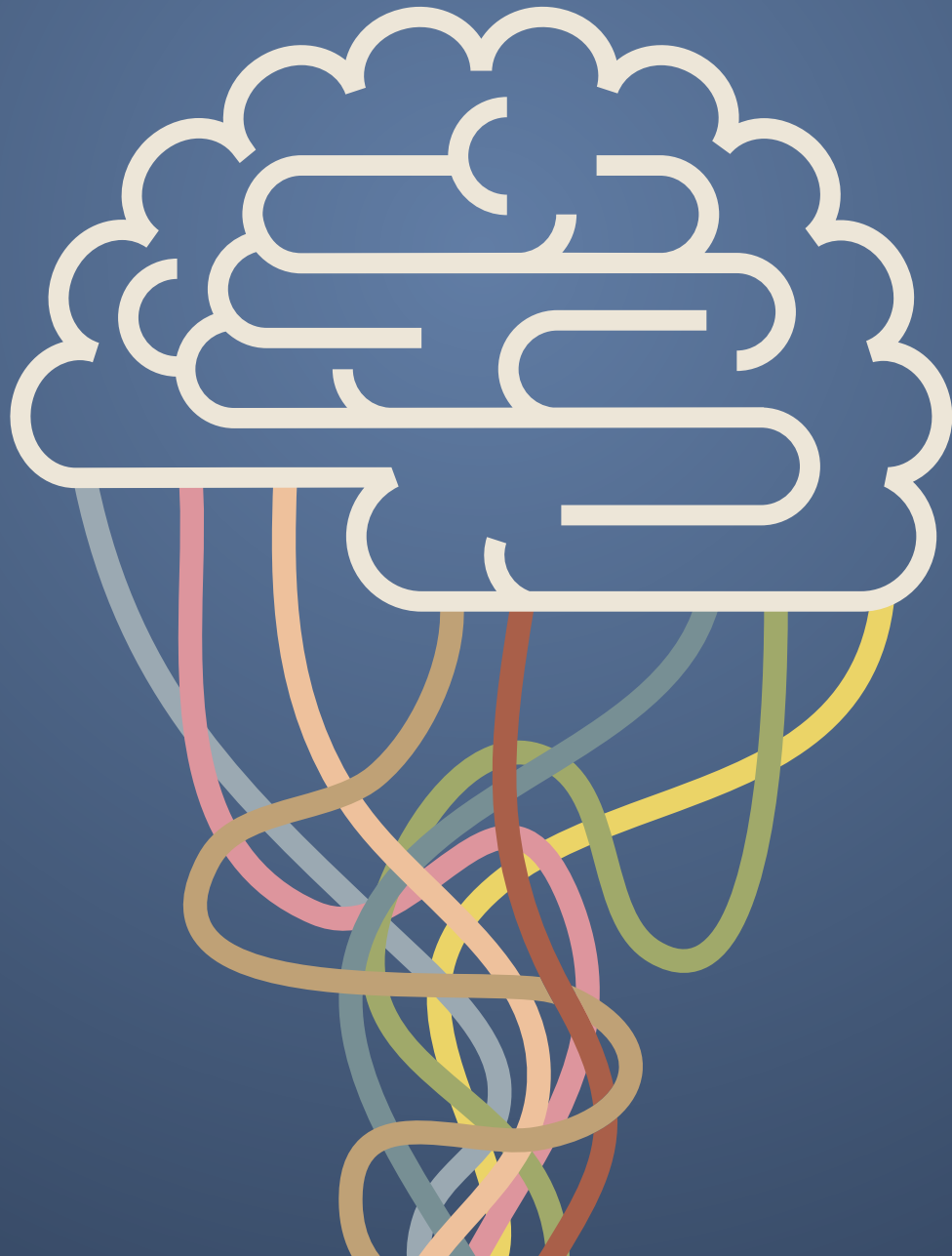


Solving *the* Brain Drain:

THE REGIONAL IMPACT
OF FARMINGDALE STATE COLLEGE

A Special Research Report From the Long Island Association, Inc.



2018

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Compiled by

John A. Rizzo, PhD,

Chief Economist, Long Island Association, Inc.

**Farmingdale
State College**

State University of New York

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Executive Summary

Background

Long Island’s institutions of higher education play a crucial economic role within the Long Island economy. They generate a steady stream of skilled workers for local businesses. They are also major economic entities whose expenditures contribute materially to regional economic activity. Moreover, by providing educational opportunities to a percentage of those who may not otherwise attended college, these institutions greatly impact the future salaries of those graduates and, as a result, their ability to purchase home, buy goods, and pay taxes.

This report documents the economic impact of one such institution, Farmingdale State College (FSC), a campus of the State University of New York. It is one of a series of special research reports by the Long Island Association, focusing on issues of regional significance.

This report was prepared by John A. Rizzo, PhD, Chief Economist of the Long Island Association. Dr. Rizzo received his PhD degree in economics from Brown University. Dr. Rizzo is currently also Professor of Economics and Professor of Family, Population, and Preventive Medicine at Stony Brook University. He has previously taught at Yale, Cornell, and Ohio State Universities. He has published more than 180 articles in peer-reviewed academic journals and has received awards from Yale University and The Child Care Council of Suffolk County for his research.



Principal Findings

- Farmingdale State College's total impact on the Long Island regional economy from 2009-2017 was \$2.51 billion.
- Farmingdale returned *five times* in economic impact for every dollar that New York State invested in the college during this period.
- Farmingdale created more than 19,800 jobs in a broad array of local industries.
- Farmingdale supports the regional economy by providing a steady stream of well-qualified employees to serve local businesses and industries. Moreover, its direct expenditures contribute materially to economic activity on Long Island.
- Farmingdale's capital and operating expenditures had a \$1.43 billion impact on the Long Island economy over the period 2009-2017. That is, direct operating and capital expenditures of about \$766 million by FSC during the study period contributed \$1.43 billion to Long Island's output of goods and services, its gross metropolitan product. Auxiliary Service Corporation (ASC) expenditures add an additional \$2.3 million in output, nearly \$787,000 in earnings and support 22 jobs.
- But beyond this impact, Farmingdale has increased the productivity of the Long Island workforce, because some students would not have attended and graduated from college but for the presence of FSC. These students earn higher salaries and have greater productivity because they were able to graduate from college. Evidence indicates that geographic proximity plays a critical role in a student's decision to enroll in college. If 10 percent of FSC graduates would not have earned a degree but for the opportunity provided by the College, the increased productivity totals an additional \$1.08 billion. Thus, the total economic impact of FSC amounts to \$2.51 billion.
- Direct spending by FSC during the study period also caused an increase in earnings estimated at more than \$484 million. Increased worker productivity raised earnings by an additional \$290 million.
- Farmingdale's four schools – Arts and Sciences, Engineering Technology, Health Sciences, and Business – enroll over 9,000 undergraduate and graduate students. Since FSC completed its evolution into a four-year institution in the 1990s, it has granted proportionately more bachelor's degrees and proportionately fewer associate degrees. Applications to FSC have doubled in the past decade and admission to the college has become increasingly selective. Fewer than half of all applicants are currently offered admission. The high school GPA of incoming freshman enrolled in baccalaureate programs was 88.7 in Fall 2016. The growing selectivity of FSC in admitting students and the outstanding academic achievements of these students is reflected in the fact that five FSC students were awarded prestigious Fulbright Scholarship Awards from 2010-13. This ranked Farmingdale first among all SUNY institutions in the colleges of technology and comprehensive colleges sectors.
- Farmingdale satisfies the workforce needs of local businesses through its emphasis on the applied sciences and technology. Its BS degree in Manufacturing Engineering Technology, which focuses on quality control and computer aided manufacturing, is the only such program in the region. It provides vital support to Long Island's technology-intensive manufacturing sector.
- Because today's growth industries are evolving from hybrid fields, FSC's academic programs are increasingly inter-disciplinary, rather than entrenched within specific disciplines. For example, because drug discovery now involves advanced computer techniques, the BS degree in Bioscience incorporates courses in both biotechnology and advanced computer techniques.
- As part of the learning process, FSC involves students in solving "real-world" problems encountered by local businesses, government agencies, hospitals and community organizations. Student internships and clinical placements are an important part of this process. They give FSC students applied experience in actual work situations and ensure that many of them will have well-paying jobs upon graduation. At the same time, they provide local businesses and institutions with the pipeline of talent they need to thrive and grow.
- Farmingdale professors keep abreast of the latest developments in their respective fields through their research publications and participation in professional conferences. They also regularly collaborate with industry representatives to ensure that their academic programs are current and responsive to the changing needs of

business and industry. This enables Farmingdale faculty to respond quickly to advances in science and technology. The utilization of outside advisory committees composed of leaders in business, industry and the professions means that program and curriculum development at FSC is agile, dynamic and up-to-date.

