THE UNIVERSITY OF NORTH CAROLINA AT ASHEVILLE
FACULTY SENATE

Senate Document Number 1804S

Date of Senate Approval 03/02/04

- -

Statement of Faculty Senate Action:

UPC4: Request to Establish a Joint NCSU-UNCA Bachelor of Science in Engineering with a Concentration in Mechatronics.

THE UNIVERSITY OF NORTH CAROLINA
REQUEST FOR AUTHORIZATION TO ESTABLISH A NEW DEGREE PROGRAM

INSTRUCTIONS: Please submit five copies of the proposal to the Senior Vice President for Academic Affairs, UNC Office of the President. Each proposal should include a 2-3 page executive summary. The signature of the Chancellor is required.

Date: 2/27/04

Constituent Institutions: North Carolina State University and the University of North Carolina at Asheville
CIP Discipline Specialty Title: Engineering
CIP Discipline Specialty Number: 14.0101 Level: B
Exact Title of the Proposed Degree: Bachelor of Science in Engineering with a Concentration in Mechatronics
Exact Degree Abbreviation (e.g. B.S., B.A., M.A., M.S., Ed.D., Ph.D.): BS
Does the proposed program constitute a substantive change as defined by SACS? Yes ___ No __X__
a) Is it at a more advanced level than those previously authorized? Yes____ No _X___
b) Is the proposed program in a new discipline division? Yes__X(UNCA)__ No __X(NCSU)__
Proposed date to establish degree program (allow at least 3-6 months for proposal review):
month _ August_ *year* 2004
Do you plan to offer the proposed program away from campus *during the first year of operation*?
Yes ___X (NCSU)_ No__ X (UNCA)__ (Note – the Mechatronics Program is currently an established distance education program for NCSU, with core engineering courses delivered from the Raleigh campus (NCSU) to the UNCA campus and the required core science and mathematics courses and general education courses delivered by UNCA.)
If so, complete the form to be used to request establishment of a distance education program and submit it along with this request.

EXECUTIVE SUMMARY

We intend to establish a joint NCSU-UNCA Bachelor of Science in Engineering Degree with a Mechatronics Concentration (EGM). Mechatronics is an interdisciplinary field of engineering that includes the study of mechanical, electrical, and computer engineering. The proposed joint degree program will give students the benefit of a strong foundation in the liberal arts combined with rigorous studies in engineering disciplines.

By engaging the strengths of each institution, we can capitalize on a synergistic educational opportunity to produce highly trained and qualified engineering graduates who have also received the benefits of a liberal education that considers and addresses social, ethical, and cultural implications of the engineering discipline and

extends the capacity for lifelong learning and development. Students will satisfy NCSU requirements for the engineering core and UNCA requirements for the Integrative Liberal Studies program (general education).

The total program is 127 credit hours, with 63 credit hours in core engineering courses (already in existence at NCSU), 34 credit hours in core science and mathematics courses, including Computer Science (already in existence at UNCA), and 30 hours in Integrative Liberal Studies courses (including 20 hours of existing courses and three new courses totaling 10 hours).

The educational objectives of the program are:

1. To provide an academic environment in which engineering undergraduates can acquire the multidisciplinary knowledge and skills in electrical, mechanical, and computer engineering that lead to knowledge and skills in Mechatronics.

2. To provide the experience of integrating modern microelectronics and information technologies into product design, development, and manufacturing.

3. To establish an educational environment in which students participate in interdisciplinary activities, improve professional interaction skills, and learn to work in an integrated team environment.

4. To produce graduates who are able to define and solve problems and are capable of developing, implementing, and evaluating solutions by integration of basic scientific skills and knowledge.

5. To expand student awareness of professional and ethical responsibilities, including the impact of engineering solutions in a global and societal context.

NCSU and UNCA currently cooperate in the delivery of two established programs in engineering, the 2+2 program and the NCSU Mechatronics program, involving approximately 100 students a year. The Mechatronics program is currently an established distance education program for NCSU. These programs have evolved over the last twenty-five years into strong, popular programs. It is logical for UNCA and NCSU to cooperate in the next step, the offering of a joint degree program in Mechatronics. NCSU is nationally known for its high-quality undergraduate and graduate engineering programs. UNCA is nationally known for its high-quality general education program and the quality of the interactions between faculty and students. Both UNCA and NCSU students and faculty would benefit from the combination of strengths from these two institutions.

The Mechatronics concentration was developed to meet needs specific to the interests of western North Carolina industries and communities. Cooperation between NCSU and UNCA has enabled the provision of a much needed resource at the most appropriate location. Additionally, the joint degree program will develop a model which other programs, similar in nature, could follow to expand the impact and benefit of engineering training across the state.

An NCSU Engineering Programs office will continue to be housed and supported on the UNCA campus. The core engineering courses for the joint Mechatronics degree program will be delivered from the Raleigh campus (NCSU) to the UNCA campus and the required core science and mathematics courses and general education courses will be delivered by UNCA. At present, the NCSU Office of Engineering Programs at UNCA occupies five offices, one laboratory, one computer laboratory, and one teleconference classroom in Robinson Hall, and uses a distance learning facility in Ramsey Library. These facilities will continue to be available for the proposed joint program. In addition, the current program is in need of an electronics laboratory, at least one research laboratory, a student senior design laboratory, and storage space. These needs will continue with the proposed

joint degree program.

The UNCA Library will support the needs of engineering students with local resources and remotely accessed resources provided through the NCSU Libraries. Distance learning services are supported by NCREN.

Prospective students will apply directly to UNCA using the UNCA application. Qualified students will be admitted to UNCA as students with an interest in engineering. Special advising will be available to students with an interest in engineering to ensure that they take the appropriate courses during the freshman year. UNCA will determine appropriate AP credit and transfer credit to be awarded to incoming students.

The new NCSU-UNCA Joint Program will undergo review by SACS on each campus during the normal SACS review process. SACS has determined that this program is not a substantive change for either campus.

Professional review of the new joint program by the Accreditation Board for Engineering and Technology (ABET) is slated. An accreditation package will be in place by Spring 2007.

The proposed NCSU/UNCA joint Mechatronics degree program is very similar to the current NCSU Mechatronics program in operation on the UNCA campus. The current program began as an expansion of the very successful 2+2 program, offered cooperatively by NCSU and UNCA. Because the Mechatronics program has been in place for several years, we are aware of the aspects of the program which work quite well and of those that need attention. The general structure of the program is already in place. Initiating a joint degree program will allow full cooperation between the two campuses to permanently solve issues dealing with student registration and transcripts and with the allocation of funds and personnel to the program.

I. DESCRIPTION OF THE PROGRAM

A. Describe the proposed degree program (i.e., its nature, scope, and intended audience).

We intend to establish a joint NCSU-UNCA Bachelor of Science in Engineering Degree with a Mechatronics Concentration (EGM). Mechatronics is an interdisciplinary field of engineering that includes the study of mechanical, electrical, and computer engineering. The proposed joint degree program will give students the benefit of a strong foundation in the liberal arts combined with rigorous studies in engineering disciplines.

By engaging the strengths of each institution, we can capitalize on a synergistic educational opportunity to produce highly trained and qualified engineering graduates who have also received the benefits of a liberal education that considers and addresses social, ethical, and cultural implications of the engineering discipline and extends the capacity for lifelong learning and development. Students will satisfy NCSU requirements for the engineering core and UNCA requirements for the Integrative Liberal Studies program (general education).

The total program is 128 credit hours, with 64 credit hours in core engineering courses, 34 credit hours in core science and mathematics courses (including Computer Science) and 30 hours in Integrative Liberal Studies courses. There are no program tracks within the program.

1. Core Engineering Courses – NCSU (64 credit hours)
   a. E 101 Introduction to Engineering and Problem Solving (1)
   b. ECE 200 Introduction to Electrical and Computer Engineering Laboratory (3)
   c. ECE 206 Introduction to Computer Organization (3)
   d. ECE 211 Electric Circuits (4)

e. ECE 212 Fundamentals of Logic Design (3)
f. ECE 220 Analytical Foundations of Electrical and Computer Engineering (3)
g. ECE 301 Linear Systems (4)
h. ECE 406 Design of Complex Digital Systems (3)
i. ECE 455 Computer Control of Robots (3)
j. ECE 460 Digital Systems Interfacing (3)
k. ECE 480 Senior Design Project in Electrical Engineering (4)
l. EGM 180 Introduction to Mechatronics Laboratory (2)
m. EGM 360 Advanced Mechatronics Design Laboratory (1)
n. MAE 206 Engineering Statics (3)
o. MAE 208 Engineering Dynamics (3)
p. MAE 301 Engineering Thermodynamics I (3)
q. MAE 310 Heat Transfer Fundamentals (3)
r. MAE 314 Solid Mechanics (3)
s. MAE 315 Dynamics of Machines (3)
t. MAE 316 Strength of Mechanical Components (3)
u. MAE 435 Principles of Automatic Control (3)
v. MSE 201 Structure and Properties of Engineering Materials (3)

2. Core Science and Mathematics Courses – UNCA (34 credit hours)
   a. CHEM 111 General Chemistry Laboratory (1)
   b. CHEM 132 General Chemistry (3)
   c. CSCI 201 Introduction to Computing (3)
   d. CSCI 202 Introduction to Data Structures (3)
   e. MATH 191 Calculus I (4)
   f. MATH 192 Calculus II (4)
   g. MATH 291 Calculus III (4)
   h. PHYS 221 Physics I (4)
   i. PHYS 222 Physics II (4)
   j. STAT 225 Introduction to Calculus-Based Statistics (4)

3. Integrative Liberal Studies Courses – UNCA (30 credit hours)
   a. ECON 102 Microeconomics (3)
   b. HF XXX Health and Fitness course (2)
   c. HUM 124 The Ancient World (4)
   d. HUM 214 The Rise of European Civilization (4)
   e. HUM 324 The Modern World (4)
   f. ILSA XXX Arts course (3)
   g. LANG 120 Foundations of Academic Writing (4)
   h. LSIC 179 Introductory Colloquium (3)
   i. LSSC 479 Senior Colloquium (3)

The recommended course sequence for the major is given in Appendix A.

B. List the educational objectives of the program.

1. To provide an academic environment in which engineering undergraduates can acquire the multidisciplinary knowledge and skills in electrical, mechanical, and computer engineering that lead to knowledge and skills in Mechatronics.

2. To provide the experience of integrating modern microelectronics and information technologies into product design, development, and manufacturing.

