290,000	6,180,000
1985-86	3,390,000 (50%)	3,390,000 (50%)	300,000	6,780,000

¹Numbers reflect agreed upon budgets for counties and budgeted APF County Board Match funds. Amounts actually received from the counties were more than budgeted in some years. The APF County Board Match figures, on the other hand, represent the maximum received in any year.

VETERINARY MEDICINE DIAGNOSTIC LABORATORY
(\$300,000)

The Veterinary Medicine Diagnostic Laboratory, located within the College of Veterinary Medicine, provides diagnostic services for the identification, control, and prevention of diseases, toxicosis, and other conditions affecting the livestock industries of Illinois. The Diagnostic Laboratory handles approximately one-third of the diagnostic case load in the State. It is the only laboratory in the State that is capable of conducting field investigations of specific diseases, a feature that is crucial in quickly limiting disease losses, and resultant economic hardship, for individual livestock owners. Personnel in this laboratory also conduct research which can lead to the development of new diagnostic tests and the improvement of existing tests. Both the cost of diagnostic services and the number of clients served have increased substantially in recent years.

Major studies of diagnostic services in Illinois were carried out by committees from the Illinois Department of Agriculture and the Illinois State Veterinary Medical Association with input from all of the major animal commodity groups. These studies indicated that the Diagnostic Laboratory would require a budget increase of approximately \$600,000 if it were to function as a full service laboratory. Comparable laboratories at peer institutions have support levels that far exceed the FY 1984 budget (\$353,900) of the College's Diagnostic Laboratory:

University of California-Davis	\$ 1,424,697
Michigan State University	930,190
Cornell University	815,000
University of Minnesota	1,051,624
University of Georgia	1,319,836
Iowa State University	1,010,755
Oklahoma State University	1,102,630

The Illinois Department of Agriculture (IDA) has agreed to provide one-half of the requested support by increasing the annual contract provided to the College. The IDA is providing an increase of \$300,000 annually starting in FY 1985 and expects the University to expand its share of the support in equivalent manner. The Illinois Department of Agriculture is generating

the extra support through the establishment of a fee system in its laboratories, but this system would be unable to provide the total support required. The IDA expects the University to add its component of support to the collaborative program by obtaining an appropriation from Agricultural Premium Funds.

The Veterinary Diagnostic Laboratory accessions by species for FY 1983 are shown below:

	ACCESSIONS ¹	
	NO.	%
Cats	637	6.4 %
Dogs	4,305	43.1
Large Animals ²	4,242	42.4
Poultry	61	.6
Miscellaneous--Fish, Birds	220	2.2
Miscellaneous Animals	309	3.1
Lab Animals	175	1.7
Non-Animal	47	.5
TOTAL	9,996	100.0 %

¹Includes University-owned animals.

²Includes cattle, sheep, horses, swine and goats.

Once full funding is provided, additional services are added, and all State diagnostic laboratories are charging consistent fees, it is expected that the number of accessions will increase significantly.

The studies of the two committees previously mentioned also recommend the establishment of a standing advisory committee for the Diagnostic Laboratory consisting of representatives of the major livestock industries and the veterinary profession. The advisory committee will assist the College in long-range planning for diagnostic services and will be appointed by fall of 1984.

The proposed budget increment for FY 1986 is shown below:

Academic Staff

1.00 FTE Virologist	\$ 29,000
1.00 FTE Toxicologist	40,000
1.00 FTE Chemist	25,000
1.00 FTE Epidemiologist	37,000
1.00 FTE Bacteriologist	20,000
1.00 FTE Pathologist	43,000
1.00 FTE Electron Microscopist	30,000

SOIL AND WATER CONSERVATION
(\$280,000)

This request is the second part of a major proposal to address crucial issues in the area of soil conservation and water quality. The program was initiated in response to needs identified in the Illinois Water Quality Management Plan submitted by the Governor in 1979 to the U.S. Environmental Protection Agency. A request for \$150,000 to support the first phase of this work was funded by the State for FY 1985.

The objective of the program is to conduct research and to provide educational programs that will ensure the efficient production of food to meet present and future needs, while enhancing the quality of surface water flowing from agricultural lands. The Agricultural Experiment Station and the Cooperative Extension Service plan to take the following actions:

1. determine cultural management practices for optimum sustained crop production/crop protection systems for land where excessive erosion now occurs,
2. quantify erosion and sediment transport processes, and
3. conduct educational programs throughout the State of Illinois on subjects related to improving water quality.

The importance of the education and research program to the people of Illinois is illustrated by Illinois Environmental Protection Agency estimates that an average of 181.4 million tons of soil is eroded by water each year in the State. Of this amount, 158 million tons are lost from agricultural land because of sheet or rill erosion. This erosion causes the loss of 8,000 acre-feet of reservoir storage each year which would cost the citizens of the State \$17.7 million annually in terms of dredging, or \$3.1 million annually for the construction of new reservoirs.

There is an urgent need for more research on the mechanics of erosion and the sediment transport processes. Extensive laboratory measurements of soil behavior are required to obtain parameters for development of systems models. Current soil-erosion educational programs offered by the Cooperative Extension Service will be continued and expanded for the transfer of research findings on these matters to agricultural producers and to governmental and regulatory agencies.

The proposed budget for FY 1986 is shown below:

Accademic Staff

Research:

2.00 FTE Assistant Professors	\$ 70,000
1.50 FTE Research Technicians	35,000

Extension:

1.00 FTE Assistant Professor (Agricultural Engineering Specialist)	35,000
2.00 FTE Area Advisers	60,000

Nonacademic Staff

Research and Extension:

3.00 FTE Clerical	36,000
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Expense

Commodities	\$ 30,000
Contractual Services	9,000
Travel	<u>5,000</u>

TOTAL	\$280,000
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ECONOMIC DEVELOPMENT FOR ILLINOIS
(\$195,000)

A significant number of counties in Illinois tend to be economically disadvantaged in terms of basic indicators such as farm income, employment opportunities, adequate housing, educational attainment, and community services and facilities. The challenge for these counties is to find ways to deal with the persistent social and economic problems associated with low income and, at the same time, to deal with growth opportunities that are potentially available to residents, businesses, and local government.

The College of Agriculture at UIUC proposes to expand upon and to improve its economic development services to the people of Illinois. Experience has proven that the most effective way to meet this challenge is to expand the number of area advisers in the Illinois Cooperative Extension Service (CES). An enlarged professional staff assigned by the University to focus full attention on this area of concern has great potential to achieve significant and quantifiable improvements.

The Illinois Cooperative Extension Service currently has a professional staff of 358 county advisers, 150 campus-based faculty and administrators, 26 area advisers, and 31 support personnel dedicated to assistance for the various farm business management associations. The staff conducts educational programming of a problem-solving nature in four program areas--Community Resource Development (CRD), Agriculture and Natural Resources, Home Economics and Family Development, and 4-H and Youth Development. The field staff assigned currently by CES to work full-time in economic development numbers only six people. Insufficient CRD area advisers are available to serve all regions of the State.

The CES campus-based Extension staff prepares educational materials for the county and area staff, conducts direct teaching of clientele, and works in collaboration with researchers on major problems. The county-based staff works with local groups to identify problems, develops educational approaches to the solution of problems, and delivers and evaluates educational programming. A portion of the work of county staff involves individualized instruction. However, county staff members also perform a significant amount of group teaching. County-based staff by definition must be

generalists. However, they are required to command expertise in one or more sub-areas of their disciplines.

The area adviser component of the delivery system brings a needed level of specialization to the field staff, given the complexity of today's society and its problems. Area advisers maintain offices in the regions they serve and provide assistance in their areas of expertise to county staff and to the public. They provide CES with the capability to concentrate on problems that are specific to the various regions of the State.

The Illinois Cooperative Extension Service is prepared to expand its problem-solving educational program in Community Resource Development. CES has both the expertise and the legislative mandate for this work. No other public agency is staffed to meet this educational need. The expanded educational program of CES would address the problems of economic development, small business management, business and industrial development, and improvements in services to local governments. Area advisers will be employed to work with county staff, with state staff, and directly with clientele to develop and to deliver educational problem-solving activities and programs. County extension advisers and extension specialists will cooperate and assist the new staff to accomplish the intended goals. Expanded efforts will be made to cooperate with other agencies and universities so as to avoid duplication and to gain the benefits of cooperative efforts.

A total of \$195,000 is requested to complete the staffing for this expanded program in FY 1986. The State provided \$100,000 in new funds in FY 1984 to begin this work. Expenses such as secretarial assistance, office rent and travel will be covered through reallocations from extant resources within the Illinois Cooperative Extension Service. The proposed staff additions would be housed in regional offices located in Dixon, Jacksonville, Peoria, and Macomb.

The details of the proposed budget for this program are outlined as follows:

Area Advisers

2.00 FTE Business and Industrial Development	\$ 65,000
2.00 FTE Resource Development/Local Government	65,000
2.00 FTE Business Management	<u>65,000</u>
Total	\$195,000

FIRE SERVICE INSTITUTE
(\$35,000)

Beginning in FY 1981 the University of Illinois received a direct appropriation from the Fire Prevention Fund for the operation of the Illinois Fire Service Institute. The monies received from the Fire Prevention Fund are used for three major purposes:

1. To continue the ongoing programs of the Fire Service Institute, formerly operated through contractual arrangements with the State Fire Marshall.
2. To provide adequate teaching and training facilities for the Institute.
3. To permit program growth and improvement.

As detailed in past budget requests, the need for adequate instructional and training facilities is acute. Current facilities are inadequate, office and classroom space is scattered across the Urbana-Champaign campus, and only one training facility, the Fire Tower, exists on the primary instruction site. Thus, after the operating needs of the current instructional programs have been met, the majority of new funds must be used to construct an adequate training facility. A modest amount of new funds have been used for program growth and improvement, with major program development activities to follow, once sufficient facilities exist.

Based upon current revenue projections, growth of approximately 7.6% is projected for the Fire Prevention Fund for FY 1986, raising the total in the Fund to \$7,538,000. The University of Illinois share of this amount (1/8) would be approximately \$942,250. The FY 1985 appropriation is expected to be \$903,900; resulting in a total increment of \$38,350 available for FY 1986.

Of this amount, approximately \$3,350 would be required to fund growth in Retirement funding, leaving \$35,000 available for salary and price increases. In view of the continuing top-priority need to secure adequate instructional and training facilities, it is expected that any funds not required for base salary and price increases will be added to the approximately \$320,000 currently available for facilities acquisition.

RETIREMENT

The level of funding of the State Universities Retirement System has been a source of significant concern during the past several years. As a result of legislation passed in 1967, annual appropriations for the system are required to cover the projected costs of future benefits plus interest on the existing unfunded liability. This statutory level of funding has never been reached and, in effect, part of the retirement costs of current employees has been shifted to future years.

There was, however, some movement towards an improved level of retirement funding from fiscal years 1979 through 1981. In each of those years the state's contribution was at or above the gross payout level of funding. At that level, the state's contribution covers all of that year's benefits and administrative expenses. The system is then able to add the employee contributions and interest and dividend income to the system's assets to provide future benefits.

The improved funding was, unfortunately, shortlived. As the State's economy worsened, so did the funding for the Retirement System. In FY 1982 through FY 1985 funding dropped significantly below the gross payout level. While these reductions are seen as necessary to prevent disastrous cuts in operating funds, it must be remembered that the State is borrowing against the future. Eventually the State will have to make up for those cuts; the longer it waits to met these obligations, the more it will cost and the greater the impact will be on the operating budget of the University.

It is a matter of long-standing policy of the Board of Trustees of the University of Illinois that the request for incremental funds for Retirement be set at the amount needed to achieve the statutory funding level. The University's FY 1984 Retirement appropriation is \$32,557,500. Based on data from SURS, the statutory level for FY 1983 is \$97,960,400. Therefore, an increment of \$65,402,900 is requested.

Bases and Calculations for
FY 1986 Continuing Components Increases
(Dollars in Thousands)

I. Salary/Compensation Improvement

- A. FY 1984 Personal Services Base: \$330,951.6
B. FY 1984 Annualization : 3,827.6
C. FY 1985 Personal Services Base: 354,381.2
D. Calculation for FY 1986 Increment
1. Annualization of FY 1985 Increases (6%)
 $(\text{FY 1984 Base} + \text{Annualization}) \times .95 \times .06 \times 2/12 =$
 $(\$330,951.6 + \$3,827.6) \times .95 \times .06 \times 2/12 = \$ 3,180.4$
2. FY 1986 Increase (8%)
 $(\text{FY 1985 Base} + \text{Annualization}) \times .95 \times .08 \times 10/12 =$
 $(\$354,381.2 + \$3,180.4) \times .95 \times .08 \times 10/12 = \$22,645.6$
3. Total Request (1 + 2) = \$25,826.0

II. General Price Increase

- A. FY 1985 Base: \$57,455.8
B. FY 1986 Percentage Increase: 8%
C. Calculation: $\$57,455.8 \times .08 = \$4,596.5$
D. Note: The General Price Increase Base includes the following objects of expenditure: Contractual Services; Travel; Commodities; Operation of Auto Equipment; Awards and Grants; Equipment; Hospital and Medical Services and Appliances; CES Expense. Funds for utilities and for library acquisitions are excluded.

III. Utilities Price Increases

- A. FY 1985 Base: \$39,696.9
B. FY 1986 Percentage Increase: 9%
C. Calculation: $\$39,696.9 \times .09 = \$3,572.7$

IV. Library Price Increases

- A. FY 1985 Base: \$6,214.4
B. FY 1986 Percentage Increase: 15% 7%
C. Calculation: $\$6,214.4 \times .15 = \932.2

$6214.4 \times .07 = 435.0$

$1586 = 6649.4 \times .07 =$

480.0

465.5

FY 1986 BASE 6,649.4

*Call Dale Monticelli
for acquisition
base for
FY 1986*

PHYSICAL FACILITIES RENEWAL

Even in a period of relatively stable enrollment, the University of Illinois has major requirements for a recurring program of planned maintenance and remodeling designed to preserve its major academic facilities. The success of controlling the maintenance of the enormous complex of academic and medical buildings which compose the University of Illinois (January 1984 replacement cost - \$2.2 billion) depends on the availability of sufficient financial resources to conduct inspections, effect minor repairs, and, most importantly, to schedule maintenance work that will prevent facility deterioration.

While funding of an adequate magnitude is of major import, it is equally critical to assure some level of support on a regular, recurring basis. With that assurance, plans can be developed and implemented, potential problems can be anticipated and addressed before the crisis stage emerges, and, if necessary, additional sources of funding can be sought. Without the assurance of regular and continuing funding for building remodeling and renovation, planning efforts lead only to the identification of problems, with limited opportunity to implement solutions.

Unfortunately, the University has not received a satisfactory level of funding to maintain its buildings and their supporting systems adequately. The absence of satisfactory funding has caused the postponement, or deferral, of basic maintenance activities. Inevitably, the effect of deferred maintenance practices is the accumulation of a substantial inventory of repair and remodeling needs, many of which become major remodeling projects rather than minor renovation efforts due to delay. Of equal concern, the lack of adequate facility renovation funds has been a major deterrent to a wide range of academic program development initiatives as well. Teaching and research laboratories in engineering, the physical and biological sciences, and many social sciences areas have become seriously deficient because they are outmoded and obsolete. Program development in such areas as commerce and business administration plus many areas of the arts and sciences which provide basic instruction to virtually all academic areas has

lagged behind the enrollment-driven need for expansion or reconfiguration of existing space.

The University has relied upon the Capital Budget as the principal source of support for facility remodeling and renovation needs. That source simply has been inadequate both in the amount of funds it has provided and in the regularity with which very limited funding has been available. The time has come, therefore, to secure a dependable, recurring source of support to meet faculty renovation and remodeling requirements through an appropriation in the operating budget.

The effects of a decade and a half of insufficient operations and maintenance funding are evident in the condition of the University facilities. The operations and maintenance division of the respective campuses have identified a series of projects resulting from deferred maintenance practices that exceeds \$130 million; while it is comprehensive in scope, it does not represent a full and complete record of all deferred needs. Examples of these projects are shown in Table 1.

In addition and equally critical are renovation needs related to academic program requirements. Primarily, the University must realign existing space to address curricular changes among and within a variety of disciplines. One examples of campus-wide remodeling required to support emerging instruction trends focuses on the installation of computer terminal work stations in almost every major academic facility to support computer-assisted education and research and the development of audio-visual presentation capabilities in central campus classrooms and lecture halls. Further examples of specific programmatic renewal projects are presented in Table 2.

The examples in Tables 1 and 2 describe major renovation and refurbishment needs. The central point, however, is not the total amount of work to be done but the almost overwhelming requirement to secure a recurring amount of funds which will be available on an annual basis to permit the planning and sequencing of remodeling work in a timely and orderly fashion. Indeed, even if the University's total remodeling needs were identified and an appropriation secured to meet that total need, not all of the space which needs to be upgraded or reconfigured could be taken out of service at the same time. Remodeling activities will need to be phased over a multi-year period; some projects will be small enough to accomplish in a matter of a few months, others will need to be phased into more than one year. The most

important objective to be met is to secure an annual appropriation to meet these needs on a recurring basis. If the Space Realignment, Renewal and Replacement formula implemented by the Illinois Board of Higher Education were followed, the University of Illinois would generate \$14.8 million. A program of this magnitude would require a statewide effort of between \$30 and \$40 million for all Illinois universities. Regardless of the ultimate magnitude of the program, it is critical that the effort begin in FY 1986.

TABLE 1
EXAMPLES OF DEFERRED MAINTENANCE PROJECTS

<u>PROBLEM</u>	<u>RESPONSE</u>	<u>COST</u>	<u>IMPACT</u>
<u>Chicago</u>			
The exhaust air provided for many of the fume hoods in the Science and Engineering South Building is below the recommended safety standard set by the Office of Environmental Health and Safety.	Replace 66 fume hood motors and V-belt drives and replace three complete exhaust fans including all necessary sheet metal and electrical modifications.	\$ 293,200	Lack of sufficient exhaust air pressure could result in the accumulation of air-borne toxic particles in instructional and research laboratories, posing a threat to both occupants and experiments.
The administrative computer center for the University of Illinois is served by a single transformer. Transformer failure could seriously disable University operations for an extended period of time.	Install a second transformer and switch gear that will serve the facility in the event of any malfunction by the existing transformer.	\$ 630,000	Transformer failure would result in the indefinite suspension of all University administrative activities which rely on computer support to manage sophisticated data bases, such as, payroll records or hospital billings.
The present emergency 400 KW generator at the Clinical Sciences Building is inoperative and the 175 KW generator at the General Hospital is insufficient.	Replace the isolated emergency generator at seven Health Sciences Center buildings with a single 1,500 KW generator located at the Steam Plant.	\$1,403,200	The failure to provide emergency electrical power to Health Sciences Center buildings presents a potentially high risk to health and safety and could result in an enormous loss of research investment.
<u>Urbana-Champaign</u>			
The Law Building air conditioning system has exceeded its useful life. Compressors fail and parts are not available for their replacement. The coils leak and should be replaced, also.	Replace the existing air conditioning system in the Law Building.	\$ 625,000	If this system is not replaced soon, the building will be without air conditioning, jeopardizing the effectiveness of the entire instructional program.
Electrical energy to most of the Urbana-Champaign campus is distributed over 15 KV cables in duct runs. In certain areas of the campus, these cables are prone to failure due to electrolytic corrosion, resulting from waste seepage.	Replace the existing cables with cables that are immune to corrosion of this type.	\$ 760,000	Since 1975 there have been eleven unscheduled outages due to cable failure, causing serious disruption to instructional and research activities. This problem will continue until the cables have been replaced.
Insulation containing asbestos fibers has been identified in numerous campus buildings. In some buildings the ends of the insulation have become frayed and the jackets are broken and can allow insulation particles to enter the breathable air stream. Temporary repairs can be effective for a short duration only.	Each damaged area should be repaired permanently or replaced to meet the requirements of the Environmental Health and Safety Division and the Occupational Health and Safety Act.	\$ 300,000	If this work is not undertaken in the near future, a potential health risk to students and staff could result.