- Farmingdale has established several institutes that support economic development on Long Island and throughout New York State. These include the Institute for Research and Technology Transfer, which provides local companies with access to modern, cost-effective manufacturing systems, the Solar Energy Center, which encourages the utilization of photovoltaic energy systems, and the Renewable Energy and Sustainability Center, which spearheads Farmingdale's pioneering efforts in green technologies.
- Farmingdale is expected to play a pivotal role in promoting future economic development on Long Island and in New York State through its partnership in the Broad Hollow Bioscience Park (BHBP) with the SUNY Research Foundation and Cold Spring Harbor Laboratory. The bioscience park, located on campus, has the potential to leverage its location and academic standing to support the commercialization of new technologies. With the development of well-configured laboratory research space for private companies in the bioscience park, FSC can potentially capture young, fast-growing bioscience companies spun off by research institutions in the New York metropolitan region and elsewhere.
- As companies at BHBP mature, they will seek facilities in the surrounding community, motivating private developers to build additional bioscience facilities in the immediate area. This will validate and leverage the State's past investments in BHBP and in FSC's expanded academic bioscience programs. It also raises the prospect that, eventually, FSC may develop its own intellectual bioscience property, thereby creating revenue for the college and the SUNY system.
- The Federal government is expected to make major investments in alternative energy sources. Teaching, research and development of alternative energy systems is and will continue to be a central function of the FSC faculty within the School of Engineering Technology.

Fueling the Long Island Economy: The Regional Impact of Farmingdale State College

A Special Research Report from the Long Island Association, Inc.

Prepared by John A. Rizzo, PhD, LIA Chief Economist

The expenditures of Long Island's institutions of higher education contribute to the region's output of goods and services, its earnings and its employment base through the multiplier process. This study documents the economic impact of Farmingdale State College and demonstrates its positive influence on various sectors of the local economy and its value to Long Island.

The Dynamic Long Island Economy

Background. Long Island's economy has recovered well from the Great Recession. The labor market is strong—approaching full employment levels. Long Island also enjoys a relatively well-educated workforce and a strong and growing presence in the education and health care sectors.

Long Island's labor market has been strong for some time. But will this pattern persist? And what sectors will show the greatest growth? Projections from the New York State Department of Labor provide some insight into these questions. As Table 1 below indicates, employment is expected to rise by 11.2 percent overall from 2012-2022. The strongest growth in percentage terms is expected to occur in:

- **Professional & Business Services** (+22.2%)
- **Health Care & Social Assistance** (+23.2%)
- **Arts, Entertainment and Recreation** (+23.9%)
- **Accommodation & Food Services** (+22.8%)

Dimensions of the Brain Drain

Employment Projections for Long Island, by Industry

Industry Title	Employment		Net Changes	Percent Changes
	2012	2022		
Agriculture, Forestry, Fishing and Hunting	3,650	3,540	-110	-3.0%
Mining	180	170	-10	-5.6%
Utilities	4,090	3,880	-210	-5.1%
Construction	62,160	73,490	11,330	18.2%
Manufacturing	73,840	75,360	1,520	2.1%
Wholesale Trade	67,630	68,840	1,210	1.8%
Retail Trade	156,430	167,120	10,690	6.8%
Transportation and Warehousing	37,790	41,380	3,590	9.5%
Information	24,320	23,210	-1,200	-4.9%
Finance and Insurance	71,480	71,580	100	0.1%
Professional and Business Services	163,760	200,120	36,360	22.2%
Educational Services	143,780	149,890	6,110	4.2%
Health Care and Social Assistance	203,330	250,410	47,080	23.2%
Arts, Entertainment, and Recreation	21,690	26,880	5,190	23.9%
Accommodation and Food Services	88,580	108,810	20,230	22.8%
Other Services (Except Government)	58,510	67,930	9,420	16.1%
Government	85,960	82,740	-3,220	-3.7%
Total Self Employed and Unpaid Family Workers, All Jobs	80,950	83,780	2,830	3.5%
Total All Industries	1,348,130	1,499,040	150,910	11.2%

This represents a mix of relatively high paying jobs (business & professional services) as well as lower-paying service sector jobs (accommodation and food services). But clearly, the service sector is expected to predominate.

In contrast, manufacturing is projected to grow, but only by 4.2 percent, a rate less than half of the overall average growth. But a recent study by the Manufacturing Institute, a Washington-based think tank, and Deloitte LLC, projects that some 3.4 million manufacturing jobs are expected to become available as baby boomers retire and economic growth increases job opportunities¹. Many of these manufacturing opportunities, however, will require

computing, technical, and problem-solving skills that will necessitate retraining of workers. And unless that happens, some two million of these jobs may go unfilled, according to that study.

The manufacturing sector is and will remain an important one for the Long Island economy. But manufacturing will require more technical skills, so retraining programs are critical for Long Island's economy to maintain a vibrant presence in this sector. Since Long Island enjoys a relatively well-educated labor force and high-quality educational system, it may be well positioned to address this projected skills gap in manufacturing.

Long Island's Changing Demographics. But while jobs have risen substantially overall, much of this growth has occurred in the service sector, which often pays lower wages. And other challenges remain. Long Island is aging. From 2015-2030, it is estimated that the population on Long Island aged 45-64 will decline by 20 percent, while the group aged 85 and above will rise by a like amount (Tables 2A, 2B). These demographic projections have obvious adverse consequences for Long Island's economy. If they in fact occur, economic growth and government revenues will decline, while health care costs will rise substantially. Avoiding these unfavorable changes

will require a multi-faceted approach, involving more affordable housing, better transportation, and more and better job opportunities, especially for younger workers. But equally important is the availability of educational opportunities to meet the changing demands of the work force. Greater technical expertise will be required, not only in scientific and technical job sectors, but in traditionally blue-collar jobs such as manufacturing. Indeed, national estimates indicate that over the next decade, some 3.4 million jobs in manufacturing will become available. But these jobs will require much greater technical skills and training than traditional manufacturing jobs.

Table 2A. Projected Population, by Year and Age Group: Nassau County

Age Range	2015	2020	2025	2030
0-4	73,473	75,634	75,746	73,825
5-14	167,911	165,841	167,530	168,721
15-24	170,145	160,942	155,311	153,482
25-44	318,410	326,938	330,975	324,320
45-64	385,569	365,517	340,405	325,222
65 plus	214,397	228,514	246,289	258,900
85 plus	35,699	33,846	32,556	34,081
Total	1,329,905	1,323,386	1,316,256	1,304,470

Source: Cornell University College of Human Ecology

Table 2B. Projected Population, by Year and Age Group: Suffolk County

Age Range	2015	2020	2025	2030
0-4	90,644	93,462	94,206	92,376
5-14	192,401	192,237	198,935	201,592
15-24	194,895	184,165	176,342	176,641
25-44	375,206	389,707	399,522	398,353
45-64	434,517	423,407	398,289	377,648
65 plus	225,064	247,572	276,421	301,758
85 plus	30,782	31,639	32,817	36,855
Total	1,512,727	1,530,550	1,543,715	1,548,368

Source: Cornell University College of Human Ecology

1. A copy of the full Manufacturing Institute/Deloitte report may be obtained at: <https://www2.deloitte.com/us/en/pages/manufacturing/articles/boiling-point-the-skills-gap-in-us-manufacturing.html>

The Brain Drain: A Zero-Sum Game? Although workers aged 45-64 are expected to decline on Long Island, the prospects for younger workers (25-44) are more promising. As the table below indicates, workers in this age group are projected to remain quite stable for New York State overall—growing by just 0.6 percent between 2015 and 2030. Some counties will gain while others will lose. But growth in these age groups is projected to be above average for both Nassau (1.9 percent) and Suffolk (6.2 percent) counties (Table 3). Such new young workers will be important to replenish the decline in older workers. And the labor market will require better training and more technical skills from these workers. So, higher education, and especially Farmingdale, will play an increasingly important role.

