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Are There Differences between Transfers from Community College Career-Oriented Programs and Liberal Arts Programs?

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Abstract

This study examined the transfer trends for, and significant differences between, transfer students who graduated from community college career-oriented programs and students who graduated from liberal arts programs and looked at possible factors which affect these trends and differences. The results indicated students who made better grades in the Community College made better grades in the Senior College. Also, for transfers who graduated from career-oriented programs, older students and students who had been placed in remedial courses earned higher senior college GPA than their younger counterparts and students who did not attend remedial courses. For transfers who graduated from liberal arts programs, males and Hispanic students did not do as well as other students.

Introduction

Today, almost 50% of the students registered in public higher education are enrolled in community colleges (Cohen & Brawer, 1996, 2003; Hughes & Graham, 1992; Laanan, 2001). Many of these students will plan to transfer to four-year institutions to pursue a bachelor's degree (Laanan, 2004). Research has often focused on students' community college grades and GPA in comparison with their transfer institution grades and GPA (Laanan, 2004). Other studies have compared community college transfer students' attrition or graduation rates with those of non-transfer students (Laanan, 2004). But none of these studies discovered differences between students who transferred from community college career-oriented programs and students from liberal arts programs (See Appendix A for a complete list of associate programs offered in the City University of New York system). Career-oriented programs in community colleges are not designed for transfer purpose and transfers from these programs to a four-year institution are required bilateral rather than statewide articulation. The accreditation criteria for faculty, the general education requirements for students as well as the workforce preparedness mission in transfer and career-oriented programs are different. For example, all courses designed as approved for transfer are taught by faculty who met certain college credential requirements while some courses designated "not-for-transfer" are taught by faculty who do not meet college credential requirements.

The studies on the academic performance of students from these two types of programs can help transfer counselors at community colleges when they provide advice to their advisees and institutional administrators at four-year institutions when they develop a bilateral articulation agreement with community colleges. The answers can also benefit state educational leaders when they reconsider their articulation system or set up a new system for four-year institutions.

Literature Review

In the 100 years since their inception, community colleges have spread across the United States to become the largest sector of higher education, representing nearly 1,200 regionally accredited institutions within commuting distance of more than 90 percent of the population and more than 11.5 million students take classes at community colleges each year (Boggs, 2004). Most U.S. community college systems began with a primary mission of promoting transfer education (Dougherty, 1994). The success of college transfer students, from an academic standpoint, has been used as an important measure of the quality of a community college education (Glass & Harrington, 2002).

However, by the latter half of the 20th century, community colleges had evolved into comprehensive institutions, offering a mix of vocational, remedial, adult education, and liberal arts programs (Bailey & Averianova, 1999).

As the functions of community colleges expanded, the percentage of enrolled students transferring to a four-year institution to pursue a bachelor's degree declined. Recent studies estimate the current national transfer rate to be between 20% and 25% (Bryant, 2001; Grubb, 1991). Moreover, because of a concerted effort to increase the retention of first and second year students, the admission slots for transfer applicants at four-year institutions have diminished during the last several years. The literature suggests that community colleges can reinforce their position in the educational pipeline by emphasizing transfer within their home institutions (Palmer, 1987; Prager, 1992).

One way that community colleges seek to increase transfer rates is through the development of both bilateral and state level articulation systems with four-year institutions and state educational administrators. The articulation systems, under ideal circumstances, are a means of standardizing the transfer process and theoretically should enhance the chances of movement through the educational pipeline. Students in the transfer pipeline have the opportunity to complete their general education requirements by participating in formalized articulation systems and then transferring to the four-year institution of choice (Laanan, 2001). Townsend (2001) suggested that students graduating from career-oriented programs at a community college may be transferring in equal or even grater numbers than students with traditional transfer degrees. However, Romano and Wisniewski (2005) indicated that transfer rates for first-time full-time entrants to community college liberal arts programs are significantly higher than transfer rates from career-oriented programs.

