EAST CAROLINA UNIVERSITY

School of Industry and Technology
119 Rawl

Office of the Dean
919-757-6704

MEMORANDUM

TO: Sue Hodges, Office of Planning and Institutional Research

FROM: A. Darryl Davis, Dean

DATE: November 1, 1990

SUBJECT: UNC-GA Mission Review - School of Industry and Technology

Attached is a packet containing Academic Program and Institute/Center Development Forms along with supporting documentation for the School of Industry and Technology. The proposed changes are in line with the University's Mission and the Unit Vision.

The proposed changes include new initiatives as well as recommendations to reclassify and properly identify existing programs. All proposals represent logical evolutions for the School and will serve to enhance the quality of the University's educational, research, and service activities.

Thank you.

Attachments

Greenville,
North Carolina
27858-4353

School of Industry and Technology
10 Year Mission Review
Proposed Academic Developments

The School of Industry and Technology mission review has resulted in the development of four major academic proposals. These proposals include:

- Reclassification of the BS Industrial Technology Degree with a concentration (track) in Construction Management as a BS in Construction Management.
- Reclassification of the BS Industrial Technology Degree with a concentration (track) in Electronics as a BS Degree in Engineering Technology.
- Development of of a Ph.D program in Industrial Technology.
- Establishing a Global Shelter Research Center.

These changes will require modifications of the School's administrative structure. Proposed organizational changes include:

- Forming a Department of Engineering Technology.
- Changing the name of the Department of Manufacturing to the Department of Industrial Technology and a transfer of selected faculty and Electronics concentrations to the new Department of Engineering Technology.
- Transferring selected faculty and concentration options (tracks) in Design/Drafting and Technical Sales from the Department of Construction Management to the Department of Industrial Technology.

These changes are reflected in the Proposed School of Industry and Technology Organization Chart attached to this package.

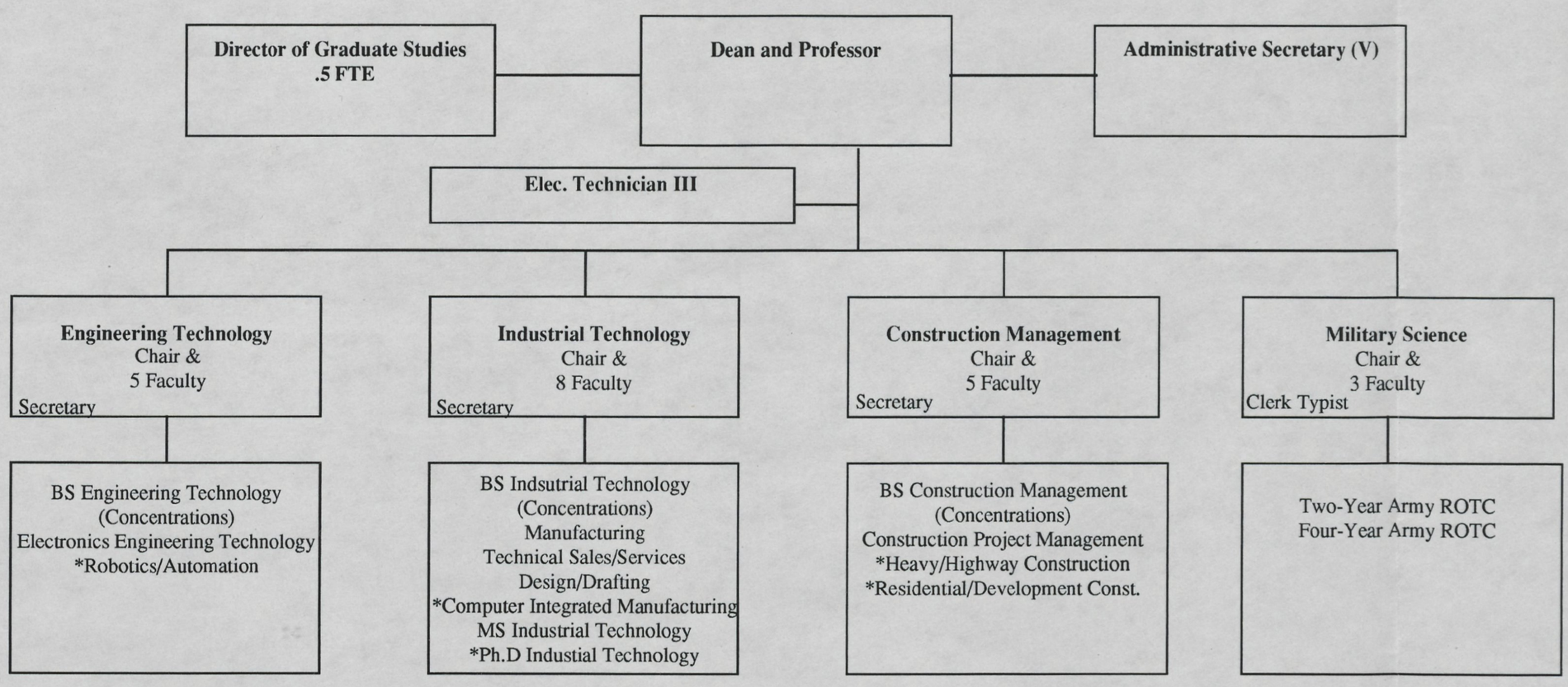
These organizational changes will streamline accreditation efforts and reduce confusion related to identification and classification of degrees and tracks. The Department of Industrial Technology would administer the degree and concentrations (tracks) accredited by the National Association of Industrial Technology and the School's graduate programs. The Department of Construction Management would administer the Global Shelter Research Center and the degree program and tracks to be accredited by the American Council for Construction Education. The Department of Engineering Technology would administer degrees developed to meet program standards established by the Accreditation Board for Engineering Technology. The most severe logistical problem posed by this new administrative alignment are office locations and secretarial assistance.