Because of the local demographic of its student body as well as the success in preparing students for the work force through its applied learning curriculum, FSC provides a

steady pipeline of employees equipped with the relevant skills regional companies seek. As of Fall 2016, 89 percent of Farmingdale’s student body came from Long Island (39 percent from Nassau and 50 percent from Suffolk). Moreover, FSC’s graduates are highly employable. A survey of the December 2015 and May 2016 graduating classes revealed that 89 percent of the baccalaureate degree recipients were employed within six months—with 88 percent working in in the New York metropolitan area, the vast majority of those on Long Island.

In addition, 46 percent of the graduates were offered positions at the company where they interned. It’s worth noting that a majority of those students obtained their internship through FSC.

Table 3. Projected Change in Population, Persons Aged 25-44, by Selected Counties

County	2015	2030	Pct Change
Kings	773,662	733,349	-5.2
Queens	696,932	700,360	0.0
New York	583,036	544,541	-6.7
Bronx	401,535	427,875	+6.6
Westchester	241,529	253,473	+4.9
Monroe	186,958	192,711	+3.1
Erie	219,982	209,753	-4.6
Richmond	127,297	136,263	+7.0
Onandaga	113,418	123,570	+8.9
Orange	96,942	110,402	+13.9
Rockland	76,018	83,347	+9.6
Dutchess	75,594	85,316	+12.9
Nassau	318,410	324,320	+1.9
Suffolk	375,206	398,353	+6.2
New York State	5,321,686	5,355,059	+0.6

Source: Cornell University College of Human Ecology

The Economic Impact of Operating Expenditures by FSC

Operating expenditures consist of the state purpose budget, the Educational Opportunity Center, residence halls, and the summer program.

- The state purpose budget includes the President’s office, administration and finance, the academic division, student affairs, institutional advancement and development. It is the core budget of the College and is supported by a combination of tuition, fees and state tax support.
- The Long Island Educational Opportunity Center (LIEOC) provides tuition-free courses for economically and educationally underserved adult New York State residents. The State University of New York provides funding for this unit through the University Center for Academic and Workforce Development.
- The residence halls are a self-supporting operation funded by dormitory room rents.
- The summer program is separate from the state purpose budget and is self-supporting.

Spending for all four major operational units is included in the following analysis. Between the 2009-10 and 2016-17 academic years, FSC’s operating expenditures totaled more than \$585 million (Table 4). Operating expenditures increased by more than 55 percent during this period. The state purpose unit accounted for approximately 88 percent of total operating expenditures. RIMS II multipliers specific to Long Island were used to estimate the ripple effect of this spending.



A survey of the December 2015 and May 2016 graduating classes revealed that 89 percent of the baccalaureate degree recipients were employed within six months—with 88 percent working in the New York metropolitan area, the vast majority of those on Long Island.

Table 4. Operating Expenditures Farmingdale State College (\$)

2009-2013

Operational Units	2009-10	2010-11	2011-12	2012-13
State Purpose Unit	54,523,300	55,418,022	53,433,839	60,459,700
President's Office	496,517	505,902	516,930	521,385
Administration & Finance	125,495,692	23,949,919	21,500,726	26,816,937
Academic Division	25,538,935	27,788,073	27,925,548	29,482,726
Student Affairs	835,109	822,047	895,331	1,098,552
Institutional Advancement	1,856,495	2,032,345	2,254,234	2,195,020
Development	292,552	319,736	341,070	345,080
LIEOC			4,502,245	4,426,240
Residence Halls	1,233,100	1,260,322	1,214,900	1,334,400
Summer Program	2,568,800	2,455,900	3,886,700	3,011,600

Source: Cornell University College of Human Ecology

2013-2017

Operational Units	2013-14	2014-15	2015-16	2016-17
State Purpose Unit	65,160,100	71,170,283	79,440,248	79,888,609
President's Office	559,209	600,032	835,994	756,500
Administration & Finance	28,814,273	31,861,055	37,528,248	36,097,980
Academic Division	31,669,708	34,019,971	36,114,636	37,745,117
Student Affairs	1,423,775	1,688,811	1,808,544	1,897,181
Institutional Advancement	2,347,656	2,575,956	2,624,433	2,746,331
Development	345,479	424,458	528,393	645,500
LIEOC	4,446,608	4,600,898	4,678,573	4,822,918
Residence Halls	1,449,800	1,516,911	1,689,879	1,439,307
Summer Program	2,539,500	3,665,442	5,344,934	4,269,677
Total (2009-2017)	73,596,008	80,953,534	91,153,634	90,420,511

Source: Cornell University College of Human Ecology

As Table 5 indicates, operating expenditures by FSC during the study period caused Long Island's output of goods and services, its gross metropolitan product, to increase by more than \$1.1 billion, including the original expenditure. This is equivalent to a net output increase

of \$514.8 million. Long Island earnings increased by \$381.6 million as a result of these expenditures and more than 10,400 jobs were created throughout the Long Island economy.

Table 5. Effects of Total Operating Expenditures on Output, Earnings, and Employment*

2009-2013

	2009-10	2010-11	2011-12	2012-13	2013-14
Total Output Increase	109,286,946	110,984,025	118,768,726	130,129,765	138,289,441
Total Earning Increase	38,008,149	38,603,096	41,368,007	45,313,966	48,145,366
Total Jobs Added	1,034	1,048	1,120	1,231	1,308

* Output and earnings in dollars

2014-2017

	2014-15	2015-16	2016-17	OE Total
Total Output Increase	152,125,187	171,133,393	169,950,836	1,100,668,318
Total Earning Increase	51,343,498	59,596,722	59,284,460	381,627,264
Total Jobs Added	1,439	1,621	1,609	10,411

* Output and earnings in dollars



The RIMS II multipliers are applied to operating expenditures by the type of industry that most closely reflects these expenditures. Tables 6 through 9 delineate the economic impacts of operating expenditures by the following industry types:

- Educational services
- Administrative and support services
- Professional and technical services
- Residence halls (real estate)

As Table 6 indicates, educational services have the largest impact, increasing output by \$607.5 million, more than half the total impact of \$1.1 billion. Expenditures on educational services increase earnings by almost \$215 million and support 5,835 jobs.

Table 6. Effects of Educational Services on Output, Earnings, and Employment*

2009-2013

	2009-10	2010-11	2011-12	2012-13	2013-14
Total Output Increase	55,868,364	59,929,459	71,781,471	71,223,464	77,317,539
Total Earning Increase	19,702,062	21,134,213	25,313,843	25,864,406	27,266,146
Total Jobs Added	535	574	687	702	740

* Output and earnings in dollars

2014-2017

	2014-15	2015-16	2016-17	OE Total
Total Output Increase	84,832,408	92,493,954	94,014,482	607,461,124
Total Earning Increase	29,916,275	32,918,131	33,154,348	214,969,425
Total Jobs Added	812	885	900	5,835

* Output and earnings in dollars

Administrative and support services also account for a large proportion of output gains, increasing output by almost \$424 million.

