

**Toward Greater Effectiveness and Efficiency in
Academic Courses and Programs**

A Report Submitted to Warwick A. Arden, Provost
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by

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Executive Summary

In an effort to improve the overall effectiveness and efficiency of its academic activities, NC State University has initiated a review of “low productivity” courses and degree programs. This report represents an initial step in the improvement of effectiveness and efficiency: to identify underutilized courses and programs with relatively low demand, enrollment, selectivity of admissions, and student qualifications, and to make recommendations for further consideration. The aim is to provide a starting point for additional study and discussions.

The report is organized in three sections: (1) courses, (2) undergraduate programs, and (3) graduate programs. In the first, the analysis addresses courses that have not been taught in five years and courses that are currently underenrolled. In the second section, undergraduate programs are analyzed according to five variables related to productivity and quality of students. In the third section, the investigation of graduate programs applies ten variables related to productivity, efficiency, and quality of students. Each section offers recommendations to be considered by the university community. Ultimately, if decisions are made to eliminate or combine programs, it is the policy of the university to allow all students currently enrolled to be allowed reasonable opportunities to complete their degrees. No courses required for a degree will be eliminated unless the curriculum has been changed by appropriate faculties and academic committees.

Overall, the report highlights patterns in which certain programs recur in the lowest rankings in the variables used in the study (Table 1). Programs in the College of Agriculture and Life Sciences (CALs), occur in relatively substantial numbers across doctoral, master’s and undergraduate programs. Programs in this college dominate the lists of graduate programs. In the College of Education (CED), technology education is listed in all levels. Low productivity programs in undergraduate education tend to be clustered in CALs and in the College of Humanities and Social Sciences (CHASS). Also in undergraduate education, there are several, possibly redundant, programs related to environmental studies across colleges. No programs in the College of Management were flagged for further consideration.

It is important to acknowledge the limitations of this report. First, it addresses only the academic realm of the university; it does not, for example, include scholarship and contracts and grants in its analysis, though clearly these play a critical role in the assessment of research productivity. Second, it does not distinguish between programs that are at the traditional core of this land-grant university and those that are not. Third, it ranks NC State programs relative to other NC State programs rather than the programs’ peers at other universities, which means it compares programs that may not be truly comparable. Fourth, like any such analysis, its conclusions are drawn from data that are based on a set of assumptions about what the data mean; the conclusions are only as sound as those assumptions. Further study and evaluation are necessary for making decisions about programs.

Table 1: Areas of Low Productivity

College	Doctoral Programs	Master’s Programs	Undergraduate Program Areas
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CALS	<ul style="list-style-type: none"> • Agricultural and Extension Education • Animal Science/Poultry Science • Biological and Agricultural Engineering • Crop Science • Entomology • Horticultural Science • Nutrition • Physiology • Plant Pathology • Soil Science 	<ul style="list-style-type: none"> • Crop Science • Extension Education • Entomology • Family Life and Youth Development • Horticultural Science • Nutrition • Plant Biology • Plant Pathology • Poultry Science 	<ul style="list-style-type: none"> • Agricultural Institute • Science Technologies/Technicians, Other • Turf and Turfgrass Management • Agricultural Mechanization, General • Agriculture, General • Botany/Plant Biology • Poultry Science • Agricultural and Extension Education Services • Food Science
Design			<ul style="list-style-type: none"> • Landscape Architecture
CED	<ul style="list-style-type: none"> • Technology Education 	<ul style="list-style-type: none"> • Elementary Education • Human Resource Development • Instructional Technology • Technology Education 	<ul style="list-style-type: none"> • Technology Teacher Education/Industrial Arts • Science Teacher Education/General Science Teaching • Sales, Marketing and Distribution Teacher Education
COE			<ul style="list-style-type: none"> • Environmental/Environmental Health Engineering • Engineering, General
CNR	<ul style="list-style-type: none"> • Forest Biomaterials • Parks, Recreation, and Tourism Mgt. 	<ul style="list-style-type: none"> • Forest Biomaterials 	<ul style="list-style-type: none"> • Environmental Engineering Technology/Environment
CHASS			<ul style="list-style-type: none"> • Liberal Arts and Sciences, General Studies • French Language and Literature • Women's Studies • African-American/Black Studies • German Studies • Religion/Religious Studies • Multi-/Interdisciplinary Studies, Other
3 PAMS			<ul style="list-style-type: none"> • Geology/Earth Science, General • Applied Mathematics • Oceanography, Chemical and Physical • Statistics, General
COT	<ul style="list-style-type: none"> • Textile Technology Management 	<ul style="list-style-type: none"> • Textile Engineering 	
CVM	<ul style="list-style-type: none"> • Physiology 	<ul style="list-style-type: none"> • Specialized Veterinary Medicine • Veterinary Public Health 	
DUAP			<ul style="list-style-type: none"> • Environmental Science

I. Courses

Method of Analysis

The first analysis of course data involved examination of the university course catalog to identify courses that had not been taught during the previous five academic years. The second analysis used census files from the current academic year to determine how many sections were being taught with low enrollments. For this analysis, low enrollment was defined as less than 10 students enrolled at census date for an undergraduate course section and less than five students enrolled at census date for graduate course sections. This analysis is limited to sections scheduled as on-campus lectures. Distance education, thesis and dissertation preparation courses, special topics, sections marked "TBA," and placeholder courses were excluded. Combined sections, such as piggybacked and cross-listed sections, were merged into one section and enrollment was summed.