On the surface, the School would appear to be highly optimistic in proposing changes of the magnitude identified. In reality, the proposals related to Construction Management and Engineering Technology provide a means to properly classify and identify the programs as they have evolved during the past ten years. These changes involve little, if any, commitment of additional resources. Work on the Global Shelter Research Center is underway and funded research projects are already in place. This Center can probably be developed and maintained through an infusion of external funds earmarked to support high visibility research and dissemination projects which focus on national and international housing problems.

The proposed Ph.D program in Industrial Technology would be one of the most cost-effective advanced degree programs that the University could establish. Industrial Technology is a well established growth discipline. There are likely to be few competing programs during the next decade. Basic research facilities are already in place or under development. Most research facilities and projects can be supported with external support and funding. A qualified faculty is already in place, recently employed faculty members are actively building credentials, and establishment of a Ph.D program would aid in attracting additional qualified faculty. Student support networks are also in place. The School's well established Industrial Fellowship Program be expanded to support upwards of 20 students per year. Regional industry has demonstrated a commitment to continue support of student involvement in research projects and industry-based educational activities.

The faculty of the School of Industry and Technology believe that these proposals reflect opportunities for the School to aggressively pursue the University's educational, research, and service missions. These changes would serve to improve the delivery systems which impact on areas of primary interest to the business, industrial, and political publics. These programs will help the University maintain a growth profile and successfully compete for resources and students in a highly competitive environment. The faculty remains confident that these recommendations can be successfully implemented and that they will significantly enhance the School's role in recruitment of quality students and in developing new support networks for the University.

PROPOSED
SCHOOL OF INDUSTRY AND TECHNOLOGY
ORGANIZATION CHART



*Proposed Programs or Tracks

EAST CAROLINA UNIVERSITY
UNC-GA Mission Review
Academic Program Development Form

COLLEGE/SCHOOL: Industry and Technology DEPARTMENT: Industrial Technology

API DISCIPLINE SPECIALTY TITLE: Industrial Technology

API DISCIPLINE SPECIALTY NUMBER: To Be Established Through NAIT* Initiative
*National Association of Industrial Technology

LEVEL: Bachelor_____ Master_____ 1st professional_____ Doctoral X

PROPOSED YEAR OF: Establishment 1995 Deletion_____ Redesign_____

DESCRIPTION OF PROGRAM AND RELATIONSHIP TO INSTITUTIONAL MISSION AND UNIT VISION:

The proposed Ph.D program in Industrial Technology would include two tracks. One track would focus on academic and research programs preparing individuals for research, development, and leadership positions in technology-intensive industries. The second track would focus on academic and research programs preparing teacher scholars for leadership positions in higher education. Establishment of a Ph.D program in Industrial Technology is positively related to both the Institutional Mission and Unit Vision. This program would be the first on the East Coast of the United States to provide students with the opportunity to participate in advanced graduates studies in a rapidly emerging discipline, Industrial Technology. Such a program would lend strong support to the University's educational, research, and service missions. Regional, national, and international students would join a highly qualified faculty in educational activities, basic research, applied research, and service-related undertakings. Problem-solving instructional activities will provide students with foundations which strengthen communication skills as well as their ability to make informed decisions. Research activities will be directed toward discovery of new knowledge as well as the development of technology-based applications for solving problems for society and industry. The Ph.D program will also improve the quality and quantity of economic outreach, industry service, and public service programs offered by the School.