3. To establish an educational environment in which students participate in interdisciplinary activities, improve professional interaction skills, and learn to work in an integrated team environment.

4. To produce graduates who are able to define and solve problems and are capable of developing, implementing, and evaluating solutions by integration of basic scientific skills and knowledge.

5. To expand student awareness of professional and ethical responsibilities, including the impact of engineering solutions in a global and societal context.

C. Describe the relationship of the program to other programs currently offered at the proposing institution, including the common use of: (1) courses, (2) faculty, (3) facilities, and (4) other resources.

The Mechatronics program will relate naturally to UNCA programs in Chemistry, Computer Science, Mathematics, and Physics, to other UNCA programs involved in the Integrative Liberal Studies program, to the 2+2 program offered cooperatively by UNCA and NCSU, and to NCSU programs in Computer Engineering, Electrical Engineering, and Mechanical and Aerospace Engineering.

Of the 128 credit hours in the proposed joint Mechatronics degree program, 64 credit hours come from courses already in existence at NCSU within the College of Engineering, in the departments of Mechanical and Aerospace Engineering, Electrical and Computer Engineering, and Mechatronics. A total of 54 credit hours come from courses that currently exist at UNCA in the Humanities and Arts and Ideas program or in the departments of Chemistry, Computer Science, Economics, Health and Fitness, Mathematics, Physics, Political Science, Psychology, and Sociology. Three new courses will be developed: LANG 120 Foundations of Academic Writing (4), LSIC 179 Introductory Colloquium (3), and LSSC 479 Senior Colloquium (3).

The joint Mechatronics degree program will use the faculty, facilities, and laboratory resources from the College of Engineering at NCSU and from many departments at UNCA. In addition, the joint Mechatronics degree program will use distance learning facilities at both NCSU and UNCA. All engineering courses will be taught by faculty of NCSU. NCSU will support the core engineering component of the joint program through Distance Education Learning Technologies (DELTA) and Engineering Online administration. Engineering computing facilities at NCSU (ITECS) will support remote engineering computer labs on the UNCA campus.

An NCSU Engineering Programs office will continue to be housed and supported on the UNCA campus. The core engineering courses for the joint Mechatronics degree program will be delivered from the Raleigh campus (NCSU) to the UNCA campus and the required core science and mathematics courses and general education courses will be delivered by UNCA.

The UNCA Library will support the needs of engineering students with local resources and remotely accessed resources provided through the NCSU Libraries. Distance learning services are supported by NCREN.

II. JUSTIFICATION FOR THE PROGRAM—NARRATIVE STATEMENT

A. Describe the proposed program as it relates to:

1. the institutional mission and strategic plan

NCSU and UNCA currently cooperate in the delivery of two established programs in engineering, the 2+2 program and the NCSU Mechatronics program, involving approximately 100 students a year. The Mechatronics program is currently an established distance education program for NCSU. These programs have evolved over the last twenty-five years into strong, popular programs. It is logical for UNCA and NCSU to cooperate in the next step, the offering of a joint degree program in Mechatronics. Both UNCA and NCSU students and faculty would benefit from the combination of strengths from these two institutions.

NCSU is nationally known for its high-quality undergraduate and graduate engineering programs. The mission of the College of Engineering at NC State University is to provide students with a sound engineering education, advance the understanding and application of scientific principles, enhance economic development, and improve the quality of life of our citizens through teaching, research, and outreach programs. In addition to ensuring that our students are exposed to modern engineering principles and have access to modern equipment and technology to support their educational experience, the College seeks to create a team-oriented environment throughout our academic enterprise. Our goal is to produce well-rounded engineers who can function effectively in the technical arena as well as possess the skills to assume leadership roles in industry, academia, and government.

UNCA is nationally known for its high-quality general education program and the quality of the interactions between faculty and students. An engineering initiative is consistent with the UNCA liberal arts mission. A tailored, focused, high-quality, interdisciplinary, modest-sized engineering program fits within our long-term planning goals for incorporating appropriate professional and pre-professional programs into our committed liberal arts framework. Currently we offer curricula in education, health and fitness, management, accounting, mass communications, multimedia arts and sciences, pre-health, and atmospheric science. This evolution has followed a national pattern. In the last twenty-five years liberal arts colleges across the country have been selectively adding career-based programs. Twenty-five outstanding liberal arts colleges currently offer degrees in engineering fields.

We furthermore believe that inclusion of applied programs is consistent with our instructional mission because of the inherent benefits this kind of educational experience offers to the state of North Carolina. Students who choose to go on in these applied fields do so from UNCA with a broadened intellectual horizon and a liberal arts perspective. These students graduate with the ability to lead successful, rewarding lives endowed with an array of ethical, cultural, scientific, and social sensitivities increasingly viewed as necessary to approach their professional responsibilities and to succeed in subsequent degree programs.

The Mechatronics concentration was developed to meet needs specific to the interests of western North Carolina industries and communities. Cooperation between NCSU and UNCA has enabled the provision of a much needed resource at the most appropriate location. Additionally, the joint degree program will develop a model which other programs, similar in nature, could follow to expand the impact and benefit of engineering training across the state.

2. student demand

Many students interested in engineering would like to pursue an engineering education related to the needs of the communities in which they live. The opportunity to pursue a university education and then apply the education to meet the employment demands of the area allows the student to benefit from a cycle of

investment and reward that strengthens the economy, productivity, and morale of the region. UNCA has served as a western host for NCSU Engineering Programs since 1983 with much success. Through the efforts of the NCSU Engineering Programs office, over 250 students have begun in engineering at UNCA and transferred to NCSU for the successful completion of the degree. The distance NCSU Mechatronics Engineering degree offered entirely on the UNCA campus has graduated 16 students in its first two classes. The structure of this program is clearly in place and functioning.

3. societal need (For graduate, first professional, and baccalaureate professional programs, cite manpower needs in North Carolina and elsewhere.)

The opportunity to respond to the voiced needs and aspirations of western North Carolina, particularly the Asheville metropolitan area, defines one of the most salient rationales for this joint degree program. The community of Asheville for many decades has identified engineering as a resource important for the continuing economic growth of the city and region. The continuing, positive relationship between UNCA and NCSU makes the development of a joint engineering program a possibility. Our long association is a benefit to both campuses and a positive dynamic of the University system as a whole. We anticipate that the development and growth of a joint program will deepen the productive association of the two campuses and allow for the most productive use of scarce resources.

4. impact on existing undergraduate and/or graduate academic programs of your institution. (e.g., Will the proposed program strengthen other programs? Will it stretch existing resources? How many of your programs at this level currently fail to meet Board of Governors' productivity criteria? Is there a danger of proliferation of low-productivity degree programs at the institution?)

The presence of small, applied programs in the UNCA curriculum would enhance the non-applied programs. Questions of great relevance may be posed and discussed from various perspectives when applied and non-applied programs share students, faculty, and facilities. Students in both curricular areas thus receive a value-added benefit from a successfully implemented mission that emphasizes the liberal arts and incorporates other kinds of educational programs.

The proposed joint degree program in Mechatronics will improve the visibility of current NCSU Engineering programs offered at UNCA. In addition, the joint degree program will help clarify and resolve administrative details related to all NCSU programs offered at UNCA.

The proposed joint degree program in Mechatronics will require additional resources for both NCSU and UNCA, but will be much more cost-effective than independent programs at each institution, as noted in the Report on Engineering from the UNC Committee on Educational Planning, Policies and Programs (Appendix B). We anticipate that the joint Mechatronics degree program will not be a low-productivity program.
Currently, UNCA has two low productivity programs at the undergraduate level, both of which have been recommended for continuation. The NCSU College of Engineering has no low productivity undergraduate programs.

B. Discuss potential program duplication and program competitiveness.
1. Identify similar programs offered elsewhere in North Carolina. Indicate the location and distance from the proposing institution. Include a) public and b) private institutions of higher education.

The undergraduate Mechatronics degree program exists only as a distance program offered by NCSU at UNCA. No other Mechatronics programs are offered in North Carolina.

Similar programs offered in the state include:

- ? Biomedical Engineering: NCSU and UNC, joint Ph.D. program, offered in Raleigh and Chapel Hill
- ? NCSU Engineering Programs at UNCA: 2+2 and 4-year Mechatronics Engineering degree program, offered in Raleigh and Asheville
- ? NCSU Engineering Programs at LCC: 2+2, offered in Raleigh and Kinston
- ? NCSU Engineering Programs at UNCW: 2+2, offered in Raleigh and Wilmington

2. Indicate how the proposed new degree program differs from other programs like it in the University. If the program duplicates other UNC programs, explain a) why is it necessary or justified and b) why demand (if limited) might not be met through a collaborative arrangement (perhaps using distance education) with another UNC institution. If the program is a first professional or doctoral degree, compare it with other similar programs in public and private universities in North Carolina, in the region, and in the nation.

This joint degree program will not duplicate other UNC programs. It offers a unique blending of expertise and experiences from NCSU and UNCA to offer a collaborative, joint degree at the undergraduate level. The program maximizes the use of resources, including faculty and staff resources, used for the education of engineering undergraduates.

C. Enrollment (baccalaureate programs should include only upper division majors, juniors and seniors).

Headcount enrollment

Show a five-year history of enrollments and degrees awarded in similar programs offered at other UNC institutions (using the format below for each institution with a similar program); indicate which of these institutions you consulted regarding their experience with student demand and (in the case of professional programs) job placement. Indicate how their experiences influenced your enrollment projections.

Institution: NCSU and UNCA
Program Title: Mechatronics

The enrollment and degrees awarded data shown below are the actual figures for the current joint UNCA/NCSU Mechatronics program established in Fall 1999.

	1999-00	2000-01	2001-02	2002-03	2003-04
Enrollment	3	17	18	20	19
Degrees-awarded			7	9	NA

Use the format in the chart below to project your enrollment in the proposed program for four years and explain the basis for the projections:

The projections shown below are based on historical data for the joint NCSU-UNCA Mechatronics program. Assuming adequate resources to provide a quality educational program, greater visibility through enhanced marketing efforts, and increasing numbers of NC high school graduates, and progress in securing accreditation for the Mechatronics program, we think current enrollments can be increased by five each year.