Enrollment in team-taught sections was divided by the number of instructors. For example, an 18-student section taught by two instructors was treated as two 9-student sections.

Findings

Approximately 600 courses were identified in the university course catalog as not having been taught in the last five years. In addition, the analysis of 2010-11 data flagged 173 undergraduate courses taught in sections of fewer than 10 students and 106 graduate courses taught in sections of fewer than five students. A fuller summary is presented in Appendix A.

Recommendations

1. Inactivate all courses in the catalog that have not been taught in the last five years. Prior to inactivating these courses, departments would be given until June 1 to justify continued listing of the flagged courses in the course catalog. This justification would necessarily include a schedule indicating when the course would be offered during the next three years. Recently approved courses would not be inactivated.
2. Re-establish required minimum class sizes. Additional research would help establish appropriate minimums. However, the following guidelines are suggested as an example:
 - a. Lower division courses, undergraduate courses numbered 100 through 299, with enrollments less than 15 will not be offered.
 - b. Courses numbered 300-499 with enrollments less than 10 will not be offered.
 - c. Graduate courses numbered 500-699 with enrollments less than 7 will not be offered.
 - d. Graduate courses numbered 700-899 with enrollments less than 5 will not be offered.
 - e. Agricultural Institute classes with enrollments less than 15 will not be offered.
 - f. The following types of courses do not count toward faculty course obligations and are not subject to the course minimums: special topics (experimental) courses, independent studies, internships, research, and thesis and dissertation preparation.
 - g. Departments will be notified of courses below the minimum and those courses will be canceled prior to the first day of class. Any exceptions to the minimum requirements must be approved by the Office of the Provost each semester.

II. Undergraduate Programs

Method of Analysis

The following variables were used for all programs:

- Enrollment
- Number of applications
- Degrees awarded
- SAT scores (total of math and verbal)
- Selectivity (admitted/applications)

Enrollment, applications, and degrees awarded were used as indicators of productivity. SAT scores and selectivity were used as indicators of student quality. Data were averaged over five years (2005/06-2009/10). Because associate degree programs in the Agriculture Institute do not require SATs, only the selectivity measure was used as a quality measure for those programs. All degree programs (plans) were summed into discipline areas using the Classification of Instructional Program (CIP); some CIP totals cross college boundaries. Undesignated programs at the university and college levels (e.g., FYC and Engineering Undesignated) were excluded, while undesignated programs at the department level were included.

The goal of this evaluation of programs was to identify the programs of concern. To achieve that goal, all programs were ranked according to each of the variables and those in the lowest quartile of each ranking were identified. See Appendix B for complete data on programs ranked in the lowest quartile on any variable. The methodology of identifying programs in the fourth quartile means that the evaluation of productivity and student quality was not absolute but relative to other programs. The threshold values separating the third from the fourth lowest quartiles were:

- Enrollment: fewer than 51.8 students
- Applications: fewer than 21.6
- Degrees awarded: fewer than 15
- SAT total: less than 1142
- Selectivity: greater than 68.6%

Programs were flagged as programs of concern if they were in the lowest quartile in at least one productivity variable and at least one quality variable. In addition, because it was deemed that degrees awarded was the most important of these indicators of the health of a program, any program that was in the lowest quartile in that variable was flagged.

Findings

Table 2 provides the data for the associate's degree programs. One program, Plant Protection and Integrated Pest Management has very low productivity numbers. What is striking about all the programs is their very low selectivity. Combined with the relatively low number of applications received, the selectivity suggests that quality of students may not reflect the expectations of the university. Furthermore, the five-year averages of degrees awarded compared to enrollment suggest that in this two-year program, many of the students fail to graduate. Table 3 lists the undergraduate programs by college that were flagged as programs of concern.

Table 2: Agricultural Institute Programs, Five-Year Average

Program Area	Selectivity	Applied	Enrolled	Degrees
Plant Protection and Integrated Pest Management	73%	2.2	3.8	3.2
Crop Production	90%	15.8	34.6	11.8
Agriculture, General	79%	25.2	27	14.2
Landscaping and Groundskeeping	89%	22.4	54.4	22.2
Animal/Livestock Husbandry and Production	92%	35.6	54.2	16.6
Turf and Turfgrass Management	90%	45.6	96.8	31
Agricultural Business and Management, General	85%	58	98.8	47.8

Table 3: Undergraduate Programs of Concern

College	Program Areas
CALS	Agricultural Institute Science Technologies/Technicians, Other Turf and Turfgrass Management Agricultural Mechanization, General Agriculture, General Botany/Plant Biology Poultry Science Agricultural and Extension Education Services Food Science
Design	Landscape Architecture
CED	Technology Teacher Education/Industrial Arts Science Teacher Education/General Science Teaching Sales, Marketing and Distribution Teacher Education
COE	Environmental/Environmental Health Engineering Engineering, General
CNR	Environmental Engineering Technology/Environment
CHASS	Liberal Arts and Sciences, General Studies French Language and Literature Women's Studies African-American/Black Studies German Studies Religion/Religious Studies Multi-/Interdisciplinary Studies, Other
PAMS	Geology/Earth Science, General Applied Mathematics Oceanography, Chemical and Physical Statistics, General
DUAP	Environmental Science

Recommendations

Some of these programs in Table 3 demonstrate promise in one or more of the variables and should be maintained. No individual recommendations for those programs are offered here. The following recommendations focus on programs of greatest concern.