RATIONALE FOR PROGRAM ADDITION/DELETION/REDESIGN:

Baccalaureate programs in Industrial Technology were first sanctioned by the National Association of Industrial Technology (NAIT) in 1967. Since that time, the number of programs has grown dramatically. In 1989, NAIT identified 150 university programs in 43 states with approximately 1,875 faculty members. While bachelors and masters programs have flourished in terms of enrollment and acceptance in the academic and industrial communities, only two universities (Purdue and the University of Northern Iowa) have established doctoral programs in Industrial Technology. Because the majority of today's Industrial Technology programs were developed by faculty who were educated in Industrial Arts teacher education programs, the discipline has traditionally looked toward these teacher education programs for new faculty. As the discipline has matured, this approach has created problems which are adversely affecting basic and applied research as well as the pool of qualified faculty members. While the profession demands researchers, who are attuned to the methodologies of conducting and disseminating research appropriate for a high-technology environment, the majority of new faculty members come from doctoral programs which focused on educational delivery systems in vocational education and industrial arts education. This approach falls short in preparing individuals to assume research and leadership positions in higher education as well as in high-technology oriented industries. The discipline has progressed to the point that a number of doctoral programs are needed. Such programs will be well positioned to focus on a variety of industry-based research needs. Graduates will be highly recruited as faculty members and for industrial positions. The doctorate in Industrial Technology will provide East Carolina University with the opportunity to establish a cost-efficient program which will have significant regional and national impact.

Proposed Doctoral Program in Industrial Technology

Expanded Rationale Statement

There is genuine regional and national need for additional doctoral programs in Industrial Technology. The discipline is hard pressed to identify a pool of qualified faculty members and industrial demand for graduates is growing dramatically. There is a definite shortage of programs competing for students seeking advanced study and research opportunities. The two existing doctoral programs in Industrial Technology are not sufficient to serve even the large base of universities and industries in the region where they are located. One or more California universities will be likely to establish programs within the next two years and programs are under consideration at Indiana State and Eastern Michigan.

With the development of a Ph.D program, East Carolina University has the opportunity to build on a well established base and develop recognition as a regional and national leader in the field. A number of factors lend support to the establishment of a doctoral program. The University has a well established and fully accredited undergraduate program as well as a growing masters program. These programs have benefited from substantial support from regional and national industries in establishing facilities and ongoing programs which support original and applied research. Facilities are in place to support research in the areas of robotics, process control, data acquisition, automation, productivity improvement, computer integrated manufacturing, modal analysis, and construction materials. Hardware and software, provided through the IBM Computer Integrated Manufacturing in Higher Education Consortium, is ideal for supporting advanced research in the field.

Industrial leaders have also awarded more than $300,000 in paid Graduate Fellowships for masters students during the past five years. Local industries have also provided many on and off-campus research opportunities for students and faculty. The development of a doctoral program in Industrial Technology could significantly improve the University's image in the industrial and business sectors and expand external support. Industry resources can be solicited to assist in developing and maintaining the research component required to support a viable doctoral program. There is ample evidence to indicate that a doctoral program would increase opportunities to engage in profitable research and service activities.

The School of Industry and Technology has a nucleus of qualified and nationally recognized faculty in place. Research and partnership programs already in place will assist with the professional development of the existing faculty and with the recruitment of highly-qualified new faculty. There has been a significant increase in faculty involvement in professional activities, research, and outreach programs. The energy and enthusiasm demonstrated by the faculty has brought considerable attention to the Industrial Technology program and has earned the University a reputation for being an exciting and challenging place to work. This reputation proved helpful in attracting quality applicants for faculty positions. Students interested in careers in higher education could also benefit from faculty strengths and course offerings in the University's nationally recognized School of Education.