TABLE 2
EXAMPLES OF PROGRAMMATIC RENEWAL PROJECTS

<u>PROBLEM</u>	<u>RESPONSE</u>	<u>COST</u>	<u>IMPACT</u>
<p><u>Chicago</u></p> <p>Room 200 of the Pharmacy Building is a large instructional laboratory (6,600 ASF) designed to train dispensing pharmacists. Recent curriculum changes emphasize the instruction of clinical pharmacists in small groups. Therefore, the usefulness of Room 200 as a pharmaceutical instructional laboratory is limited.</p> <p>The Clinical Sciences Building (CSB) contains nearly 90,000 ASF of former patient-use space which could be remodeled into modern laboratory and research space to meet critical needs for the College of Medicine, whose units are scattered in several locations across the campus, many in space that is unusable for current research activities. Basic building system work can be accomplished through capital budget funds already appropriated. Program remodeling can then be phased over a several-year period. As examples:</p> <p>Medical Oncology is in the very early stages of development both as a clinical subspecialty and as an area of research. Both laboratory and office space is required for faculty in this emerging area of study. Existing faculty are located in separate buildings in areas with no options for expansion.</p> <p>The section of Rheumatology, begun four years ago, has already received research support from the National Institute of Health and the Arthritis Foundation, while providing clinical training on campus, as well as at Cook County and the West Side Veteran's Hospitals. Further expansion, as well as coordination of the existing program, is severely hampered by the lack of permanent facilities and the scattered location of section faculty in several locations.</p>	<p>Realign space in Room 200 to create a variety of model pharmacies which can be used by students to simulate conditions that they will encounter as practicing pharmacists.</p> <p>Remodel 2,772 ASF of space on floor 7N of the CSB to provide three laboratories and four faculty offices.</p> <p>Remodel 2,100 ASF on floor 11E of the CSB to provide three laboratories, a small conference room, a work room, and four faculty offices.</p>	<p>\$ 293,200</p> <p>\$ 370,800</p> <p>\$ 295,500</p>	<p>Failure to remodel Room 200 as model pharmacies will continue the College of Pharmacy deficit in modern instructional laboratories. Further, without funds to remodel this limited use laboratory, the College may forfeit the opportunity to receive approximately \$600,000 of private contributions to support and equip this area.</p> <p>This new space, a full wing in the CSB, will provide contiguous laboratory and office space for the four faculty and four fellows presently on staff in Medical Oncology and will permit expansion of both clinical and research activities in this emerging area of study.</p> <p>Program expansion can continue, with fellowship support already available from the Arthritis Foundation, while maintaining close ties with the research element of the program.</p>

TABLE 2 (Continued)
EXAMPLES OF PROGRAMMATIC RENEWAL PROJECTS

<u>PROBLEM</u>	<u>RESPONSE</u>	<u>COST</u>	<u>IMPACT</u>
The UIC Physics Department has developed two substantial research efforts: the Excimer Laser Program, which aims at the development of a soft x-ray laser, and the Microphysics Program. Both programs are steadily growing and require additional research space to continue to prosper.	Reconfigure space in Room 1250 Science and Engineering South (a three story high bay area) to create three floors of physics laboratory space.	\$ 330,000	Maximizing the utilization of space in the Science and Engineering South Building will provide the Department of Physics with adequate space to continue its research in high technology areas. Also, additional research space (approximately 12,000 ASF) will be garnered for campus use without the need to acquire or construct a new facility.
Through the efforts of a small number of faculty, the University of Illinois at Chicago has become a nationally recognized Institution in the field of electronic visualization - the art and science of electronic imagery. The marginal space in which this work has occurred is no longer suitable for this expanding program.	Remodel 2,100 ASF of the fourth floor of the Peoria Street Building to house 10 electronic work stations in an instructional/research laboratory. Modifications to the electrical service, including lighting, must be made, also.	\$ 200,000	Development of this modest laboratory will allow the Chicago campus to continue its preeminence in this emerging field. Work conducted here could result in developments in interactive educational media, industrial design, graphic design, computer simulation in film, and personal expressive art.
<u>Urbana-Champaign</u>			
The fourth floor space in the Main Library is not appropriately configured for use by the departmental libraries which are housed there currently. Also, the cellulose wall board used for partitioning does not meet present fire codes.	Relocate the departmental libraries from the fourth floor to larger open areas on the second floor which are occupied by library processing and technical personnel.	\$ 750,000	Departmental libraries will be housed in space which will suit their use and library personnel can operate in a less congested and noisy environment, thus enhancing their productivity.
At the present time it is impossible to meet student demand for courses in cinematography/ photography due to the lack of studio and laboratory space.	Remodel space in the Fine Arts Building to create a Cinematography Shooting Studio and several small dark rooms. Heating and ventilation changes are needed.	\$ 375,000	The provision of additional space will be sufficient to meet student demand for cinematography/photography courses.
Modifications to mechanical engineering curricula during the past 35 years are not reflected in the type of space available in the Mechanical Engineering Building. Current instruction concerning robotics in the manufacturing process cannot be conducted properly in shops designed immediately following World War II.	Convert former shop space into robotics systems laboratories with state-of-the-art computer support. Capture space in the former Internal Combustion Engine Laboratory for use as a mechanical design laboratory.	\$3,500,000	The remodeling of out-of-date laboratories in an existing building for contemporary engineering instruction is a cost effective method for revitalizing the campus' investment in engineering facilities.

TABLE 2 (Continued)
EXAMPLES OF PROGRAMMATIC RENEWAL PROJECTS

<u>PROBLEM</u>	<u>RESPONSE</u>	<u>COST</u>	<u>IMPACT</u>
The School of Life Sciences has been in inadequate space for a decade and presently has a shortage of 65,000 ASF of instructional and research space. Existing laboratories are outmoded and obsolete. Severe facility needs have hampered the development of the School since its inception, and correction of those space needs is the top priority of the School's new director.	The Urbana campus' top-priority project for the FY 1986 Capital Budget, remodeling the former Veterinary Medicine Basic Sciences Building, will provide new space for the Department of Geology. Geology's move will vacate approximately 38,900 ASF in the Natural History Building, which can be made available to the School of Life Sciences.	\$2,000,000 over approx. two years	Severe overcrowding of instructional activities will be eased. Research laboratory space can be brought up to current standards, permitting major new initiatives in life sciences research.
The annual enrollment growth rate of the College of Commerce has been substantial since the Fall of 1970. In response to this growth and recommendations by accrediting agencies, the College has hired additional faculty and plans to hire further staff. The College is constrained from implementing their hiring plans due to an insufficient amount of office space.	Remodel a 1,600 ASF area of the south end of the second floor of David Kinley Hall into offices for seven to nine faculty and staff members.	\$ 152,500	The assignment of newly created office space to the College of Commerce, located in one of its central instructional facilities, will allow the College to recruit sufficient staff to meet student demand appropriately.

FISCAL YEAR 1986 CAPITAL BUDGET REQUEST

UNIVERSITY OF ILLINOIS CAPITAL BUDGET REQUEST
FY 1986

Introduction

In recent years the State of Illinois has conducted a capital improvements program that emphasizes limiting the State's overall bonded indebtedness while also completing two major State office buildings and constructing or remodeling several correctional facilities. Pursuit of these objectives has seriously limited the availability of capital funding for higher education projects since FY 1981.

During this time the University of Illinois, like other Illinois higher education systems, received minimal support for capital projects from State sources, exacerbating the mounting capital needs at both campuses. Examples of the critical campus needs include: the identification of over \$60 million of new construction and remodeling required for engineering facilities at the Urbana-Champaign campus; several major buildings at the Health Sciences Center, which are 40 or 50 years old, need substantial remodeling of mechanical systems and realignment of space to meet the demands of modern clinical instruction and research; and the College of Engineering and several physical science departments at the Chicago campus have a severe deficiency of research laboratory space

In addition to renovations required to address programmatic needs, nearly all of the University's facilities suffer from the effects of a decade of funding deficiencies in operations and maintenance. The forced deferral of maintenance projects has led inevitably to failures in roofs, mechanical systems, and masonry. Evidence of the negative impact of deferred maintenance can be seen in the minor remodeling capital priority list, which includes repair projects which could have been avoided if sufficient funding had been available to maintain facilities properly. However, even

If sufficient funding is available for proper maintenance, building systems will require attention eventually due to age and high level of utilization. Nearly 40% of the non-residential space on the Urbana-Champaign campus is over 50 years old. Renovations must be made to these structures if they are to continue their usefulness. Although a portion of the Chicago campus is less severely affected by the problems associated with

aged facilities, the demands for increasing utilities support for modern, technologically-based health care has rapidly decreased the useful life of Health Sciences Center facilities. The University Center presents a unique rehabilitation problem resulting from the compressed period of time in which the majority of campus buildings were constructed. For example, roofing system failures in institutional style buildings occur at approximately twenty year intervals. All major facilities at the University Center were built within a seven year period of time and, it is possible that significant roofing problems at a number of major buildings could develop within a limited time span, not to mention the need for many other repairs required by twenty years of building occupancy.

Most damaging of all, the absence of adequate remodeling and repair funds has made it nearly impossible to reconfigure existing space to meet new instructional and research requirements as the pace of change accelerates in state-of-the art advances in new knowledge throughout the University. Teaching and research laboratories which were adequate ten or twenty years ago have been made obsolete two or three times over. Their inadequacy diminishes the instruction students receive, deters new faculty from coming to the University, and in some instances causes faculty to look to other institutions to meet their research and teaching needs.

Without substantial financial assistance from the State to address these compounding capital problems, the University has turned to small scale alternate funding sources partially to support the most pressing immediate capital improvement needs. To finance minor scale, but extremely important, programmatic remodeling, the University initiated two remodeling efforts in FY 1984 with operating budget funds. The first program, Renovation for Excellence, provided approximately \$2.2 million to rehabilitate research space for faculty in several disciplines who are among the University's most productive scholars and researchers. These funds have been used to remodel laboratory and office space which will support teaching and research in such areas as physics, biophysics, photosynthesis, genetics, and the humanities. A second, smaller effort associated with the Engineering Revitalization

program has provided the Colleges of Engineering with funds to renew a portion of their facilities. FY 1984 funds were primarily used to complete the first phase of remodeling Newmark Laboratory at Urbana-Champaign for the Department of Civil Engineering and to reconfigure Electrical Engineering laboratory space in Chicago. The funds for both programs are recurring appropriations which will continue to be allocated to similar remodeling activities barring drastic financial difficulties elsewhere within the overall budget.

Private gifts have also supported the University's capital program in recent years. Gift funds have financed the construction of the Swanlund Administration Building, the Lions' Eye Research Facility and the Auditorium Rehabilitation. Most recently funds were received to construct an addition to the Krannert Art Museum. Private funding has not been readily available, however, to meet construction and remodeling needs associated with general purpose instruction and research facilities.

In an area over which the University has more direct control, the University has maintained a vigorous annual remodeling and renewal program for its auxiliary services facilities to help insure their longevity and meet formal commitments to bond holders. Facilities which house auxiliary services derive funds from a recurring capital development reserve on a formula basis within their operating budgets which is used to conduct remodeling and renovation in their buildings. Approximately \$3.5 million has been budgeted for this purpose in FY 1985.

Although the University has already sought other sources of support to supplement a deficient capital budget, a more substantial effort is absolutely essential if academic facilities are to adequately serve the teaching and research activities which are carried on in them. The time has come to secure a recurring source of support in the operating budget to address space remodeling and renovation needs, and such a program is proposed elsewhere in this budget request. If such a program--adequately funded, were in place, the capital budget could be devoted to major remodeling projects (in which an entire building were involved) and to new construction needs. Since such a program is not now in place, the FY 1986 capital budget request includes remodeling and renovation projects, along with high priority large-scale remodeling and new construction efforts.

FY 1986 Capital Budget Request

The University's FY 1986 Capital Budget Request is comprised of three major segments: (1) Regular, (2) Energy Conservation, and (3) Food for Century III. The Regular segment of the request includes remodeling, renovation and construction projects necessary to support the University's ongoing programmatic activities. The Energy Conservation/Fuel Conversion segment represents a special effort initiated in FY 1981 to help control spiraling energy costs through retrofit improvements to the building and mechanical systems. The third segment of the request consists of those projects considered essential to complete the Food for Century III Program. The total request for the three major budget segments in FY 1986 is \$50,783,600.

This section of the document presents a description of the Regular segment of the FY 1986 Capital Budget Request. The Energy Conservation segment is presented in a separate section immediately following the Regular request material, and a third section describes the University's FY 1986 Food for Century III Program.

Each project in the request has been reviewed by the campus and University administration and integrated into a set of University capital budget priorities for Regular Capital, Energy Conservation, and Food for Century III. The priority list is an assessment of the relative need for each project as compared to other capital projects. In addition, the priority list reflects a level of funding which meets the University's highest priority needs and is realistic and defensible when compared to other pressing State needs.

Emphasis of the FY 1986 Regular Capital Budget Request

Table 1 presents a summary of the proposed projects for FY 1986 in priority order. The first priority project entails the installation of an air conditioning and ventilation system in the Pharmacy Building at the Chicago campus. Currently, the building suffers from extreme fluctuations in temperatures, with temperatures often reaching 90° or higher, and the

introduction of noxious and toxic fumes exhausted from laboratories into other areas of the building. In addition to the installation of chillers, chilled water risers, and necessary piping, the existing ventilation system will be upgraded by installing additional air handling and distribution equipment.

For the Urbana-Champaign campus the highest priority capital project is the remodeling of the former Veterinary Medicine Building for occupancy by the Department of Geology and the Institute for Environmental Studies. Approximately one-quarter of a million dollars of campus funds will be expended in FY 1985 for project planning. The FY 1986 request will fund construction activities such as the upgrading of building systems, remodeling laboratories for geological and environmental research, and minor repairs designed to insure the building's continued utilization. An equipment request supporting this project will be made for FY 1987.

The majority of projects included in the FY 1986 Capital Budget Request, as in recent years, continue to be major remodeling projects. These projects seek to renovate existing campus buildings in order to address programmatic and structural needs. Major remodeling projects at the Chicago campus include: planning and remodeling of the University Center Library and relocating the Office of Admissions and Records which currently occupies library space; upgrading electrical service to the Roosevelt Road Building, which houses the University's administrative computer; remodeling the Clinical Sciences Building; the installation of a central air conditioning system and a power distribution system for the 1919 West Taylor Street Building; and a significant remodeling of Chemistry Department space in the Science and Engineering Laboratory. At the Urbana-Champaign campus the major remodeling projects include: the third phase of the multiphased remodeling of the English Building; renovating laboratory space in the Mechanical Engineering Building; providing laboratory space for computer assisted research; and conducting structural renovations in Noyes Laboratory which is used by the School of Chemical Sciences. The request also includes the development of two new buildings at the Urbana-Champaign

campus: planning for the construction of an addition to the Digital Computer Laboratory and erection of the Pilot Training Facility to replace deteriorated quonset huts dating from World War II. In addition to renovating buildings and limited new construction, the University has requested two projects for the Urbana-Champaign campus that will improve the campus environs. First, the campus must reimburse Champaign County for matching Federal funds to resurface Pennsylvania Avenue from Sixth Street to Burnside Laboratory; and, second, the Huff Gym Fields will be upgraded for instructional and recreational use. Table 2 presents a breakdown of the FY 1986 request by campus and capital budget category.

In accordance with recent budgeting practice, the University will request Space Realignment, Renewal and Replacement packages for each campus for FY 1986. These projects are necessary to preserve the structural integrity of the University's facilities and to meet program related space realignment requirements. The generation of SR³ amounts for each campus is presented in Table 3 and a list of SR³ projects appears in Table 4. Table 5 presents the cost per square foot of each building and major remodeling project requested for FY 1986. Table 6 shows the future implications of the FY 1986 request.

Status of Ongoing Projects

Table 7 provides a summary of actions on capital budget requests from FY 1981 to FY 1985. The University's capital appropriation (new projects) for FY 1985, excluding Food for Century III, totals \$5,136,500.

The projects included in the FY 1985 regular capital appropriation are:

Chicago

Library Improvements Planning	\$ 324,500
Pharmacy Building Air Conditioning Planning	433,200

Urbana-Champaign

Microelectronics Center Remodeling	3,500,000
Animal Sciences Laboratory Chilled Water Line	354,600
Roof Replacements	524,200

University Total	\$5,136,500
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Table 8 shows the construction or funding status of each University capital appropriation from FY 1982 to FY 1984. At this date only two capital projects are awaiting the release of funds from the Governor. These FY 1982 Chicago campus projects are Lecture Center Lighting Modifications (\$113,000) and construction funds for the vertical utility system for the former Hospital Addition (\$1,160,000).

TABLE 1
UNIVERSITY OF ILLINOIS
FY 1986 CAPITAL REQUEST
PRIORITY LIST
(Dollars in Thousands)

Priority	Campus	Project	Category	FY 1986 Request	Cumulative Cost		
					University	Chicago	Urbana
1	C	Heating, Ventilation and Air Condition - Pharmacy Building	REMD	\$5,218.0	\$ 5,218.0	\$ 5,218.0	
2	C	Library Improvements	REMD/EQUIP	6,494.8	11,712.8	11,712.8	
3	U	Remodel the Former Veterinary Medicine Building for the Sciences	REMD	5,000.0	16,712.8		\$ 5,000.0
4	U	Computer Laboratory Addition	PLAN	1,100.0	17,812.0		6,100.0
5	U	English Building Remodeling	REMD	3,040.0	20,852.8		9,140.0
6	U	Life Sciences Laboratory Addition	BLDG	743.2	21,596.0		9,883.2
7	U	Mechanical Engineering Building Remodeling	PLAN	265.0	21,861.0		10,148.2
8	C	Electrical Upgrade of Administrative Computer Center	REMD	631.7	22,492.7	12,344.5	
9	U	SR ³ -I	REMD	3,429.9	25,922.6		13,578.1
10	U	SR ³ -I Equipment	EQUIP	377.6	26,300.3		13,955.7
11	C	Remodel Clinical Sciences Building	REMD	3,493.0	29,793.2	15,837.5	
12	U	Chemistry Laboratory Remodeling	REMD	634.0	30,427.2		14,589.7
13	C	Associated Health Sciences Remodeling	REMD	2,063.0	32,490.2	17,900.5	
14	U	Pilot Training Facility	BLDG/UTIL	818.3	33,308.5		15,408.0
15	C	SR ³ -I	REMD	2,163.9	35,472.4	20,064.4	
16	U	SR ³ -II	REMD	2,786.5	38,258.9		18,194.5
17	U	SR ³ -II-Equipment	EQUIP	137.0	38,395.9		18,331.5
18	C	Remodel Pharmacy Building (Phase I)	REMD	1,567.0	39,962.9	21,631.4	
19	C	SR ³ -II	REMD	3,267.8	43,230.7	24,899.2	

TABLE 1
UNIVERSITY OF ILLINOIS
FY 1986 CAPITAL REQUEST
PRIORITY LIST
(Dollars In Thousands)
(concluded)

Priority	Campus	Project	Category	FY 1986 Request	Cumulative Cost		
					University	Chicago	Urbana
20	C	Chemistry Department Remodeling - Science and Engineering Laboratories	PLAN	218.8	43,449.5	25,118.0	
21	U	Outdoor Instructional/ Recreation Facilities	SITE	75.0	43,524.5		18,406.5
22	C	SR ³ -III	REMD	924.3	44,448.8	26,042.3	
23	U	Pennsylvania Avenue Street Improvement	SITE	150.0	44,598.8		18,556.5
24	C	Physics High Bay Laboratories - Science and Engineering South	PLAN	211.2	44,810.0	26,253.5	

TABLE 2
SUMMARY OF THE FY 1986 CAPITAL BUDGET REQUEST
BY CAMPUS AND CATEGORY
(Dollars in Thousands)

<u>Category</u>	<u>Chicago</u>	<u>Urbana-Champaign</u>	<u>Total</u>
1. Buildings, Additions, and/or Structures	--	\$ 1,490.5	\$ 1,490.5
2. Land	--	--	--
3. Equipment	\$ 1,293.6	--	1,293.6
3a. SR ³	--	514.6	514.6
4. Utilities	--	71.0	71.0
5. Remodeling	18,173.9	8,674.0	26,847.9
5a. Space Realignment, Renewal and Replacement	6,356.0	6,216.4	12,572.4
6. Site Improvements	--	225.0	225.0
7. Planning	<u>430.0</u>	<u>1,365.0</u>	<u>1,795.0</u>
Total	\$26,253.5	\$18,556.5	\$44,810.0