1. The university should take the opportunity afforded by this review of academic programs to reconsider the place of the Agricultural Institute in our institution. Could the resources, human and financial, be put to better use in meeting the mission of the university? The Agricultural Institute was inaugurated before the creation of the community college system now in place. The people of North Carolina may be better served by the university focusing on its core mission. If the associate's degree is to be maintained, it could be restructured into three broader programs: Agricultural Business and Management, Animal Science/Husbandry, and Plant and Soil Science.
2. CALS should consider discontinuing its least productive programs, Agricultural Mechanization, General (5-year average of 5.8 degrees awarded) and Turf and Turfgrass Management (6 degrees awarded). Further, the college should consider reorganizing its current programs as concentrations under broader umbrella programs, which could include Agriculture, Life Sciences, and Extension Education/Agricultural Business Management.
3. There are a number of degree programs in CHASS that require special attention because they fall into the lowest quartile for multiple performance criteria. The college should consider (a) consolidating current foreign language programs (French Language and Literature, German Studies, and perhaps others as appropriate) into a comprehensive foreign language degree; (b) consolidating Women's Studies and African-American/Black Studies into one Gender and Ethnic Studies degree program; (c) discontinuing the Liberal Arts and Sciences, General Studies (Leadership in the Public Sector) program if appropriate; (d) strengthening the Liberal Arts and Sciences/Liberal Studies program (also known as IDS) and Science, Technology, and Society by supporting growth in these programs; (e) eliminating Religion/Religious Studies or combining it with philosophy.
4. Absent a viable plan for growing Geology/Earth Science, General and Oceanography (Marine Sciences) and evidence of growth, PAMS should consider discontinuing or consolidating them.

General Comments

1. The first recommendation above proposed the possible consolidation of Agricultural Institute programs as concentrations under several umbrella programs. One approach to implementing that recommendation is to use the following structure:

AAS in Plant and Soil Science with following concentrations:

- Plant Protection and Pest Management (Pest Management)
- Crop Production
- Agriculture, General
- Landscaping and Grounds-keeping
- Turf and Turfgrass Management
- Other programs (not on the low performance list) as deemed appropriate

AAS in Animal Science/Husbandry:

- Animal/Livestock Husbandry and Production
- Other programs (not on the low performance list) as deemed appropriate

AAS in Agricultural Business and Management

- Possible new degree to include concentrations related to Ag Business Management such as Agricultural Business and Management, General.
- Other programs (not on the low performance list) as deemed appropriate

2. CALS programs could be reorganized into umbrella programs as follows:

Agriculture with the following concentrations:

- Turf and Turf-grass Management
- Agricultural Mechanization
- General Agriculture
- Poultry Science
- Horticultural Science

Life Sciences:

- Plant Science (Botany)
- Microbiology
- Biochemistry
- Biological Sciences, General
- Food Science

Extension Education/Agricultural Business Management:

- Agriculture and Extension Education Services
- Agricultural Teacher Education
- Agribusiness/Agriculture Business Operations
- Science Technologies

III. Graduate Programs

Method of Analysis

Two kinds of analyses were applied to data about graduate programs, an analysis of the overall data and an analysis of specific attributes of programs.

1. Analysis of Overall Data

Data from graduate programs were analyzed according to ten variables:

- Enrollment overall
- Enrollment/number of faculty
- Applications overall
- Applications/number of faculty
- Degrees awarded overall
- Degrees awarded/number of faculty
- GRE verbal scores
- GRE quantitative scores
- GRE writing scores
- Selectivity in admissions (admitted/applications)

These variables were chosen to represent a variety of dimensions of program effectiveness and efficiency:

- Productivity—overall enrollment and overall degrees awarded
- Efficiency—enrollment/faculty and degrees awarded/faculty
- Demand—applications and applications/faculty
- Student Quality—GRE scores and selectivity

The programs in the bottom quartiles of the variables were identified and then ranked separately by the number times they appeared in the lowest quartiles of the rankings by variables (Appendix C).