Objectives

Although career-oriented programs are not designed for transfer, some students in these programs do transfer to four-year institutions to pursue a bachelor's degree. Thus when we talk about community college transfer students, we are talking about career-oriented transfer students and liberal arts transfer students. What is the transfer pattern for these two groups of students? Are there any differences in terms of their academic performance at transfer institutions? How are their community college GPA and demographic characteristics associated with their transfer institution academic performance? Because there is a dearth of literature regarding these questions, this study focuses on the following three research questions:

1. What are the transfer trends for career-oriented graduates and liberal arts graduates from community colleges?
2. Are there any significant differences between the academic performance (GPA) of career-oriented graduates and liberal arts graduates at either their community college or at their transfer institution?
3. Are there any specific predictor variables for transfer institution academic performance (GPA) of career-oriented graduates and liberal arts graduates?

The present study addresses these questions through an examination of transfer rates, transfer institution graduation rates, and predictive factors for community college transfer students from these two types of programs.

Methods

Sample

The sample selected for the present study consisted of 8,746 students who graduated from Borough of Manhattan Community College (BMCC) between June 1994 and February 2002 and transferred to a senior college in the City University of New York (CUNY). Of these 8,746 students, 5,950 graduated from a career-oriented program and 2,796 from a liberal arts program. All data used for this study were drawn from CUNY Institutional Research Database in Oracle Discoverer (IRDB) and Common Selection System created by BMCC College Computer Center.

Borough of Manhattan Community College is a typical urban community college with its location in Lower Manhattan of New York City. Among its 18,465 enrollments in fall 2003, part-time students make up 39.4% and minority students make up 88.9% (BMCC Fact Book, 2003 – 2004) and all students come from five boroughs of New York City. The college deems its mission as providing general, liberal arts, and career education, as well as transfer programs, relevant to the needs, interests, and aspirations of all students, along with continuing education for adults of all ages (BMCC Fact Book, 2002 – 2003). It is also committed to providing collaborative programs and services responsive to the educational, cultural, and recreational needs of the community.

Variables

The dependent variable was Senior College GPA, which was measured as in the last semester BMCC transfers graduated from or stayed with a transfer institution by Fall 2004. The scores of standardized tests, such as SAT Verbal, SAT Math, Regent English, Regent Math 1, Regent Math 2, and Regent Math 3 were originally selected as independent variables but finally excluded from this study because of the very low percent of students who took these tests. Eleven independent variables were grouped into three blocks, Academics (BMCC GPA, BMCC Credit Hours Earned, and College Admissions Average), Demographics (Age, Gender, Black, Hispanic, and Asian), and Other (Months from High School Graduation, Education Disadvantage, and Economic Disadvantage) as shown in Table 1.

Table 1. Descriptive Statistics for all Relevant Variables

Variable	Type of Variable	N	Value/Range	Cell %	Mean	S. D.
Dependent Variable						
Senior College GPA	Numeric	8,746	0.00 – 4.00	100.0	1.796	1.347
Independent Variable						
Block 1 Academics						
BMCC GPA	Numeric	8,746	1.85 – 4.00	100.0	2.878	.477
BMCC Credit Hours Earned	Numeric	8,746	36.0 – 171.0	100.0	48.32	16.57
College Admissions Average[1]	Numeric	8,746	0.00 – 96.0	100.0	54.81	32.26
Block 2 Demographics						
Age	Coded Item	198	Below 20=1	2.2		
		2,454	20 – 22=2	28.0		
		1,536	23 – 24=3	17.5		
		2,109	25 – 29=4	24.1		
		2,173	30 – 44=5	25.0		
		266	45 – 64=6	3.0		
		10	65 or over=7	0.1		
Gender	Dummy	2,560	Male=1	29.2	1.71	.455
		6,186	Female=0	70.8		
Black	Dummy	4,592	Yes=1	52.6	.526	.499
		4,154	No=0	47.4		
Hispanic	Dummy	2,270	Yes=1	25.9	.259	.438
		6,476	No=0	74.1		
Asian	Dummy	1,074	Yes=1	12.3	.123	.328
		7,672	No=0	87.7		
Block 3 Other						
Months from High School Graduation	Numeric	8,746	0 - 552	100.0	87.44	69.99
Education Disadvantage[2]	Dummy	6,613	Yes=1	75.7	.757	.429
		2,133	No=0	24.3		
Economic Disadvantage[3]	Dummy	7,155	Yes=1	81.8	.818	.386
		1,593	No=0	18.2		

[1] This is overall average of high school grades for each registered student.