TABLE 3
GENERATION OF FY 1986 SR³ REQUEST
BY CAMPUS

	<u>Chicago</u>	<u>Urbana-Champaign</u>
1. Estimated Replacement Cost of Facilities January 1984 (Total Unadjusted Replacement Cost)	\$768,438,748	\$1,115,668,050
2. Estimated Replacement Cost of Facilities, January 1986 (Step 1 escalated 6% per year from January 1984 to January 1986)	\$860,651,398	\$1,249,548,216
3. Gross Area (Total GSF, Residential excluded)	7,410,742	11,135,569
4. Average Cost per GSF (Step 2 ÷ Step 3 = \$/GSF)	\$116.14	\$112.21
5. Annual Space Rehabilitation and Remodeling Generation [\$/GSF (Step 4) x .667 (2/3 to be remodeled) x .01 (one time/100 years)]	\$.7747	\$.7484
6. Area of Campus Maintained by Physical Plant with State Funds, Fall 1985 (GSF)	7,014,411	9,302,475
7. Funds Generated by Campus (Step 5 x Step 6)	\$ 5,434,064	\$ 6,961,972
8. Total Funds Including Architect/Engineer Fees and Contingency (Multiply Step 7 by 1.195)	\$ 6,493,706	\$ 8,319,557
	(43.8%)	(56.2%)
	<div style="border-top: 1px solid black; width: 100%; height: 10px; margin-top: 10px;"></div>	
	\$14,813,263 (100.0%)	

TABLE 4
FY 1986
SR³ PROJECTS BY CAMPUS

Urbana-Champaign			Chicago		
SR ³ -I	REMD	EQUIP	SR ³ I	REMD	
Dairy Manufactures Bldg - Remodeling	\$ 610.0	\$ 44.0	Handicapped Accessibility - Phase II & Partial Phase III	\$ 387.9	
David Kinley Hall - Remodeling	140.5	12.0	Fume Hood Corrections - SE South	293.2	
50N & 60 Elect. Engineering - Remodeling	365.0	60.0	Room 200, Pharmacy - Remodeling	485.2	
Visual Arts Lab - Remodeling	254.0	128.6	Code Correction - Peoria St. Bldg. - Phase I	525.7	
Glassblowing Lab - Remodeling	90.0	25.0	Rooms 560-566A CMET - Remodeling	246.8	
Classroom Renovation	161.4	31.0	Upgrade Elect. Power, BRL	119.9	
Animal Room Improvements	124.0	52.0	Rooms 234 & 236 CMWT - Remodeling	105.2	
Library Fourth Floor - Remodeling	200.0	25.0	Total	\$2,163.9	
Digital Computer Lab. A.C.	350.0	--			
Roof Replacements I	500.0	--	SR ³ II		
Morrill & Burrill Hall - Heat Detectors	55.0	--	Exterior Masonry Repairs (Phase III)	\$ 443.9	
Metallurgy & Mining Bldg. Renovation	112.0	--	Remodel Rms. 409 & 409B CMW	60.0	
University High School Improvements	285.0	--	Pedestrian Safety (Phase I)	264.7	
Bevier Hall Fume Hood Rm. 338	40.0	--	Exterior Masonry Repairs (Phase IV)	514.5	
Accessibility Improvements	143.0	--	A/C 2nd & 34d floor, SPH - East	329.0	
Total	\$3,429.9	\$377.6	Remodel Locker Rm. Area for Research & Grad Educ. Seminar Space, Coll. of Nursing	252.5	
			Campus Emergency Power Dist. Network	1,403.2	
SR ³ -II			Total	\$3,267.8	
Elevator Replacement	\$ 180.0	--			
Stair Enclosures - Gregory Hall	427.5	--	SR ³ -III		
Mechanical Engr. Lab - Remodeling	56.0	\$ 25.0	Handicapped Accessibility (Phase III)	\$ 506.8	
David Kinley Hall - Rm. 114	307.0	11.0	Install Campus Security Access Series I	213.5	
Digital Comp. Lab. - Remodeling	50.0	--	Remodel Theater Lobby & Air Cond. Theater Equip. Room	204.0	
Coordinated Science Lab - Remodeling	88.5	--	Total	\$ 924.3	
Commerce West - Remodeling	108.0	12.0			
Fume Hood Improvements	403.0	--	Chicago - SR ³ Total - \$6,356.0		
Huff Hall Basement	319.0	29.0			
Institute of Aviation - Remodeling	56.0	--			
Davenport Hall - Remodeling	296.5	60.0			
Roof Replacements II	495.0	--			
Total	\$2,786.5	\$137.0			
Urbana-Champaign - SR ³ Total	\$6,731.0				

TABLE 5
COST PER SQUARE FOOT OF NEW BUILDING AND MAJOR REMODELING PROJECTS BY CAMPUS

	<u>Project Cost</u>	<u>Gross Square Feet</u>	<u>Assignable Square Feet</u>	<u>Efficiency ASF/GSF</u>	<u>\$/GSF</u>	<u>\$/ASF</u>
Chicago						
Major Remodeling (FY 1986 Request)						
Library Improvements						
OAR Relocation	\$1,149,800	25,500	15,300	.60	\$ 45.09	\$ 75.15
Library Remodeling	4,051,400	53,100	31,850	.60	76.30	124.09
Clinical Sciences Building	3,493,000	33,852	18,200	.54	103.18	191.92
Pharmacy Building	1,567,000	18,875	11,275	.62	83.02	138.98
Urbana-Champaign						
New Buildings						
Pilot Training Facility	747,300	10,200	8,500	.83	73.26	87.91
Major Remodeling						
Former Veterinary Med. Building	5,000,000	81,246	49,445	.61	61.54	101.12
English Building Remodeling	3,040,000	43,270	22,500	.52	70.26	135.11
Life Sciences Laboratory Addition	743,200	6,000	4,100	.68	123.86	181.27

TABLE 6
UNIVERSITY OF ILLINOIS
FY 1986 CAPITAL REQUEST
FUTURE IMPLICATIONS
(Dollars In Thousands)

Priority	Campus	Project	Category	FY 1986 Request	Additional Costs	
					FY 1987 Costs	Cost for FY 1988 and Beyond
1	C	Heating, Ventilation and Air Condition - Pharmacy Building	REMD	\$5,218.0	--	--
2	C	Library Improvements	REMD/EQUIP	6,494.8	--	--
3	U	Remodel the Former Veterinary Medicine Building for the Sciences	REMD	5,000.0	\$ 400.0	--
4	U	Computer Laboratory Addition	PLAN	1,100.0	17,689.9	\$ 900.0
5	U	English Building Remodeling	REMD	3,040.0	--	3,900.0
6	U	Life Sciences Laboratory Addition	BLDG	743.2	75.0	--
7	U	Mechanical Engineering Building Remodeling	PLAN	265.0	2,650.0	--
8	C	Electrical Upgrade of Administrative Computer Center	REMD	631.7	--	1,000.0
9	U	SR ³ -I	REMD	3,429.9	--	--
10	U	SR ³ -I Equipment	EQUIP	377.6	--	--
11	C	Remodel Clinical Sciences Building	REMD	3,493.0	1,513.0	3,780.0
12	U	Chemistry Laboratory Remodeling	REMD	634.0	--	2,101.0
13	C	Associated Health Sciences Remodeling	REMD	2,063.0	--	--
14	U	Pilot Training Facility	BLDG/UTIL	818.3	148.0	--
15	C	SR ³ -I	REMD	2,163.9	--	--
16	U	SR ³ -II	REMD	2,786.5	--	--
17	U	SR ³ -II-Equipment	EQUIP	137.0	--	--
18	C	Remodel Pharmacy Building (Phase I)	REMD	1,567.0	2,240.0	1,672.0
19	C	SR ³ -II	REMD	3,267.8	--	--

TABLE 6
UNIVERSITY OF ILLINOIS
FY 1986 CAPITAL REQUEST
PRIORITY LIST
(Dollars in Thousands)
(concluded)

Priority	Campus	Project	Category	FY 1986 Request	Additional Costs	
					FY 1987 Costs	Cost for FY 1988 and Beyond
20	C	Chemistry Department Remodeling - Science and Engineering Laboratories	PLAN	218.8	1,592.6	1,592.6
21	U	Outdoor Instructional/ Recreation Facilities	SITE	75.0	240.0	1,600.0
22	C	SR ³ -III	REMD	924.3	--	--
23	U	Pennsylvania Avenue Street Improvement	SITE	150.0	--	--
24	C	Physics High Bay Laboratories - Science and Engineering South	PLAN	211.2	<u>3,074.2</u>	<u> </u>
					\$29,622.6	\$16,545.6

TABLE 7
HISTORY OF RECENT CAPITAL BUDGET REQUESTS

	<u>FY 1981</u>	<u>FY 1982</u>	<u>FY 1983</u>	<u>FY 1984</u>	<u>FY 1985</u>
<u>Campus Requests</u>					
Chicago	\$21,536,000	\$ 9,939,200	\$ 7,330,000	\$11,146,900	\$17,775,400
Urbana-Champaign	20,782,400	19,236,400	7,821,100	9,884,600	23,032,100
TOTAL	(\$42,318,400)	(\$29,175,600)	(\$15,151,100)	(\$21,031,500)	(\$40,807,500)
<u>IBHE Recommendations</u>					
Chicago	\$ 7,374,500	\$ 4,286,400	\$ 3,244,900	\$ 4,289,300	\$ 4,255,400
Urbana-Champaign	11,446,900	12,776,900	5,715,200	5,635,500	10,447,500
TOTAL	(\$18,821,400)	(\$17,063,300)	(\$ 8,960,100)	(\$ 9,923,800)	(\$14,702,900)
<u>Appropriation¹</u>					
Chicago	\$ 225,000	\$ 2,072,800	-0-	\$ 660,000	\$ 757,700
Urbana-Champaign	919,000	7,500,000 ²	-0-	350,000	4,378,000
TOTAL	(\$ 1,144,000)	(\$9,572,800)	-0-	(\$ 1,010,000)	(\$ 5,136,500)
<u>Appropriations for Special Projects</u>					
Food Production Research	\$ 4,045,000	\$ 1,000,000	\$ 750,000	\$ 2,254,500	\$11,116,100
Energy Conservation	8,745,800	2,085,700	15,000,000	4,549,200	-0-
TOTAL	(\$12,790,800)	(\$ 3,085,700)	(\$15,750,000)	(\$ 6,803,700)	(\$11,116,100)
<u>Total University of Illinois</u>					
Appropriation	\$13,934,000	\$12,658,500	\$15,750,000	\$ 7,813,700	\$16,254,600

¹Excludes Food Production Research and Energy Conservation.

²Excludes funds which were lapsed because the substitution of moveable book stacks for fixed stacks reduced construction costs.

TABLE 8
STATUS OF CAPITAL PROJECTS
FY 1982 - 1984
AS OF SEPTEMBER 1984
(Dollars in Thousands)

	<u>PROJECT COST</u>	<u>ESTIMATED COMPLETION</u>	<u>STATUS</u>
FY 1982 Appropriations			
<u>Chicago</u>			
SR ³ - University Center	\$ 781.8	N/A	Three of four projects will be completed by 5/85. <u>Funds for one project (Lighting Modifications - \$113.0) remain frozen.</u>
Hospital Addition Remodeling	1,291.0	N/A	Planning is complete. <u>Construction funds ((\$1,116.0) remain frozen.</u>
Energy Conservation - University Center	993.2	5/85	Construction initiated in 9/84.
Energy Conservation - Health Sciences Center	522.0	11/84	Construction initiated in 9/84.
Subtotal	<u>\$ 3,588.0</u>		
<u>Urbana</u>			
Library Sixth Stack Addition	\$ 7,500.0	4/84	Complete.
Willard Airport Fuel Conversion	266.0	10/84	Construction initiated in 6/84.
Energy Conservation	304.5	4/85	Construction initiated in 8/84.
Veterinary Medicine Basic Sciences Building	1,000.0	2/84	Complete.
Equipment			
Subtotal	<u>\$ 9,070.5</u>		
FY 1982 Total	\$12,658.5		
FY 1983 Appropriations			
<u>Urbana</u>			
Agricultural Engineering Sciences Building	\$ 750.0	4/84	Complete.
Equipment			
FY 1983 TOTAL	\$ 750.0		

TABLE 8
STATUS OF CAPITAL PROJECTS
FY 1982 - 1984
AS OF SEPTEMBER 1984
(Dollars in Thousands)
(concluded)

	<u>PROJECT COST</u>	<u>ESTIMATED COMPLETION</u>	<u>STATUS</u>
FY 1984 Appropriations			
<u>Chicago</u>			
Roof Replacement - Peoria School of Medicine	\$ 202.9	8/84	Complete.
Hazardous Waste Incinerator	457.1	N/A	Planning initiated in 7/84.
Energy Conservation - Health Sciences Center	981.4	N/A	Bids anticipated in 10/84.
Energy Conservation - University Center	552.5	N/A	Bids anticipated in 10/84.
Subtotal	<u>\$ 2,193.9</u>		
<u>Urbana</u>			
Microelectronics Center	\$ 350.0	N/A	Planning initiated in 5/84.
Agricultural Engineering Research Lab Remodeling	404.5	8/85	Bids anticipated in 11/84.
Plant Sciences Greenhouse/Headhouse Planning	650.0	N/A	Planning initiated in 6/84.
Veterinary Medicine Animal Room Facilities	1,200.0	N/A	Planning initiated in 7/84.
Energy Conservation	<u>3,015.3</u>	N/A	Bids anticipated in 10/84.
Subtotal	<u>\$ 5,619.8</u>		
FY 1984 Total	<u>\$ 7,813.7</u>		

FY 1986 CAPITAL PROJECTS
CHICAGO CAMPUS

Heating, Ventilation and Air Condition Pharmacy Building - (\$5,218,000)

The University of Illinois, College of Pharmacy is the only Pharmacy School in Illinois. The original building was constructed in 1952 with additions made in 1956, 1958 and 1968. The windows were sealed by design in order to deliver air conditioning to the interior spaces, however, no cooling equipment or piping was installed.

While the three additions to the original building are equipped with air conditioning, these areas encompass a relatively small portion of the facility and include very few instructional or faculty areas. The problem is further exacerbated because the existing ventilation systems are inadequate.

The American Council on Pharmaceutical Education, in its 1981 accreditation report cited the problems in its evaluation of the College's physical facilities. . . "improvements in the air conditioning/ventilation, space renovation. . . are fundamental to assurances of compliance with standards for physical facilities." The extreme heat and toxic fumes create hazards to both students and staff. Due to aggregate problems, much time, money and patience have been exhausted in trying to correct the situation.

This project affects the environment of the principal instructional and research space of the College of Pharmacy. The project involves the following scope of work.

Heating, ventilation and air conditioning: The project consists of the major upgrading of the heating, ventilation and air conditioning systems and related accessories to meet the space utilization requirements for the College of Pharmacy. The upgrading of the H.V.A.C. systems and related components will be accomplished by installing new systems, replacing obsolete and non-functioning systems along with their related components and accessories, and by modifying existing systems. Also included is the modification of the make up air and exhaust systems for the fume hoods to conserve energy and to eliminate odors, and toxic and noxious fumes.

Perimeter Radiation System: The existing steam energized perimeter radiation units are to be converted to a hot water system.

Chilled Water System: The project will revise and expand the existing chilled-water system, including a new remote chiller unit, which will handle the entire Pharmacy Building.

Temperature Control System: The existing temperature control system will be replaced with an automated system which will control all of the H.V.A.C. systems in the building.

Electrical: Upgrading the present electrical system will provide additional power for the combined heating, ventilating and air conditioning systems, along with certain new power distribution of the building.

Architectural and Miscellaneous Requirements: Two new mechanical equipment rooms will be needed. Since the installation of new ductwork and piping, plus the revisions to the existing ductwork, will require extensive cuttings through the existing suspended ceilings, new suspended ceilings and lighting fixtures will be utilized to restore the rooms to their proper usable condition.

Energy Management: Concurrent with the design studies, recommendations will be made for the installation of an automated energy management system.

Library Improvements - (Remodeling - \$5,201,200/Equipment \$1,293,600)

The University Center Library currently houses the Office of Admissions and Records in approximately 13,000 square feet. This space was originally designed to store library acquisitions but was temporarily reassigned to provide admissions space. The annual acquisition rate has grown to 58,300 equivalent volumes per year and is expected to maintain that level in the future. Funds were appropriated in FY 1985 to plan library renovations to recapture space for book storage. This FY 1986 project will accomplish the necessary rehabilitation work to allow the Office of Admissions and Records to move into the Peoria Street Building while remodeling Library space to improve the management of the existing collection and future acquisitions. Remodeling in the Library itself will require \$4,051,400. Remodeling in the Peoria Street Building for the relocated Office of Admissions and Records will require \$1,149,800

The program for remodeling the Library can be separated into three parts:

1. Found space, i.e., the recovery of space by a) filling in the remaining wells on the fourth floor; b) enclosing the balconies on the second, third and fourth floors; c) designing Library space in the north and south ends of the basement in space originally designed for mechanical equipment; d) remodeling space presently occupied by the Office of Admissions and Records but designed originally as Library space.

2. First floor remodeling.

3. Second floor remodeling.

With the completion of this remodeling program, the campus will have recovered all available space in the UIC-UC Library building.

Found Space -- Space found by enclosing the balconies on the second, third and fourth floors will represent a gain of approximately 3,300 square feet per floor, or a total gain of 10,000 square feet. The space found by filling in the wells on the fourth floor will represent a gain of 2,400 square feet. Space on this floor will be used for patron seating and increasing the stack efficiency by freeing an equivalent amount of space elsewhere in the building for additional bookstacks.

The areas to be remodeled in the basement will be used for the storage of manuscript and archival materials now stored in various locations inside and outside the library. If space permits, the Staff Lounge will be relocated on the first floor and the basement space previously used as a lounge will be converted to materials storage. Compact shelving installations will be planned for these areas. Existing shelves will be used for expansions on other floors of the building.

Approximately 13,000 square feet will be recovered from OAR space on the first floor. The use of the space is described in the first floor remodeling.

First Floor Remodeling -- The first floor will become the location for the most heavily used and basic public services--reserve books, current journals and newspapers, the circulation desk, and seats for studying one's own material between classes, as well as for using library books and other media. Commuting students and faculty will be able to rapidly locate and

use these vital services. These areas also will be designed to remain open while the rest of the building is closed. In other strategically located spaces the appropriate technical service units will be grouped around the loading dock. The administrative offices and the personnel office will be located at the Morgan Street door.

Second Floor Remodeling -- The second floor of the Library is as important as the heavily used first floor. The second floor entrance will be closed and the front stairs leading to the first floor removed. Round tables and informal seating will be provided so as to create an attractive area for users.

On the second floor the original reference counter will be removed, thereby allowing the reorganization of the reference and bibliographic collections and enhancing accessibility for the reference librarians on duty at the information desks, the bibliographers in the Collections Development offices, and the staff members of the Cataloging Department. Offices for the reference librarians will be provided in three locations surrounding the card catalog, the reference and bibliographic collections, and the information desks. Round tables and informal seating will be used to create an attractive area for users.

The total found and remodeled space is about 31,850 ASF.

The Office of Admissions and Records must vacate space occupied in the Library Building, designed originally as library space, to allow the Library to expand and complete its remodeling program. The new location for the Office of Admissions and Records will be the Peoria Street Building. As proposed, remodeling in the Peoria Street Building will occur in portions of the basement, first, second, and fourth floors. The new location will serve to consolidate the admissions and records operations of the combined campus.

Equipment purchases related to this project will be made to outfit the remodeled portions of the Library. The equipment items will include: carrels, book shelving, librarian work stations, and standard table and chairs for use by library patrons.

Electrical Upgrade of Administrative Computer Center - (\$631,700)

The University of Illinois administrative computer system is centralized in the Roosevelt Road Building. The system provides computer support for both campuses of the University of Illinois and any power failure for an extended period would seriously disable University operations. While a standby power system would be the ultimate answer, it is believed that a double source of electrical power supply will be sufficient to ensure suitable continuity of electrical service. At the present time there are two 12,000 volt power distribution lines from two separate high voltage cables coming to the Roosevelt Road Building; however, a bottleneck exists, since there is only one transformer to reduce the voltage to 4809 volts. This project will provide a second transformer and switch gear that will allow switching from the high voltage cables to the second transformer in the event that the existing transformer fails.

Remodel Clinical Science Building - (\$3,493,000)

Of the five buildings involved in space vacated by the Replacement Hospital, the Clinical Sciences Building represents the structure having the greatest amount of space available for reuse; is most suitable for conversion to laboratory facilities; and is capable of providing for the most critical needs of the College of Medicine in the least amount of time. For these reasons the remodeling of this facility has been selected for priority rehabilitation consideration.