2. Analysis of Specific Attributes of Programs

For a more fine-grained examination of the programs in the lowest quartiles, the data were evaluated by the following metrics (Appendix D):

- Programs that are least productive (defined as having *both* the lowest enrollments and degrees awarded)
- Programs that are the least efficient (defined as having *both* the lowest enrollments per faculty and degrees awarded per faculty)
- Programs for which there is the least demand (defined as having *both* the lowest number of applications overall and the lowest applications per graduate faculty)
- Programs in which quality of students is jeopardized by low selection and selectivity (defined as having *both* the lowest number of applications and lowest selectivity)
- Programs in which entering students are least academically prepared (defined as having *both* the lowest verbal and quantitative scores or *all* the lowest verbal, quantitative, and writing scores)

In the analysis of master's programs, those that were associated with healthy doctoral programs (appearing in 3 or fewer categories in the overall data), such as Physics, Toxicology, and Applied Mathematics, were removed from the lists. In many departments, students enter in the doctoral program and may receive a master's degree on the way. Eliminating these programs allowed for a more useful perspective on master's programs.

Data Collection

All the data for this report, with one exception as described below, came from the Student Information System database.

To create a comparison that did not disadvantage smaller programs, separate lists were made based on dividing the data by number of faculty in each program in addition to the overall lists of programs. It was important that the faculty divisors reflect not only the size of the program but also the unit of the department. The faculty divisor was determined in 3 ways according to the 3 kinds of programs involved. (1) A single program in a single department (such as Entomology): faculty was defined as the 5-year average of graduate faculty associated with the program and paid by through department. (2) Multiple graduate programs in a single department (such as Technology Education, Science Education, and Mathematics Education): faculty was defined as those associated with the individual programs and paid through the department. Because the graduate faculty list does not in most cases parse departmental faculty in this way, it was necessary to find this information from heads and Directors of Graduate Programs. They identified faculty primarily associated with each program and those associated with more than one. To maintain consistency in the number of departmental faculty, those in the "both" category were divided equally among the programs. Because a 5-year average was not available for this count, the current numbers were used. (3) Interdisciplinary/interdepartmental programs (such as Physiology): faculty was defined as the 5-year average of all graduate faculty associated with the program and paid by the university (so that adjuncts and others were not counted), which included faculty from a variety of departments. In an attempt to assure that the different divisors did not misrepresent any type of program, the appropriate data were analyzed in three categories, overall, departmental, and interdisciplinary/interdepartmental.

Findings

The goal of this investigation was to identify the graduate programs that are relatively ineffective compared with other programs at NC State so that actions may be taken to improve the overall effectiveness and efficiency of academics at the university. The analysis identified the programs in Table 4. These are programs that appeared in the bottom quartiles of 5 or more of the rankings by variable in the overall analysis and/or were identified as programs of concern in the analysis of specific attributes of programs. See Appendix D for a more detailed summary of the analysis.

Recommendations

1. The majority of programs of concern are in CALS, the majority of which are in agriculture. One option for improving the effectiveness of these programs is to create a set of umbrella programs with many of the present programs as concentrations. For example, such umbrella programs could include the animal sciences, plant sciences, biological sciences, genomic sciences, life sciences, and environmental sciences.

Table 4: Graduate Programs of Concern

College	Doctoral Programs	Master's Programs
CAL S	Agricultural and Extension Education	Crop Science
	Animal Science/Poultry Science	Extension Education
	Biological and Agricultural Engineering	Entomology
	Crop Science	Family Life and Youth Development
	Entomology	Horticultural Science
	Horticultural Science	Nutrition
	Nutrition	Plant Biology
	Physiology	Plant Pathology
	Plant Pathology	Poultry Science
	Soil Science	
CED	Technology Education	Elementary Education
		Human Resource Development
		Instructional Technology
		Technology Education
CNR	Forest Biomaterials	Forest Biomaterials
	Parks, Recreation, and Tourism Mgt.	
CVM	Physiology	Specialized Veterinary Medicine
		Veterinary Public Health
COT	Textile Technology Management	Textile Engineering

2. Presently, there are 3 separate graduate programs in the Department of STEM Education, Mathematics, Science, and Technical Education. Though it is Technology Education that is of most concern, Science and Mathematics Education have relatively small enrollments and demand. One option is to combine the three as one graduate program in STEM Education. This could be a groundbreaking program with its focus on STEM education in a single graduate program, encouraging courses and scholarship in STEM education as well as in mathematics, science, and technical education. This new configuration may give the program a marketing advantage that would attract more applicants, thus providing the opportunity for increasing productivity, efficiency, and student quality. This is an option the college is considering.
3. The doctoral program in Animal Science and Poultry Science and the master's program in Poultry Science elicited concerns related to low productivity and, for the latter program, low efficiency and low demand. The Poultry Science master's degree program was in the lowest quartile in 8 of 10 variables. Consider combining the master's in Poultry Science with Animal Science, as the present doctoral degree is configured.
4. Agricultural and Extension Education appeared in the bottom quartile in 8 out of 10 possible categories in the data and exhibited problems in low productivity, low efficiency, low

demand, and low selection and selectivity. This program could be discontinued. The department could focus on the two master's programs, with an emphasis on increasing the demand and productivity of both.