[2] A student is defined as 'Education Disadvantaged' if s/he has failed any CUNY skills assessment test.

[3] This variable indicates that the student either (1) received economic assistance from any of the following programs: PELL, TAP, APTS, AFDC, HRA benefits, College Discovery or SEEK, or (2) his/her financial status is equal to or less than the following values: single adult with family income under $10,750, or married with income of $17,600 per couple plus $3,900 per child.

Data Analyses

To answer the first research question, a descriptive profile was created for all BMCC graduates, transfers (to a CUNY senior college), and transfer rates over the time (June 1994 to February 2002). Another descriptive profile was also created for transfers who graduated from a CUNY senior college and their senior college graduation rates during the time. To answer the second research question, two *t* tests were used to examine differences in the average GPA for career-oriented graduates versus liberal arts graduates. The comparisons between these two groups were made regarding their BMCC GPA as well as their senior college GPA. To answer the third research question, a multiple linear regression was conducted on independent variables to determine how much variance of the dependent variable (senior college GPA) was explained by each independent variable and which independent variables significantly influenced the dependent variable for these two groups. Each variable was entered using the stepwise method based on their significant ability to explain the dependent measure because the literature review did not reveal any *a priori* reason for sequencing predictor variables in the model. Separate equations were solved for career-oriented graduates and liberal arts graduates. A two-tailed test of statistical significance ($p<0.05$) was used for assessing the statistical significance of the equations solved and the independent variables. SPSS 11.5 was used for the analyses.

Limitations

First, this study was based on the data collected from a single urban community college; therefore, the findings may not be generalized to either four-year institutions or other community colleges. Second, the sample only includes BMCC graduates who transferred to a senior college in the CUNY system during June 1994 to February 2002. Though the majority of BMCC graduates transferred to the CUNY system, a small number of graduates transferred to four-year institutions in the State University of New York (SUNY) system and other states and were not covered in this study. Third, the indicator for academic performance is GPA which may not be consistent from college to college because of various grading procedures. Fourth, the independent variables did not include other parameters, such as psychological, affective, or behavioral indicators. Consequently, the percentage of variance which can be explained for the dependent variable is low (32.1% for career-oriented graduates and 24.1% for liberal arts graduates). Fifth, the definition and classification of career-oriented programs and liberal arts programs may vary in different higher education systems. The classification of associate programs used in this study (see Appendix A) is only for the CUNY system. Finally, the study only focuses on graduates from a community college program and its results may not apply to students who transfer to a senior college before completing their community college program.

Results

It is quite clear that over the period of time for this study, the transfer rates for these two groups in Table 2 were pretty stable with overall transfer rate for liberal arts graduates being 8.8 percent points higher than that for career-oriented graduates. The transfer rate differences between these two groups ranged from 6.7 percent points (98-99) to 11.4 percent points (99-00). Though career-oriented programs are not designed for transfer purpose, more than half of the students (57.8%) who graduated from these programs transferred to a senior college to pursue a bachelor's or higher degree. The senior college graduation rates for these two groups are very close with the overall graduation rate for liberal arts graduates being only .8 percent point higher than that for career-oriented graduates.

With graduation measured based on students who completed their degree requirements prior to Fall 2004 several factors can be interpreted from Table 3. First, the earlier cohorts, with the longer periods of time in which to graduate, obtain higher graduation rates. When the time-

Table 2. BMCC Graduates, Transfers, and Transfer Rates over Time

Cohort Year		94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	Overall
Career-oriented	Graduates	1,185	1,232	1,329	1,384	1,335	1,320	1,276	1,242	10,303
	Transfers	622	660	771	815	819	807	766	690	5,950
	Transfer Rate	52.5%	53.6%	58.0%	58.9%	61.3%	61.1%	60.0%	55.6%	57.8%
Liberal Arts	Graduates	430	445	602	591	562	550	526	492	4,198
	Transfers	271	270	414	396	382	399	355	309	2,796
	Transfer Rate	63.0%	60.7%	68.8%	67.0%	68.0%	72.5%	67.5%	62.8%	66.6%

to-cohort was coded as a linear number of years prior to Fall 2004 (01-02 = 2, 00-01 = 3, etc.), and a quadratic of this measure was fit to the graduation rate, the data in the table showed that graduation rates increased at a decreasing rate until about eight to nine years after completing the community college program.