Table 7. Effects of Administrative and Support Services on Output, Earnings, and Employment*

2009-2013

	2009-10	2010-11	2011-12	2012-13	2013-14
Total Output Increase	46,562,782	43,739,737	39,266,776	48,975,772	52,623,507
Total Earning Increase	16,271,523	15,284,838	13,721,763	17,114,569	18,389,269
Total Jobs Added	457	430	386	481	517

* Output and earnings in dollars

2014-2017

	2014-15	2015-16	2016-17	OE Total
Total Output Increase	58,187,845	68,537,839	65,925,741	423,819,999
Total Earning Increase	20,333,725	23,950,528	23,037,731	148,103,947
Total Jobs Added	572	673	648	4,163

* Output and earnings in dollars

Table 8. Effects of Professional and Technical Services on Output, Earnings, and Employment*

2009-2013

	2009-10	2010-11	2011-12	2012-13	2013-14
Total Output Increase	4,937,466	947,757	5,830,459	5,735,386	6,092,941
Total Earning Increase	1,675,164	1,613,310	1,978,136	1,945,880	2,067,190
Total Jobs Added	31	33	36	36	38

* Output and earnings in dollars

2014-2017

	2014-15	2015-16	2016-17	OE Total
Total Output Increase	6,745,076	7,472,655	7,771,483	45,533,223
Total Earning Increase	2,288,443	2,535,294	2,636,679	16,740,097
Total Jobs Added	42	47	48	311

* Output and earnings in dollars

Table 9. Effects of Residence Hall Expenditures on Output, Earnings, and Employment*

2009-2013

	2009-10	2010-11	2011-12	2012-13	2013-14
Total Output Increase	1,918,334	1,960,683	1,890,020	2,075,926	2,255,454
Total Earning Increase	359,572	367,510	354,265	389,111	422,762
Total Jobs Added	11	12	11	12	13

* Output and earnings in dollars

2014-2017

	2014-15	2015-16	2016-17	OE Total
Total Output Increase	2,359,858	2,628,945	2,239,130	17,328,350
Total Earning Increase	442,331	492,769	419,702	3,248,021
Total Jobs Added	14	15	13	102

* Output and earnings in dollars

Operating expenditures increase output across all Long Island industries. As Table 10 indicates, the effects are greatest for educational and business and professional services. But the impact ripples throughout the economy.

Table 10. Industry-wide Effects of Total Operating Expenditures*

Industry	Output	Earnings	Jobs
Agriculture & Forestry	981,522	340,316	9
Construction	17,256,934	5,983,380	163
Manufacturing	29,307,343	10,161,536	277
Wholesale Trade	29,611,680	10,267,057	280
Retail Trade	24,113,414	8,360,681	228
Transportation & Warehousing	9,904,445	3,434,101	94
Information	40,907,264	14,183,498	387
Finance & Insurance	82,081,138	28,459,437	776
Real Estate & Rental Leasing	98,291,126	34,079,816	930
Professional & Business Services	333,037,441	115,471,814	3,150
Educational Services	323,824,646	112,277,524	3,063
Health Care & Social Assistance	34,148,223	11,839,982	323
Arts, Entertainment, and Recreation	6,813,648	2,362,450	64
Accommodation & Food Services	12,108,262	4,198,216	115
Other Services	10,301,419	3,571,741	97
Government	47,979,813	16,635,715	454

* Output and earnings in dollars



The Economic Impact of Capital Expenditures

Capital expenditures consist of expenditures for construction and equipment and technical and scientific services (Table 11).

Table 11. Capital Expenditures Farmingdale State (\$)

Fiscal Year	Design Cost	Construction Cost	Equipment Cost	Total Cost
2009-10	2,804,233	14,026,386	1,007,755	17,838,374
2010-11	4,127,162	16,080,613	253,415	20,461,190
2011-12	4,064,016	22,799,526	2,544,333	29,407,875
2012-13	3,075,131	26,685,007	891,213	30,651,351
2013-14	2,898,354	29,003,322	1,924,479	33,826,155
2014-15	1,573,562	17,251,073	2,794,823	21,619,458
2015-16	1,840,748	13,058,856	359,885	15,259,489
2016-17	2,503,599	8,019,084	674,790	11,197,474

The results in Table 12 show that capital expenditures increase output by more than \$330 million, increase earning by more than \$108 million, and support and additional 2,011 jobs.

Table 12. Effects of Total Capital Expenditures on Output, Earnings, and Employment*

2009-2013

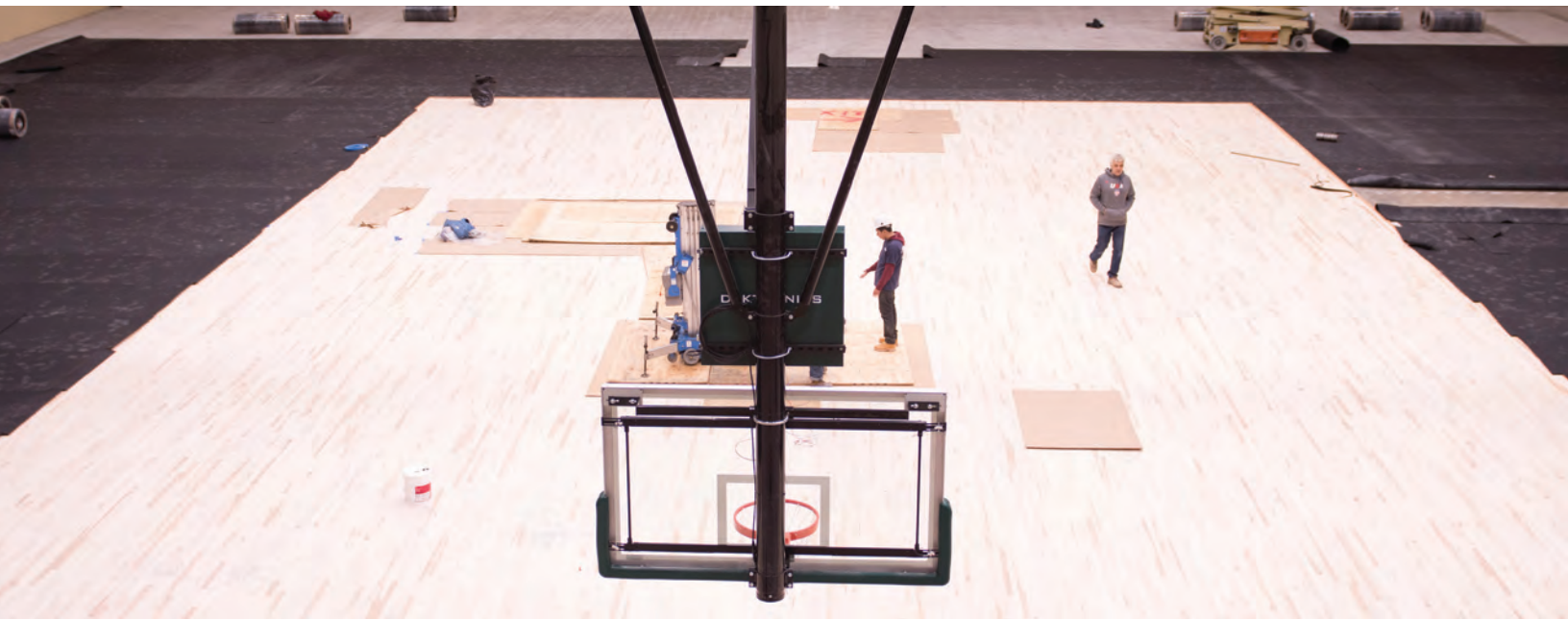
	2009-10	2010-11	2011-12	2012-13	2013-14
Total Output Increase	32,701,281	37,552,860	53,883,811	56,106,855	61,894,663
Total Earning Increase	10,249,559	11,822,549	16,856,750	17,485,480	19,260,731
Total Jobs Added	202	232	333	347	382

* Output and earnings in dollars

2014-2017

	2014-15	2015-16	2016-17	OE Total
Total Output Increase	39,545,703	27,947,053	20,562,648	330,194,875
Total Earning Increase	12,290,005	8,727,414	4,648,677	103,180,205
Total Jobs Added	244	173	98	2,011

* Output and earnings in dollars



Like operating expenditures, capital expenditures by FSC ripple throughout the Long Island economy. The effects are greatest for the construction industry (Table 13).

Table 13. Industry-wide Effects of Total Capital Expenditures*

Industry	Output	Earnings	Jobs
Agriculture & Forestry	285,856	89,325	2
Construction	162,400,424	50,747,333	989
Manufacturing	8,535,392	2,667,163	52
Wholesale Trade	8,624,027	2,694,860	53
Retail Trade	7,022,726	2,194,481	43
Transportation & Warehousing	2,884,544	901,370	18
Information	11,913,722	3,722,833	73
Finance & Insurance	23,905,081	7,469,929	146
Real Estate & Rental Leasing	25,382,063	7,931,457	155
Professional & Business Services	44,530,225	13,914,927	271
Educational Services	2,281,130	712,814	14
Health Care & Social Assistance	9,945,327	3,107,715	61
Arts, Entertainment, and Recreation	1,984,389	620,087	12
Accommodation & Food Services	3,526,378	1,101,932	21
Other Services	3,000,158	937,498	18
Government	13,973,512	4,366,482	85



Aggregate Economic Impact of Operating and Capital Expenditures

The aggregate effects of FSC’s operating and capital expenditures are reported in Table 14. These expenditures increased output by more than \$1.43 billion, raised earnings by more than \$484 million, and supported more than 12,400 jobs. The table also shows average annual impact on output, earnings, and jobs.