The building consists of 240,000 gross square feet and 128,676 assignable square feet. It is 14 stories in height, is structurally sound, and is in reasonably good repair. It was constructed in the early 1950's and has subsequently become outmoded for modern patient care delivery.

Upon occupancy of the new Replacement Hospital approximately 85,000 assignable square feet of space in the Clinical Sciences Building was reassigned to the College of Medicine. The College will utilize this space to provide badly needed faculty offices and laboratories for its clinical departments.

The scope of remodeling in FY 1986 consists of remodeling portions of the 5th, 6th, 7th, 11th, and 14th floors for the Departments of Surgery, Medicine and Pediatrics. The remodeling will provide office, laboratory and meeting facilities and will extend the building utility and laboratory services, to be installed with FY 1982 funds, to the remodeled areas. The remodeling of these floors is the first phase of space remodeling which will eventually provide for consolidation of these three major clinical departments of the College. A total of ten floors will ultimately be involved in the multi-phased remodeling and consolidation plan.

Associated Health Sciences Remodeling - (\$2,063,000)

The 1919 West Taylor Street Building, formerly the Public Health Hospital and Clinic, was transferred to the University in June 1975. This "H" shaped, eight story building, constructed in the early 1950's, has approximately 183,000 GSF and 109,000 ASF.

The need for upgrading of this facility was apparent before the University assumed operational responsibility for it. The facility houses the Sickle Cell Program, the Division of Services for Crippled Children, the Family Practice Program, a new Child Care Center and three curricula of the School for Associated Health Professions: Occupational Therapy, Physical Therapy, and Biocommunication Arts.

This project provides three component parts of a major renovation designed to bring together the Department of the College of Associated Health Professions in an academic facility appropriate to its diverse instructional, research and service-related plans and activities. The three component parts of the project are:

- Install a central air conditioning system,
- Distribution of electric power, floors 2, 3, 4, 5 and 6, and
- Remodel 6th floor.

Subsequent phases will distribute air conditioning to academic areas and remodel additional building areas to complete the consolidation of the College.

This program provides the necessary components for the purchase and installation of a central air conditioning system in the 1919 West Taylor Street Unit and will provide chilled water to floors 1, 2, 3, and 4.

The installation of a central air conditioning system has major implications for the educational and research activities of the departments housed in the building. The absence of air conditioning drastically affects instructional laboratory activities and has had a negative effect on research, also.

Upgrading and modernization of electrical services in the 1919 West Taylor Street Unit began in FY 1979. Completion of the work has provided adequate electrical service to the building for future needs and distributes power vertically to all floors.

This project will extend electrical service throughout the building. Currently the electrical capability of the building is inadequate to effectively implement the activities of those departments currently located at 1919 West Taylor Street and those departments planned for relocation there. All of the programs by their very nature require electrical equipment for teaching and research. Some academic projects have had to be postponed because of the inadequate electrical power and others have been conducted only after excessive logistical maneuvering.

SPACE REALIGNMENT, RENEWAL AND REPLACEMENT (SR³) - I - (\$2,163,900)

Handicapped Accessibility - Phase II - (\$387,900)

The provisions of Section 504 of the Federal Rehabilitation Act of 1973 requires that the educational programs of universities receiving Federal support be accessible to the handicapped. This project is the second phase of a multi-phase program to increase the accessibility of all University Center facilities. Examples of the work to be done include modifying sidewalk grades, construction of ramp entryways to various buildings, and modifying doorways to eliminate accessibility barriers. Work will be conducted at 14 locations at the Center.

Fume Hood Corrections - Science and Engineering South Building - (\$293,200)

The exhaust air provided for many of the fume hoods located in the Science and Engineering South Building is below the recommended safety standard set by the University of Illinois at Chicago Office of Environmental Health and Safety. This standard is that the face velocity of air at the fume hood opening shall be one hundred (100) feet per minute with the fume hood sash fully open.

To correct the exhaust air inadequacies for the fume hoods, the following is required:

1. Replace 66 motors and respective V-Belt drives and make the necessary electrical modifications.
2. Replace 3 complete exhaust fans with new fans including necessary sheet metal and electrical modifications.

Remodel Room 200, College of Pharmacy - (\$485,200)

Room 200 is a large laboratory, located in the north bay on the second floor of the Pharmacy Building. It consists of 6,600 ASF. The remodeling project will create model working pharmacies which will duplicate conditions in the working world for undergraduate students. The program dictates the removal of all existing equipment and the complete remodeling of the area. The project scope envisioned will result in a total cost of more than \$1,088,000. The College of Pharmacy is anticipating private fund contributions of approximately \$600,000 toward construction of this instructional laboratory.

The original design of the Pharmacy Building provided for students taught in large groups in large laboratories, with emphasis upon training dispensing pharmacists. In recent years, however, emphasis has been placed on smaller teaching groups and training clinical pharmacists, rendering old laboratories such as Room 200 inefficient. The remodeling completely changes the character of this laboratory and provides a modern up-to-date teaching lab.

The Center recognizes that the College of Pharmacy has a deficit of modern updated teaching laboratories. Maintenance of program quality in the face of critical space shortages can only be accomplished through efficient use of space currently available. This remodeling project is designed to meet that objective.

Code Correction - Peoria Street Building - Phase I - (\$525,700)

This project replaces the badly deteriorated wood stairs located in the southwest corner of the south building with stairs of non-combustible construction. The stairs are a necessary second exit from this building and must be replaced in their entirety (basement to sixth floor). In their present condition, the stairs are a definite safety hazard and must be replaced immediately to comply with code.

In addition to the above, the following conditions in both the north and the south buildings must be revised to comply with code:

- Extend landings & enclosure of south central stairs (8 landings).
- Install new fire doors, frames and related hardware.
- Provide 2 door enclosures at north central stairs (6 landings).
- Provide 4 door building separation vestibules between north and south buildings (5 floors)
- Revise exits from building as required.
- Provide fresh air intakes to air handling units from roof.

Remodel Rooms 560-566A - College of Medicine East Tower, Anatomy -
(\$246,800)

The remodeling will include: 1) partitioning Rooms 563, 565 and 566; 2) installing new lab furniture and plumbing in all the rooms: 3) installing fume hoods in Rooms 566 and 565; and 4) air-conditioning all the rooms. The remodeled areas will be used for cellular neurobiology research.

These rooms, except the ceilings, have never been remodeled or adequately maintained since construction of the building in the 1930's. Apart from the unsightly peeling of plastered walls and the frequent weather-induced flooding problems, these rooms are totally outdated for biomedical research.

Remodeling and updating the lab fixtures are urgent needs for these rooms. The staff are currently conducting experiments on the cell and molecular biology of the development of synapse. They are taking a multi-disciplinary approach to this problem, including tissue culture, light and electron microscopy, electrophysiology and biochemistry. These varied approaches necessitate an efficient partitioning of these rooms to minimize interference between projects. For tissue culture, it is of utmost importance to have a room in which aseptic operation can be conveniently carried out. This condition cannot be met under current conditions.

Upgrade Electrical Power, Operating Rooms - Biologic Resources Laboratory -
(\$119,900)

The upgrading of the electrical services in operating rooms of the Biologic Resources Laboratory Building involves several of the ten original surgical suites and the support areas. This area (3500 square feet) is currently being used for limited experimental surgery, animal manipulation and physiological monitoring under the supervision of the laboratory management, but is assigned to other departments on the campus. The efficient use of this area will be significantly increased when the electrical deficiencies are corrected.

The present electrical system in this area does not meet building codes for receptacles, has substandard wiring and has cross-connected circuits between rooms. These deficiencies prevent the use of many monitoring systems and create tremendous problems in terms of overloading the circuits. This area represents a potentially significant hazard to those working in the rooms. With the increasing use of sophisticated electrical equipment for experimental monitoring, this area cannot effectively meet the needs of the funded research projects requiring this type of support.

Remodel Rooms 234 and 236 - College of Medicine West Tower, Physiology -
(\$105,200)

Remodeling plans for Room 234 include installation of air conditioning, new vinyl floor and suspended ceiling and painting. It will continue to be used as an office after remodeling. Room 236, adjacent to room 234, is a research laboratory of approximately 272 square feet. Remodeling will consist of installation of air conditioning, vinyl floor and suspended ceiling. A conventional four foot fume hood is to be purchased and installed with the necessary duct work. New metal laboratory furniture with formica counter tops will be purchased and installed, replacing existing wooden laboratory benches. Utilities (air, gas, vacuum) will be relocated. The hood is to have the usual laboratory services, air, gas, vacuum, steam and cold water. A new sink with metal base cabinet to match other furniture will replace the larger existing sink.

Remodel Pharmacy Building (Phase I) - (\$1,567,000)

Since the Pharmacy Building was constructed, there have been major changes in the programs of the College of Pharmacy. A new pharmacy curriculum, the Doctor of Pharmacy degree program, was approved for implementation in the Fall of 1984. Previously the faculty of the College taught several basic science courses. In the new curriculum these basic courses are a component of the prepharmacy requirements and can be acquired at most undergraduate campuses. The undergraduate curriculum has undergone significant change with much less emphasis on wet laboratory instruction and greater emphasis on the social/behavioral/administrative and the professional practice of pharmacy. As a result of this major curricular change and the corresponding reduction in class size there is no longer need for large laboratories designed in the early 1950's. Some of these laboratories should be modernized into smaller, more flexible laboratories for computer applications and pharmacy practice simulations.

The north and south ends of the fourth floor of the Pharmacy Building are large undergraduate laboratories designed in the early 1950's to meet the requirements of the pharmacy curriculum at that time. The laboratories in the north end were used for laboratory instruction in physical chemistry (404) and physics (404A), 404B) which are now provided in the pre-pharmacy curriculum. Room 404 will be remodeled to provide four faculty office--laboratory suites. Rooms 404A and 404B will be remodeled as a computer graphics, applications, and a robotic facility for research and instructional purposes. The laboratory at the south end (Room 440) was used for instruction in quantitative chemistry which will be taught in small sections in a multipurpose laboratory setting in the new Pharm D. curriculum. Room 440 will be partitioned to provide two faculty office-laboratory suites, a modern classroom seating 100 students, and a flexible-use undergraduate instructional laboratory. Under a flexible-use plan, this laboratory can be used as an instructional facility for each of the College's departments. Existing ceiling lighting, electrical service, furniture, equipment, laboratory benches and utility services, and flooring will require alteration or replacement to accommodate the new arrangement.

SPACE REALIGNMENT, RENEWAL AND REPLACEMENT (SR³) - II (\$3,267,800)

Exterior Masonry Repairs - Phase III - Education and Communications Building and Peoria Street Building - (\$443,900)

This project includes repairing the walls of the Education and Communications Building (main building--including subsequent interior damage), theater walls and terrace, as well as repairs to the walls of the Peoria Street Building. The repairs to the Education and Communications Building are a continuation of work completed in Phase II. This phase will also begin repairs to the Peoria Street Building.

Repairs to the Education and Communications Building, including the theater buildings and terrace, will require the grinding out of mortar joints on exterior brick work, removal of weathered caulking, removal of bricks, paving bricks and stone where necessary, replacing flashing, replacing weeps, repairing membrane waterproofing, installing expansion joints where necessary, modifying shelf angles, tuckpointing where indicated, and recaulking and reinstalling the exterior masonry removed during the project.

Work at the Peoria Street Building will include general tuckpointing, removal and replacement of weathered caulking and repairs to parapet walls surrounding the building as well as general structural wall repairs.

Remodel Rooms 409 and 409B - College of Medicine West Tower, Pharmacology - (\$60,000)

The single most limiting factor in the current goal of improving the academic excellence of the University of Illinois College of Medicine is the availability of wet laboratory research space. This space shortage is felt keenly in the quality of the recruitment package which can be offered. Also, space limitations have hindered recruitment of research personnel with funded grants. Thus space inadequacies are hindering academic productivity and creation of new jobs. This problem must be solved. Current economic conditions prevent the possibility of constructing new buildings for housing

laboratories. A proposed solution is an initial step in the restructuring of internal departmental space to increase utilization efficiency, and to convert released space to wet laboratory space.

This project will remodel Room 409B, currently used as a machine shop, to house a combined electronic design and repair shop with limited machine capability. This includes the installation of bench and desk space plus some light weight machining equipment. By combining these functions, 350 ASF of space in Room 409 will be released for conversion to a wet laboratory function. This will include the installation of laboratory benches, and utility services.

This proposal would enable a reduction in space occupied by the Departmental shops through better space planning and the purchasing of newer compact equipment that would accommodate these vital functions in one room. This space is strategically located near central support facilities including instrument rooms, hoods and cold rooms. Thus, this seemingly small space is capable of supporting a major research program. Such expansion is necessary to increase the department's competitiveness for attracting outside funding.

Pedestrian Safety (Phase I) - (\$264,700)

The volume of pedestrian traffic crossing Morgan Street between Harrison Street and Vernon Park Place demanded that vehicular traffic be diverted from the area to insure pedestrian safety. Phase I of this project will interrupt traffic on Morgan Street with the installation of a curb across the Morgan Street right of way as an extension of the south Harrison Street curb. Street drainage at this point will be altered as a result of this curbing, and the intersection of Harrison and Morgan will become a "T" type of interchange. Approximately 300 feet south of the Harrison Street curbing, additional curbing will be constructed, creating a gentle curve that will cause traffic to flow from Vernon Park Place (eastbound and

westbound) into Morgan Street (northbound and southbound). The first phase essentially isolates the area.

Future phases concern work that will provide a pedestrian mall in the area between Harrison Street and Vernon Park Place in the vacated Morgan Street right of way. This mall will provide one limited access service drive for University Hall and one for the Behavioral Sciences Building. In addition, a network of pedestrian walks will also be constructed. Planter areas will be provided throughout the mall. These areas, together with the rest of the mall, will be provided with an underground drainage system. Proper sub-soil and top soil will be provided to fill these planter areas to grade. The trees, shrubs and grass for the planters will be financed separately, but the work will be coordinated with this phase of the mall development. All necessary dismantling work, such as paving, curbing, sub-surface drainage, etc., will be included in these future phases.

There is approximately 20,000 square feet of abandoned right of way that is to be re-developed in this mall project. In addition to the right of way area, there is approximately 5,000 square feet of building access to the Behavioral Sciences Building and 10,000 square feet of building access to University Hall to be considered in the mall project.

Exterior Masonry Repairs - Phase IV - Education & Communications Building, Peoria Street Building and Services Building - (\$514,500)

Repairs to the Education and Communications Building will include the grinding out of mortar joints on exterior brick work, removal of weathered caulking, removal of bricks, paving bricks and stone where necessary, replacing flashing, replacing weeps, repairing membrane waterproofing, installing expansion joints where necessary, modifying shelf angles, tuck-pointing where indicated, and recaulking and reinstalling the exterior masonry removed during the project.

The continued work at the Peoria Street Building includes general tuck-pointing, removal and replacement of weathered caulking and repairs to parapet walls surrounding the building as well as general structural wall repairs are required.

This project also provides for the repair of the exterior walls of the Services Building including removal of brick as necessary, installation of wall expansion joints, replacing flashing weeps, recaulking, and reinstalling the exterior masonry removed during the project.

Air Condition 2nd and 3rd Floors - School of Public Health - East -
(\$329,000)

The School of Public Health - East Building (SPH-East) is a three-story brick structure located at 2035 West Taylor Street, on the western edge of the Health Sciences Center. The building was constructed in 1956 and served as St. Mary's Convent until leased by the University in 1973 for use by the School of Public Health. Subsequently purchased by the University in 1980, the building continues to house two departments of the School of Public Health. The building provides 13,500 ASF (21,000 GSF), which is utilized for faculty/staff offices and classrooms. SPH-East is currently heated throughout by hot water convectors. The first floor is air conditioned by a forced air system employing three central units providing a total capacity of approximately five tons. The second and third floors, which house all of the faculty and staff offices, are not air conditioned.

The requested project consists of installing new through-wall heating and cooling units on the second and third floor of SPH-East and the renovation or modification of existing temperature control systems. The existing hot water heating convectors on the second and third floors will be replaced with the new combination heating and air conditioning units. The project area involves 50 offices encompassing 6,500 ASF (10,500 GSF).

Implementation of the project is necessary for optimal utilization of SPH-East. From the purchase date to the present, over \$100,000 of Campus and School funds have been invested in minor remodeling and decorating projects to enhance the use and appearance of the building. However, lack of

air conditioning continues to be the focus of employee dissatisfaction with the facility. The situation has had a definite impact on faculty morale, and further may affect retention and recruitment efforts. Further, the lack of environmental control has resulted in costly heat-related malfunctions of several microcomputers which are used in the building.

Remodel Locker Room Area for Research and Graduate Education Seminar Space - College of Nursing - (\$252,500)

The mission of the College of Nursing is to serve as a center for advanced nursing education, research, and practice. Program priorities to be addressed over the next five years are keyed to this mission and focus on the enhancement of faculty research potential and expansion of the graduate program. The first priority of the College is to strengthen and expand its graduate program. Since construction of the College of Nursing Building in 1969, the faculty and student population has trebled. Teaching, research and office space is constrained, inhibiting the development both of academic and research programs.

The College of Nursing space to be restructured (approximately 4,800 square feet) was initially designed as a locker room which is no longer needed. At the present time the space is utilized for equipment storage. The project includes the removal of existing concrete block pedestals, purchase and installation of movable partitions, installation of new doors, carpeting, revisions to the existing ceilings, ventilation, lighting, power distribution and installation of air conditioning.

Renovation will afford space for graduate student research, study and seminar/conferences. Graduate student research, office and study space has been preempted by faculty office and research requirements. This remodeling will provide an appropriate graduate student work environment.

The College of Nursing maintains the major portion of its teaching and research activities in this building and improved utilization of existing space will enhance the quality of its graduate programs.

Campus Emergency Power Distribution - Network - (\$1,403,200)

The present 400 KW generator at the Clinical Sciences Building is inoperative, and the 175 KW unit at the General Hospital is insufficient. The proposed unit will be placed at the Central Emergency Generator facility located at the Steam Plant eliminating isolated generators and simplifying testing and maintenance.

This project provides for the installation of a 1500 KW diesel driven generator, controls, substation, and connecting cabling to provide autonomous emergency power to the following Health Sciences Center main block buildings:

- General Hospital
- Illinois Surgical Institute
- Campus Health Service
- Old Aeromedical Laboratory
- Clinical Sciences Building
- Biologic Resources Laboratory
- Neuropsychiatric Institute

The Health Sciences Center has recently completed a study confirming the need to provide emergency electrical power for academic needs. A proposal based on National Institutes of Health guidelines is being processed for adoption as a campus standard. The study reports an enormously high and wide-spread risk to health and safety, research investments, and grant support now encountered due to the relative absence of locally-generated emergency power. These standards will be integrated into these emergency power plans.

Chemistry Department Remodeling - Science and Engineering Laboratories -
(\$218,800)

The Chemistry Department suffers from an acute shortage of research space. All space in Science and Engineering South (SES) has been fully utilized. In fact, a severe overcrowding exists in many areas. During the past several years the research activity of many of our faculty have expanded. The number of research grants and of graduate students in the department has been steadily increasing and putting continually increasing demand on departmental research space. Moreover, the Department is currently undergoing a careful re-examination process which will result in the relocation of some departmental support functions into further lines for active research faculty.

Since there is no realistic opportunity for expanding research space in the SES Building, the only feasible solution is to create research space in Science and Engineering Laboratory (SEL). This can be accomplished by consolidating and relocating some of the current teaching activities. The plan which is being presented calls for the remodeling of the entire second floor section in the southwest segment of the SEL Building into a research area. In order to accomplish this, some of the current teaching laboratories will have to be relocated to the third floor which will require the remodeling of two third-floor laboratories.

The proposed plan will result in the creation of 12 laboratory units, 3 instrument rooms, 6 faculty offices, 1 secretarial office, 5 small student offices, and a conference room. The total amount of newly created research space will be about 10,000 square feet.

The third floor remodeling will create a new organic chemistry laboratory for the more advanced organic students. The course for which this laboratory is intended (Chemistry 237) is currently taught under extremely difficult and potentially hazardous conditions without the prerequisite number of hoods. This space was not designed for this purpose and seriously limits the scope of the course. The space designated as 3209D and

3029C will, for the first time, provide an adequate laboratory space with individual hood space for one 16-student section. Rooms 3209A and B will house the advanced analytical course (Chemistry 321). Room 3210 will serve the needs of three physical chemistry courses.