The equation for Career-oriented students was:

Graduation Rate = -.628 + 12.766xYear– .804xYear^2
R^2 = .971, p< .001

The equation for Liberal Arts students was:

Graduation Rate = -6.583 + 14.017xYear– .808xYear^2
R^2 = .901, p< .003

Senior College GPA

Differential GPA means and *t*-test results between all BMCC career-oriented graduates and liberal arts graduates as well as graduates who transferred to a senior college in CUNY during the time are presented in Table 4. For all BMCC graduates, graduates from a career-oriented program earn a significantly higher average GPA (2.90) than graduates from a liberal arts program (2.82) with an effect size (*d*) of 0.17[1]. Consistently, the mean of GPA for all transfers who graduated from a career-oriented program (2.91) is significantly higher than for students who graduated from a liberal arts program (2.81) with an effect size (*d*) of 0.21. The mean of senior college GPA for students who graduated from a career-oriented program (2.69) is significantly higher than for students who graduated from a liberal arts program (2.57) with an effect size (*d*) of 0.11.

Senior College GPA Equations

The variable-by-variable incremental R^2 change for career-oriented and liberal arts graduates is shown in Table 5. In both the career-oriented group and the liberal arts group, BMCC GPA was by far the largest contributor to transfer institution academic performance (GPA). For career-oriented graduates, a multiple correlation of *R*=.566 (*p*<.001) was achieved. The BMCC GPA explained a significant proportion (31.4%) of the variance in senior

Table 3. Senior College Graduation Rates over Time

Cohort Year (BMCC)		94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	Overall
Career-oriented	Transfers	622	660	771	815	819	807	766	690	5,950
	Graduates	319	316	371	378	354	320	246	135	2,439
	Graduate Rate	51.3%	47.9%	48.1%	46.4%	43.2%	39.7%	32.1%	19.6%	41.0%
Liberal Arts	Transfers	271	270	414	396	382	399	355	309	2,796
	Graduates	157	133	217	184	158	156	126	39	1,170
	Graduate Rate	57.9%	49.3%	52.4%	46.5%	41.4%	39.1%	35.5%	12.6%	41.8%

Table 4. Grade Point Average Means for BMCC Graduates and Transfers from June 1994 through February 2002 (Graduates, N=14,501 students; Transfers, N=8,746 Students)

	Mean	SD	Effect Size (*d*)	*t*-ratio	*p*-value
BMCC GPA					
Total Graduates					
Career-oriented	2.8980	.4613	0.1687	9.365	0.000
Liberal Arts	2.8171	.4985			
All Graduates Who Transferred					
Career-oriented	2.9094	.4669	0.2059	9.071	0.000
Liberal Arts	2.8108	.4907			
Senior College GPA					
Career-oriented	2.6868	.9393	0.1145	3.288	0.001
Liberal Arts	2.5722	1.0613			

college GPA (p<.001), followed by dummy variable Gender (R^2 *Change* = .003, p<.001), Age (R^2 *Change* = .002, p<.05), College Admissions Average (R^2 *Change* = .001, p<.05), and dummy variable Education Disadvantage (R^2 *Change* = .001, p<.05). For liberal arts graduates, a multiple correlation of R=.491 (p<.05) was achieved. The BMCC GPA explained a significant proportion (23.7%) of the variance in senior college GPA (p<.001), followed by dummy variable Gender (R^2 *Change* = .002, p<.05) and dummy variable Hispanic (R^2 *Change* = .002, p<.05). As can be seen in Table 5, the total proportion of the variance explained in transfer institution academic performance was 32.1 percent for career-oriented graduates and 24.1 percent for liberal arts graduates.