Table 14. Total Economic Impact of Farmingdale State College OR and Capital Expenditures

	Direct	Indirect	Total: 2009-17	Avg Annual
Output Increase	766,114,121	664,749,072	1,430,863,193	178,857,899
Earnings increase	259,457,323	225,350,146	484,807,469	60,600,934
Jobs Added	6,639	5,783	12,422	1,553

Economic Impact of ASC Payments

The Auxiliary Service Corporation (ASC) is a not for profit corporation that provides a variety of services to FSC, including fiscal administration and support, bookstore services, and other services. ASC expenditures increased total output by almost \$2.3 million, as shown in Table 15.

Table 14. Total Economic Impact of Farmingdale State College OR and Capital Expenditures

	Direct	Indirect	Total: 2009-17	Avg Annual
Output Increase	1,233,411	1,018,944	2,252,085	281,511
Earnings increase	430,921	356,070	786,991	98,374
Jobs Added	12	10	22	3

Economic Impact of Increased Worker Productivity

The full economic impact of FSC extends far beyond its expenditures, however. In addition to the economic effects of operating and capital expenditures, FSC enhances human capital. Farmingdale State College makes it possible for some students to graduate from college who would not otherwise have done so. These graduates will have significantly higher productivity and earnings throughout their careers. But for the presence of FSC, students' travel distance to affordable higher education would increase significantly. A substantial literature from the economics of education finds that increasing travel distance significantly reduces college attendance and graduation. If this is true for just 10 percent of FSC students (a very conservative assumption given evidence from the literature), the additional effects on output, earnings and jobs would be very large. These impacts are quantified in Table 16². As the table indicates, output over the period 2009-2017 would increase by an additional \$1.08 billion, earnings would rise by more than \$290 million, and 7,356 jobs would be supported. Table 16 also shows the average annual effects on output, earnings, and jobs.

Also, to be considered is the relief from heavy debt that is an advantage for Farmingdale students, with savings from

paying high tuition costs translating into purchasing power and investment in their local communities. In 2016, FSC students had an average student debt of less than \$16,000 compared to the national average of over \$24,000.

Combined, these factors provide upward mobility for Farmingdale graduates that would not have otherwise been possible. A 2017 study by *The New York Times* concluded that the average FSC graduate earned \$44,200 at age 34, placing Farmingdale in the top one-third of selective public U.S. colleges.

Table 16. Impact of Farmingdale State College on Worker Productivity

<i>Item</i>	<i>2009-17</i>	<i>Avg Annual</i>
Output	1,081,757,723	135,219,715
Earnings	290,529,217	36,316,152
Jobs	7,356	919

Putting It All Together

Table 17 aggregates the total economic impacts of Farmingdale's operating and capital expenditures, ASC expenditures, and impacts on worker productivity over the period 2009-2017. As the table illustrates, these effects are very substantial. The value of output increases by \$2.51 billion. Additionally, earnings increase by almost \$766 million, and more than 19,800 jobs are supported. The table also quantifies the average annual effects on output, earnings, and jobs.

Table 17. Total Economic Impact of Farmingdale State College

Item	2009-17	Avg Annual
Output	2,514,873,001	314,359,125
Earnings	776,123,677	97,015,460
Jobs	19,800	2,475



² The methodology behind these calculations is described in Appendix B.

FSC's Academic Programs

Farmingdale State College meets the needs of the Long Island/Downstate region and those of New York State through its emphasis on the applied sciences and technology as shown in the following chart.

Masters Degree (MS)

- Technology Management

Bachelor Degrees (BS)

- Aeronautical Science/Professional Pilot
- Applied Economics
- Applied Mathematics
- Applied Psychology
- Architectural Engineering Technology
- Aviation Administration
- Bioscience
- Business Management
- Computer Engineering Technology
- Computer Programming & Information Systems
- Construction Management Engineering Technology
- Criminal Justice: Law Enforcement Technology
- Dental Hygiene Degree Completion (online)
- Dental Hygiene - Entry Level
- Electrical Engineering Technology
- Global Business Management
- Horticultural Technology Management (BT)
- Industrial Technology/Automotive Management Technology
- Industrial Technology/Facility Management Technology
- Interaction Design
- Manufacturing Engineering Technology
- Mechanical Engineering Technology
- Medical Technology
- Nursing
- Nursing - Degree Completion (online)
- Professional Communications
- Science , Technology & Society
- Security Systems
- Software Technology
- Sport Management
- Telecommunications Technology
- Visual Communications: Art & Graphic Design (BT)

Associate Degrees (AAS)

- Automotive Technology
- Criminal Justice/Law Enforcement (AS)
- Dental Hygiene
- Landscape Development
- Liberal Arts & Sciences (AA)
- Mechanical Engineering Technology
- Ornamental Horticulture

Certificate Programs

- Accounting
- Advanced Programming (local)
- Computer Information Systems
- Computer Systems Technology
- Health Studies
- International Business
- Management (local)
- Manufacturing Methods and Numerical Controls
- Marketing
- Ornamental Horticulture
- Sciences for the Health Professions

A 2017 study by *The New York Times* concluded that the average FSC graduate earned \$44,200 at age 34, placing Farmingdale in the top one-third of selective public U.S. colleges.

FSC degree programs produce highly educated employees in engineering technology, manufacturing, architecture, construction, aviation, energy, and automotive industries.

The School of Engineering Technology offers several unique degrees. Its BS degree in Manufacturing Engineering Technology is the only program in the region that focuses on quality control, destructive and nondestructive testing and computer-aided manufacturing. Graduates of the degree programs in Mechanical Engineering Technology and Facility Management Technology play a pivotal role in retaining technology-intensive manufacturing enterprises on Long Island and in helping them to expand.

FSC's BS degrees in Architectural Engineering Technology and Construction Management Technology are the only nationally accredited programs of their kind in the New York metropolitan area.

FSC offers degrees that equip students with the quantitative, analytic and problem-solving skills needed in business, finance, government, research and nonprofit organizations.

The growing technological orientation of the Long Island economy requires a workforce with sophisticated quantitative skills with an emphasis on conceptual understanding, problem solving through mathematical modeling and the use of real-world data. Through its Center for Applied Mathematical Sciences, the mathematics faculty and advanced undergraduate students work with representatives of local business, industry and government to identify and solve the mathematical problems they face.

FSC prepares tech-savvy professionals for challenging careers in computer and information systems.

Graduates of the BS degree in Computer Programming and Information Systems typically find employment as Computer Support Specialists, Information Technology Specialists, Data Communications Analysts, Quality Assurance Technicians, Systems Analysts, Programmer/Analysts, Data Base Analysts, Web Developers, and Network Administrators.

In addition, FSC is the only public institution in the New York metropolitan area offering a BS Degree in Automotive Technology. The program has partnered with Tesla to place students in internships and fast-track them for full-time employment.

The School of Engineering Technology has also partnered with National Grid to train the next generation of clean energy employees through a Natural Gas Technician Certificate program.

The baccalaureate program in Applied Economics prepares students for careers in business, financial institutions, government, and public and private research and nonprofit organizations. The Bioscience program produces versatile graduates prepared for a wide range of positions in the rapidly developing bioscience field or for entry into graduate or professional programs in the life and health sciences.



FSC degrees lead to successful careers in a wide range of business fields.

The College offers wide-ranging programs in Business Management, Global Business Management, Horticultural Technology Management, Visual Communications: Art & Graphic Design, Professional Communications, Sports Management, and Applied Psychology, which focuses on organization and industrial psychology. The graduate employment rate in Applied Psychology combined with the graduate school acceptance rate is nearly 100%.

FSC serves the Health Care Industry by producing professionals in nursing, dental hygiene, and medical laboratory technology.