	Year 1 (2004-05)	Year 2 (2005-06)	Year 3 (2006-07)	Year 4 (2007-08)

Full-time	15	18	21	24
Part-time	10	12	14	16
TOTALS	25	30	35	40

Please indicate the anticipated steady-state headcount enrollment after four years:

Full-time 24 Part-time 16 Total 40

SCH production (upper division program majors, juniors and seniors only, for baccalaureate programs). Use the format in the chart below to project the SCH production for four years. Explain how SCH projections were derived from enrollment projections (see UNC website for a list of the disciplines comprising each of the four categories).

The SCH projections are based on historical Mechatronics upper-level major FTE/SCH ratios combined with actual category 1-IV ratios since 1999.

Year 1	**Student Credit Hours**			
Program Category	**UG**		**Masters**	**Doctoral**
	UNCA	NCSU		
Category I	137			
Category II	19			
Category III	43			
Category IV		485		

Year 2	**Student Credit Hours**			
Program Category	**UG**		**Masters**	**Doctoral**
	UNCA	NCSU		
Category I	164			
Category II	22			
Category III	51			
Category IV		582		

Year 3	**Student Credit Hours**			
Program Category	**UG**		**Masters**	**Doctoral**
	UNCA	NCSU		
Category I	191			
Category II	26			
Category III	60			
Category IV		679		

Year 4	**Student Credit Hours**			
Program Category	**UG**		**Masters**	**Doctoral**
	UNCA	NCSU		
Category I	218			

Category II	30			
Category III	68			
Category IV		776		

III. PROGRAM REQUIREMENTS AND CURRICULUM

A. Program Planning.

1. List the names of institutions with similar offerings regarded as high quality programs by the developers of the proposed program.

Bucknell University
Harvey Mudd College
Hope College
Lafayette College
Spelman College
Swarthmore College
Texas A&M University - Galveston
Union College (NY)
Virginia Military Institute

2. List other institutions visited or consulted in developing this proposal. Also discuss or append any consultants' reports, committee findings, and simulations (cost, enrollment shift, induced course load matrix, etc.) generated in planning the proposed program.

Institutions consulted:
Bucknell University
North Carolina State University
Smith College

Appendix B: University of North Carolina Report on Engineering, March 20, 2003, Office of the President. Includes a Needs Assessment by NCHEMS and a Report by a Visiting Team of Engineering Deans.

This report was sponsored by the UNC Office of the President. The consultants were a visiting team of engineering deans from Virginia Commonwealth University, the University of Arizona, and the University of Kansas. The report includes a needs assessment for engineering graduates in North Carolina prepared by the National Center for Higher Education Management Systems (NCHEMS). The NCHEMS assessment concluded that North Carolina does not need new engineering degree programs and that the greatest need is for additional graduates in computer science and software engineering. The consultant report contained six recommendations for UNCA:

"1. The Team recommends that UNCA does not develop independent, freestanding engineering programs.

2. The Team recommends that UNCA continue to work with NCSU in offering the Mechatronics program.

3. The Team recommends that UNCA and NCSU consider development of a computer-engineering program following the same model used in the Mechatronics program.

4. The Team recommends that the UNC Office of the President implement a policy whereby students completing programs like the Mechatronics program receive dual degrees (one each from UNCA and NCSU) or that their diploma indicates that degree is a joint one from UNCA and NCSU.

5. The Team recommends that the UNC Office of the President study other administrative and accounting policies that are barriers to these joint degree offerings.

6. The Office of the President of the University of North Carolina should consider providing additional funding to both UNCA and NCSU to support the expansion of these programs."

B. Admission. List the following:

1. Admissions requirements for proposed program (indicate minimum requirements and general requirements).

Prospective students will apply directly to UNCA using the UNCA application. Qualified students will be admitted to UNCA as students with an interest in engineering. Special advising will be available to students with an interest in engineering to ensure that they take the appropriate courses during the freshman year. UNCA will determine appropriate AP credit and transfer credit to be awarded to incoming students.

Classification of students as EGM (Mechatronics) students will begin when the major in Engineering with a Concentration in Mechatronics is declared. Students may declare the major when they have satisfied the following requirements:

1. Completion of the following courses:
   - CHEM 111
   - CHEM 132
   - E 101
   - EGM 180
   - LANG 120
   - MATH 191
   - MATH 192
   - PHYS 221
2. A cumulative GPA of 2.5 in all courses completed
3. An average GPA of 2.5 in the last two math courses completed (both at the time of application and at the end of the semester in which the student is declaring).

On acceptance, EGM students become degree-seeking students at both UNCA and NCSU.

2. Documents to be submitted for admission (listing or sample).

For Admission: UNCA Application for Admission
For Declaration of Major: UNCA Declaration of Major Form

C. Degree requirements. List the following:

1. Total hours required. 128 Major. 64 Minor. NA

2. Proportion of courses open only to graduate students to be required in program (graduate programs only). NA

3. Grades required.

Students will be required to maintain a 2.0 GPA in all coursework and a 2.0 GPA in the major to graduate with a joint NCSU/UNCA B.S. in Engineering with a Concentration in Mechatronics.

4. Amount of transfer credit accepted.

Transfer credit will be accepted pursuant to existing NCSU and UNCA standards. See Appendix C for information on phasing in the new degree program for students currently preparing to enter the Mechatronics program.

5. Other requirements (e.g. residence, comprehensive exams, thesis, dissertation, clinical or field experience, "second major," etc.).

As part of the 128 credit hours in the joint degree program, students will be required to complete a Senior Design Project and the Senior Colloquium of the Integrative Liberal Studies (ILS) program. Presentation of the Senior Design Project will constitute fulfillment of the oral competency requirement.

Students will also be required to complete an ILS Topical Cluster. A Topical Cluster is a set of courses that explore a problem, issue, or idea, engaging it through disciplinary and interdisciplinary methods. Students must complete at least three courses from one Topical Cluster, totaling nine semester hours or more (included as part of the 128 hours in the program). Their choices must include a Social Science course, a Natural Science course, and either an Arts course or an elective. See Appendix D for a sample Topical Cluster. While we anticipate that students will be able to complete the Cluster within the 128 hours required for the program, we cannot guarantee it. It may be necessary for students to take an additional course to satisfy this requirement.

Intensive Courses are also part of the new UNCA ILS program They offer curricular emphases in skills and content areas as a way for students to integrate their Liberal Studies education with other offerings in their academic experience. Students may take courses designated as Intensives within the ILS program, in their majors, or among their electives. These courses need not add credit hours, but must be fulfilled for graduation.

Intensive	**Courses (credit hours required to fulfill)**
Writing Intensive (W)1	3 courses (credit hours may vary)
Diversity Intensive (D)	1 course (3 credit hours)
Quantitative Intensive (Q)	1 course (3 credit hours)
Information Literacy Intensive (I)2	2 courses (credit hours may vary)

Appropriate courses are indicated on the Proposed Plan of Study in Appendix A.

6. Language and/or research requirements.

The student will be required to comply with the UNCA Foreign Language requirement, which may be satisfied by either: a) demonstrating proficiency through the introductory level for any language (120-level for modern foreign languages, CLAS 102 for Latin, or CLAS 104 for Greek), or b) successful completion of two semesters of study of any language not studied in high school. Since this requirement may be satisfied by proficiency demonstration, any necessary Foreign Language courses are not included in the

1 Since all Liberal Studies Introductory Colloquia are Writing Intensive, students will take two additional W-designated courses.

2 Since LANG 120 is Information Literacy Intensive, students will take one additional I-designated course.

128 credit hours required for the joint degree.

7. Any time limits for completion.

None.

D. List existing courses by title and number and indicate (*) those that are required. Include an explanation of numbering system. List (under a heading marked "new") and describe new courses proposed.

Existing Courses (all required)
NCSU

*E 101 Introduction to Engineering and Problem Solving (1)
*ECE 200 Introduction to Electrical and Computer Engineering Laboratory (3)
*ECE 206 Introduction to Computer Organization (3)
*ECE 211 Electric Circuits (4)
*ECE 212 Fundamentals of Logic Design (3)
*ECE 220 Analytical Foundations of Electrical and Computer Engineering (3)
*ECE 301 Linear Systems (4)
*ECE 406 Design of Complex Digital Systems (3)
*ECE 455 Computer Control of Robots (3)
*ECE 460 Digital Systems Interfacing (3)
*ECE 480 Senior Design Project in Electrical Engineering (4)
*EGM 180 Introduction to Mechatronics Laboratory (2)
*EGM 360 Advanced Mechatronics Design Laboratory (1)
*MAE 206 Engineering Statics (3)
*MAE 208 Engineering Dynamics (3)
*MAE 301 Engineering Thermodynamics I (3)
*MAE 310 Heat Transfer Fundamentals (3)
*MAE 314 Solid Mechanics (3)
*MAE 315 Dynamics of Machines (3)
*MAE 316 Strength of Mechanical Components (3)
*MAE 435 Principles of Automatic Control (3)
*MSE 201 Structure and Properties of Engineering Materials (3)

UNCA

*CHEM 111 General Chemistry Laboratory (1)
*CHEM 132 General Chemistry (3)
*CSCI 201 Introduction to Computing (3)
*CSCI 202 Introduction to Data Structures (3)
*MATH 191 Calculus I (4)
*MATH 192 Calculus II (4)
*MATH 291 Calculus III (4)
*PHYS 221 Physics I (4)
*PHYS 222 Physics II (4)
*STAT 225 Introduction to Calculus-Based Statistics (4)

*ARTS XXX Arts elective (3). (The XXX indicates that a variety of ARTS courses may fulfill this requirement.)
*ECON 102 Microeconomics (3)
*HF XXX (2) (The XXX indicates that a variety of Health and Fitness courses may fulfill this requirement.)

*HUM 124 The Ancient World (4)
*HUM 214 The Rise of European Civilization (4)
*HUM 324 The Modern World (4)

New Proposed Courses:

*LANG 120 Foundations of Academic Writing (4)

The newly approved UNCA Integrative Liberal Studies program requires students to complete LANG 120 (Foundations of Academic Writing) and three writing intensive courses, one of which is LSIC 179 or 300 (offered for transfer students). In LANG 120, students will continue to refine their knowledge of the mechanics of writing and will be asked to focus on the development of specific rhetorical and research strategies, close reading of texts, and complex analysis. Students will acquire the skills necessary to develop persuasive essays using specific evidence from other sources while integrating evaluation, documentation, and assessment of source materials into their own arguments.