SPACE REALIGNMENT, RENEWAL, AND REPLACEMENT - III - (\$924,300)

Handicapped Accessibility - Phase III - ANSI Standard Width Doors -

(\$506,800)

The entrance doors to most of the existing campus buildings were constructed with a 2 foot 6 inch module. These doors are grouped in pairs, and there is an inner and outer pair in each vestibule to each building. The existing doors have been provided with a mullion between the doors so that the buildings may be electronically secured. This security is necessary and vital to the campus operation. However, the installation of these mullions has created entrances that are not acceptable to the provisions of Article 504 of the Federal Rehabilitation Act of 1973. In order to comply with this law and the newly developed American National Standards Institute (ANSI) standards, we propose to retrofit all of the entrances as necessary.

This project provides two pairs of accessible doors at the main entrances of all of the earlier campus buildings. One pair replaces the outer doors and one pair replaces the inner doors at the typical main vestibule entrance to each building. The new doors will be constructed in three of the standard 2 foot 6 inch modules of the existing glass curtain wall. The doors that will be replaced exist in only two of the modules. The inner pair must be set back to provide proper clearance between the doors.

Install Campus Security Access - Series 1 (Phase II) - (\$213,500)

The Series 1 Controlled Access Systems at the Chicago campus are computer-based magnetic stripped card controlled building access systems. At the Health Sciences Center the system controls access to twenty (20) buildings. At the University Center the system controls access to five (5)

buildings. This system remotely locks and unlocks each building at a preset time and keeps a record of each after-hour entry per building.

The purpose of this project is to complete the installation at both the University and Health Sciences Centers.

Specifically, the scope of the project is as follows:

1. Install necessary cabling from the computer located in the Services Building to each building.
2. Install necessary badge reader and interface at the "after-hour entry" door at each building.
3. Make the necessary connections at the building and computer.
4. Consolidate the two systems into a campus-wide single access control system.

The project involves the installation of forty (40) card readers in twenty-six (26) buildings.

Although the Series 1 Controlled Access System is an integral part of the campus security system, it is not an alarm system. The existing campus-wide security alarm system will be converted to a computer-based system in the near future.

Remodel Theater Lobby and Air Condition Theater Equipment Room - Education and Communications Building - (\$204,000)

This project will provide for the installation of a complete ventilating and air conditioning system in Room 2180. This room is where the lighting dimmers for the theater were located as a part of an FY 1980 capital request.

The original location for the lighting dimmers was at the ceiling level of the three story Theater, Room L-280. The dimmers were at approximately the same level and physically mounted in the upper catwalk adjacent to the lights they control. Continuous use of the lighting increased the

temperature to a level that the dimmers could not tolerate, causing most of the dimmers to break down. Consequently, the replacement dimmers were moved to Room 2180, a separate room adjacent to, but separate from, the Theater during the first phase of the Communications and Theater Project. This was the first step in counteracting the overheating and subsequent dimmer failure caused by the close proximity to the Theater lighting.

This project, representing the second phase, proposes to install an HVAC system (ductwork, fan, insulation and thermostatic controls) that will maintain the required temperature level for the lighting dimmers in Room 2180, thereby preventing any future breakdowns of the replacement dimmers.

Also included in this project will be the move of the Theater Box Office from its present location, Room L-282 in the basement, to the proposed first floor location in the Theater lobby, Room L-280A.

The present location of the Theater Box Office is in the basement. This location is remote from the public entrance to the Theater. Theater patrons presently must go down a flight of stairs and through a door at the basement level to get to the Box Office, a small room (L-282), to obtain tickets. The basement area should not be accessible to the general public because it compromises the security of the entire building. Therefore, this project proposes to construct a new Box Office in the main Theater lobby, L-280A, where the general public enters the theater. This main Theater lobby, L-280A, is directly accessible from Harrison Street, and is a natural location for the Box Office.

The following items will also be installed in the main lobby, Room L-280A, as a part of this project:

1. A new display case to match the existing one located on the west wall of the lobby.
2. New graphics identifying the University Theater as well as the new Box Office.
3. New fixed public seating to accommodate those waiting to enter the Theater. This seating will be of vandal-proof molded fiberglass.

Physics High Bay Laboratories - Science and Engineering South - (\$211,200)

The Physics Department has now developed two of the most visible high technology programs in the world. The first is the Excimer Laser Program which aims at the development of a soft x-ray laser. The significance of this program cannot be overstated. It reaches in three directions:

- a) Laser fusion;
- b) Holography of life molecules (DNA); and
- c) Photoemission and the study of microscopic surfaces processes.

Each of these areas is of vital interest to the country and of considerable relevance to high technology.

The second is the Microphysics Program. This program consists of two efforts--one is the Molecular Beam Epitaxy (M.B.E.) effort and the other is the characterization effort. The M.B.E. effort is endowed with the largest M.B.E. system presently operating in the world. The characterization effort has received national and international recognition as one of the most advanced.

The purpose of this project is to develop existing space in the Physics high bay area (Room 1250 Science and Engineering South) into three floors of laboratories for research activity. The present lack of adequate research space for these programs has already created problems. As the programs continue to expand, the lack of adequate space becomes increasingly critical.

The availability of newly created research space proposed by this project will make it possible for the University of Illinois at Chicago to continue moving to the forefront of the scientific and technical universities that are laying the foundation for high technology in our country.

FY 1986 CAPITAL PROJECTS
URBANA-CHAMPAIGN CAMPUS

Remodel the Former Veterinary Medicine Building for the Sciences -
(\$5,000,000)

Since the completion of the Veterinary Medicine Basic Sciences Building the former veterinary education facility has remained unoccupied. After careful study it has been determined that with appropriate remodeling this building will make an excellent facility for the Department of Geology and the Institute for Environmental Studies. Geology will benefit from this facility in several ways. First, the staff of the Department of Geology will be consolidated in a single building along with its own departmental library. Second, the Department will be closer to the offices of the State Geological Survey (Natural Resources Building) with which the Department interacts frequently. And, third, the accommodation of the Department in newly remodeled space will increase its competitiveness with peer institutions. The Institute for Environmental Studies will benefit from this project, also, by consolidating their staff from their four current locations to a single facility.

In addition to providing much-needed renovated space for these two units, the space released by the move of both the Geology Department and the Institute for Environmental Studies will be made available for two very high priority areas. Space vacated by Geology can be made available for the School of Life Sciences (approximately 38,900 ASF). Space made available by the relocation of the Institute for Environmental Studies can be used immediately by the College of Engineering.

The 49,445 ASF building is excellent structurally; unfortunately, this 1952 vintage building has virtually no central air conditioning or ventilation systems. Consequently, the five existing fume hoods probably do not meet current code requirements. The proposed occupants require approximately twenty-five fume hoods which will require a major heating, ventilation and air conditioning improvement for the building. It will be

necessary to reduce the size of the five large instructional laboratories and extensive renovations are needed to change the usage of the anatomy laboratory area. The first two floors of the Veterinary Medicine Annex that housed the State Diagnostic Laboratory will require extensive renovation. Most of the laboratory benches are in good condition and will be used by the new occupants of the building.

The proposed FY 1986 remodeling has been estimated to cost \$5,000,000. The planning for the project has been estimated to cost \$250,000 and will be funded by the Urbana-Champaign campus during FY 1985. Movable equipment for this project has been estimated to cost \$400,000 and will be requested in FY 1987.

Computer Laboratory Addition (\$1,100,000)

The Department of Computer Science has experienced a significant increase in enrollment in recent years. Enrollments have grown from 672 FTE in Fall 1975 to 1,151 FTE in Fall 1983. To meet the teaching demand imposed by the increase in students, the Department has relied heavily on teaching assistants and has increased the section sizes of its courses. In order to satisfy the various accrediting agencies, the Department must now hire additional permanent faculty to restore the student/staff ratio to a more satisfactory level and to reduce the section sizes of its courses.

In addition to its instructional mission, the Department of Computer Science continues to maintain the preeminence of its research reputation in the fields of computer architecture, information systems, software development, and automata theory. As a result of its direct research activities, the Department has garnered substantial funding for research programs from Federal and other sources.

The Digital Computer Laboratory houses both the Department of Computer Science and the Office of Computing Services. The Office responds to the growing demand from students and scholars in various departments for computer supported instruction and research. Included in its activities are conducting computer workshops and consulting and troubleshooting for specific research projects utilizing the campus computer system.

The increasing demand for formal coursework from the Department, expanded research activities, and the developing need for computer support in the academic community at large have combined to produce space needs that exceed the capacity of the Digital Computer Laboratory. This project proposes constructing an addition of approximately 60,000 ASF to meet existing and future needs.

Upon completion of this project, 4,603 ASF of space will be razed. Additionally, upon the project's completion, approximately 4,500 ASF in the Woodshop and Foundry Laboratory will be vacated for reassignment to other units. The Woodshop space has just recently been vacated and will be remodeled for Computer Science through the FY 1985 Renovation for Excellence Program in order to provide an interim solution until the DCL Addition can be constructed.

The total planning cost, including the initial steps in construction document, is estimated to be \$1,100,000. It is anticipated that funds for constructing this addition will be included in the FY 1987 Capital Budget Request.

English Building Remodeling - (\$3,040,000)

This request represents the third of a multi-phased project to completely renovate the English Building. The renovation program is estimated to cost approximately \$8,710,000 and extend one more phase. After the total remodeling project is completed, the English Building will be, for all practical purposes, new inside the exterior walls. The remodeling is estimated to cost 40-50% less than construction of a new facility of the same size. The total remodeling program involves a new heating and air conditioning system for the building, construction of a new fire rated stair, enclosing two existing stairs, installation of an elevator, additional rest rooms and new plumbing installations, new structural flooring in the west half of the building as well as the typical partitioning, lighting and ceiling improvements, thus illustrating the broad scope of the remodeling project.

The overall thrust of this project is to remodel the 61,490 ASF and 118,140 GSF English Building, located on the west side of the quadrangle, into an office/classroom building to match the facility with the program to be housed in the facility in the foreseeable future. The English Building was originally constructed as a Women's Building some 77 years ago with two subsequent additions in 1913 and 1923 to provide a facility to house the home economics and the women's physical education program. The very nature of the original programs indicated a need for large rooms which makes the current use of the building very awkward because English requires a large number of offices to house faculty and teaching assistants. The gymnasiums and locker rooms previously used by physical education are inappropriate for any other use without extensive remodeling. The proposed remodeling will give the Department of English adequate classroom and office space to conduct its program in space designed to meet current needs.

The phase currently requested involves renovation of the northwest section of the building as well as the west center portion of the building on the first, second and third floors. The remodeling will involve the installation of an elevator and the construction of new structural floors in the areas to be remodeled. The scope of the remodeling in this phase will be substantial as everything will be new within the outside walls. The remodeling is justified because the English Building is a permanent building and will provide good service for years to come after remodeling. The remodeling will provide basically office space, three instructional areas, and involves remodeling 22,500 assignable square feet. There will be an equipment request in FY 1987 to support this Phase III request.

Life Science Laboratory Remodeling - (\$743,200)

This project will enclose on the ground level of Burrill Hall, which is presently open to the outside, to house faculty and graduate students currently in the School of Life Sciences who need laboratory space that does not require the use of fume hoods. The amount of space to be gained is

relatively small, but it is in an excellent location to give some relief to the severely crowded conditions in Burrill and Morrill Halls. The School of Life Sciences requires an additional 65,000 ASF to accommodate existing programs which represents more than a twenty percent shortage of space according to University standards. Approximately forty percent of the space assigned to the school is located in two 1900 vintage buildings, which adds to this overall space problem because the buildings are very marginal for modern day teaching and research.

It has been determined that semi-wet laboratory space can be created because drains are located in the structural pillars, and other utilities are located in the ceiling. Faculty assigned to this space would do computer-assisted research, cell culturing, and strain manipulation in this space. Another benefit derived from the addition will be the elimination of the yearly problem of frozen pipes and drains. Every winter the Operation and Maintenance Division constructs a temporary enclosure to combat the freezing problem.

The addition is a good long-term investment because the space will be located in a permanent building in the core of the School of Life Sciences space. The addition is not large enough to be a cure-all, but it will help relieve a critical space problem with a long term solution. There will be an equipment request to support this request in FY 1987. There will be no space released as a result of this addition.

Mechanical Engineering Building Remodeling - (\$265,000)

This project involves planning to remodel the Mechanical Engineering Building in order to reflect the change in the program during the past thirty-five years. The northeast corner of the second floor which was originally designed as shop area for both instruction and research support will be remodeled into a two-level area because of the existing high ceilings. This area will provide approximately 10,000 ASF of usable space with

4,000 ASF of office space and 6,000 ASF of research laboratory space. The research laboratory space will make extensive use of computers emphasizing manufacturing techniques and the use of robotics in manufacturing. An existing locker room and shower area will be converted into offices for faculty providing 1,800 ASF from space that currently has marginal use. Because of program changes, students do not need the locker room and shower area. The large Internal Combustion Engine Laboratory will be remodeled into mechanical design laboratories because the old laboratory is no longer needed. This conversion will redesign 3,650 ASF of space into four instructional laboratories for mechanical design. This remodeling project will involve 24,600 GSF and approximately 15,450 ASF.

The scope of the remodeling will be extensive because the areas are basically large spaces which need to be converted into smaller spaces. Therefore, the remodeling will require partitioning, lighting, electrical work, painting, and the introduction of a HVAC system because of computer usage. This request involves Planning Funds with the request for construction funds to be made in FY 1987. This project is part of an overall plan to upgrade space in the College of Engineering.

SPACE REALIGNMENT, RENEWAL, AND REPLACEMENT - I - (Remodeling - \$3,429,900/
Equipment - \$377,600)

Digital Computer Laboratory Air Conditioning - (\$350,000)

The field of computer science is steadily growing and increased research and student usage has led to the installation of more computer equipment and machines than were originally intended for the building. Workstations are replacing or augmenting the traditional terminals, and air conditioning is now required in all rooms, not just the designated computer rooms.

As the amount of equipment and the number of computers increase, so does the amount of air conditioning required to keep them cool. The Digital Computer Laboratory is the major computer facility on campus. In order to meet its increased demands, and to allow all equipment to function properly, 120-150 tons of air conditioning must be added. Engineers have been hired

to prepare drawings, specifications, cost estimates and building documents. This request is for the installation of additional air conditioning equipment recommended by the engineers.

Dairy Manufactures Building Remodeling - (Remodeling - \$610,000/
Equipment - \$44,000)

This project involves the remodeling of 6,900 square feet on the second floor of the Dairy Manufactures Building. The remodeling will provide needed space for photo-synthetic research being conducted by the Department of Horticulture. Currently this research is being conducted in an inadequate and crowded space in the Vegetable Crops Building. This project develops needed space for research in both Food Sciences and Horticulture. It also frees up space in the Vegetable Crops Building for other activities of the Department of Horticulture.

Included in the project is the creation of wet laboratory facilities, an instrumentation lab, media preparation area, cold room, and other support facilities. Work to be done includes the removal of as much interior metal and ferrous material and partitions as possible, and its replacement with non-metallic and non-ferrous materials. The mechanical systems will need major overhauling. The ammonia refrigeration is to be replaced with a freon system. Central air conditioning is to be added and the heating and plumbing systems will need to be upgraded. Exterior improvements include reroofing, tuckpointing, and new aluminum windows on the second floor and a new exit stairtower.

Roof Replacements I - (\$500,000)

This project will provide for the replacement of all or part of the roofs on the following buildings:

Psychology Building was constructed in 1969, and the mineral surfaced flat roof over 1/2 inch fiberglass insulation has weathered very poorly. This type of roof has a poor performance record, and is no longer on the market due to many premature failures. The insulation is saturated over most of the roof, and leakage has damaged finishes and plaster work, in addition to causing inconvenience to the occupants. This project entails

the removal of all 12,900 square feet of existing roofing material to the deck, and replacement with new insulation and membrane.

Talbot Laboratory was constructed in 1927, and the roof dates from a 1958 replacement that used a smooth surface asphalt system. This roof has surpassed its life span, and the weakened membrane is continually assaulted by large amplitude vibrations that result from material testing operations inside the building. Leakage is damaging finishes and inconveniencing occupants in numerous areas of the building, and several small sections have already been replaced due to leaks. This project entails the removal of 23,000 square feet of old roofing materials and installation of new roofing on the badly deteriorated main roof.

Hangar #1 Willard Airport has two lean-to sections which were added to the main hangar building in 1946. The materials used to construct the lean-to sections were acquired as military surplus from an air force base located in Arkansas. The proposed project would eliminate the peak and valley of the existing roof on the west side by adjoining the new roof just under the main roof eave overhang with a single slope roof. The east lean-to roof project would replace or overlay and insulate the present roof covering the pilot training facilities. A portion of this roof was replaced to protect expensive link trainer equipment from water damage to their electrical systems. This project would essentially complete the renovation of the remaining portion of that section of the building.

This request is part of an overall program developed to reroof many of the Urbana campus buildings requiring new roofs. There is a similar request for an additional two roofs to be completed in the SR³-II package. The three buildings listed above are in the worst condition of any on campus and therefore have the higher priority.

Remodeling 50N & 60 Electrical Engineering - (Remodeling - \$365,000/
Equipment - \$60,000)

As the demand for high technology will likely increase in the near future, more modern and upgraded semiconductor and microelectronic research

facilities will be needed. Part of this need will be met by the remodeling of the Water Resources Building which will house most of the compound semiconductor research. The other portion of the need, silicon-related research, will be housed in the ground level of the Electrical Engineering Building.

This project provides for testing and characterization laboratory facilities as well as faculty and graduate student office space over 2,600 square feet of the buildings. All silicon-related research is planned to be completed in this one building.

This project calls for the remodeling of Room 60 into office and computer facilities and Room 50N will be remodeled to provide research laboratory space. This lab space will have to be capable of above average cleanliness, yet does not need ultra-clean handling equipment. Some wet laboratory facilities will be needed in the remodeled space and special air conditioning equipment will be needed for computer operations.

Morrill and Burrill Hall - Heat Detectors - (\$55,000)

This is a safety request involving the installation of smoke and/or heat detectors in 50 laboratory and work areas in Morrill and Burrill Halls. Currently there are no fire detection devices for laboratories and departmental work areas in these two buildings. Reports of fires must be telephoned or transmitted through the campus fire alarm system. A destructive fire in October 1975 in Morrill Hall could possibly have been checked during the early stages with an alarm triggered by a smoke or heat rise detector. This request is part of an overall program to correct safety deficiencies in the Urbana-Champaign campus permanent buildings.

Visual Arts Laboratory Remodeling - (Remodeling - \$254,000/
Equipment - \$128,600)

This project will complete Phase II of the remodeling for the Visual Arts Laboratory. It will provide cinematography facilities, a studio for photography/cinematography, and facilities to introduce photography to freshman art students. Currently, it is impossible to meet the student demand for the courses in this area of study, and the facilities are taxed to the limit by students enrolled in the courses.

Included in the project are construction of new walls, installation of additional power requirement, additional shelving, and revisions to heating and air conditioning. The first phase of this program involving a cost of \$162,200 was funded as a part of the FY 1976 Capital budget and included needed expansion for photographic laboratories. This second phase (6,117 ASF) is to fund the required remodeling for a Cinematography Shooting Studio and several small darkrooms for students and faculty in the Fine Arts Building. Major heating and ventilation changes need to be completed for optimal use of space created by remodeling in Phase I and II. The major part of the equipment will be cinematography cameras and related equipment. This segment of the request is very important because instruction in cinematography includes an evaluation of the students' use of the available equipment.

Metallurgy and Mining Building Renovation - (\$112,000)

This project involves modernization of 76 year old laboratory space which has had little or no remodeling in the past. Renovation is for the systematic expansion of polymer research in the Department of Metallurgy to meet current and future needs. The remodeling involves Rooms 209, 211, 213, and 213A of the Metallurgy and Mining Building. Polymer research is closely related to chemistry, and for these rooms to be used effectively, modernization must occur.

Included in the renovation project is the installation of an additional fume hood, power outlets, lab benches, sinks and cabinets for the storage of chemicals. The general appearance of these rooms will also be modernized.

University High School Improvements - (\$285,000)

This request is a part of an overall program to meet Federal and State laws requiring that all programs be accessible to paraplegic and other handicapped persons. University High School has four floors containing 26,129 ASF and 41,730 GSF. It is a permanent University of Illinois building which must conform with standards set by Section 504 of the Rehabilitation Act of 1973.