The Nursing department at Farmingdale offers a BS program. Hospital affiliations include Northwell Health System, Catholic Health System, NYU Winthrop Hospital, Stony Brook Medicine, and Mather Hospital. The rigorous baccalaureate nursing program at Farmingdale is accredited by CCNE and The New York State Board of Regents. To gain admission to this highly competitive program, applicants go through an intense academic review and take a pre-admissions examination. Hospital affiliations include Northwell Health System, Catholic Health System, NYU Winthrop Hospital, Stony Brook Medicine, and Mather Hospital.

The Dental Hygiene program at FSC offers both an Associate of Applied Science degree, and a bachelor degree leading to licensure, as well as an on-line Bachelor of Science degree completion program. Internships with various healthcare providers and agencies broaden the students' understanding of the professional role of the dental hygienist in the health care system. The Medical Laboratory Technology program offers a BS degree in Medical Technology that prepares graduates for a wide range of positions in the clinical laboratory profession. The graduate employment rate for all of these programs is consistently well above 90%.



FSC's cutting-edge interdisciplinary programs prepare graduates for careers in new fields of employment emerging in the 21st Century.

Because today's growth industries are evolving from hybrid fields, the academic programs at Farmingdale are increasingly inter-disciplinary and cross disciplinary. As a consequence, the learning experience at Farmingdale displays an applied and collaborative focus. Examples of the interdisciplinary nature of the FSC curriculum:

- The MS degree in Technology Management produces graduates who have knowledge and competency in the field of technology management with an emphasis on engineering technologies. They also have the knowledge and skills necessary to be imaginative, critical thinkers who develop logical answers and apply effective solutions in the practice of technology management. Graduates will step into leadership roles in designing, developing, improving, and transforming the industrial systems that are the basis of much of the industry in the New York Metro area and throughout New York State.
- The BT degree in Interaction Design focuses on human behavior and user experience in the design and development of mobile applications, responsive web design and user experiences, service design, social networks, way-finding projects, brick and mortar and on-line retailing, and exhibit design—emerging fields where FSC is poised to excel.



The MS degree in Technology Management produces graduates who have knowledge and competency in the field of technology management with an emphasis on engineering technologies.

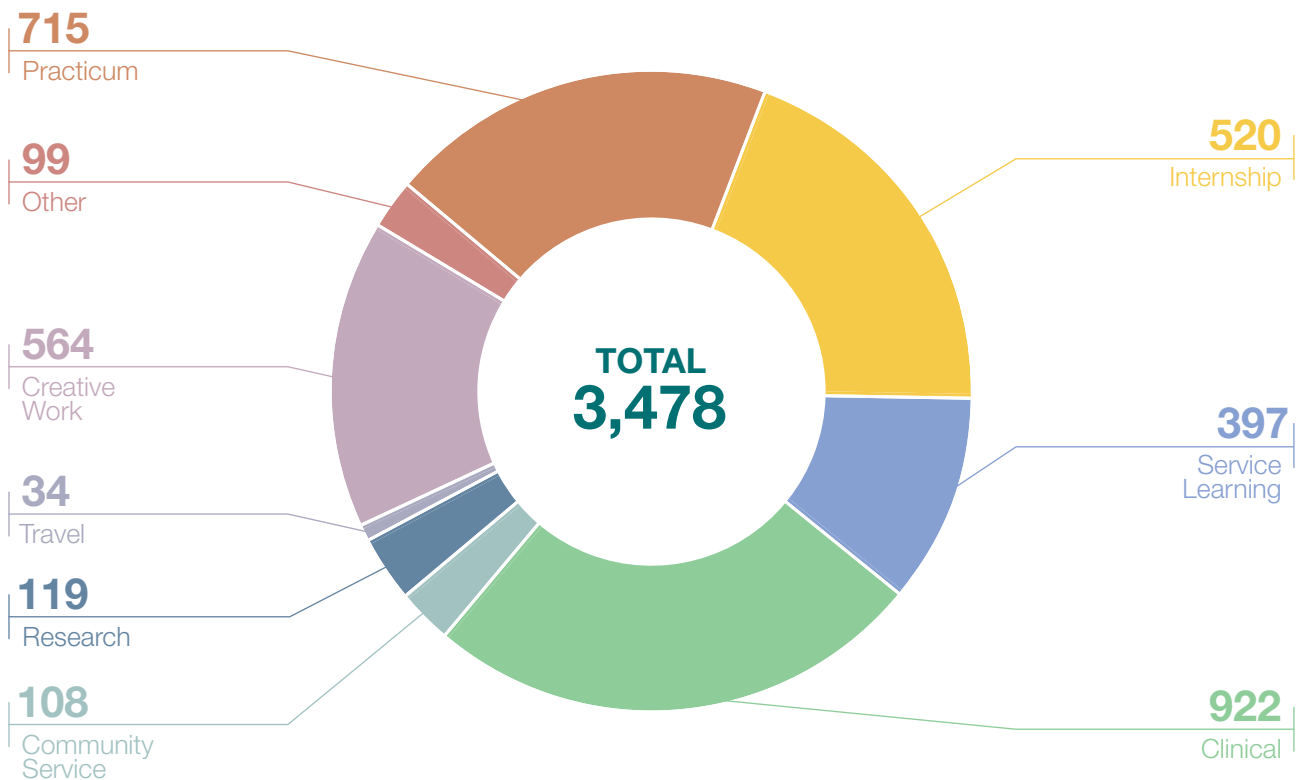


The Emphasis on Applied and Experiential Learning

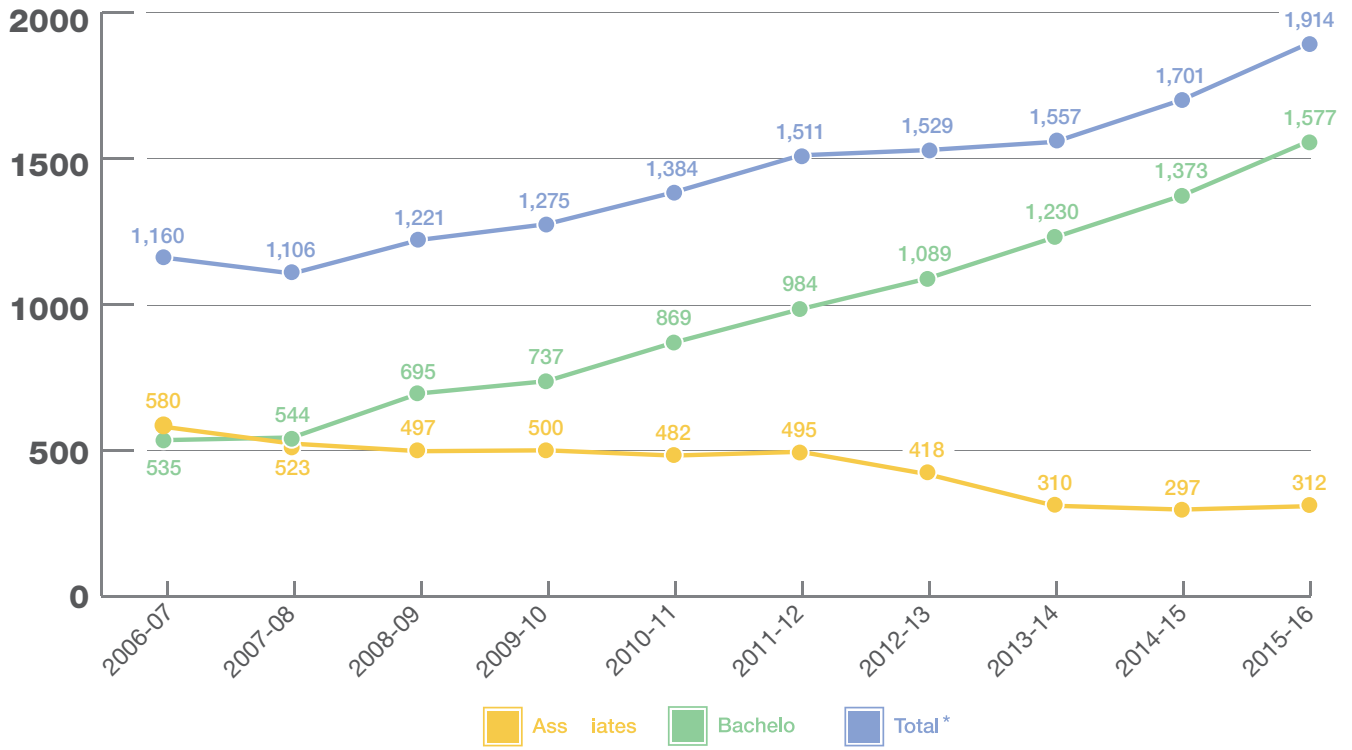
A commitment to applied learning is one of the important ways in which FSC achieves its goal of preparing students for the workforce and equipping them with the in-demand skills of prospective employers. In 2017, the College created the Nexus Center for Applied Learning & Career Development, integrating the administration

and development of internship opportunities, applied learning opportunities, and career development into one comprehensive entity. Through this new enterprise, students are provided multiple opportunities to practice the skills learned in a real-world setting, which in turn helps them gain employment or entrance to graduate school.