*LSIC 179 Introductory Colloquium (3)

The proposed UNCA Integrative Liberal Studies (ILS) program requires students to complete a pair of colloquia, one taken at the beginning of their education at UNCA and one taken at the end. The Liberal Studies Introductory Colloquium (LSIC) introduces students to education in a liberal arts environment and assists them in making the transition to UNCA. To facilitate students' transition to college, LSIC 179 will address topics including time management, money management, health, proper use of college resources, academic advising, and an appreciation of the rhythms of the academic year. To introduce students to opportunities specific to UNCA, the students will be encouraged to see the campus within the civic community and the academic community, understanding how it has the possibility to affect each. They can explore the responsibilities of the liberally educated through Service Learning and the opportunities for active learning available through the Undergraduate Research experience. They should have an opportunity to experience cultural events and special opportunities offered by the campus.

*LSSC 479 Senior Colloquium (3)

The Liberal Studies Senior Colloquium (LSSC) is also topical and is intended to be taken in a student's final semester at UNCA. The LSSC will incorporate content and insights from both the ILS program and each student's major and elective courses. In this way, it attempts to provide a capstone liberal studies experience in which students will be able to integrate the knowledge they have acquired through their major with the wider perspectives provided in their general education. Students will also be required to complete a self-directed project which demonstrates this level of integration. As a capstone course, the issue(s) explored in the class will be related to the concepts the students have been absorbing in the ILS program, including Humanities courses, Arts courses, LSIC, and the clusters. While there may be common content in all LSSC sections, each will have a topical focus, approved by the ILS Colloquia Coordinator. These topics will allow for consideration of issues of contemporary relevance from multiple disciplinary perspectives. Because this course highlights connections, its faculty will have a responsibility to show how different aspects of the issue are affected by the various disciplines. It is expected that the students will play a direct role in this effort. In the classrooms, students from a variety of disciplines should be challenged to consider how their discipline has given them insight into the issue(s) and how the insights of other students in the class are affected by the approach they have learned through their particular discipline.

In terms of the student's project, there are three outcomes to be demonstrated. First, that the student is able to accomplish active learning that is self-directed. Second, that the student is able to see the relevance of such effort. Third, that the student is able to convey both the project and its relevance to other educated individuals who may not share the presenter's specific specialty. It is possible that students will use an idea originally approached in another class, but they must be able to conceptualize and express its relevance to the course beyond a given discipline. Student projects must be approved in advance by the instructor and may include

undergraduate research, research done for the course, service learning projects, artistic creations, or other relevant productions.

IV. FACULTY

A. List the names of persons now on the faculty who will be directly involved in the proposed program. Provide complete information on each faculty member's education, teaching experience, research experience, publications, and experience in directing student research, including the number of theses and dissertations directed for graduate programs. The official roster forms approved by SACS can be submitted rather than actual faculty vita.

Appendix E is the SACS official roster for NCSU faculty.
Appendix F is the SACS official roster for UNCA faculty.

B. Estimate the need for new faculty for the proposed program over the first four years. If the teaching responsibilities for the proposed program will be absorbed in part or in whole by the present faculty, explain how this will be done without weakening existing programs.

It is anticipated that two additional faculty will be needed at UNCA over the first four years. One faculty hire will be at the Associate Professor level, and will serve half-time as the UNCA Associate Director and teach co-requisite classes for the joint degree program. The second faculty hire will be at the Assistant Professor level and will also support co-requisite classes for the joint degree program. These faculty members will be housed in the Department of Computer Science or Physics, as appropriate.

C. If the employment of new faculty requires additional funds, please explain the source of funding.

Funding for new faculty is expected to come from additional state appropriations.

D. Explain how the program will affect faculty activity, including course load, public service activity, and scholarly research.

Current faculty activity levels should continue under the new joint Mechatronics program.

V. Library

A. Provide a statement as to the adequacy of present library holdings for the proposed program.

The holdings of the UNCA library in mathematics, computer science, physics, and other natural sciences have been adequate to support the largely lecture and laboratory-based courses of the undergraduate Mechatronics program. Expansion of that program, however, calls for the ready availability of specialized engineering materials expanded both in breadth and depth.

B. State how the library will be improved to meet new program requirements for the next five years. The explanation should discuss the need for books, periodicals, reference material, primary source material, etc. What additional library support must be added to areas supporting the proposed program?

The UNCA library seeks to establish a small, core collection of print reference sources, books, and browsable journals both to support the basic engineering information needs of students and their faculty, and to attract students to the pleasures of a life-long relationship with the information flow of their

profession. This will represent a one-time cost of $30,0003 and an annual commitment of $7,5004 in new dollars.

C. Discuss the use of other institutional libraries.

The University Librarians at NCSU and UNCA have developed a highly collaborative model which provides Mechatronics engineering students and faculty the best possible engineering information collections and services at the least possible cost to the state. Financing for and the functionality of this model rest on the recognition that when taking an engineering course on the Asheville campus each student is also a distance learner in the NCSU system. As such, each student would have access to the NCSU library's electronic databases, "1-800" reference service (including specialized assistance in engineering), and the overnight delivery of requested books and journal articles. The task at UNCA would be to ensure the easiest access feasible for the students and to provide support to facilitate NCSU's efforts. The assumption is that when an engineering student is NOT enrolled in an engineering course, the student would not need access to NCSU's collections beyond traditional Interlibrary Loan.

Assuming the above, the UNCA and NCSU libraries accept the principle that money for libraries would follow the students. There would be no need to transfer funds for library support from one campus to another. Since library funds are assigned as a proportion of campus funding based on student credit hours, each library would, over time, receive funds proportional to student credit hours taught by its faculty.

In addition, the libraries agreed to the following:

- ?Each library will assign a coordinator for the joint Mechatronics degree program.
- ?An NCSU librarian will provide orientation for engineering students annually at UNCA.
- ?NCSU will also provide orientation to engineering sources and likely student needs to UNCA library personnel.
- ?An NCSU engineering librarian will consult with UNCA library personnel to create a compact, core collection of print materials in engineering at UNCA.
- ?Engineering adjuncts at UNCA and full-time UNCA faculty teaching engineering courses will have access to research materials via the NC State library system.
- ?Both libraries are interested in taking full advantage of full-text electronic products including collections of engineering books in that format.

VI. FACILITIES AND EQUIPMENT

A. Describe facilities available for the proposed program.

At present, the NCSU Office of Engineering Programs at UNCA occupies five offices, one laboratory, one computer laboratory, and one teleconference classroom in Robinson Hall, and uses a distance learning facility in Ramsey Library. These facilities will continue to be available for the proposed joint program. In addition, the current program is in need of an electronics laboratory, at least one research laboratory, a student senior design laboratory, and storage space. These needs will continue with the proposed joint degree program.

B. Describe the effect of this new program on existing facilities and indicate whether they will be adequate, both at the commencement of the program and during the next decade.

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3 This calculation is based on purchasing approximately 310 reference and general engineering books at an average price of $96.59 (2001 avg. price for engineering titles as reported in the 2003 *Bowker Annual*, p. 496).

4 Based upon purchasing approximately 10 engineering serials at an average price of $432.88 (avg. price of engineering periodicals for 2002 as reported in the 2003 *Bowker Annual*, p. 493) and 33 engineering books per year.

The current Mechatronics program needs additional space. We anticipate that the proposed joint degree program will gradually increase the number of engineering students on the UNCA campus. Additional facilities will need to be identified. The completion of the new Biology, Chemistry, and Multimedia Arts and Sciences building, scheduled to break ground in the Fall of 2004, and the new Carmichael Hall, scheduled to break ground in the Spring of 2004, both on the UNCA campus, will allow some movement of departments and programs to provide additional space for engineering. The immediate need for space is currently unmet.

C. Discuss any information technology services needed and/or available.

UNCA currently has an adequate distance learning facility in Ramsey Library, largely provided and mainly used by NCSU Engineering programs. The facility will need to be updated periodically to remain compatible with the distance learning facilities at NCSU.

D. Discuss sources of financial support for any new facilities and equipment.

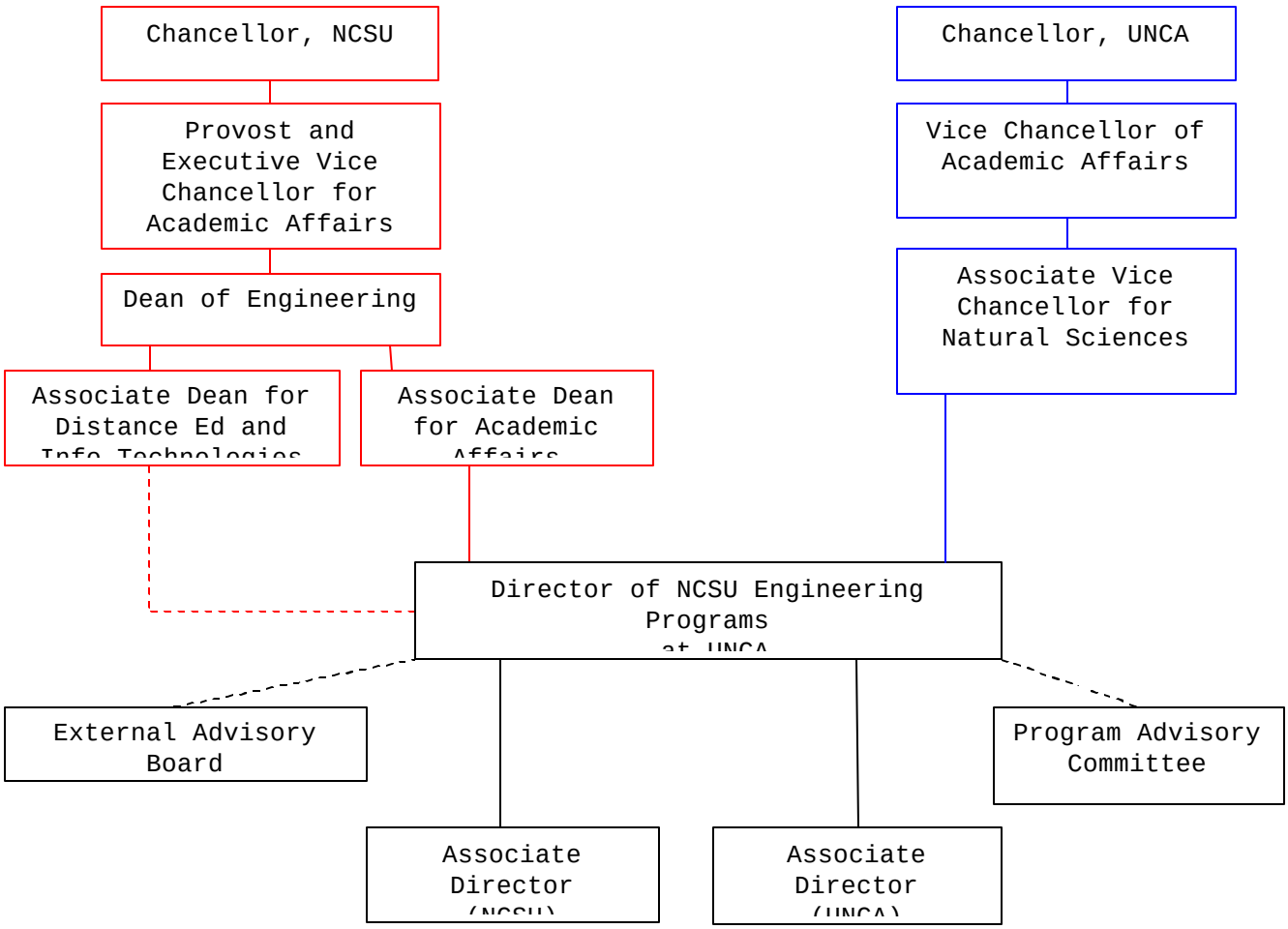
The North Carolina General Assembly has made a one-time allocation of $300,000 to NCSU and UNCA for start up costs associated with the proposed joint Mechatronics degree program. This funding is available until June 30, 2004.