This project involves the installation of an elevator in University High School, modification of restrooms, as well as the construction of a ramp at the south entrance to the building.

As a result of a recent inspection and recommendation by an architect with the Illinois Office of Education, this project has been expanded to include improvements required by the Illinois Life Safety Codes for secondary schools. Items added as a result of the above inspection are as follows: sealing transoms; closing of air circulation vents; installation of smoke and/or heat detectors; and installation of a fire horn and emergency battery operated lighting system. An inside stair rail must also be installed from the top floor to the first floor at both ends of the building.

Glassblowing Laboratory Remodeling - (Remodeling - \$90,000/Equipment - \$25,000)

This project includes the remodeling of warehouse space into a glass-working studio for the School of Art and Design. The present limitations of the glass program at the University of Illinois are directly related to the lack of adequate studio space. The studio is forced to close at least twenty days during the academic year because of snow drifting inside the studio or because of rain flooding high voltage equipment. Existing studio space is being shared with the graduate sculpture students out of necessity due to inadequate facilities. By remodeling a warehouse, all glass activities would be adjacent to, but not in conflict with, the graduate sculpture program.

This request will remodel warehouse space into five individual areas: glassblowing, cold glass working, all purpose rooms for critique, lecture and/or slide room, graduate student space, and a research studio for the professor in charge of the program. Included in the project is the construction of walls, installation of lighting and insulation, ventilation for the glassblowing room to reduce heat buildup and vapors from furnaces and electric kilns. The equipment needs for this project are fairly modest. Furnishings to accommodate the studio needs will consist of tables, storage units, portable lighting and laboratory equipment.

Classroom Renovation - (Remodeling - \$161,400/Equipment - \$31,000)

This project is the first year of a multi-year program to upgrade and modernize a number of the older classrooms on campus. Forty-five percent of the classrooms are over 50 years old and several have not been substantially altered in many years. This phase will remodel nine rooms in Engineering Hall which are centrally located and heavily used. These rooms in Engineering Hall are over 80 years old. The goal of this project is to modernize the classroom space to support current methods of instruction. The work proposed will improve classroom audio-visual capability by adding variable lighting controls and blackout shades, replacing pitted chalkboards, installing suspended ceilings, adding more effective heating and generally modernizing their appearance. Also, three small rooms are to be remodeled into two larger rooms to accommodate larger class sizes. To properly equip the rooms, approximately 300 new movable arm chairs will be purchased to replace old fixed chairs.

Animal Room Improvements - (Remodeling - \$124,000/Equipment - \$52,000)

The project involves upgrading the existing animal holding facilities in the Electrical Engineering Annex to a level required by Federal regulations. Federal grant agencies have threatened to withhold research funds if the facilities are not improved. This is the third of a five-phased program to bring existing facilities into compliance with the U.S. Department of

Health and Human Services standards and regulations governing the humane handling, care, and treatment of laboratory animals.

The work to be done in the Electrical Engineering Annex involves remodeling 853 ASF on the first floor. The project includes modification of the ventilation system, dropping ceilings, installing sinks, partition changes, and installing a cage washer and bottle filler. These improvements will allow the Department of Electrical Engineering to do a better job of caring for the animals and will save animal caretaker time. The major portion of the equipment to be purchased will be stainless steel cat and rodent cages and cabinets. The caging equipment is needed to meet Federal guidelines for the housing of laboratory animals. The Urbana-Champaign campus anticipates that after project completion, the facility will serve the animal holding needs for the Department of Electrical engineering for a number of years.

Bevier Hall Fume Hood - Room 338 - (\$40,000)

This project involves the installation of a fume hood for more efficient utilization of a recently remodeled wet chemistry lab, and to increase research productivity while insuring safety for students and staff. Research to be conducted in this room requires the use of a number of toxic and volatile chemicals to study microorganisms which cause food poisoning.

Due to the continuing lack of usable research space, this and other laboratories must be upgraded so they can be fully utilized. Included in this Bevier Hall project is the cost of a fume hood ductwork for outside ventilation and electrical connections. Existing cabinets will be removed for the fume hoods and accompanying bench space.

Accessibility Improvements - (\$143,000)

This project includes the conversion of old rest room facilities in ten (10) permanent buildings for accessibility by handicapped students, faculty, employees and/or guests of the Urbana-Champaign campus. Work would include the widening of water closet shelters, installation of grab bars, reswinging of doors, lowering of mirrors and towel dispensers, and in some cases the removal of urinals or other stools to provide access space required. Upon

completion of the rest room portion of the project, eighteen (18) rest rooms will be converted in buildings that presently have rest rooms which are not accessible. These ten buildings have 159 classrooms and 69 instructional laboratories plus offices, gymnasiums, pools, etc.

The second portion of the project involves the installation of a paraplegic ramp at the Institute of Labor and Industrial Relations Building. The existing ramp, located at the rear entrance, does not meet current code requirements for paraplegic access (slope of 1:5.2). New code requirements recommend a maximum slope of 1:12 in new construction. This request is a portion of an overall accessibility improvement program at the Urbana-Champaign campus to make permanent buildings readily accessible to the handicapped. There will be similar requests in future years for this type of improvement.

Library Fourth Floor Remodeling - (Remodeling - \$200,000/Equipment - \$25,000)

The current arrangement of libraries on the fourth floor does not make efficient or effective use of the space available. Existing walls are constructed of cellulose wall board over wood studs and do not meet current fire codes. Steel support columns supporting the roof are not covered with fire retardent materials as required by current codes. By relocating the smaller libraries from the fourth floor to larger open areas on the second floor we could reduce staff required to operate these units. Library administrative and technical processing personnel would then be relocated into open landscaped office and work space on the fourth floor.

This project includes the planning and engineering for the complete east fourth floor area (22,520 ASF) and the completion of the remodeling of approximately 1/3 of the space (6,948 ASF). The remodeling must be phased in order to be able to relocate staff and books around the construction area and to be able to keep the library areas usable by faculty, staff and students. The equipment to be purchased will be office equipment such as desks, chairs, file cabinets, bookcases and dividers.

David Kinley Hall Remodeling - (Remodeling - \$140,500/Equipment - \$12,000)

The College of Commerce and Business Administration has experienced a phenomenal annual growth rate in undergraduate majors since the Fall of 1970. Similar growth has been experienced in transfer students and the graduate student population. The College is understaffed by over 60 faculty and staff positions, and it intends to hire 6 - 8 faculty members for next year.

This remodeling project is to help alleviate this problem by expanding the number of single station faculty offices within the current space available to the College. By completely remodeling 1,600 square feet at the south end of the second floor of David Kinley Hall, an additional 5 - 7 faculty offices can be gained. Work includes the removal of some walls, cast iron radiators, linoleum and old light fixtures. New walls will be constructed, T-bar suspended ceilings with recessed fluorescent fixtures will be installed, and new floor covering and air conditioning will be installed. The major portion of the equipment will be office equipment such as desks, chairs, file cabinets, and bookcases. This movable equipment will allow teaching staff members to use the remodeled space in an effective manner.

Chemistry Laboratory Remodeling - (\$634,000)

This project involves renovating the plumbing system and the remodeling of the west entrance to Noyes Laboratory. Currently, the school is constantly repairing drains and water lines in Noyes Laboratory due to deterioration over the 69 (Phase II) to 83 (Phase I) year life of the building. Also, there have been so many plumbing modifications over the years that it is very difficult to keep the system in working order. The west entrance to Noyes Laboratory has two very large doors which allow a tremendous amount of cold air in the winter which makes the first floor corridor uncomfortably cold. The entrance has been used extensively for 83 years and needs to be upgraded and modernized to help eliminate the current conditions and improve the appearance of the building.

These plumbing and entrance replacements are two of several building system components that require improvement. The building requires extensive replacements and improvements to the electrical system, heating systems, temperature control system, window replacements, elevator replacement and fume hood improvements. These items are all part of the needed improvements which will be requested in future years to make the building more functional.

Pilot Training Facility - (\$818,300)

This project has been given a high priority by the campus administration because of the badly deteriorated condition of the present facility. The current facility was constructed in 1945. While the building has been upgraded, at least temporarily, and remodeled to furnish minimum facilities, it is rapidly deteriorating and requires replacement. The facility is poorly insulated, has inadequate climate control capacity, and until a recent temporary coating was applied to the roof, it leaked.

Deterioration due to aging and weather damage has occurred to the point where current educational functions have been jeopardized. Instructors were not being protected from leaking structures, and expensive electronic flight simulators were being damaged from moisture and furnace residues. There has existed the potential for severe electrical shock resulting from

the operating of equipment in areas where water has collected. While the resurfacing of the roof has corrected the situation for the short term, these leakage problems are expected to recur in two to three years from now. The current space is also extremely energy inefficient and this must be corrected to conserve energy and utilities funds.

The replacement facility will be of low-cost construction (concrete block or pre-engineered metal structure with concrete foundation and concrete floor).

SPACE REALIGNMENT, RENEWAL, AND REPLACEMENT - II - (Remodeling -

\$2,786,500/Equipment - \$137,000)

Elevator Replacement - (\$180,000)

The Lincoln Hall elevator was originally installed in 1930 and employs the single automatic type control with manual controls on the door. The elevator has no leveling devices and is difficult for paraplegics to use. A modern elevator car will be installed with selective-collective controls, automatic leveling system and power door controls for ease of operation by paraplegics. This improvement will allow handicapped individuals easy access to all five floors and the 33 classrooms in the building, including 14 classrooms on the second and third floors. This request is part of an overall program to replace obsolete elevators which are inadequate and difficult to maintain.

Gregory Hall Stair Enclosures - (\$427,500)

Gregory Hall, a 65,952 ASF and 109,393 GSF building, presently has two dead end corridors with no fire-rated exits. With 33 classrooms, plus instructional laboratories and offices, this building is one of the most heavily utilized facilities on the campus. As a result, safe exits in the event of a fire are desperately needed.

The project includes the construction of hollow steel and wired glass stair enclosures with magnetic door holders and smoke detectors on each floor. Also included is the installation of illuminated exit signs, panic hardware on exterior doors and the replacement of existing windows in the stairwells with metal and wireglass. A new ground level exit will be

constructed for the west stairwell so occupants have immediate access to the outside of the building. This request is part of an overall safety related program to provide adequate means of egress in permanent buildings that do not have enclosed stairways.

Mechanical Engineering Laboratory Remodeling - (Remodeling - \$56,000/
Equipment - \$25,000)

This project will provide an improved environment in Room 115 of the Mechanical Engineering Laboratory for conducting fluid flow experiments using sophisticated optical techniques such as laser doppler velocimetry (LDV), laser Roman scattering, and other laser-based methods. Presently, the research area is open, hot, and humid; this environment is very poor for the expensive electronic equipment and instrumentation located therein. Also, the lack of both controlled access to the area and physical separation from the other areas of the laboratory exposes all people working in the laboratory to unacceptably high noise levels and potentially dangerous stray laser beams from fluid flow experiments.

The proposed solution to the above-cited environmental problems involves the separation of the fluid flow experimentation area from the rest of the laboratory space by installing concrete block walls along the south side of the area (along the flume) and the east side between the main laboratory floor and the lower level. Access to the area would be through double-door sets located on both the east and west ends of the area to provide a better environment for the researchers and the instrumentation.

David Kinley Hall--Room 114 - (Remodeling - \$307,000/Equipment - \$11,000)

This project consists of the complete renovation of a 2,537 ASF lecture room in David Kinley Hall. This project is one in a series of efforts to upgrade the 50-60 year old lecture halls. These facilities are totally outdated in ventilation, heating, lighting, seating and are inadequate for any audio-visual service. Presently this room has a limited use due to the marginal services provided.

The remodeling of this room would consist of installing an air conditioning/heating system, a new ceiling and lights, new floor tile and seats, plus necessary installations and remodeling required to provide audio-visual capabilities needed for certain lectures. The air conditioning/heating

system modification is essential to provide temperature controls and ventilation when the audio-visual services are in use. These services require that all doors and windows be closed with black-out shades to prevent light from entering the room during a film showing. The equipment request consists of a motion picture projector, slide projectors, an overhead projector, a lectern and stand, and a screen.

Digital Computer Lab Remodeling - (\$50,000)

With the increasing use of small computers and work stations, the key-punch and job entry areas are rapidly becoming obsolete. The former location of these services, Rooms 162, 164, 166, and 168, are long and narrow and have limited capabilities.

The Computing Services Office has requested these rooms be remodeled so they can be fully utilized. Included in the remodeling is the removal of interior walls and the installation of a new doorway. A new hallway will be created to gain entrance into six new offices and a conference room. The new configuration of 1,270 square feet of space will be better suited to meet future needs of the department and occupants of the building.

Coordinated Science Laboratory Remodeling - (\$88,500)

The Coordinated Science Laboratory has expanded its research staff to the point that additional office and laboratory space must be provided. To alleviate this problem we plan to remodel the under-utilized Chemical Milling shop now located in Room 99 and a portion of Rooms 93, 93A, 95 and 97 into suitable office and/or laboratory space.

This project includes the removal of some walls, relocation of existing equipment, installation of new walls, modifications to the electrical service and revisions to the heating and air conditioning systems.

Commerce West Remodeling - (Remodeling - \$108,000/Equipment - \$12,000)

The College of Commerce and Business Administration requires more faculty and staff office space. To help alleviate this problem, the college is attempting to maximize all available office space by remodeling with the intention of increasing the number of single station faculty offices.

This request is to remodel seven offices in various locations of the Commerce West Building into fourteen smaller offices. This project involves 1,836 square feet of space and will help alleviate the severe space problem suffered by the College. All rooms will require the installation of partitions, corridor doors, and an adaptation of the heating-air conditioning system. The major portion of the equipment request will be desks, chairs, cabinets, and other standard office equipment.

Fume Hood Improvements - (\$403,000)

This project involves the renovation of fume hoods in Turner Hall and the Animal Sciences Laboratory, as part of an overall program to improve fume hoods throughout the campus. Improvements would be made to all fume hoods located in 25 rooms of Turner Hall. The fume hoods installed in Turner Hall Phase I construction do not meet safety standards. The exhaust outlets need to be increased in height and changes made to increase fan velocity to prevent toxic fumes from reentering through fresh air inlets. In most cases larger fan motors will have to be installed.

The improvements in the Animal Science Laboratory Building involve fume hoods located in 25 rooms. Fan motors must be relocated from the rooms to the penthouse with concurrent installation of extended discharge ducting. The resultant increased face velocity to the fume hoods will compound negative air pressure problems in the building. This situation must then be corrected by increasing the make-up air quantity to the building.

Huff Hall Basement - (Remodeling - \$319,000/Equipment - \$29,000)

This project involves remodeling 7,700 ASF on the west side of the Huff Hall basement to accommodate new offices for the Department of Leisure Studies and new locker room space for women. Remodeling will make all the activity areas available to women and increase women's locker facilities. Construction of the office space will permit the Department of Leisure Studies to be centrally located in Huff Hall and to vacate space in the Children's Research Center for expansion of the research projects being conducted by the Institute for Child Behavior and Development. Also included in this project is the installation of a fire alarm warning system and evacuation annunciator for the total building.

The remodeling will involve new partitioning, heating-ventilation, electrical, flooring, and ceiling changes and improvements. Included in this project is a new towel distribution room, a conversion for a women's rest room, and a co-ed corridor connecting all the activity areas. To properly equip this remodeled area, a separate equipment request in the amount of \$29,000 is included in the budget.

Institute of Aviation Remodeling - (\$56,000)

The Aviation Maintenance Training Program has an enrollment of approximately 175 students. Thirteen instructors teach twenty-five courses in four Quonset buildings (#3, 4, 7 and 8) at the airport. The need for additional demonstration and laboratory areas is apparent when the nature of the curriculum is considered. Aircraft assemblies and mock-ups of assemblies must be used to teach system operation and maintenance. Typical assemblies are aircraft engines, helicopter assemblies, hydraulic systems, etc. The physical size and the number of these instructional aids fill the space in the four Quonsets and overflow into Quonset #2.

This request is for the remodeling of Quonset #2 to provide space for permanent installation of various mock-ups and assemblies. Remodeling would include the installation of a heating system, lights and adequate insulation

to provide a live demonstration area. This remodeling would eliminate the requirement for exchange or transfer of equipment between Quonset #2 and other Quonset buildings. The equipment is expensive, burdensome to move and difficult to maintain under present conditions.

Davenport Hall Remodeling--Geography - (Remodeling \$296,500/Equipment \$60,000)

This project will provide two modern 30-station instructional laboratories, one wet and one dry; a preparation area; storage space; and a seminar room in the Room 137 complex. The displaced office space will be relocated to the Room 237 complex which is an old laboratory area formerly used by Agronomy. This switch in space is necessary to assure that the laboratory rooms are accessible for the handicapped because the rooms are typically used 30 hours per week for undergraduate instruction. This portion of Davenport Hall has seen very little remodeling since it was constructed in 1900. The project includes removal of walls and old laboratory benches. The improvements include a new heating system, air conditioning, new sinks, new flooring, acoustical ceiling tile, lighting and painting. The above improvements will provide the means to do more and better laboratory demonstrations, thus allowing the instructors to do a better job of teaching.

Roof Replacements II - (\$495,000)

This project will provide for the replacement of all or a part of the roofs on the following two buildings:

Roger Adams Laboratory was constructed in two phases, in 1948 and 1963. Most of the roofing is asphalt and gravel over one inch rigid insulation, installed in the late 1940's and early 1960's. This roofing has deteriorated badly, and many of this building's twenty roof levels require replacement due to saturated insulation and deteriorated membranes. This project

entails removal to the concrete deck of all existing materials, and replacement with new insulation and membrane (ten levels out of twenty, 29,000 square feet of 40,000 total).

Digital Computer Laboratory was constructed in three phases, in 1958, 1963, and 1966. The coal tar pitch and gravel roof on all three phases is badly deteriorated, and chronic leakage is observed over offices in the earliest phase. The leakage that occurs in several other areas is quite worrisome in this facility, due to the many millions of dollars of computer hardware that is located in the building. This project entails removal to the concrete deck of all old materials, and replacement with new roofing and insulation on the entire roof (22,000 square feet).

This request is part of an overall program developed to reroof many of the Urbana campus buildings requiring new roofs. There will be similar requests in future years to reroof major buildings.

Outdoor Instructional/Recreation Facilities - (\$75,000)

This project calls for the construction of four additional tennis courts next to the four existing tennis courts west of the Illini Grove. This will provide a complex of eight tennis courts which is ideal for use when teaching tennis. Also, these courts will be in a good location for students living in the large dormitory complexes located along Lincoln Avenue to use for instruction and recreation. This site will require some leveling, but there will be no drains required because surface drainage will be adequate for these asphalt base recreational courts. The improvement is part of an overall program to improve the outdoor recreational facilities.

Pennsylvania Avenue Street Improvement - (\$150,000)

The FY 1986 request involves payment of the Urbana campus share of the cost to make the Pennsylvania Street Improvement to Champaign County. The County has agreed to temporarily provide the \$150,000 needed to make the street improvements to avoid losing the Federal matching funds. It is important that the Urbana campus reimburse Champaign County in order to be considered for matching funds with future projects. Pennsylvania Avenue is a University-owned street between Fourth Street and Lincoln Avenue.

The \$150,000 requested in FY 1986 involves paving, widening, curbing, lighting and draining approximately 1,375 feet of Pennsylvania Avenue from Sixth Street to Burnside's Laboratory. The Urbana Campus was allocated Federal Aid Urban (FAU) funds to provide one-half the cost of this project because the street is considered eligible for those funds based on analysis by the Champaign-Urbana Urbanized Area Transportation Study (CUUATS). The Illinois Department of Transportation (IDOT) classified Pennsylvania Avenue as a part of the designated FAU system. The Urbana Campus has completed the planning and design portion of the project which is a condition of a request being eligible for funding. The portion of Pennsylvania Avenue which has been paved was a surface treated cinder base road with very high maintenance costs.

The street is on the southern perimeter of the academic campus providing a most important access route to, from and across the south campus. Traffic studies indicate that Pennsylvania Avenue is heavily used as an urban collector street, proving its importance as a street serving University staff and student transportation circulation. This improvement is integrated with and complies with University master planning and long-range transportation planning. The development of Food for Century Three facilities along the Pennsylvania Avenue corridor has increased traffic on this campus street. This segment of Pennsylvania Avenue with lighting will extend the existing permanent pavement and lighting adjacent to the Law Building and connects to a recently improved link of the street (which includes lighting) from Burnsidess Laboratory to Lincoln Avenue.