Applied learning experiences students participated in during 2016-17

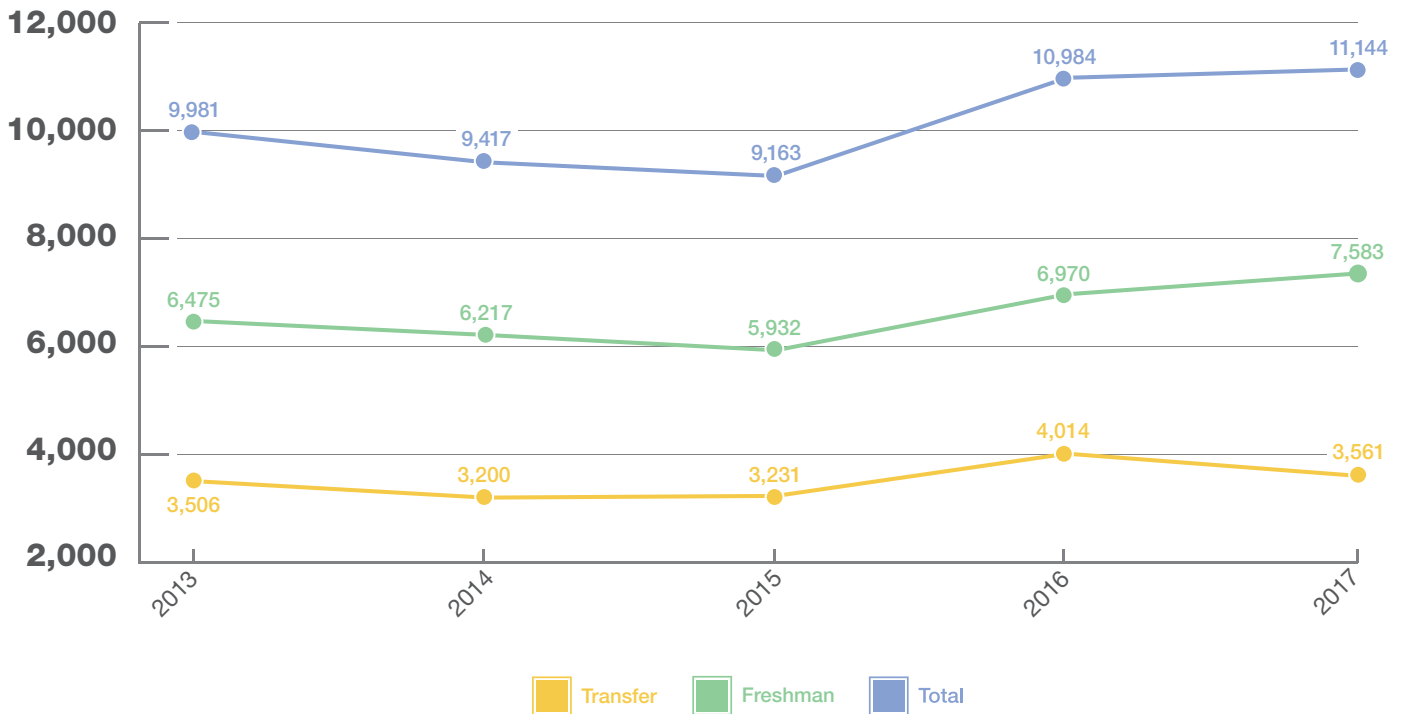


Total associate & bachelor degrees granted by FSC



* Total includes certificates

Fall applications, Farmingdale State College: 2013 through 2017



Selectivity, full-time vs. part-time enrollment, Farmingdale State College: 2013 through 2017

Fiscal Year	High School Average*	SAT Average†	Full-Time Enrollment	Part-Time Enrollment	Total	% Full-Time Enrollment
2013	87.9	1030	6,074	2,088	8,162	74%
2014	88.2	1029	6,287	2,107	8,394	75%
2015	88.8	1036	6,388	2,260	8,648	74%
2016	88.2	1032	6,942	2,293	9,235	75%
2017	88.7	1095†	7,541	2,122	9,663	78%

*First-time, full-time, baccalaureate students

†Based off post-March 2016 SATs scoring

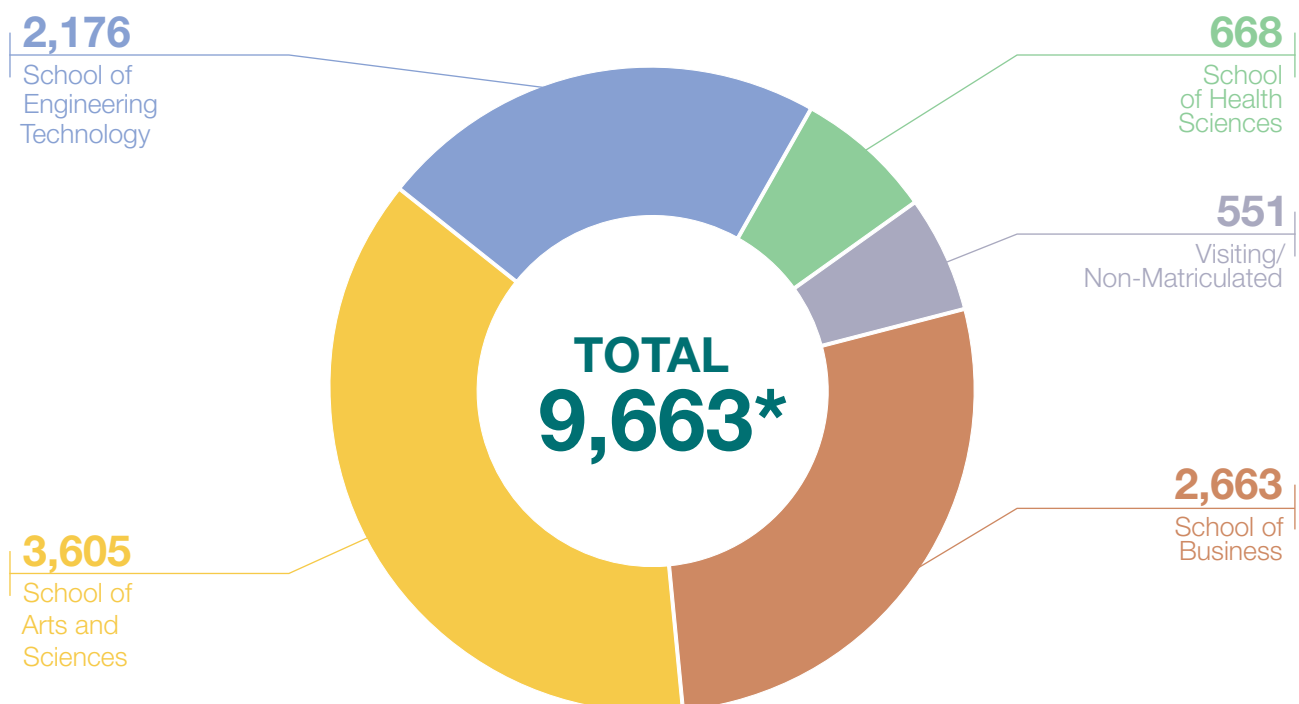
FSC Enrollment by School and Major Program, 2017-18 Academic Year

Fall enrollment during the current academic year totaled 9,663 students of whom 9,112 were matriculated full-time and 1,690 were part-time with other 551 visiting or non-matriculated.