5. Family Life and Youth Development is a young program (first admissions in 2006/2007) and should be given time to increase its productivity in enrollment and degrees awarded. The faculty in the program should place a special emphasis on increasing demand for the program and admitting higher quality students.
6. Elementary Education was on the recent low productivity list from UNC General Administration. The analysis reported here raised concerns related to low efficiency, demand, and academic preparation of the students. The head of the department submitted a plan for increasing the demand for the program. Increased demand should allow the program to enroll higher quality students through increased selectivity. The program should be monitored to assure that it is meeting its goals.
7. Human Resource Development had an average enrollment over the past 5 years of 4 students; its associated program, Training and Development, in the same department, had an average of 47 students. One option would be to discontinue Human Resource and Development and offer only Training and Development. Or both programs could be placed under the umbrella program Human Resource Education.
8. The 5-year average enrollment in Specialized Veterinary Medicine was 5.4, in Veterinary Public Health, 3.6. Each ranks low in productivity, efficiency, and demand. The university should scrutinize the cost/benefits of these programs to determine if they should be continued. The Veterinary Public Health faculty have proposed a joint program with the School of Public Health at UNC-Chapel Hill. That option should be investigated further.
9. Forest Biomaterials from the College of Natural Resources was listed as a program of concern for both master's and doctoral degrees. It may be that the educational opportunities for students in this program would be expanded if it were a part of an umbrella program in environmental sciences with appropriate programs in CALS and Engineering.

Appendix A: Scheduled Course Sections Below Cut and Average Section Size, 2010-11

Owner	Course SUBJECT	Graduate Courses				Undergraduate Courses			
		Scheduled Sections Taught	Sections Below Cut	% Below Cut	Avg Section Size	Scheduled Sections Taught	Sections Below Cut	% Below Cut	Avg Section Size
CALS	IMM - Immunology	3	2	66.7%	1.7			0.0%	0.0
CALS	ANS - Animal Science	9	5	55.6%	5.3	35	4	11.4%	57.9
CALS	CS - Crop Science	8	3	37.5%	6.5	28	6	21.4%	15.2
CALS	BAE - Biological & Agric Eng	8	3	37.5%	10.1	33	7	21.2%	26.5
CALS	PO - Poultry Science	3	1	33.3%	6.0	16	5	31.3%	11.9
CALS	BIT - Biotechnology	21	7	33.3%	9.0	28	3	10.7%	10.0
CALS	SSC - Soil Science	15	3	20.0%	7.8	14	2	14.3%	65.8
CALS	HS - Horticulture Science	10	2	20.0%	7.9	35	4	11.4%	29.0
CALS	AEE - Agricultural Education	10	2	20.0%	8.6	22	1	4.5%	20.1
CALS	PP - Plant Pathology	32	5	15.6%	3.1	5	1	20.0%	17.4
CALS	FM - Feed Mill	1	0	0.0%	6.0	1	1	100.0%	7.0
CALS	BBS - Bioprocessing			0.0%	0.0	10	4	40.0%	7.1
CHASS	LOG - Logic	1	1	100.0%	2.0	6	2	33.3%	28.0
CHASS	FLF-Foreign Language - French	1	1	100.0%	3.0	56	6	10.7%	18.8
CHASS	FL - Foreign Languages	4	2	50.0%	10.3	7	1	14.3%	22.7
CHASS	COM - Communication	27	6	22.2%	10.0	151	5	3.3%	35.2
CHASS	FLN - Foreign Language - Hindi			0.0%	0.0	14	11	78.6%	5.4
CHASS	FLPER-For Lang - Persian			0.0%	0.0	4	2	50.0%	8.5
CHASS	FLP-Foreign Language - Portugu			0.0%	0.0	3	1	33.3%	15.3
CHASS	FLE-Foreign Language - English			0.0%	0.0	21	6	28.6%	11.7
CHASS	ARS - Arts Studies			0.0%	0.0	9	2	22.2%	22.3
CNR	FOR - Forestry	11	4	36.4%	8.6	37	9	24.3%	20.0
CNR	WPS-Wood and Paper Science	12	4	33.3%	7.2	12	6	50.0%	12.8
CNR	GIS - Geographic Info Systems	7	2	28.6%	32.7			0.0%	0.0
CNR	NR - Natural Resources	9	2	22.2%	10.0	9	1	11.1%	36.9
CNR	FW - Fisheries & Wildlife Sci	5	1	20.0%	5.4	13	4	30.8%	43.2
COE	NE - Nuclear Engineering	17	9	52.9%	8.0	36	12	33.3%	15.4
COE	BEC Biomanufacturing Tr Ed Ctr	13	5	38.5%	4.3	29	10	34.5%	9.9
COE	BME - Biomedical Engineering	13	4	30.8%	6.0	28	6	21.4%	24.4
COE	OR - Operations Research	14	3	21.4%	10.1			0.0%	0.0
COE	MSE - Materials Sci and Engine	33	7	21.2%	10.9	32	6	18.8%	40.5
COE	EI-Entrepreneurship Initiative			0.0%	0.0	4	1	25.0%	53.5
Design	ADN - Art and Design	6	3	50.0%	5.8	16	3	18.8%	12.6
Design	DDN - Design - Graduate	3	1	33.3%	6.7			0.0%	0.0
Design	ID - Industrial Design	7	2	28.6%	10.3	10	2	20.0%	14.5
Design	GD - Graphic Design	4	1	25.0%	11.5	13	2	15.4%	24.8
Design	LAR - Landscape Architecture	13	3	23.1%	14.2	6	0	0.0%	30.3
CED	ELM - Elementary Education	2	1	50.0%	7.5	34	0	0.0%	29.0
CED	EMS - Math & Science Education	14	1	7.1%	11.1	29	10	34.5%	13.6
PAMS	BMA - Biomathematics	5	2	40.0%	4.4			0.0%	0.0
PAMS	MEA-Marine,Earth,& Atmosph Sci	24	6	25.0%	10.3	59	9	15.3%	66.4
Std Aff	AS - Aerospace Studies			0.0%	0.0	19	6	31.6%	12.3
Std Aff	PEC- Physical Educ - Coaching			0.0%	0.0	10	2	20.0%	22.2
Textiles	TT - Textile Technology	11	2	18.2%	8.5	36	10	27.8%	26.1