It is expected that continuing financial support will come from new state appropriations.

VII. ADMINISTRATION

Describe how the proposed program will be administered, giving the responsibilities of each department, division, school, or college. Explain any inter-departmental or inter-unit Administrative plans. Include an organizational chart showing the "location" of the proposed new program.

The joint NCSU–UNCA Mechatronics degree program will be jointly administered by NCSU and UNCA. The currently existing Director of NCSU Engineering Programs and the Associate Director will provide NCSU support. UNCA will provide support through a new position, a second Associate Director. The UNCA Associate Director will report to the NCSU Director. An External Advisory Board, made up of industry and academic representatives provide input and feedback to the Director. In addition, an NCSU/UNCA Joint Program Advisory Committee will also provide input and feedback to the Director. UNCA members of the Program Advisory Committee will include the chairs of the UNCA Departments of Physics and Computer Science and two additional UNCA faculty who participate in the program. NCSU members of the Program Advisory Committee will consist of supporting faculty from the NC State Departments of Mechanical and Aerospace Engineering and Electrical and Computer Engineering.



VIII. ACCREDITATION

Indicate the names of all accrediting agencies normally concerned with programs similar to the one proposed. Describe plans to request professional accreditation. If the proposed new degree program is at a more advanced level than those previously authorized or if it is in a new discipline division, was SACS notified of a potential "substantive change" during the planning process? If so, describe the response from SACS and the steps that have been taken to date with reference to the applicable procedure.

The new NCSU-UNCA Joint Program will undergo review by SACS on each campus during the normal SACS review process. SACS has determined that this program is not a substantive change for either campus. (See Appendix G, Letter from SACS.)

Professional review of the new joint program by the Accreditation Board for Engineering and Technology (ABET) is slated. An accreditation package will be in place by Spring 2007.

IX. SUPPORTING FIELDS

Are other subject-matter fields at the proposing institution necessary or valuable in support of the proposed program? Is there needed improvement or expansion of these fields? To what extent will such improvement or expansion be necessary for the proposed program?

The UNCA Departments of Chemistry, Computer Science, Mathematics, and Physics are necessary in support of the proposed program. The joint program is supported at NCSU by the ABET accredited Departments of Mechanical and Aerospace Engineering and Electrical and Computer Engineering. The existing programs are excellent.

X. ADDITIONAL INFORMATION

Include any additional information deemed pertinent to the review of this new degree program proposal.

The proposed NCSU/UNCA joint Mechatronics degree program is very similar to the current NCSU Mechatronics program in operation on the UNCA campus. The current program began as an expansion of the very successful 2+2 program, offered cooperatively by NCSU and UNCA.

Because the Mechatronics program has been in place for several years, we are aware of the aspects of the program which work quite well and of those that need attention. The general structure of the program is already in place. Initiating a joint degree program will allow full cooperation between the two campuses to permanently solve issues dealing with student registration and transcripts and with the allocation of funds and personnel to the program.

Catalog description:

The joint degree program leading to the Bachelor of Science in Engineering with a Concentration in Mechatronics offers students a multidisciplinary education in design and product development processes, with a solid background in the traditional liberal arts. The curriculum integrates the classical fields of mechanical engineering, electrical engineering, computer science and engineering, and information technology to establish basic principles for a contemporary engineering design methodology. In this methodology, engineering products and processes have moving parts that require manipulation and control of dynamic constructions to a very high degree of accuracy. The design process also requires enabling technologies such as sensors, actuators, software, optics, communications, electronics, structural mechanics and dynamics, and control engineering. A key factor for the design process involves integrating modern microelectronics and information technologies into mechanical and electromechanical systems. The Mechatronics Concentration supports the synergistic integration of precision mechanical engineering, electronics control, and systems thinking into the design of intelligent products and processes.

Courses delivered from NCSU to UNCA will be listed in the UNCA catalog using the NCSU course designations.

Participation in graduation:

Students who have completed their degree programs will participate in graduation ceremonies at UNCA. Students may elect to participate in graduation at NCSU upon timely notification of the NCSU registrar.

Design of diploma: See attached draft design, Appendix H.

XI. BUDGET

Provide estimates (using the attached form) of the additional costs required to implement the program and identify the proposed sources of the additional required funds. *Use SCH projections (section II.C.) to estimate new state appropriations through enrollment increase funds.* Prepare a budget schedule for each of the first three years of the program, indicating the account number and name for all additional amounts required. Identify EPA and SPA positions immediately below the account listing. New SPA positions should be listed at the first step in the salary range using the SPA classification rates currently in effect. Identify any larger or

specialized equipment and any unusual supplies requirements.

For the purposes of the second and third year estimates, project faculty and SPA position rates and fringe benefits rates at first year levels. *Include the continuation of previous year(s) costs in second and third year estimates.*

Additional state-appropriated funds for new programs may be limited. Except in exceptional circumstances, institutions should request such funds for no more than three years (e.g., for startup equipment, new faculty positions, etc.), at which time enrollment increase funds should be adequate to support the new program. Therefore it will be assumed that requests (in the "New Allocations" column of the following worksheet) are for one, two, or three years unless the institution indicates a continuing need and attaches a compelling justification. However, funds for new programs are more likely to be allocated for limited periods of time.

Note: Accounts may be added or deleted as required.

SUMMARY OF ESTIMATED ADDITIONAL COSTS FOR JOINT MECHATRONICS PROGRAM

INSTITUTION: NCSU DATE: 11/7/2003

Program (CIP#, Name, Level):14.0101-Gen. Engineering with a Concentration in Mechatronics-Undergrad

Degree to be Granted Bachelor of Science Program Year 0 (2003-04)

		ADDITIONAL FUNDS REQUIRED - BY SOURCE				
		Reallocation of Present Institutional Resources	Enrollment Increase Funds	Federal Other (Identify)	New Allocations	Total
101	**Regular Term Instruction**					
2000	Supplies and Materials	$15,000				$15,000
3000	Current Services	$5,000				$5,000
5000	Capital Outlay (Equipment)	$130,000				$130,000
	TOTAL - Regular Term Instruction					**$150,000**
	TOTAL ADDITIONAL COSTS					**$150,000**

SUMMARY OF ESTIMATED ADDITIONAL COSTS FOR JOINT MECHATRONICS PROGRAM

INSTITUTION: UNCA DATE: 11/7/2003

Program (CIP#, Name, Level):14.0101-Gen. Engineering with a Concentration in Mechatronics-Undergrad

Degree to be Granted Batchelor of Science Program Year 0 (2003-04)

		ADDITIONAL FUNDS REQUIRED - BY SOURCE				
		Reallocation of Present Institutional Resources	Enrollment Increase Funds	Federal Other (Identify)	New Allocations	Total
101-	**Regular Term Instruction**					
2000	Supplies and Materials	$2,000				$2,000
3000	Current Services	$6,000				$6,000
4000	Fixed Charges					$0
5000	Capital Outlay (Equipment)	$30,000				$30,000
	TOTAL - Regular Term Instruction					**$38,000**
151-	**Libraries**					
5600	Library Books and Materials	$30,000				$30,000
	TOTAL - Libraries					**$30,000**
152-	**Academic Support**					
2000	Supplies and Materials	$2,000				$2,000
3000	Current Services	$5,000				$5,000
4000	Fixed Charges					$0
5000	Capital Outlay (Equipment)	$75,000				$75,000
	TOTAL - Academic Support					**$82,000**
	TOTAL ADDITIONAL COSTS					**$150,000**

XII. EVALUATION PLANS

All new degree program proposals must include an evaluation plan which includes: (a) the criteria to be used to evaluate the quality and effectiveness of the program, (b) measures to be used to evaluate the program), (c) expected levels of productivity of the proposed program for the first four years of operation (number of graduates), (d) the names, addresses, e-mail addresses, and telephone numbers of at least three persons (six reviewers are needed for graduate programs) qualified to review this proposal and to evaluate the program once operational, and (e) the plan and schedule to evaluate the proposed new degree program prior to the completion of its fifth year of operation once fully established.

PROGRAM EVALUATION FORMAT

A. Criteria to be used to evaluate the proposed program:

The criteria used to evaluate the joint program are outcomes related to the Program Educational Objectives (see I.B.) and are pursuant to the ABET-Required Skills of Engineering Graduates. The complete assessment plan can be viewed at: http://www.engr.ncsu.edu/assessment/departments/mech/mech_peo.html

B. Measures to be used to evaluate the program:

1. Senior Demonstration of Competency through the successful completion of ECE 480 Senior Design Project in Electrical Engineering and ENGR 400 Senior Colloquium.

2. Survey of graduating seniors.

3. Surveys of alumni.

4. Annual Review meeting. Each year representatives of NCSU and UNCA will meet to review the operation of the joint Mechatronics degree program, address new issues, and recommend changes to the operation of the program. Appropriate revisions will be submitted in a timely manner to the Boards of Trustees of NCSU and UNCA and to the Board of Governors of the UNC System for evaluation and approval.