The standardized (beta) regression weights, *t* values, and significance levels for career-oriented and liberal arts graduates are presented in Table 6. The BMCC GPA was the strongest positive predictor for both career-oriented graduates and liberal arts graduates, indicating that students who earned higher BMCC GPA tend to perform better at transfer institutions. Gender was the strongest negative predictor for both career-oriented graduates and liberal arts graduates, suggesting that female students who transferred tend to perform better in transfer institutions. For career-oriented graduates, the other positive variables were Age and Education Disadvantage, indicating that older students and those who were flagged as having an education disadvantage performed better academically at transfer institutions. The other negative variable was College Admissions Average, revealing that those who obtained lower grades in high school did better academic performance at transfer institutions. For liberal arts graduates, the other negative variable was Hispanic (a dummy variable), implying that Hispanic transfer students did not do as well as other students at transfer institutions.

Discussion

The results from this study indicate the transfer rates for BMCC students who graduated from career-oriented programs are very close to graduates from liberal arts programs. But career-oriented programs offered at community colleges are not designed for transfer purpose and transfer from these programs to a four-year institution requires a bilateral rather than being based on a statewide articulation. As community college liberal arts programs play a critical role in providing access to students who desire to continue their education beyond a two-year institution (Laanan, 2001), it is reasonable for us to rethink the design of career-oriented programs. To ensure the students who graduated from these programs have a secure and smooth transfer to a four-year institution, we may need to set accreditation criteria for faculty members to teach in career-oriented programs, add general education requirements to students to study in these programs, and expand the bilateral articulation agreements to statewide or even profession-wide agreements. At least all courses offered in these programs should be taught by faculty who met college credential requirements.

The BMCC GPA means for the students who graduated from a career-oriented program were significantly higher than those from a liberal arts program with an effect size of 0.21. Though the senior college GPA means of the former group were still significantly higher than the latter, the effect size was almost reduced to half of the value (0.11) and their senior graduation rates were almost equal. Does this mean that career-oriented graduates do not have potential for further study as liberal arts students do? This finding may also suggest a modification for the design of career-oriented programs offered at community colleges or a further study to investigate this phenomenon.

Though other variables contributed to transfer institution

Table 5. Results of Stepwise Multiple Regression for Senior College GPA from All Independent Variables

Career-Oriented Graduates

Step	Variable	Multiple R	R^2	R^2 Change
1	BMCC GPA	.560***	.314***	.314***
2	Gender (Dummy)	.563***	.317***	.003***
3	Age	.565*	.319*	.002*
4	College Admissions Average	.566*	.320*	.001*
5	Education Disadvantage (Dummy)	.566*	.321*	.001*

Liberal Arts Graduates

Step	Variable	Multiple R	R^2	R^2 Change
1	BMCC GPA	.487***	.237***	.237***
2	Gender (Dummy)	.489*	.239*	.002*
3	Hispanic (Dummy)	.491*	.241*	.002*

*p<.05; **p<.01; ***p<.001

academic performance, their contribution was much smaller compared with the BMCC GPA. Their combined effects only explained 0.7% additional variance in senior college GPA for career-oriented graduates and 0.4% for liberal arts graduates. This result is consistent with Phlegar's (1981) finding that community college GPA is the best single predictor of transfer institution GPA. Among the other variables, the strongest negative variable, which affects the transfer institution academic performance, is student gender. This finding indicated that female students who transferred from a community college performed better academically than male students at transfer institutions. For career-oriented students who transferred, older students did better academically at transfer institutions. The results also suggested that students who were flagged as having an education disadvantage would do better than those who were not. This result may reveal that remedial courses offered at the community college are efficient in improving students' basic skills, such as math, English reading and writing. All students who failed any CUNY skills assessment test are flagged as having an education disadvantage and placed in related remedial courses. It is interesting that economic disadvantage did not show a significant effect on transfer institution academic performance. For liberal arts students who transferred, Hispanic students did not perform as well as other students did. These findings may be helpful for transfer program consultants in providing appropriate advice to their advisees for assisting their transfer efforts.

Recommendation

A broader survey is needed to examine the relationship between the students who graduated from career-oriented programs and the students who graduated from liberal arts programs at community colleges regarding their community college academic performance and transfer institution performance with more variables from other realms, such as psychological, affective, and behavioral parameters.