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Notes

- 1 This table contains only sections identified as lecture, scheduled, on-campus, and regular-term during academic year 2010-11.
- 2 The following courses have been excluded: Distance Education, TBA (arranged), labs, problem sessions, placeholders, graduate thesis and dissertation, special topics (29x, 49x), and all 6xx, 8xx, and 9xx courses.
- 3 Shaded subject codes have graduate and undergraduate low enrollment sections of 20% or more.
- 4 Sections and headcounts are prorated for team teaching, therefore fractional sections and headcounts are possible.
- 5 Combined sections for piggy-back and cross-listed situations are combined into one section with summed headcount enrollment.
- 6 The "cut" for graduate section enrollment is 5 and the "cut" for undergraduate section enrollment is 10.
- 7 Enrollment on census day (10th day of classes) is checked and sections with headcount below the cut are summed in the "Below" column.
- 8 The test for below cut is applied after combined sections are summed and after team teaching situations are prorated.

Appendix B: Quartile Rankings for Undergraduate Instructional Programs
 Undergraduate Plans summed by CIP with 5-year Averages and Quartile Rankings of those Averages

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
CIP	College	Program (CIP) Description	Flagged Count	SAT Total 5-yr Avg	Selectivity 5-yr Avg	SAT Total Quartile	Selectivity Quartile	Apply 5-yr Avg	Enroll 5-yr Avg	Degree 5-yr Avg	Applied Quartile	Enrolled Quartile	Degrees Quartile	UNC Baccalaureate	Old or New
010201	CALS	Agricultural Mechanization, General	4	1103	43%	4	1	13.6	34.6	5.8	4	4	4	1	
010607	CALS	Turf and Turfgrass Management	4	1103	54%	4	2	15.8	39.75	7.5	4	4	4	1	New
010801	CALS	Agricultural and Extension Education Services	4	1073	75%	4	4	3	40.2	15.4	4	4	3	1	
010907	CALS	Poultry Science	4	1094	70%	4	4	21.6	49.8	11	3	4	4	1	
010000	CALS	Agriculture, General	3	1093	39%	4	1	34.5	21.67	3	3	4	4	2	
260301	CALS	Botany/Plant Biology	3	1202	77%	2	4	8.6	32	21.4	4	4	3	1	
419999	CALS	Science Technologies/Technicians, Other	3	1243	58%	1	2	6	15.67	2	4	4	4	1	
011001	CALS	Food Science	2	1150	63%	3	3	24.6	49.2	12.2	3	4	4	1	
131301	CALS	Agricultural Teacher Education	2	1074	70%	4	4	40.6	101.2	15.2	3	3	3	2	
010102	CALS	Agribusiness/Agricultural Business Operations	1	1079	51%	4	2	52.6	228.6	78	3	2	1	1	
011102	CALS	Agronomy and Crop Science	1	1111	62%	4	3	21.8	85	20	3	3	3	1	
011103	CALS	Horticultural Science	1	1108	57%	4	2	33.2	175.2	44.2	3	2	2	1	
260101	CALS	Biology/Biological Sciences, General	1	1162	72%	3	4	1140.2	1426.2	268.4	1	1	1	15	
260202	CALS	Biochemistry	1	1182	73%	3	4	257.2	409.6	87.4	1	1	1	3	
260502	CALS	Microbiology	1	1183	74%	2	4	43.2	147	45.4	3	2	2	1	
130101	CED	Education, General	2		67%		3	3	22.6	15.8	4	4	3	1	
131309	CED	Technology Teacher Education/Industrial Arts	2	1128	37%	4	1	9.2	95.4	30.8	4	3	2	3	
131310	CED	Sales, Marketing and Distribution Teacher Ed	2	1181	36%	3	1	33.8	49.8	8.4	3	4	4	1	
131316	CED	Science Teacher Education/General Science	2	1150	69%	3	4	29.8	65.6	14.4	3	3	4	5	
131202	CED	Elementary Education and Teaching	1	1096	51%	4	2	281.8	200.25	41	1	2	2	14	New
131203	CED	Junior High/Intermediate/Middle School Education	1	1129	68%	4	3	27.8	98.4	22.4	3	3	3	13	
131311	CED	Mathematics Teacher Education	1	1167	74%	3	4	103.4	174	36.6	2	2	2	12	
050125	CHASS	German Studies	3	1150	50%	3	2	8	10.33	3	4	4	4	1	New
050201	CHASS	African-American/Black Studies	3		40%		1	2.5	8	4.25	4	4	4	6	New
050207	CHASS	Women's Studies	3	1207	38%	2	1	5.3	8.33	5	4	4	4	6	New
160901	CHASS	French Language and Literature	3	1192	68%	2	3	16.4	22.6	9.4	4	4	4	9	