C. Projected productivity levels (number of graduates):

Level	Year 1	Year 2	Year 3	Year 4	TOTALS
B	9	10	11	12	42
M					
I/P					
D					

(Key: B-Bachelor's, M-Master's, I/P-Intermediate or Professional, D-Doctoral)

D. Recommended consultant/reviewers: Names, titles, addresses, e-mail addresses, and telephone numbers. May not be employees of the University of North Carolina.

Dr. James G. Orbison,
Dean of the College of Engineering
Bucknell University
Lewisburg, PA 17837
Phone: (570) 577-3711
Email: jorbison@bucknell.edu

Dr. James P. Schaffer
Professor and Director of Engineering
332 Dana Hall of Engineering
Lafayette College
Easton, PA 18042
Phone: 610-330-5403

Fax: 610-330-5059
Email: schaffej@mail.lafayette.edu

Dr. John Hurt
Program Director, Partnerships for
Innovative Programs
The National Science Foundation
4201 Wilson Boulevard, Arlington, Virginia 22230, USA
Tel: 703-292-5111, FIRS: 800-877-8339 | TDD: 703-292-5090
Email: jhrt@nsf.gov

Dr. Abdel-Moez E. Bayoumi
Professor and Chair
Mechanical Engineering
University of South Carolina
300 Main Street, Room A224
Columbia, SC 29208, USA
Tel: 803-777-3082
Fax: 803-777-0106
Email: bayoumi@engr.sc.edu

E. Plan for evaluation prior to fifth operational year.

The NCSU/UNCA joint Mechatronics degree program will be evaluated every two years, beginning in 2006, using the UNCA Biennial Assessment and Planning Report (see Appendix H).

XIII. REPORTING REQUIREMENTS

Institutions will be expected to report on program productivity after one year and three years of operation. This information will be solicited as a part of the biennial long-range planning revision.

Proposed date of initiation of proposed degree program: Fall, 2004

This proposal to establish a new degree program has been reviewed and approved by the appropriate campus committees and authorities.

Chancellor: _____
(NCSU – Dr. Marye Anne Fox)

Chancellor: _____
(UNCA – Dr. James H. Mullen)

List of Appendices

APPENDIX A
Proposed Plan of Study
Joint NCSU-UNCA
Bachelor of Science in Engineering Curriculum
Mechatronics Concentration

FALL SEMESTER				SPRING SEMESTER			
Freshman Year							
MATH	191	Calculus I	4	MATH	192	Calculus II	4
LANG	120	Found. Acad. Writing	4	PHYS	221	Physics I	4
CHEM	132	General Chemistry (ILSN cluster)	3	CSCI	201	Intro Algorithm Design - Java	3
E	*101*	*Intro to Engr & Prob Solv'g*	*1*	ECON	102	Microeconomics (ILSS cluster)	3
CHEM	111	General Chemistry Lab	1	*EGM*	*180*	*Intro to Mechatronics Lab*	*2*
LSIC	179	Freshman Colloquium (W)	3				16
			16				
Sophomore Year							
MATH	291	Calculus III	4	ECE	220	Analytical Found. in ECE	3
PHYS	222	Physics II	4	CSCI	202	Introduction to Data Structures	3
ECE	*200*	*Intro to ECE Lab*	*3*	*MAE*	*208*	*Engineering Dynamics*	*3*
ECE	*206*	*Intro to Comp Organization*	*3*	*ECE*	*211*	*Electric Circuits*	*4*
MAE	*206*	*Engineering Statics* (Q)	3	*ECE*	*212*	*Fundamentals of Logic Design*	*3*
			17				16
Junior Year							
MSE	*201*	*S & P of Engr Mat'ls* (Elect clust)	*3*	*MAE*	*314*	*Solid Mechanics* (Q)	*3*
MAE	*301*	*Engr Thermodynamics I*	*3*	*ECE*	*406*	*Design of Complex Digital Sys*	*3*
ECE	*301*	*Linear Systems*	*4*	HUM	214	Rise of European Civilization	4
HUM	124	The Ancient World	4	ARTS	XXX	Arts Course (D) (Elect clust)	3
HF	XXX	Health and Fitness	2	*EGM*	*360*	*Adv. Mechatronics Lab* (I)	1
			16	*MAE*	*435*	*Principles of Automatic Control*	*3*
							17
Senior Year							
MAE	*310*	*Heat Transfer Fundamentals*	*3*	*MAE*	*316*	*Strength of Mech Components*	*3*
MAE	*315*	*Dynamics of Machines*	*3*	*ECE*	*455*	*Computer Control of Robots*	*3*
ECE	*460*	*Digital Systems Interfacing*	*3*	*ECE*	*480*	*Senior Design Project in EE* (W)	*4*
HUM	324	The Modern World (D)	4	STAT	225	Intro. Calc.-based Statistics	4
			13	LSSC	479	Senior Colloquium	3
							17

Total hours shown: 128

Italics indicate the course is received from NCSU by distance education technology.

2/12/04
Y.F.

APPENDIX B

University of North Carolina

Report on Engineering

Committee on Educational Planning,
Policies and Programs

March 20, 2003

Includes Needs Assessment by NCHEMS

And

Report by a Visiting Team
of Engineering Deans

Office of the President

INTRODUCTION

The 2001 General Assembly required the Board of Governors to do a feasibility study of engineering at East Carolina University, University of North Carolina at Asheville, and at Western Carolina University. The Office of the President made a preliminary report to the Educational Planning Committee in the Summer 0f 2002, and reported the need to have 2000-2010 data from the North Carolina Employment Security Commission in order to have the most recent NC data on employment and openings in the field of engineering. Due to a new system there was a delay in obtaining that data, but the ECS made a special effort and provided the data for engineering prior to releasing the full 2002-2010 projections. The Office of the President received that data at the end of January 2003. We agreed to have an external consultant do a needs assessment for engineering in NC, then follow that with a team of engineering deans visiting each campus to assess specific proposals for engineering and facilities within the context of the needs assessment.

NEEDS ASSESSMENT BY DENNIS JONES OF NCHEMS

The Office of the President contacted the National Center for Educational Management Systems (NCHEMS), one of the premier national organization for analyzing educational data. The organization through its President, Dennis Jones, agreed to do the needs assessment and it was scheduled for the month of January 2003 to coincide with the time frame we had been given by the ESC for receipt of the new engineering employment data for North Carolina. The study uses both national and state data to compare NC with regional states and states with high tech industry. It uses all degrees produced in NC in the engineering and computer applications area from both public and private colleges and universities. Based on data and analysis, Jones reached the conclusions reported in the following section. The full report from NCHEMS is in Appendix C.

CONCLUSIONS OF THE NCHEMS ASSESSMENT

On the basis of these findings, I come to the following conclusions:

1. North Carolina does not have need for additional engineering programs. The state already produces more graduates than current and projected annual job openings. Further, the parts of the state that do not have a nearby engineering school are characterized by having relatively low levels of engineering employment. There is no compelling case in the data for additional engineering programs.

2. Because high engineering employment is geographically coincident with locations of engineering programs, there will inevitably arise what I call the "field of dreams" argument-build it (an engineering program) and they (jobs) will come. There are too many examples of very large and strong engineering programs located in communities without commensurate job growth (Purdue and the University of Illinois come to mind) to make this argument credible. If all the other stars are in alignment (venture capital, critical mass of professional employment, airports, etc.), the presence of programs becomes a necessary element-but it is not a sufficient element-to generation of high levels of engineering employment.

3. One place where North Carolina does fall short is at the Master's level. This suggests a shortage of ready access to continuing professional education for those engineers already in place. The pattern in hiring engineers is that:
· Baccalaureate level engineers are recruited from a wide geographic area and moved to wherever the job is-thus the high rates of mobility of individuals with engineering degrees.
· Once located, however, it is important that they have ready access to coursework (not always programs) that will ensure that they have up-to-date information in their fields. The availability of graduate level education is a factor in recruitment, retention, and currency of an engineering workforce. Given the nature of most graduate level engineering education, this coursework can be delivered at a distance from existing programs. It is not necessary to create new programs, with the unneeded undergraduate capacity, to achieve this objective.

4. The greatest need in North Carolina is for computer science/software engineering graduates. It is here that the projected growth is the largest and the gap between job openings and degree production is the greatest. If an investment is to be made, I would suggest it be here rather than in engineering programs. Institutions can have very good computer science programs without companion engineering programs.

CHARGE TO THE TEAM OF ENGINEERING DEANS DOING THE FEASIBILITY STUDY

After a review of the needs assessment, a charge for the visiting team of engineering deans was prepared. The NCHEMS report and the charge to the visiting team were shared and discussed with the six chancellors directly involved, the three at the institutions being visited, and the three at the institutions with existing engineering schools. The Charge is in Appendix D. At that point all chancellors agreed that the charge was a reasonable basis on which to proceed, and the chancellors of the three institutions to be visited indicted that they were not seeking a full engineering school or college but specific programs that would enhance their campus and their region. (Prior to the visit, UNCA indicated it was interested in just Phase I at this time.) The deans selected for the visiting team were Professor Carl Locke, former dean of engineering at the University of Kansas, Dean Peter Crouch, Professor of Engineering at Arizona State University, and Dean Robert Mattauch, Professor of Engineering at Virginia Commonwealth University.

The team arrived in Chapel Hill on Sunday, February 23, and met with the deans (or representative) of the three existing engineering schools for an orientation to what was currently available in engineering at UNC institutions. On Monday the team flew to Asheville, visited the UNCA campus in the morning, and traveled to WCU for an afternoon visit. On Tuesday the team drove to Greenville to visit ECU. At each campus there was interaction with faculty and administrators including the chancellors, and at WCU and ECU there was an opportunity to tour new facilities under construction.

RECOMMENDATIONS BY THE TEAM OF ENGINEERING DEANS

The full report by the Engineering visiting team is in Appendix D. Here are the recommendations the team made.

There are some overarching recommendations that the Feasibility Team offers.

1. The Team does not recommend the formation of any school or college of engineering at the institutions considered. If any new engineering programs are approved, the Team recommends that those programs be organized in existing schools/colleges at the institutions in the UNC system. The costs of supporting additional schools/colleges do not seem justified at this time. None of the chancellors at the three institutions visited are seeking a school or college of engineering at this time. Therefore, the Team did not devote much attention to the costs associated with start-up of a new school or college of engineering. However, Dr. Mattauch has been involved in start-up of a new school of engineering at Virginia Commonwealth University and through his experience a rough estimate of the costs for a new engineering school was made. Attachment II contains this estimate. The total start-up cost for 800 students in 2 engineering programs is estimated to be $36 million which includes a building, laboratory equipment, and the IT infrastructure. This does not include faculty and staff salaries but represents just the physical facilities needed.