The graduation rates at the transfer institution for those who transferred from the two types of programs at community colleges were surprisingly similar and indicate that if one is to look at graduation, it may be necessary to look at a time of 8-10 years as the time it takes for the rate to stabilize. The length of time is most likely also related to going part-time and being older and other factors that are seen as putting students at risk of not completing a bachelor's degree.

The BMCC GPA means for transfer students from career-oriented programs are significantly higher than those from liberal arts programs with an effect size of 0.21. Though senior college GPA means for the former group are significantly higher than the latter, the effect size was almost reduced to half of the value (0.11). Further study is needed to investigate if this phenomenon means that career-oriented students do not have potential for further study as liberal arts students do.

Endnote

[1] The effect size is computed as the mean difference divided by a pooled estimate of standard deviation. The pooled standard deviation is found as the root mean square of the two standard deviations (Cohen, 1988, p. 44). That is, the pooled standard deviation is the square root of the average of the squared standard deviations.

References

Bailey, T. R., & Averianova, I. E. (1999). *Multiple Missions of Community Colleges: Conflicting or Complementary? (CCRC Brief No. 1, May).* New York: Columbia University Community College Research Center.

Boggs, G. R. (2004). Community colleges in a perfect storm. *Change, Vol. 36(6)*, p6.

Bryant, A. N. (2001). ERIC review: Community college students: Recent findings and trends. *Community College Review 29(3)*: 77-94.

Cohen, A. M., & Brawer, F. B. (1996). *The American Community College (3rd ed.)*. San Francisco: Jossey-Bass.

Cohen, A. M., & Brawer, F. B. (2003). *The American Community College (4th ed.)*. San Francisco: Jossey-Bass.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.

Dougherty, K. J. (1994). *The Contradictory College: The Conflicting Origins, Impacts and Futures of the Community College.* Albany, NY: SUNY Press.

Glass, J. C., & Harrington, A. R. (2002). Academic performance of community college transfer students and "native" students at a large state university. *Community College Journal of Research and Practice, 26,* 415-30.

Grubb, W. N. (1991). The decline of community college transfer rates: Evidence from national longitudinal surveys. *Journal of Higher Education 62 (2),* 194-217.

Hughes, J. A., & Graham, S. W. (1992). Academic performance and background characteristics among community college transfer students. *Community/Junior College Quarterly, 16*, 35-46

Laanan, F. S. (2001). Transfer student adjustment. *New Directions for Community Colleges, No. 114*. San Francisco: Jossey-Bass.

Laanan, F. S. (2004). Studying transfer students: Part I: Instrument design and implications. *Community College Journal of Research and Practice, 28,* 331-51.

Palmer, J. (1987). Bolstering the community college transfer function: An ERIC review. *Community College Review, 14(3)*, 53-63.

Phlegar, A. G., Andrew, L. D., & McLaughlin, G. W. (1981). Explaining the academic performance of community college students who transfer to a senior institution. *Research in Higher Education, 15(2),* 99-108.

Prager, C. (1992). Accreditation and transfer: Mitigating elitism. *New Directions for Community Colleges, No. 78*. San Francisco: Jossey-Bass.

Romano, R.M., & Wisniewski, M. (2005). Tracking community college transfers using national student clearinghouse data. *AIR Professional File, No. 94, Winter, 2005*.

Townsend, B. K. (2001). Blurring the lines: transforming terminal education to transfer education. In D. D. Bragg (ed.), The New Vocationalism in Community Colleges. *New Directions for Community Colleges No. 115*. San Francisco: Jossey-Bass.