240199	CHASS	Liberal Arts and Sciences, General Studies	3		67%		3	1.5	34	3.5	4	4	4	1
301501	CHASS	Science, Technology and Society	3	1050	42%	4	1	5.2	32.6	15	4	4	3	1
380201	CHASS	Religion/Religious Studies	3	1177	61%	3	3	20.6	34.4	10.8	4	4	4	6
309999	CHASS	Multi-/Interdisciplinary Studies, Other	1		0%		1	0	0	1			4	1
440701	CHASS	Social Work	1	1123	30%	4	1	69.8	107.6	28.8	2	3	2	13
450401	CHASS	Criminology	1	1132	36%	4	1	211.4	263.8	77.4	2	2	1	2
150507	CNR	Environmental Engineering Technology/Environment	3	1142	69%	4	4	14	90.4	19.8	4	3	3	1
030101	CNR	Natural Resources/Conservation, General	1	1102	67%	4	3	55	135	24.8	3	2	2	1
030201	CNR	Natural Resources Management and Policy	1	1174	61%	3	3	16.4	75.6	15.8	4	3	3	2
030506	CNR	Forest Management/ Forest Resources Management	1	1084	53%	4	2	41.4	85.4	15.2	3	3	3	1
030509	CNR	Wood Science and Wood Products/Pulp and Paper	1	1214	73%	1	4	43	141	24.2	3	2	3	1
310301	CNR	Parks, Recreation and Leisure Facilities Mgmt	1	1097	54%	4	2	139.8	366.2	99.2	2	1	1	8
310504	CNR	Sport and Fitness Administration/Management	1	1094	42%	4	1	273.5	275	71	1	2	2	4
140101	COE	Engineering, General	2	1245	73%	1	4	899.4	721.4	9	1	1	4	4
141401	COE	Environmental/Environmental Health Engineering	2	1236	74%	1	4	65.6	81.8	12.2	2	3	4	1
140501	COE	Biomedical/Medical Engineering	1	1248	76%	1	4	336.4	267.2	39.8	1	2	2	2
140701	COE	Chemical Engineering	1	1272	76%	1	4	216.6	388.2	82.8	1	1	1	2
141801	COE	Materials Engineering	1	1280	75%	1	4	32	78.2	16.2	3	3	3	1
142301	COE	Nuclear Engineering	1	1273	71%	1	4	95.6	147	20.6	2	2	3	1
143301	COE	Construction Engineering	1					1	115.2	36	4	3	2	1
520601	COM	Business/Managerial Economics	1	1169	73%	3	4	42.5	90.8	41.2	3	3	2	4
040601	Design	Landscape Architecture	1	1198	38%	2	1	29.2	52.2	10.2	3	3	4	2
030104	DUAP	Environmental Science	2	1198	66%	2	3	58.6	48.8	7.8	2	4	4	7
270301	PAMS	Applied Mathematics	3	1268	72%	1	4	13.6	47.2	27.6	4	4	2	3
400601	PAMS	Geology/Earth Science, General	3	1189	57%	2	2	9.2	27.2	9.6	4	4	4	8
270501	PAMS	Statistics, General	2	1280	75%	1	4	16.2	60	19	4	3	3	3
400607	PAMS	Oceanography, Chemical and Physical	2	1166	51%	3	2	84.2	30	5.4	2	4	4	3
400801	PAMS	Physics, General	1	1316	72%	1	4	93	115.2	24.4	2	3	3	12
142801	Textiles	Textile Sciences and Engineering	1	1142	76%	3	4	393.8	832.8	133	1	1	1	1

Notes:

1 Five year history from Student Data File as submitted to UNC-GA taken at each appropriate time point.

- 2 Admissions and enrollment counts are taken for fall semester only.
- 3 Degrees awarded counts are academic year total (summer, fall, spring).
- 4 Curricula in legacy student system and plan in SIS are consolidated to CIP degree program code, In some cases a CIP spans colleges, especially CIP = 030101.
- 5 Undesignated programs are entry points to a college for students and cannot award a degree. The student must matriculate to a degree granting program to graduate.
- 6 In COE the students who enter a departmental undesignated program (CIP) are placed in that degree program for this analysis.
- 7 CIP 240199 is the degree completion program Leadership in the Public Sector

Columns:

- A CIP (Classification of Instructional Program) = Federal taxonomy that categorizes degree programs at NC State authorized by UNC-General Administration
- B College = owner of program, or largest share of program.
- C Description = label of CIP.
- D Flagged Count = count of the 5 measures with bottom quartile (4 = lowest) ranking.
- E SAT Total 5-yr Avg = average 2-part SAT score for all students that submitted those test scores.
- F Selectivity 5-yr Avg = Admitted applicants / total applicants, average for years with applications up to 5 years.
- G SAT Total Quartile = bottom quartile given to programs with SAT score average below 1142 of up to 5 years of students who submitted SATs.
- H Selectivity Quartile = bottom quartile given to selectivity 5-year average above 68.6% (lower selectivity is better).
- I Applied 5-yr Avg = count of applications in last 5 fall semesters, divided by number of semesters with applications.
- J Enrolled 5-yr Avg = average fall headcount enrollment for years with students enrolled.
- K Degrees 5-yr Avg = average degrees awarded for years with degrees. Note 1 student can receive more than 1 degree (in 2009-10 4,474 undergraduate students received 4,797 degrees).
- L Applied Quartile = bottom quartile given to a program with less than 21.6 average applications.
- M Enrolled Quartile = bottom quartile given to a program with total fall enrollment average less than 51.8 students.
- N Degrees Quartile = bottom quartile given to a program with degrees conferred average less than 15.0 degrees.
- O UNC Baccalaureates = count of universities in UNC system with a degree program in this CIP. Count includes NC State. Undesignated programs have no similar programs in inventory.
- P Flag for possible old (phasing out) or new (phasing in) program.

Appendix C: Graduate Programs by Instances in Lowest Quartiles of 10 Variables

DR RANKING	Instances ¹		MR RANKING	Instances ¹
Agricultural & Extension Education	8		Veterinary Public Health	8
Nutrition	8		Poultry Science	8
Technology Education	8		Functional Genomics	7
Soil Science	7		Elementary Education	7
Entomology	7		Technology Education	7
Parks, Rec and Tourism Mgmt	6		Toxicology	6
Physiology	6		Plant Pathology	6
Plant Pathology	6		Specialized Vet Medicine	6
Crop Science	6		Plant Biology	6
Textile Technology Mgt	6		Human Resource Develop	6
Horticultural Science	6		Physics	6
Biological & Agri Engineering	5		Immunology	5
Fish, Wildlife, and Cons Biology	5		Textile Engineering	5
Forest Biomaterials	5		Bioinformatics	5
Animal Science & Poultry Science	5		Entomology	5
Counseling Education	4		Extension Education	5
Functional Genomics	4		Family Life and Youth Dev	5
			Forest Biomaterials	5
			Nutrition	5
			Applied Mathematics	5
			Genetics	4
			Crop Science	4
			Microbiology	4

¹ This table includes only those programs that appeared 4 or more times in the bottom quartiles of the rankings.

Appendix D: Graduate Programs of Concern by College

Doctoral Programs	>4 Variables ¹	Low Product ²	Low Efficiency ³	Low Demand ⁴	Low Select ⁵	Acad Prep ⁶
CALS						
Agricultural and Ext Education	8	X	X	X	X	
Animal Science/Poultry Science	5	X				
Biological and Ag Engineering	5		X	X		
Crop Science	6		X			
Entomology	7		X	X	X	
Horticultural Science	6		X	X		
Nutrition	8	X		X		X
Physiology	6	X	X	X		
Plant Pathology	6		X			X
Soil Science	7	X	X	X		
CED						
Technology Education	8	X		X	X	X
Parks, Rec, and Tour Mgt	6		X	X		
CNR						
Fish, Wildlife, & Cons Biology	5	X			X	
Forest Biomaterials	5	X				
COT						
Textile Technology Mgt	6		X	X		
Master's Programs						
CALS						
Crop Science			X			
Entomology	5		X	X		
Family Life and Youth Dev	5	X				X
Horticultural Science			X			
Nutrition	5	X				
Extension Education	5				X	X
Functional Genomics	7			X		
Plant Biology	6					
Plant Pathology	6	X	X	X		

Poultry Science	8	X	X	X		
CED						
Elementary Education	7	X		X	X	X
Human Resource and Dev	6					X
Instructional Technology		X			X	
Technology Education	7	X		X	X	
CNR						
Forest Biomaterials	5			X	X	
CVM						
Specialized Vet Med	6	X	X	X		
Veterinary Public Health	8	X	X	X		
COT						
Textile Engineering	5			X		

¹Programs that are in the bottom quartile in 5 or more of the 10 variables in the overall data

²Programs that are least productive (defined as having *both* the lowest enrollments and degrees awarded)

³Programs that are least efficient (defined as having *both* the lowest enrollments per graduate faculty and degrees awarded per graduate faculty)

⁴Programs for which there is the least demand (defined as having *both* the lowest number of applications overall and the lowest applications per graduate faculty)

⁵Programs in which quality of students is jeopardized by selection and selectivity (defined as having *both* the lowest number of applications and lowest selectivity [admitted/applications received])

⁶Programs in which entering students are least academically prepared (defined as having *both* the lowest verbal and quantitative scores or *all* the lowest verbal, quantitative, and writing scores)