2. The Team recommends that at this time the names of any school/college in which an engineering program is organized not have the name changed to include the word "engineering."

3. The Team recommends that all institutions develop more detailed and realistic cost proposals for all proposed programs.

Findings, observations, and recommendations for each campus are discussed separately.

Recommendations-UNC Asheville

1. The Team recommends that UNC Asheville does not develop independent, freestanding engineering programs.
2. The Team recommends that UNC Asheville continue to work with NC State in offering the Mechatronics program.
3. The Team recommends that UNC Asheville and NC State consider development of a computer-engineering program following the same model used in the Mechatronics program.
4. The Team recommends that the UNC Office of the President implement a policy whereby students completing programs like the Mechatronics program receive dual degrees (one each from UNC Asheville and NC State) or that their diploma indicates the degree is a joint one from UNC Asheville and NC State.
5. The Team recommends that the UNC Office of the President study other administrative and accounting policies that are barriers to these joint degree offerings.
6. The Office of the President of the University of North Carolina should consider providing additional funding to both UNC Asheville and NC State to support the expansion of these programs.

Recommendations-WCU

1. The Team recommends that faculty and administration at Western Carolina University continue to work with industry in the region and seek to increase those contacts. It might benefit all concerned if those contacts could result in funded projects that could support students and faculty in these projects.
2. The Team recommends that Western Carolina not develop a freestanding engineering program in electrical and computer engineering.
3. The Team recommends that the faculty and administration at Western Carolina initiate conversations with the School of Engineering at UNC Charlotte to discuss cooperative engineering programs with that institution. It might be possible to offer engineering degrees at Western Carolina in a manner similar to the program in Mechatronics that is offered on the UNC Asheville campus by NC State. This should include a policy whereby students receive formal recognition of having studied on the Western Carolina campus while receiving instruction from UNC Charlotte. This formal recognition should be included on their diploma.
4. The Team recommends that the UNC Office of the President study other administrative and accounting policies that are barriers to joint degree offerings.
5. The Team recommends that the UNC Office of the President provide additional infrastructure support for both institutions if a cooperative engineering program is developed by Western Carolina and UNC Charlotte. This support should be such that would allow both institutions to offer distance-learning opportunities in the new degree program.
6. The Team recommends that Western Carolina also develop formal 2+2 engineering programs in cooperation with NC State and UNC Charlotte.

Recommendations-ECU

1. The Team recommends that East Carolina University partner with NC State to develop formal 2+2 programs and possibly in the future develop a program using the same concept now being used by UNC Asheville for the Mechatronics degree. In this program, NC State would provide a degree program taken by students on the East Carolina campus using distance learning techniques and resident faculty at East Carolina.

It is the opinion of the Team, that this approach will allow the faculty, staff, and administration to develop an engineering culture on campus. The program developed in cooperation with NC State could be designed to fulfill the goals for a new and different engineering program as outlined by the Provost.

RECOMMENDATIONS TO THE BOARD OF GOVERNORS BY THE OFFICE OF THE PRESIDENT

One item of note is the parallel discussion in the Office of the President at the time of the visit regarding the need for campuses to have an opportunity to offer joint degrees with each participating campus's name on a single diploma. Two universities (NCSU and UNC CH) have already proposed a joint degree program as a way to leverage both strengths and resources. That idea has developed to the point that it can now become the vehicle to more explicitly realize what the engineering teams was recommending in several cases.

The recommendations by the Office of the President in the case of UNCA and WCU track very closely the recommendation by the visiting team and incorporate the concept of a joint degree.

UNCA

Discussions should be initiated immediately between NC State and UNC Asheville about transforming the baccalaureate Mechatronics program into a joint degree program in engineering between the two campuses. A consideration will be to have some engineering faculty resident at UNCA to interact with local and regional business and industry where appropriate.

UNC Asheville and NC State should jointly sponsor a needs assessment to see what kind of computer applications or computer engineering degrees might be justified in this region, and, if need is demonstrated, the two campuses would explore the best combination of UNC Asheville offered computer applications, and jointly offered computer engineering.

The existing cooperative programs with other engineering programs should be maintained.

WCU

WCU should explore the expansion of its technology programs where justified by need and student demand.

Discussions should be initiated immediately between UNCC and WCU to explore the extension of UNCC's baccalaureate programs in electrical and computer engineering to the WCU campus, with the goal of establishing a joint degree between the two campuses in one or both of these areas. A consideration would be to have some engineering faculty resident at WCU to interact with local and regional business and industry where appropriate.

WCU could explore the development of cooperative programs in other areas with UNCC or other existing engineering programs (NCA&T, NCSU).

ECU

We recommend that ECU initiate planning activities for their proposed new program in general engineering, and prepare a more detailed account of the features of the program for further review by the Office of the President.

Where need can be identified, ECU should initiate discussions with other engineering programs in the state (NCA&T, NCSU, UNCC) regarding cooperative programs in engineering and possibly joint degree programs.

One recommendation for ECU by the Office of the President goes beyond what the visiting team recommended. The Office of the President does this for several reasons. The team was struck by the potentially innovative nature of the ECU proposal, but did not think it was well worked out at the point of their visit. The proposal, if successfully worked out in detail, would not appear to lend itself to a joint program format since it is so different from the standard programs in engineering. Finally, ECU made the case that many of the business firms in their region were small and typically wanted a generally trained engineer not a specialist in one area.

General

The Office of the President concurs with the conclusion of the NCHEMS Assessment and with the recommendation of the Visiting Team of Engineering Deans that no new schools or colleges of engineering be established at this time nor should any new schools or colleges carry "engineering" in their name.

All programs are recommended with the understanding that they are to maintain or achieve accreditation by the appropriate engineering accrediting agency.

The Office of the President will address barriers to students having efficient access to programs from multiple campuses, campus concerns regarding tracking such students and the consequences for graduation rates.

The NCHEMS Report identified computer applications as an area where NC may need to produce more graduates. The Office of the President will initiate a review of the capacity of our campus to produce more graduates in this area and the feasibility of increasing the capacity for our campus in the area of computer applications.

The NCHEMS Report concluded that NC comparatively seems to be under producing graduates at the master's level in engineering and that this fact might have consequences for supporting high tech industry in NC, since both the companies and engineering employees want access to continuing education and advanced degrees. The Office of the President will initiate discussion with the current schools with master's programs in engineering (North Carolina A&T State University, North Carolina State University, and the University of North Carolina at Charlotte) about ways to make advanced engineering continuing education and degrees available across the state for engineers employed in NC companies.

The recommended planning initiatives are to result in proposals from the institutions, which will include specific steps and expected costs for both immediate steps and for the longer-term maintenance of the programs.

CONCLUSION

The Office of the President believes it has identified some significant next steps to take in engineering education that can both enhance several campuses' academic offerings and provide a vehicle for laying the groundwork to stimulate economic development. While there will be cost associated with these developments, we believe they will be modest in comparison to establishing a full school or college of engineering on one or more campuses. Enhancing capacity in computer applications (and all but one of our campuses have computer science) will respond to a need identified in the NCHEMS assessment, and expanding our master's offerings in engineering to employees throughout the state may be a significant factor in convincing high tech firms to come or stay in the state. Given the mobility of baccalaureate recipients in engineering, this may prove to be an effective strategy for economic development.

APPENDIX C

Policy on Students Currently Preparing to Enter the Degree Program in Mechatronics

Students accepted to the EGM program prior to July 1, 2004, may choose to complete the NCSU (non-joint) version of the degree in Mechatronics, or they may switch to the joint degree program. Students who have not yet been accepted to the EGM program but who have been taking courses at other institutions under the advisement of the NCSU Office of Engineering Programs at UNCA toward fulfillment of the general education requirements of the original EGM degree should not be disadvantaged by the implementation of the new program. These students may also elect to complete the NCSU (non-joint) version of the degree in Mechatronics. Once the new degree is in place, with the exception of those noted above, no new students will be admitted to the existing program.

APPENDIX D

SAMPLE ILS CLUSTER APPLICATION
(Please note that this is a sample, suggested clusters. All adopted clusters will have to be approved by the UNCA Integrative Liberal Studies Oversight Committee (ILSOC).)

Cluster Title: The Material World – The Past, Present, and Future

Cluster Coordinator:

Brief Description: This cluster is intended to introduce students to the development and use of materials through human history. In addition to understanding the historical significance of materials, particular attention will paid to understanding the physical make of materials, the design of new materials in the future, and the economic impact of new materials.

Courses in the cluster:

CHEM 132: General Chemistry (ILSN) (3)
Introduction to basic chemical concepts such as atomic theory, periodic properties of elements, stoichiometry, gas behavior, electronic structure of atoms and molecules, molecular structure and bonding, solution theory including acid-base chemistry and aspects of oxidation-reduction, and introduction to chemical equilibrium concepts. Prerequisite: MATH 167 or higher

ECON 102: Principle of Microeconomics (ILSS) (3)
A study of markets and how prices and output are determined. Topics include market structure, input markets and public policy as it influences economic decisions.

MSE 201: Structure and Properties of Engineering Materials (Cluster elective) (3)
Introduction to the fundamental physical principles governing the structure and constitution of metallic and nonmetallic materials and the relationships among these principles and the mechanical, physical and chemical properties of engineering materials. Prerequisite: CHEM 132.

ARTS XXX: (ILSA) (3) Arts course on the history and use of materials in various world cultures.