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Appendix A: Complete List of Associate Programs Offered in CUNY

Career-Oriented Programs

SED Award Name	CIP Title	HEGIS
AA	Accounting Technology/Technician and Bookkeeping	5002
AA	Administrative Assistant and Secretarial Science, General	5005
AA	Adult Development and Aging	5506.2
AAS	Agriculture, Agriculture Operations and Related Sciences, Other	5402
AAS	Architectural Drafting and Architectural CAD/CADD	5304
AS	Architecture (BArch, BA/BS, MArch, MA/MS, PhD)	5602
AAS	Athletic Training/Trainer	5299.3
AAS	Automobile/Automotive Mechanics Technology/Technician	5306
AAS	Banking and Financial Support Services	5003
AA	Business Administration and Management, General	5004
AAS	Business, Management, Marketing, and Related Support Service	5099
AAS	Business/Commerce, General	5001
AAS	Business/Office Automation/Technology/Data Entry	5102
AAS	Chemical Technology/Technician	5305
AAS	Civil Engineering Technology/Technician	5309
AAS	Clinical/Medical Laboratory Technician	5205
AAS	Commercial and Advertising Art	5012
AS	Community Organization and Advocacy	5506
AAS	Computer Installation and Repair Technology/Technician	5105
AAS	Computer Programming/Programmer, General	5103
AAS	Computer/Information Technology Services Administration and	5104
AAS	Construction Engineering Technology/Technician	5317
AS	Criminal Justice/Police Science	5505
AAS	Culinary Arts and Related Services, Other	5404
AAS	Data Processing and Data Processing Technology/Technician	5101
AAS	Dental Hygiene/Hygienist	5203
AAS	Dental Laboratory Technology/Technician	5204
AAS	Electrical, Electronic and Communications Engineering Technology	5310
AAS	Electromechanical Technology/Electromechanical Engineering Technician	5311
AAS	Engineering Technologies/Technicians, Other	5399
AS	Environmental Engineering Technology/Environmental Technology	5408
AAS	Funeral Service and Mortuary Science, General	5299.2
AAS	Graphic and Printing Equipment Operator, General Production	5009
AAS	Health Information/Medical Records Technology/Technician	5213
AAS	Health Professions and Related Clinical Sciences, Other	5299
AAS	Hotel/Motel Administration/Management.	5010
AAS	Industrial Radiologic Technology/Technician	5316
AAS	Industrial Technology/Technician.	5312
AAS	Mechanical Drafting and Mechanical Drafting CAD/CADD	5303
AAS	Mechanical Engineering/Mechanical Technology/Technician	5315
AAS	Medical Radiologic Technology/Science - Radiation Therapist	5207
AAS	Medical/Clinical Assistant	5214
AAS	Nursing - Registered Nurse Training (RN, ASN, BSN, MSN)	5208
AAS	Nursing - Registered Nurse Training (RN, ASN, BSN, MSN)	5208.1
AS	Occupational Therapist Assistant	5210
AAS	Optometric Technician/Assistant	5212
AAS	Parks, Recreation and Leisure Studies	5506.1
AAS	Photographic and Film/ Video Technology/Technician and Assistant	5007

Appendix A: Complete List of Associate Programs Offered in CUNY (cont.)

AAS	Physical Therapist Assistant	5219
AA	Psychiatric/Mental Health Services Technician	5216
AA	Public Administration and Social Service Professions, Other	5501
AAS	Public Administration and Social Service Professions, Other	5508
AS	Public Administration and Social Service Professions, Other	5599
AAS	Radio and Television Broadcasting Technology/Technician	5008
AAS	Respiratory Care Therapy/Therapist	5215
AS	Science Technologies/Technicians, Other	5407
AAS	Science Technologies/Technicians, Other	5499
AA	Teacher Assistant/Aide	5503
AAS	Tourism and Travel Services Management	5011.1
AAS	Transportation and Materials Moving, Other	5011
AAS	Veterinary/Animal Health Technology/Technician and Veterinary	5206
AAS	Wildlife and Wild-lands Science and Management	5403

Liberal Arts Programs

SED Award Name	CIP Title	HEGIS
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AS	Engineering, General	5609
AA	English Language and Literature, General	5615
AA	Liberal Arts and Sciences/Liberal Studies	5649
AS	Mathematics, General	5617
AS	Physical Sciences	5619
AA	Social Sciences, General	5622
AAS	Visual and Performing Arts, General	5610

IR Applications is an AIR refereed publication that publishes articles focused on the application of advanced and specialized methodologies. The articles address applying qualitative and quantitative techniques to the processes used to support higher education management.

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