FISCAL YEAR 1986 ENERGY CONSERVATION REQUEST

ENERGY CONSERVATION REQUEST
FY 1986

The University's concern with energy conservation dates back to the early 1970s when it initiated changes in the operation and maintenance of its energy systems to help control escalating energy costs. Through these operational measures, significant energy costs were avoided. At the end of the last decade it became clear that since virtually all significant operational energy conservation measures had been implemented, the University must devise new ways of curbing the precipitous growth in its utilities budget. The solution to this problem was the development of an Energy Conservation capital improvements program which had the potential to far exceed the operational savings already achieved. Projects in this program are aimed toward improving the energy efficiency of building and mechanical systems and utilizing more economical fuel sources in energy production systems.

In FY 1981 the University began requesting funding for the Energy Conservation program and it received enthusiastic support from the Illinois Board of Higher Education, the Bureau of the Budget, the General Assembly, and the Governor. An appropriation of \$8.8 million was awarded for projects in its initial year. In FY 1982 almost \$2.1 million was also appropriated to the University for energy system improvements. In FY 1983, the General Assembly approved a \$15 million appropriation for installation of a pollution control system at the Urbana-Champaign Abbott Power Plant. These funds supplement a \$6.9 million appropriation awarded in FY 1981 for the reconversion of 3 boilers from oil/natural gas to coal firing.

Although the University received significant funding from the State in FY 1981 and FY 1982, no State appropriations were made available for energy conservation requests in FY 1983. However, the University has actively pursued other resources to support this effort.

In FY 1982 the University acquired funding from the U. S. Department of Energy (USD OE) amounting to \$1.4 million for projects at the Chicago campus. In FY 1983 an additional \$.5 million of Federal grants were received for projects at both the Chicago and Urbana-Champaign campuses. In FY 1984 the University received \$2.5 million in Federal grant awards from the USD OE for projects at both campuses. These awards were matched by State appropriations. Again, in FY 1985 the University anticipates receiving Federal grant awards in the range of approximately \$700,000 to \$750,000 for energy conservation measures.

Although the University has received considerable funding support since the program's inception, continued support is necessary to realize significant future energy savings. During FY 1985, energy costs are projected to increase approximately 9% and are expected to increase another 9% in FY 1986. Consequently, implementation of additional energy conservation projects is required to support the University in its endeavor to respond to these precipitous increases in energy costs.

To support this continued effort in controlling energy costs, the University is requesting \$14.4 million in FY 1986 for 38 energy conservation capital improvement projects. Table 1 lists these projects in priority order based on a "simple payback" calculation using a methodology prescribed by the Illinois Board of Higher Education. Following Table 1 are detailed descriptions of energy conservation projects composing the FY 1986 request.

Table 1
FY 1986 Energy Conservation Request
Project Priority List
All University

Priority	Campus	Project	Payback	Project Cost	Cumulative Total
1	C-HSC	Light Fixtures & Controls - Steam Plant	1.00	\$ 49,000	\$ 49,000
2	C-HSC	Var. Air Vol. Fans w/economizer - Hosp. Add.	1.00	346,000	395,000
3	URB	Chiller Dr. Conv. - Vet. Med. Basic Sci. Bldg.	1.00	2,867,700	3,262,700
4	C-HSC	S1 & S2 Fans (Phase II) - College of Pharm.	1.00	103,300	3,366,000
5	URB	VAV - 19 Buildings	1.00	1,147,300	4,513,300
6	URB	Trap Util. Steam Main into Low Pressure Main	1.00	69,700	4,583,000
7	C-HSC	Vent. Start/Stop Ctl's. - Coll. of Med. - West	1.00	33,300	4,616,300
8	URB	Nonessential Load Limiting by Remote Cntl.	1.11	1,392,900	6,009,200
9	C-HSC	Bldg. Equip. Automation - Coll. of Med. - East	1.39	257,800	6,267,000
10	URB	Abbott Efficiency Improvement	1.43	454,200	6,721,200
11	URB	Conv't. to VAV - Roger Adams Lab	1.53	424,900	7,146,100
12	C-HSC	Aux Chiller Unit - Coll. of Med. - Peoria	1.67	72,300	7,218,400
13	C-HSC	Steam Pipe Insulation - Steam Plant	1.78	167,800	7,386,200
14	C-HSC	Oxygen Trim Controls - Steam Plant	2.09	208,400	7,594,600
15	URB	Domestic Hot Water Retrofit	2.19	43,200	7,637,800
16	URB	HVAC Retrofit	2.27	681,300	8,319,100
17	URB	Radiation Zone Control	2.51	341,900	8,661,000
18	URB	Reheat Systems Zone Control	2.54	355,800	9,016,800
19	URB	Steam Metering Improvements	2.86	711,600	9,728,400
20	URB	Conversion to Ctrl. Fan System - Armory	2.94	91,600	9,820,000
21	URB	Install Air Curtains above Entry Ways	2.95	46,000	9,866,000
22	URB	Radiation Zone Control	2.96	711,600	10,577,600
23	URB	Summer/Winter Ventilation Rate	3.00	40,000	10,617,600
24	URB	Conv. from Cast Iron to Fin Tube Rad. - Ann. Sci.	3.01	325,600	10,943,200
25	URB	Radiation Zone Control	3.12	78,800	11,022,000
26	URB	Central Supervisory Control Expansion	3.16	605,600	11,627,600
27	URB	Temp. Control Remodel & Replacement	3.21	787,300	12,414,900
28	C-UC	HTHW Pipe Insulation, Util. Dist. System	3.23	93,900	12,508,800
29	URB	Domestic Hot Water Control	3.44	53,700	12,562,500
30	URB	Animal Room Ventilation	3.51	272,500	12,835,000
31	URB	Reheat System Zone Control	3.60	242,200	13,077,200
32	C-UC	Supply Air Temp. Reset	3.72	75,500	13,152,700
33	URB	Pipe Insulation	3.81	33,200	13,185,900
34	URB	Steam Absorb. Machine Control	3.91	151,000	13,336,900
35	URB	Domestic Hot Water Control	3.93	24,400	13,361,300
36	URB	Conversion to Zoned Vent. - Art & Design Bldg.	3.97	218,200	13,579,500
37	URB	Insulation on High Pressure Steam Mains	4.12	651,000	14,230,500
38	URB	Reheat System Zone Control	4.96	143,100	14,373,600

ENERGY CONSERVATION
CHICAGO CAMPUS

New Lighting Fixtures and Controls - Steam Plant - (\$49,000)

The Steam Plant building has 6 different floor levels. Presently, all lighting is from bare bulb incandescent fixtures with metal reflectors. Each fixture is fitted with a 150 watt incandescent bulb. All six floors are presently illuminated around the clock.

This project replaces 82 incandescent fixtures with 37-250 watt metal halide fixtures. A new mounting height combined with a spacing to mounting height factor of 2.0 will allow a 50% reduction in fixture number. The new fixtures will be installed on the 2nd floor and will be fitted with 4 hour spring timers on all necessary circuit branches. The new timers shall be piped to stair risers, entries, and support columns. This will reduce the consumption by 67% because these areas are only occupied eight hours a day.

Variable Air Volume Fans with Economizer - Clinical Sciences Building - (\$346,000)

This project will eliminate the high ventilation rate experienced during the heating season. Fan systems which will be retrofitted and replaced were all designed for use when this building was used as the main hospital. Since the building of a replacement hospital in 1979, this structure has been used as a clinic, office and laboratory support facility. An in-depth energy audit of the facility has found that many of the former systems can be modified.

As an example, the former operating rooms have been converted to office space. Thus, city code will allow recirculation of air from the space and a reduction of the outside air intake. This energy measure will payback its capital cost with utilities cost avoidance in approximately one year.

S1 and S2 Fans (Phase II), VAV System - College of Pharmacy - (\$103,300)

This project will eliminate the high ventilation rate during the heating season. These systems presently ventilate the majority of rooms on the 2nd, 3rd, 4th and 5th floors in the Phase II portion of the College of Pharmacy Building. These rooms are currently ventilated at over 2.8 cfm/sq.

ft. The city code will allow a reduction of 50%, or 1.2 cfm/sq. ft. to these rooms.

Since these two systems are 100% outside air units, the energy savings from reducing the winter ventilation rate will be substantial. The method of ventilation reduction shall be made from the installation of Titus 'ECT' variable volume retrofit kits inside the existing mixing boxes. The pneumatic volume control shall be connected to the nearby thermostat branch and main air connections. The main supply and exhaust fans shall have a variable frequency controller installed to control motor speed according to duct system pressure several floors below. Final discharge filters shall be installed on the two main supply fans to keep dirt from clogging the velocity sensors that will also be installed.

Ventilation Start/Stop Controls - College of Medicine West - (\$33,300)

This energy project will retrofit three of the five major classroom ventilating systems in the building. Appropriate air handlers will be retrofitted with programmable start/stop controls. The unit will have full 365 day programming ability with non-erase memory in case of a power failure. The unit will sense outside air temperature and classroom temperature to maintain heating or cooling optimization. The installation of the start/stop controls will prevent the needless operation of a manual system. Single zone air handlers will be modified into variable volume systems. The motor starter will be replaced with a variable frequency speed controller. This will permit a full by-pass if the unit is down for repair. System controls will be operated by remote pneumatic thermostat.

Building Equipment Automation - College of Medicine - East Tower and College of Pharmacy - (\$257,800)

The Building Equipment Automation system, presently installed in all University Center buildings and in fourteen (14) Health Sciences Center buildings, has been proven to be an effective method of saving utility and manpower costs. This project consists of installing equipment necessary to monitor and control the energy usage in two additional Health Sciences Center buildings. This equipment will then be connected to the existing Building Equipment Automation computer at University Center. Included as

part of the Building Equipment Automation system are software modules which will accomplish the following energy conservation measures.

- Monitor all systems for off normal operations
- Monitor operating conditions of all systems and reschedule set points to optimize energy use
- Limit peak electrical demand via a loadshedding schedule
- Set up duty cycling schedules for the daily, weekly and seasonal variations in HVAC operations
- Automate the night set back and morning warm-up schedule by economizer control
- Automate the lighting schedule to minimize the lighting level during non-operating hours.

Auxiliary Chiller Unit - College of Medicine at Peoria - (\$72,300)

The building cooling needs are met by a single 322 ton chiller. It is therefore necessary to operate this machine in the evening and during the weekend for small areas such as the animal rooms (which require 24-hour ventilation) and the TV studio.

This project proposes to install a small additional chiller with a 35 ton rating. The small machine will be run during the weekend and evening low-load time periods. Savings of 1.2 kilowatts/ton/hour will be achieved from the use of the small machine.

Steam Pipe Insulation - Steam Plant - (\$167,800)

This project will increase the insulation thickness on the steam distribution lines within the tunnel system. The tunnel system extends some 3700 feet in various directions from the main plant. The main steam lines carry high pressure superheated steam at 460° F to the individual buildings around the Medical Center District. The system of piping is now insulated with calcium silicate. The increased insulation thickness will reduce year round heat loss.

Oxygen Trim Controls - Steam Plant - (\$208,400)

Tests were undertaken to determine the present excess oxygen level and possible efficiency improvements. Our consultants, along with our instrument engineer, have found that the present excess oxygen level is 12%. The

consultants have also determined the contributing factors to this inefficiency. These factors were lack of oxygen trim controls to set fuel/air ratio and infiltration into the boiler from boiler plate openings.

Our consultants have assured Physical Plant personnel that a level of 4% excess is attainable. All boiler sections and seams shall be smoke tested and sealed as necessary with welded plates and gaskets. In addition, oxygen and carbon monoxide sensors and analysers shall be installed in the appropriate boiler outlet point. The sampling point shall be determined by several test locations evaluated for accuracy.

The present air/fuel control shall be reset by the excess oxygen level to attain the greatest efficiency. Controls shall be modified to attain the safest possible configuration from an unscheduled loss of fuel.

The retrofit work shall occur on each of the five (5) original plant boilers.

High Temperature Hot Water Pipe Insulation Utilities Distribution System - (\$93,900)

The existing HTHW system has significant heat losses that presently are exhausted. This project proposes to add 2.5 inches of new rigid-wrap fiberglass pipe insulation to existing insulation on 4590 lineal feet of HTHW supply piping as follows:

- 4.0" diameter piping - 290 feet of insulation
- 6.5" diameter piping - 1,900 feet of insulation
- 7.5" diameter piping - 1,200 feet of insulation
- 9.5" diameter piping - 1,200 feet of insulation

Supply Air Temperature Reset - Behavioral Sciences Building - (\$75,500)

At present the major fan systems in the Behavioral Sciences Building do not have adequate control to maximize the use of the mixed air temperature during times of moderate weather. This project proposes the installation of pneumatic controls on each of the ten major fan systems to maximize the mixed air temperature. The control would be a pneumatic link with the major zone reheat control signal lines. All major reheat signals would be sent

through a pneumatic comparator. The signal showing the least amount of need for terminal reheat would then be used to reset the mixed air temperature to the highest possible setting. This method will allow us to keep one reheat coil completely shut off and the remainder at reduced flows. The project will raise the mixed air temperature from 50° to 60° F, thus reducing the need to heat the total volume of air an additional 10 degrees with high temperature hot water.

ENERGY CONSERVATION
URBANA-CHAMPAIGN CAMPUS

Chiller Drive Conversion - Veterinary Medicine Basic Sciences Building -
(\$2,867,700)

This building now has an electrically driven centrifugal freon compressor to chill water. The project proposes changing the operating mode of the system from electricity to steam. Work involves replacing the electrical drive with a steam turbine and changing chilled water and steam piping. The steam rate of the existing system will be reduced from 20 psig to 14 psig.

Variable Air Volume Controls - 19 Buildings - (\$1,147,300)

This project includes installing fan speed controls on the supply and return fans of 194 ventilation fan systems in nineteen buildings. The fans are presently single-speed and set for the largest volume of air required.

Also, the work includes connecting the fan systems to the microprocessor in each building. These revisions will provide for day-night, summer-winter, and electrical peak demand limiting by fan speed control from the Monitor and Control System on campus. The work will be performed in the following buildings:

Administration Building	Electrical Engineering Bldg.
Armory	Foreign Languages Bldg.
Art & Design Building	Krannert Center
Astronomy	Law Building
Bevier Hall	Materials Research Lab
Burrill Hall	Music Building
Children's Research Center	Turner Hall
Commerce West	Undergraduate Library
Coordinated Science Lab	Veterinary Med. Clinic
Digital Computer Lab	

Trap Utility Steam Main into Low Pressure Steam Main - (\$69,700)

Presently, the steam traps on the main 8 inch utility steam main (150 psi) dumps this excess steam into the condensate line that returns to Abbott Power Plant. This system elevates temperatures in the return line and wastes energy.

This project proposes to reroute the steam traps, at 95 locations in the main steam tunnel system, to transfer the excess steam into the 12 inch low-pressure steam main (40 psi). The excess steam can then be utilized and temperatures in the condensate return line will be restored to normal.

Non-Essential Load Limiting by Remote Control - (\$1,392,900)

This project provides for installation of remote control equipment for 3,800 window air conditioners, 150 electric water heaters, 360 refrigerated water coolers and 120 toilet exhaust fans. Remote control of this equipment would allow shutdown at night, weekends, holidays and peak electrical demand times, thereby saving electrical consumption and demand charges. The control system would be either "carrier wire" switches or "RF actuated power relays." The proposed system would be implemented campus wide and is designed to control the energy using devices which cannot be operated by the campus central supervisory control system.

Abbott Power Plant Efficiency Improvements - (\$454,200)

Currently, the operator receives little or no feedback concerning the operating efficiency of the Abbott cogeneration power plant. This project provides for the installation of a computer based monitoring system and software to accomplish system efficiency and optimization based on real time measured parameters. Some of the parameters monitored will be steam and electric demand, fuel price, efficiency and characteristics of plant equipment, i.e., boilers, turbines, pumps and desuperheaters. Optimized operation of the power plant will increase efficiency approximately 2-3%.

Reduction of Air Volume - Roger Adams Laboratory - (\$424,900)

Roger Adams Laboratory currently has three 100 h.p. and one 40 h.p. single speed fans supplied by 100% outside air. Also, the building has 225 single-speed 3/4 h.p. fume hood exhaust fans.

This project provides for the installation of variable air volume controls on the four supply air fans and changing the 225 single-speed exhaust fans to two speed. Also, wiring and software changes will be made to the existing microprocessor to track the supply fan speeds to the number of fume hood exhaust fans on low speed.

Domestic Hot Water Retrofit - 4 Buildings - (\$43,200)

This project includes removal of existing heat exchangers and hot water holding tanks. Instantaneous hot water heaters will be installed then along with a system flow pump, time clock and controls. The new controls will shut off domestic hot water systems during the unoccupied time period for each building and thereby reduce steam usage.

The work will be performed in the following buildings:

Gregory Hall
Loomis Lab
Bevier Hall
Animal Science

HVAC Retrofit - 2 Buildings - (\$681,300)

This project provides for the replacement of the dual duct ventilation systems in Loomis Laboratory of Physics and the Materials Research Laboratory with a variable air volume (VAV) system. Included in the project are thirty fan systems and 430 variable volume units, one in each room of both buildings. This modification will use less energy to produce the room temperatures desired because the systems will not heat and cool simultaneously.

Radiation Zone Control I - 24 Buildings - (\$341,900)

This project will reduce the uncontrollable heat input during the heating season and includes installation of the following control devices in the heating systems of twenty-four buildings:

Zone thermostats
Zone valves
Time clocks
Insulation
Outside air sensing controllers
Steam traps
Condensate return piping
Control tubing

The work will be performed in the following buildings:

Civil Engineering Bldg.	Davenport Hall
Education Building	Electrical Eng. Research Lab.
Inst. of Labor & Ind. Rel.	Engineering Research Lab
Physical Plant Svc. Bldg.	Huff Gymnasium
Veterinary Med. Complex	Kenney Gymnasium
Medical Sciences Building	Speech and Hearing Clinic
Law Building	Engineering Hall
Gregory Hall	Coble Hall
Coordinated Science Lab	University High School Gym
Library	Wood Shop and Foundry
Library 7th Addition	Natural Resources Studies Annex
Turner Hall	Smith Memorial Hall

Reheat Systems Zone Control - 12 Buildings - (\$355,800)

This project will reduce the steam used by the reheat systems located in the ventilation systems of twelve buildings. The project includes the installation of valves and controls to isolate the system by zones and to shut off the converters and pumps at a time determined by outside air temperature.

The work will be performed in the following buildings:

Burnsides Research Lab	Natural Resource Studies Annex
Civil Engineering Building	Rehabilitation Center
Veterinary Medicine Complex	Medical Sciences Building
Foreign Languages Building	Law Building
Children's Research Center	Animal Science Laboratory
Materials Research Lab	Smith Memorial Hall

Steam Metering Improvements - 47 Buildings - (\$711,600)

This project provides for remote continuous reading of meters which monitor usage of electricity, steam flow and condensate. The computer based Monitor and Control System (MACS), presently operating in 47 major research and instructional facilities, would be connected to the existing meters.

The work includes installation of a few new meters, hardware and computer program changes. The new system will provide continuous monitoring of energy flows and identify abnormal or excessive usage for quick reaction. It will also provide information to occupants concerning energy use rates and will verify conservation efforts and maintain historical records.

Conversion to Central Fan System - Armory - (\$91,600)

This project provides for the removal of motors, fans, and filters from 56 fan coil units, increasing the size of the duct leading to each fan coil unit, and the installation of a bypass valve on each fan coil unit heating coil. Also included is the changing of the thermostat from a heating/cooling season control device to only heating thermostat, installation of larger exhaust fans, and the installation of heating and cooling coils in large supply fans on the mezzanine.

Install Air Curtains Above Entryways - Three Buildings - (\$46,000)

This project will provide for the installation of five air curtains over the entrances to prevent cold drafts of outside air from entering the buildings (and resulting structural heat loss) as follows:

Library - north and south main entrance
Institute of Labor and Industrial Relations - south entrance
Armory - northeast and southwest entrance

Radiation Zone Control II - 26 Buildings - (\$711,600)

This project includes the installation of zone controls, thermostats and timers. The purpose of the installation is to reduce the uncontrollable heat input to the buildings during the heating season.