APPENDIX E
ROSTER OF INSTRUCTIONAL STAFF

Name of Institution North Carolina State University **Term(s)** 2003-04, 2004-05

Name of Academic Department/School Mechatronics - College of Engineering **Date Form Completed** 10/26/03

1	2	3	4	5
Name	**Most Advanced Degree and Discipline**	**Other Degrees**	**Courses Taught**	**Other Qualifications or Experience**
Richard D. Gould	Ph.D., Mechanical Engineering (Purdue University)	M.S., Mechanical Engineering (Purdue University) B.S., Mechanical Engineering (Purdue University)	Engineering Thermodynamics I, Heat Transfer Fundamentals	Director of Graduate Programs, Director Applied Research Laboratory, R&D Combustion Engr. Detroit Diesel, Aero-Propulsion & Power Directorate Faculty Fellow Wright Laboratory
Jeffrey W. Eischen	Ph. D., Mechanical Engineering (Stanford University)	M. S., Mechanical Engineering (Stanford University) B. S., Mechanical Engineering (University of California Los Angeles)	Strength of Mechanical Components	Failure Analysis Associates, Shell Foundation Teaching Fellow, Registered Professional Engineer
Richard F. Keltie	Ph.D., Mechanical Engineering (North Carolina State University)	M.S., Mechanical Engineering (North Carolina State University) B.S., Mechanical Engineering (North Carolina State University)	Dynamics of Machines	Assoc. Dean Acad. Affairs, College of Engr., Assoc. Dept. Head, Dept. Mech. & Aero. Engr., Dir. Center for Sound & Vibration, MAE
Michael A. Boles	Ph.D., Mechanical Engineering (North Carolina State University)	M.S., Mechanical Engineering (North Carolina State University) B.S., Mechanical Engineering (North Carolina State University)	Engineering Thermodynamics I	Head, Division of Engineering Inidian Inst. Tech., Research Engineer, E.I. Dupont DeNemours, Aerospace Engr., Faculty Fellow, NASA Lewis Research Center

ROSTER OF INSTRUCTIONAL STAFF

Name of Institution North Carolina State University **Term(s)** 2003-04, 2004-05

Name of Academic Department/School Mechatronics - College of Engineering **Date Form Completed** 10/26/03

1	2	3	4	5
Name	**Most Advanced Degree and Discipline**	**Other Degrees**	**Courses Taught**	**Other Qualifications or Experience**
Eric C. Klang	Ph.D., Engineering Mechanics (Virginia Polytechnic Institute)	M.S., Mechanical & Aerospace Engineering (University of Missouri) B.S., Mechanical & Aerospace Engineering (University of Missouri)	Engineering Statics	Research Assoc., Univ. Illinois, Research Fellow, Delft. Univ. of Technology, Research Engineer, NASA-Langley,
Gregory D. Buckner	Ph. D., Mechanical Engineering (University of Texas at Austin)	M. S., Mechanical Engineering (Virginia Polytechnic Institute) B. S., Mechanical Engineering (Louisiana State University)	Principles of Automatic Control, Engineering Dynamics	Research Engineer, Univ. of Texas at Austin Center for Electromechanics, Process Controls Consultant, Austin TX, Senior Engineer, Westvaco's Covington Research Center, Co-Founder, Compu-Crane, Inc.
Yusef Fahmy	Ph.D., Materials Science & Engineering (North Carolina State University)	M.S., Materials Science & Engineering (North Carolina State University) B.S., Mechanical Engineering (North Carolina State University)	Structure and Properties of Engineering Materials, Intro. to Mechatronics Laboratory, Adv. Mechatronics Design Laboratory, Senior Design in Electrical Engineering	Director, NCSU Engineering Programs at UNCA, Senior Lecturer, Dept. Materials Science & Engr., NCSU, Senior Research Assoc., Advanced Materials Laboratory, NCSU, National Council, ASM

APPENDIX E
ROSTER OF INSTRUCTIONAL STAFF

Name of Institution North Carolina State University **Term(s)** 2003-04, 2004-05

Name of Academic Department/School Mechatronics - College of Engineering **Date Form Completed** 10/26/03

1	2	3	4	5
Name	**Most Advanced Degree and Discipline**	**Other Degrees**	**Courses Taught**	**Other Qualifications or Experience**
Charles J. Woodley	Ph.D., Biomedical Engineering and Mathematics (University of North Carolina, Chapel Hill)	B.S., Electrical Engineering (North Carolina State University)	Intro. to Electrical and Computer Engr., Electric Circuits and Microelectronics Laboratory, Robotics & Controls Laboratory	NC Professional Engineer, Research Asst. Prof., UNC-CH, Elec. Engineer, USEPA, Dir. Engineering, A.R. Energy, NC, Pres., CW Automation, Inc., NC
Ionnis Viniotis	Ph. D., Electrical Engineering (University of Maryland)	M. S., Electrical Engineering (University of Maryland) B. S., Electrical Engineering (University of Patras, Greece)	Analytical Foundations of Electrical and Computer Engineering	Director Systems Architecture, Vitesse Semiconductor Corp., Co-Founder, Orologic, Inc.
Rhett Davis	Ph.D., Electrical Engineering (University of California at Berkeley)	M.S., Electrical Engineering (University of California at Berkeley) B.S., Electrical Engineering (North Carolina State University)	Design of Complex Digital Systems	Computer Architecture and Systems Design Research, Hewlett-Packard, Germany, Chameleon Systems, CA

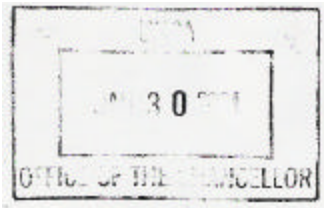
APPENDIX F
ROSTER OF INSTRUCTIONAL STAFF

Name of Institution The University of North Carolina at Asheville **Term(s)** 2003-04, 2004-05

Name of Academic Department/School Computer Science, Physics **Date Form Completed** 10/26/03

1	2	3	4	5
Name	**Most Advanced Degree and Discipline**	**Other Degrees**	**Courses Taught**	**Other Qualifications or Experience**
J. Dean Brock	Ph.D., Computer Science (M.I.T.)	E.E., S. M., EE&CS (M.I.T.) B.A., Math, (Duke)	Computer Organization, Digital Logic, Computer Networking, Data Structures, Robotics (Intro to Mechatronics) and in the past many more (see http://www.cs.unca.edu/~brock/classes)	Past research in computer architecture, Consultant to Hewlett-Packard. Interinstitutional Adjunct faculty, NCSU Department of Electrical and Computer Engineering
Rebecca F. Bruce	Ph. D., Computer Science (New Mexico State University)	M. S., Computer Science (New Mexico State University) M. S., Mechanical Engineering (Stanford University) B. S., Civil Engineering (University of Texas - El Paso)	Introductory Programming, Programming Languages, Information Retrieval also see (http://www.cs.unca.edu/~bruce/teachingIndex.html)	North Carolina Professional Engineer, 12 years experience as Mechanical Engineer (design, development, and analysis of missile systems, submarine and carrier structures, centrifuge rotors, Space Shuttle control engines), research in machine learning and natural language understanding. Interinstitutional Adjunct faculty, NCSU Department of Electrical and Computer Engineering
Michael J. Ruiz	Ph.D., Physics (University of Maryland)	M.S., Physics (Univ. of Maryland) B.S., Physics (St. Joseph's College)	Engineering Statics, Engineering Dynamics	Interinstitutional Adjunct faculty, NCSU Department of Mechanical and Aerospace Engineering
Katherine M. Whatley	Ph.D., Physics (Duke University)	M.A., Physics (Duke University) B.S., Physics (Wake Forest University)	Engineering Statics, Engineering Dynamics	Interinstitutional Adjunct faculty, NCSU Department of Mechanical and Aerospace Engineering

APPENDIX G



SOUTHERN ASSOCIATION OF COLLEGES AND SCHOOLS
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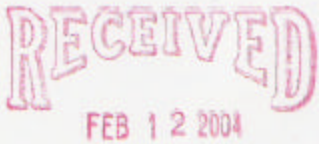
January 28, 2004



Dr. James H. Mullen, Jr.
Chancellor
University of North Carolina Asheville
253 Phillips Hall, CPO 1400
University Heights
Asheville, NC 28804-8503

Dear Dr. Mullen:

Thank you for your letter of December 19, 2003, and the notification of your intent to offer a joint engineering degree program, a Bachelor of Science in Engineering (BSE) in Mechatronics, with North Carolina State University (NCSU). You have had a partnership program with NCSU since 1998 in which the current degree is awarded by NCSU and utilizes UNCA courses, on-site engineering courses taught by UNCA and resident NCSU faculty, and distance learning courses originating from NCSU. The proposed degree program would not differ from the existing program of study except that students completing the degree would receive a joint degree from NCSU and UNCA. We require no further information from you and shall include the proposed degree program within the scope of accreditation previously granted.

Best regards,

James T. Rogers
Executive Director
Commission on Colleges

JTR/RER:rlb

cc: Dr. Ann B. Chard

APPENDIX H: DRAFT diploma

North Carolina State University
at Raleigh

The University of North Carolina
at Asheville

By authority of the Board of Governors of the
University of North Carolina,
the Faculty and Trustees of North Carolina State University
and the University of North Carolina at Asheville
have conferred upon

Name of student here

The Degree of

Bachelor of Science in Engineering

In recognition of the satisfactory fulfillment of the prescribed requirements for the
Degree with all the rights and privileges pertaining thereunto.

Given in Asheville (Raleigh) North Carolina, this XXX day of XXX, 20XX

President of the University of North Carolina

Chair of the Board of Governors

APPENDIX I

UNCA Biennial Assessment and Planning Report: 2001-03

Department Name

Submitted by:
Date Submitted:
Reviewed and Approved:

By: _____
(*Vice Chancellor/Chancellor*)

Date:
Date(s) of Departmental Meeting(s) to Review Report:
Departmental Members Present:

Part I. Departmental Mission

I. Departmental Mission Statement

II. Linkage to UNCA Mission

Part II. Departmental Goals and Assessment Results

I. Goal 1 (*description*)
   A. Strategies and/or action steps
   B. Assessment procedure(s) for determining the extent to which the goal has been achieved
      1. Description
      2. Criteria for success
      3. Assessment or data collection schedule
   C. Assessment Results
      1. Summary and conclusions of assessment results
      2. Use of results to improve the department

Repeat for each goal

Part III. Organizational and Resource Issues

I. Have there been changes in department organization, leadership or staffing over the last two years? Describe the impact of any changes on the effectiveness of the department in achieving its goals.

II. Describe key relationships to other UNCA academic and administrative departments and/or external agencies. How do these relationships impact your department's effectiveness?

III. What have been the major accomplishments of the department over the last two years?

IV. In what areas does the department need to improve?

V. How does the current level of resources (personnel, equipment, facilities, and budget) affect the ability of the department to achieve its goals? Include any significant changes (increase or decrease) in your resource level during the past two years.

Part IV. Changes in Department Goals

I. If new or modified goals have emerged, attach an amended departmental goal statement (see Part I), including required information about assessment.

II. If new resources are needed, attach a resource request indicating:
   A. Specific resource requested.
   B. Justification for the resource, based on your departmental goals and assessment.

Prepared by UNCA Institutional Effectiveness Committee
last revised (10/1/02)