The **School of Business** accounted for an estimated 2,645 students. Students in business management comprised the largest group of students followed by students in computer programming and information systems, sport management, visual communications, and horticultural. The **School of Arts and Sciences** accounted for 3,566 students. Popular majors within this school include

science, technology, and society, liberal arts, bioscience, professional communications, and criminal justice. Criminal justice: law enforcement technology and mechanical engineering technology made up the largest two majors in the **School of Engineering Technology**. Other popular programs include the construction management, electrical engineering technology, security systems, and computer engineering technology. The nursing program accounted for the largest number of students in the **School of Health Sciences**. There was also significant enrollment in the dental hygiene and medical technology programs.

All FSC Students, Fall 2017, by School



*Number as of 9/6/2017

Enrollment by Program, Fall 2017*

School of Arts and Sciences

Program	Full-Time Students	Part-Time Students	Total Students
Science, Technology, and Society	1,050	299	1,349
Liberal Arts and Sciences	1,006	79	1,085
Bioscience	383	62	445
Professional Communications	227	33	260
Criminal Justice: Law Enforcement	150	15	165
Applied Psychology	132	5	137
Sciences for the Health Professions	14	50	64
Applied Mathematics	57	3	60
Total	3,020	546	3,565

School of Business

Program	Full-Time Students	Part-Time Students	Total Students
Business Management	1,162	211	1,373
Computer Programming & Info. Systems	477	126	603
Sport Management	200	18	218
Visual Communications	188	13	201
Horticultural Technology Management	58	17	75
Global Business Management	50	9	59
Applied Economics	36	10	46
Ornamental Horticulture - Horticulture Management	14	10	24
Ornamental Horticulture - Landscape Development	10	10	20
Interaction Design	12		12
Computer Systems Technology (Data Processing), CERT	2	4	6
Accounting, CERT	2	3	5
Computer Information Systems, CERT		2	2
Ornamental Horticulture, CERT		1	1
Total	2,211	434	2,645

*Number based off of time of Census, 11/10/17

School of Engineering Technology

Program	Full-Time Students	Part-Time Students	Total Students
Criminal Justice: Law Enforcement Technology	514	85	599
Mechanical Engineering Technology	284	52	336
Construction Management Engineering Technology	156	42	198
Electrical Engineering Technology	149	46	195
Computer Engineering Technology	134	25	159
Security Systems	117	26	143
Aviation Administration	111	16	127
Architectural Engineering Technology	105	17	122
Aeronautical Science: Professional Pilot	86	12	98
Industrial Technology - Automotive Management	47	8	55
Manufacturing Engineering Technology	26	19	45
Technology Management, MS	10	12	22
Automotive Engineering Technology	16	5	21
Industrial Technology - Facility Management	12	6	18
Software Technology	10	3	13
Mechanical Engineering Technology, AS	2	1	3
Telecommunications Technology	3		3
Total	1,782	375	2,157

School of Health Sciences

Program	Full-Time Students	Part-Time Students	Total Students
Nursing	177	222	399
Medical Technology	76	36	112
Dental Hygiene, AAS	40	40	80
Dental Hygiene (Completion), BS	3	35	38
Other Programs	5	14	19
Dental Hygiene (Entry Level), BS	11		11
Total	312	347	659

Appendix A. Multiplier Methodology

The economic impact of FSC will be assessed using input-output (I-O) models. An input-output model quantifies the flows of economic activity within a region. The model captures what each business or sector must purchase from every other sector in order to produce a dollar's worth of goods or services. The economic impact of spending on a project consist of three components: direct, indirect, and induced effects. Direct effects are quantified as the spending for the project itself; for example, the successful bid by a defense contractor to manufacture aircraft. In this example, indirect effects are the changes in sales, income or jobs in sectors within the region that supply goods and services to the aerospace sector. The increased need for drafting firms, tools, equipment, and sheet metal resulting from the awarding of the contract is an indirect effect of visitor spending. Induced effects are the increased sales within the region from household spending of the income earned in the aerospace and other sectors that support the manufacturing of the aircraft. Contractor employees and workers on the project spend the income they earn on housing, utilities, groceries, etc. These represent induced effects. Since the project may require the hiring of additional employees, and the region will be adding residents who will also spend, we quantify their effects on economic activity as well.

Multipliers are used to quantify all three effects—direct, indirect, and induced. These multipliers are developed from input-output tables produced by the Bureau of Economic Analysis (BEA). Since the 1970s, the BEA has

produced regional I-O multipliers that quantify inter-industry purchases resulting from changes in final demand. The multipliers produced by the model are customized to account for the economic activity in any set of contiguous U.S. counties. Multipliers show the total effect on economic activity resulting from a project. For example, a project costing \$1 million might generate economic output of \$1.8 million once direct and induced effects are added to the cost of the project itself. There are several measures of changes in total economic activity that one may estimate—gross output, earnings, and employment.

Gross output is equal to the sum of the intermediate inputs and value added. It can also be measured as the sum of the intermediate inputs and final use. Gross output is a duplicative total in that goods and services will be counted multiple times if they are used in the production of other goods and services.

Earnings consist of wages and salaries and proprietors' income³. Employer contributions for health insurance are also included. Personal contributions to social insurance and employee pension plans are excluded because the model must account for only the portion of personal income that is currently available for households to spend.

Employment consists of a count of jobs that include both full-time and part-time workers. An excel spreadsheet analysis is provided together with this report that shows the calculations used to estimate these economic impacts.



Appendix B. Method for Calculating Worker Productivity Effects

State colleges and universities offer substantially lower in-state tuition than private universities. But an additional attraction is that these schools appeal to commuters, who can enjoy further savings by avoiding on campus housing and related costs. So, geographic proximity is an important consideration as well. Indeed, a substantial literature finds that distance to public colleges and universities affects student enrollments. Specifically, greater distance has been found to significantly reduce enrollment (Alm and Winters 2009; McConnell 1965; Kariel 1968; Ullis and Knowles 1975; Leppel 1993; Ordovensky 1995; Desjardins, Dundar, and Hendel 1999; and Ali 2003). As previously noted, 89 percent of Farmingdale State College students are from Nassau and Suffolk counties. If Farmingdale State College were not available to these students, they would need to travel significantly further to attend a public university. For example, SUNY at Old Westbury is some 16 miles away from Farmingdale, Stony Brook University is about 25 miles away from Farmingdale, and Farmingdale is almost 40 miles from New York City and its CUNY system.

Based upon a review of the available literature on students' distance from college and the effects of distance on enrollment, we conservatively estimate that, but for the availability of Farmingdale State College, 10 percent of its students each year would not have graduated from college⁴. These graduates will enjoy a significantly higher wage than high school graduates. Evidence from the Bureau of Labor Statistics indicates that four-year college graduates earn on average about \$25,000 more per annum than high school graduates, and that students graduating with associate degrees would earn approximately \$6,000 more than high school graduates⁵. And this will be true for such students in each of FSC's prior graduating classes. Assuming that individuals work on average for 40 years, this increased earnings productivity will accrue for 3 percent of stunts in each of FSC's prior 40 years of graduating classes. Thus, total increased earnings for each year (EARNSTOT) may be estimated as:

$$(1) \text{ EARNSTOT} = \text{PCTSTUDENTS} * \text{WAGEPREMIUM} * \sum \text{STUDENTS}_i, i = 1 \dots 40$$

Where:

PCTSTUDENTS = percent of students who would not have graduated college but for the availability of FSC

WAGEPREMIUM = increased average annual earnings of college graduates vs. high school graduates⁵

$\sum \text{STUDENTS}_i$ = number of students enrolled at FSC over a 40-year time period

In order to calculate total economic impacts for output, earnings, and jobs, equation (1) must be multiplied by the appropriate multipliers for each of these categories. We used the average values of RIMS multipliers across all industries for output, earnings, and employment to obtain these values.



3. The wage premium is calculated as the weighted average wage premium of four-year and associate degree students, weighted by the average prevalence of these degrees awarded by FSC.

4. Available estimates of elasticities of enrollment with respect to students' travel distance from campus range considerably, but many of these are quite large. This implies that even a small increase in travel distance has a substantial impact on enrollment. This is especially true for financially disadvantaged students.

5. See: <https://smartasset.com/retirement/the-average-salary-by-education-level>.

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