The work will be performed in the following buildings:

Children's Research Center	Natural Resources and Garage
Burnsides Research Lab	Noyes Laboratory
Commerce West	Personnel Services Building
Psychology Laboratory	Physics Research
Rehabilitation Center	Stock Pavilion
Foreign Languages Building	Talbot Lab
Altgeld Hall	Transportation
Ag. Engineering Research	Arcade
Ceramics	Electrical Engineering Annex
Fire Station	David Kinley Hall
Lincoln Hall	Harker Hall
Mumford Hall	English Building
Natural History	Dairy Manufactures Building

Summer-Winter Ventilation Rate - 3 Buildings - (\$40,000)

This project will provide the capability to operate fifty fan systems at lower ventilation rates during the heating season. Savings will result from a reduction of outside air which requires heating prior to delivery to the building space.

The work will be performed as follows:

Psychology Building	18 fan systems
Law Building	16 fan systems
Music Building	16 fan systems

Conversion from Cast Iron to Fin Tube Radiation - Animal Science Laboratory - (\$325,600)

This project will provide for conversion of cast iron radiation to fin tube radiation with cover. The conversion will reduce the amount of steam used by the radiation system by approximately 40 percent.

Radiation Zone Control - 6 Buildings - (\$78,000)

This project includes the installation of two zone valves, two zone thermostats and two controllers, and referred to outside temperatures on the steam-supplied radiation. This will reduce the amount of steam used by the radiation systems. In the Arts and Design Building, the work includes the same as above plus a normally closed valve on the steam to water heat exchanger.

Art & Design	Digital Computer Lab
Materials Research Laboratory	Harding Band Bldg.
Aero Lab A & Brakeshoe Laboratory	Chemistry Annex

Central Supervisory Control Center - (\$605,600)

This request is to provide funds to connect the master control of the Central Supervisory Control Center to an additional six buildings and provide additional controls to ten buildings. A feasibility engineering study of supervisory control centers had indicated that the University should install a central control system capable of providing the control needs for all the buildings on the campus and accommodating their occupants to give the most efficient, economical, and reliable environmental conditions available.

A computerized control center can collect and monitor any type of data. Scientific laboratory experiments can even be connected to a central panel and efficiently controlled with a maximum of safety and security. Any abnormal condition would be immediately detected and appropriate action taken where necessary.

Temperature Control Remodeling and Replacement - 7 Buildings - (\$787,300)

This project will replace the existing controls in seven buildings for 141 fan systems and 2,700 room thermostats. The controls presently operating in these buildings have, through deterioration over the years, become inefficient and obsolete. New sensors and signaling type controls will be installed to improve the ability to control space temperatures in these buildings.

The work will be performed in the following buildings:

Library	Noyes Laboratory
Gregory Hall Phase II	Chemistry Annex
Smith Memorial Hall	Bevier Hall
College of Veterinary Medicine	

Domestic Hot Water Control - 6 Buildings - (\$53,700)

This project includes the controls to shut off the domestic hot water systems during the unoccupied time period for each building, thus reducing the amount of steam utilized. Work involves the installation of one time clock, one control valve and controller, and one P.E. switch on each of the domestic water systems.

The work will be performed in the following buildings

Institute of Labor and Industrial Relations
Children's Research Center
Administration Building
Harding Band Building
Astronomy Building
Turner Hall

Animal Room Ventilation - 2 Buildings - (\$272,500)

The use of 100% outside air in ventilating animal room spaces in these buildings require large energy expenditures to maintain indoor conditions. This project will provide for the installation of thermal energy recovery devices which can reclaim up to seventy percent of the energy required for each fan system.

The work will be performed in the following buildings:

Psychology Laboratory

College of Veterinary Medicine and Annex

Reheat Systems Zone Control - 10 Buildings - (\$242,200)

This project will reduce the steam used by the reheat system associated with the ventilation system of several buildings. Included is the installation of a time clock, zone valves, a normally closed steam valve on the steam to water heat exchangers and a controller to operate the systems according to outside temperatures.

The work will be performed in the following buildings:

Harding Band Building

Commerce West

Coordinated Science Lab

Electrical Engineering Bldg.

Library 7th Addition

Psychology Lab

Altged Hall

Astronomy Building

Electrical Engineering Annex

Art & Design

Pipe Insulation - Electrical Engineering Building - (\$33,200)

This project includes the insulation of hot surfaces throughout the building, such as steam and condensate lines from the building entrance to zone valves, hot surfaces on converters and steam absorption machines, and exposed piping throughout the building to prevent heat from escaping through an uncontrolled source in the Electrical Engineering Building.

Steam Absorption Machine Control - 4 Buildings - (\$151,000)

This project includes the installation of air operated automatic steam control valves, the removal of solution control valves, and the installation of microprocessing control units. These modifications will reduce the amount of steam used to air-condition the buildings.

The work will be performed on absorption machines in the following buildings:

Burnsides Laboratory
Library 7th Addition

Rehabilitation Center
Psychology Building

Domestic Hot Water Control - 4 Buildings - (\$24,400)

This project includes the controls to shut off the domestic hot water systems during the unoccupied time period for each building as follows. Work involves the installation of one time clock, one control valve and controller, and one P.E. switch on each of the domestic water systems.

The work will be performed in the following buildings:

Foreign Languages Building
Medical Sciences Building

Natural Resource Studies Annex
Burnsides Research Laboratory

Conversion to Zoned Ventilation - Arts & Design Building - (\$218,200)

This project provides for the removal of the existing mixing boxes and room thermostats and the installation of heating and cooling coils in each of the hot and cold ducts. Also included are controls for separating each floor in the building into north and south zones and the installation of a duct between the main duct and the room service duct for each supply.

Increased Insulation on High Pressure Steam Mains - (\$651,000)

The current condition of the 8 inch utility steam main ((150 psig) permits significant heat losses. To correct the problem, this project provides for installation of additional 1 1/2 inch fiberglass "wrap on" type insulation to the 28,600 feet of steam piping.

Reheat Systems Zone Control - 4 Buildings - (\$143,100)

This project is to reduce the steam used by heating systems located in the ventilation systems of four buildings. It involves the installation of 750 reheat coils in 53 ventilation systems.

The work will be performed in the following buildings:

Library

Digital Computer Laboratory

Morrill Hall

Education Building

FISCAL YEAR 1986 FOOD FOR CENTURY III REQUEST

FOOD FOR CENTURY III:
FOOD-PRODUCTION RESEARCH FOR A DYNAMIC ILLINOIS AGRICULTURE

A dynamic Illinois agriculture is critically important to the continued growth and development of the state's economy, since this major industry directly or indirectly affects food producers, consumers, processors, agribusinesses, allied industries, and Illinois citizens as a whole. With the strong support of land-grant agricultural research and related extension education programs, Illinois farmers from Galena to Cairo produced and marketed a broad range of agricultural commodities valued at more than \$7.43 billion during 1982. Total cash receipts for the calendar year included an impressive \$5.06 billion for various field, horticultural, and nursery crops and more than \$2.37 billion for livestock and livestock-derived products. (Figure 1 identifies the 1982 cash receipts derived from principal Illinois agricultural commodities, both regionally and statewide.)

Enhancing Illinois' long-standing position as one of the nation's foremost agricultural regions, the state's farmers produced and marketed more than 18 percent of the entire U.S. corn crop and 16 percent of its soybean crop during 1982. Nationwide, Illinois ranked first among the 50 states in soybean production, second in corn production, and second in total cash receipts from all crops. Illinois livestock producers also accounted for nearly one-third of the state's agricultural income, ranking second nationwide in hog production and ninth in overall cash receipts from livestock and livestock-derived products.

Agricultural exports represent an increasingly vital component in the Illinois economy, with nearly one-half (44 percent) of the state's annual agricultural output now reaching international markets. More than \$3.3 billion in raw and processed agricultural commodities were shipped abroad during FY 1982, with Illinois ranking first nationwide in exports of soybeans and soybean-derived products, first in feed grains and derived products, and first overall in exports of all agricultural commodities. A

Figure 1:

-2-

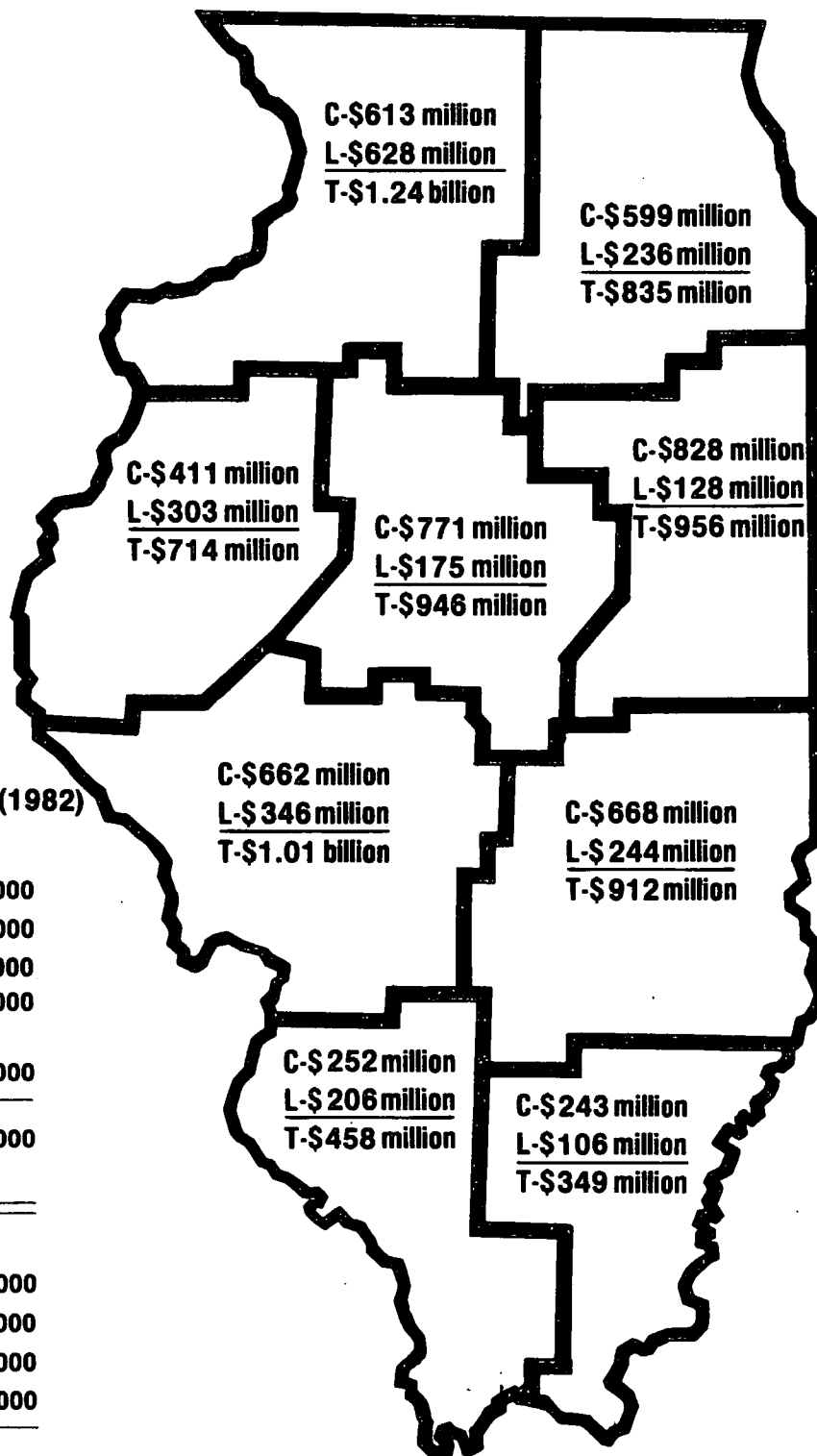
Cash Receipts From Illinois Agricultural Commodities

C-Crops (cash receipts, all crops)

L-Livestock (cash receipts, all livestock and livestock products)

T-Total (cash receipts, all agricultural commodities)

(Calendar Year 1982, By Region)



Cash Receipts From Farm Marketings, Illinois Agricultural Commodities (1982)

Cattle and Calves	\$ 661,642,000
Hogs	1,278,859,000
Dairy Products	353,160,000
Eggs	55,487,000
All Other Livestock & Livestock Products	23,346,000
Total, Livestock & Livestock Products	\$2,372,494,000

Corn	\$2,690,909,000
Soybeans	1,926,638,000
Wheat	229,307,000
All Other Crops	215,059,000
Total, All Crops	\$5,061,913,000

Total Cash Receipts, Crops and Livestock	\$7,434,407,000
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Source: Illinois Agricultural Statistics,
Illinois Cooperative Crop Reporting Service

vigorous Illinois livestock industry also ranked high in total export shares for the year, holding the fifth position nationwide in exports of live animals and meats.

In a very tangible way, the myriad of agricultural commodities annually produced and marketed by Illinois agriculture exert a profound impact on the state's economy and also serve the social and humanitarian goal of meeting increased world food needs. The comprehensive World Food and Nutrition Study (1977), as well as other more recent works in the area of agricultural and economic development, emphasize the long-term need for expanded world food production, better food distribution and marketing systems, improved human nutrition, and more effective population control methods. Illinois agriculture, with its great abundance of human and natural resources, can undoubtedly provide strong leadership in many of these high-priority areas.

Today, there is a growing realization that many of these pressing socio-economic problems can be best resolved through increased investments in agricultural research and education. In Illinois, prior investments in the Food for Century III program for food-production research are already yielding major dividends in the form of state-of-the-art agricultural research and extension programs which benefit agricultural producers and consumers throughout the state, the nation, and the world.

Today's Illinois agriculture is truly a dynamic entity, representing many things to many people. It constitutes a major component in the nation's economy; a positive force in the world marketplace; a respected member of the international agricultural community; a useful model for national agriculture in developing countries; and, above all, a valued state asset. As Illinois' broad-ranging agriculture enterprise moves rapidly into the era of high technology, even more dramatic achievements may be anticipated as many benefits of the Food for Century III program are fully realized.

The FY 1986 Food for Century III request marks the beginning of a final phase of a distinct University of Illinois initiative for food production research facilities. With the completion of the Animal and Dairy Sciences Facility, for which planning funds have been requested for FY 1986, the "critical" mass of agricultural and veterinary medicine research facilities will have been developed at the University. Remaining research facility needs will be integrated with other vital campus capital project requests.

Table 1 presents the multi-year Food for Century III request. ,
Following Table 1 are detailed descriptions of the FY 1986 Food for Century III projects.

UNIVERSITY OF ILLINOIS
FY 1986
FOOD FOR CENTURY III PROGRAM
(Dollars In Thousands)

<u>FY 1986 Priority</u>	<u>Project Name</u>	<u>Total Cost</u>	<u>FY 1984 Appropriations</u>	<u>FY 1985 Appropriations</u>	<u>FY 1986 Request</u>	<u>FY 1987</u>
1.	Plant Sciences Greenhouse Complex					
	Planning	\$ 650.0	\$ 650.0			
	Building	8,666.1		\$ 8,666.1		
	Utilities	600.0		600.0		
	Equipment	450.0			\$ 450.0	
	(Project Subtotal)	<u>(10,566.1)</u>	<u>(650.0)</u>	<u>(9,466.1)</u>	<u>(450.0)</u>	
2.	Veterinary Medicine Animal Room Facilities					
	Remodeling	2,700.0	1,200.0	1,500.0		
	Equipment	300.0		150.0	150.0	
	(Project Subtotal)	<u>(3,000.0)</u>	<u>(1,200.0)</u>	<u>(1,650.0)</u>	<u>(150.0)</u>	
3.	Animal and Dairy Sciences Laboratory					
	Planning	1,000.0			1,000.0	
	Remodeling	2,700.0				\$ 2,700.0
	Building	12,463.0				12,463.0
	Utilities	300.0				300.0
	Equipment	900.0				900.0
	(Project Subtotal)	<u>(17,363.0)</u>			<u>(1,000.0)</u>	<u>(16,363.0)</u>
	TOTAL COST	\$30,929.1	\$1,850.0	\$11,116.1	\$1,600.0	\$16,363.0

FOOD FOR CENTURY III PROJECTS FOR FY 1986

Plant Sciences Greenhouse Complex - (\$450,000)

The present greenhouses used by the College of Agriculture, built in the early 1900's and programmed for replacement, are antiquated, energy inefficient, lacking in sophisticated controls, and structurally deteriorating. Funding has been approved for the planning (\$650,000 - FY 1984), construction (\$8,866,100 - FY 1985), and utilities (\$600,000 - FY 1985) for a new Plant Sciences Greenhouses Complex to be located adjacent to the existing Turner Hall greenhouses, providing modern, efficient facilities for sophisticated plant research. An equipment request of \$450,000 for FY 1986 has been developed to support the project. The equipment will consist of plant laboratory items such as drying ovens, environmental chambers, soil steaming carts, and spectrophotometers as well as the traditional greenhouse benches. Some areas of the complex will be provided with standard office equipment.

Veterinary Medicine Animal Room Facilities - (\$150,000)

Construction of the new Basic Sciences Building for the College of Veterinary Medicine brought online the first major project in the University's Food for Century III program. The College's first 30 years were spent developing teaching and service programs to help meet the nation's critical shortage of veterinarians. The recently completed Basic Sciences Building has permitted the College to expand its programs directed toward basic veterinary research. The Basic Sciences Building has provided modern laboratory space for researchers in the College's pathobiology and biosciences departments; however, construction of animal room facilities in an unfinished area on the first floor of the Building continued to be required.

An appropriation of \$1,200,000 was made in FY 1984 for the first phase remodeling of unfinished space in the Veterinary Medicine Basic Sciences Building into a sophisticated animal disease research laboratory area. An FY 1985 appropriation involved the remaining funds to complete first floor

animal room space plus the funds to correct some problems that have surfaced since the occupancy of the building. An equipment request of \$300,000 has been developed to support the project with \$150,000 approved in FY 1985 and \$150,000 requested in FY 1986. The equipment will consist mainly of animal cages.

Animal and Dairy Sciences Facility - (\$1,000,000)

The Animal Agriculture Program in the College of Agriculture has been scattered about in five campus buildings for many years. The long-range plan has been to consolidate the facilities for that program on the south campus within easy reach of related facilities existing on the research farm space south of campus. The purpose of the consolidation is to facilitate interdisciplinary and multidisciplinary research efforts. The remodeling of the Meat Science Laboratory represented the initial step in the consolidation process. The completion of this project will represent the final step in that process.

A proposed addition of 38,000 ASF to the Animal Sciences Laboratory will provide space to house both the Animal Science and Dairy Science Departments in adequate office and laboratory facilities. The Animal Science Department is now scattered in five buildings. There is currently a shortfall of research laboratory space for the two departments of over 20,000 ASF. The space shortage coupled with scattered and obsolete facilities creates a significant negative impact on the program.

This project will involve the construction of an addition (to be requested in FY 1987) followed by remodeling in the existing Animal Science Laboratory (to be requested in FY 1987, also). Construction of the addition as the initial step in the project will allow staff and equipment to be relocated thus freeing up space in the existing structure for the remodeling phase of the project. The addition will include the most sophisticated research space in the complex and will also include laboratory animal space that will enable researchers to implement or expand the numerous research programs:

-- In microbiology, a team is developing a system of predicting the performance of ruminants based on diet composition--a task made difficult because feedstuffs are first subjected to rumen fermentation.

-- Another team is developing a system of predicting the adverse effects of various mycotoxins, nitrosamines, nitrites, and other agents. Their work may help clarify the structural features leading to toxicity and carcinogenicity.

-- One group is studying the use of grass clippings as a new feed ingredient to contribute to the efficiency of animal agriculture--particularly poultry.

-- Still another group is studying ways to improve the bioavailability of several B-vitamins, lysine, and the sulfur-containing amino acids.

-- A group of dairy scientists is developing a method using electrical conductivity to monitor cows infected with mastitis.

-- Another team is developing procedures for increasing the number of female gametes from desirable cows and transplanting them in less desirable cows.

In addition, work in rumen physiology, animal waste management, and other areas of microbiology and management are underway. Most of the work benefits from an interdisciplinary approach will be made workable by the consolidation of facilities.

Planning for the Addition and remodeling of the existing building is proposed in FY 1986 at a cost of \$1,000,000. The planning will assure that the construction of the Addition and remodeling work in the existing Animal Sciences Laboratory will be coordinated. The funds to construct the Addition and remodel the existing facility will be requested in FY 1987.