East Carolina University is in a position to recruit appropriate numbers of qualified students for its doctoral program. There are 41 southern universities offering Industrial Technology programs. During 1988-89 a total of 137 students completed masters degrees at these universities. Other potential students include career professionals who have educational and professional backgrounds which feature combinations of engineering and management. The region's diverse industrial base can be expected to provide many part-time and special interest students. With the outstanding research opportunities and Industrial Fellowship Program available at East Carolina University, there is ample reason to believe that reasonable numbers of highly-qualified students can be recruited.

Graduates of an Industrial Technology doctoral program should be highly recruited for positions in industry and education. There is a regional and national shortage of faculty with doctoral degrees to fill teaching and administrative positions in higher education. Continued growth in the discipline and related Engineering Technology programs, combined with the decline of influence from traditional Industrial Arts programs, will increase problems of faculty recruitment and retention. The outlook for industry-oriented careers for graduates is also bright. All technology-based industries are being forced to develop "World-

Class" operations in order to compete in the global marketplace. Local, regional, national, and international companies are recognizing the need to develop new technology applications as well as innovative technology management and control systems. Industrial Technology programs focus on the interdisciplinary approaches required to develop and facilitate implementation of effective and workable strategies in complex industrial environments. The success of graduates of the School's masters program is indicative of industries' need for the skills and abilities developed in advanced studies in the field.

Overview of Program Requirements

Development of a doctoral program in Industrial Technology would not require an extensive infusion of new or reallocated funds and resources. Many of the expensive elements required to support such a program are already in place and support networks have been established. The program can be expected to return a high yield on funding and effort invested in its developments. There is a demonstrated regional and national need for the graduates and research which would evolve from the program. There is also a large pool of potential students in the Southeast as well as all other regions of the nation. The table and comments below summarize overall requirements and what is needed to position the School to meet these requirements.

Resource Requirements	**Available**	**Needed**
1. Appropriate Faculty Resources (number required to assure availability of a qualified pool)		
•Curriculum Development	4	0
•Technology as a Discipline	4	0
•Philosophical Foundations	3	0
•Robotics and Automation Specialist	2	0
•Research Methodology	2	1
•Statistical Analysis	1	1
•Computer Applications	3	1
•Industrial Systems Specialist	2	1
•Adult Education Theory and Methodology	(Through the School of Education)	
2. Research Facilities (% in place or to be developed)		
•Industry Financed Research Projects	100%	
•Modal Analysis Facilities	95%	5%
•Industrial Control Systems Laboratory	90%	10%
•Software Access	90%	10%
•Access to Specialized Databases	85%	15%
•Industrial Workcell	75%	25%
•Computer Platforms and Accessories	60%	40%
•Construction Materials Research Laboratory	60%	40%
•Industrial Materials Research Laboratory	20%	80%
3. Library and Information Resources (% in place or to be developed)		
•Books	85%	15%
•Periodicals	75%	25%
•Specialty Collections (Technical Papers, etc.)	75%	25%
•Access to Specialized Databases Through Sources Such as the Information Technology Center	40%	60%
4. Student Support Network (number of .5 FTE positions)		
•Teaching Assistantships	6	5
•Research Assistantships	1	4
•Industry Funded Fellowships	10	8
•Externally Funded Research Assistants	1	8

Notes:

1. Appropriate Faculty Resources:

   If growth in all other undergraduate and graduate programs remains consistent, a doctoral program would require the commitment of the equivalent of two full-time positions. Three additional course offerings would be required for each semester and the commitment of faculty effort to research would be increased. The School has a nucleus of six faculty who are well qualified to provide core curriculum offerings. Three younger faculty members are developing outstanding original and applied research credentials which will provide additional support for industry-oriented research initiatives. Other young faculty members can be expected to develop to the point that they can serve as resources for the program. Faculty credentials can also be enhanced through recruitment to fill normal vacancies. One new faculty position would be required to initiate the program and an additional position may be required within two years after the program is initiated.

2. Research Facilities:

   The School has developed outstanding research facilities and support systems. The IBM supported Computer Integrated Manufacturing facility is well equipped for conducting research at the forefront of interest to American industry. The School has access to high-end computer systems and software essential to research and instructional needs. Other outstanding facilities have been developed to support research in the areas of robotics, construction materials, modal analysis, process simulation, and productivity improvement. Primary support for development of these facilities have come in the form of industrial donations and support projects. The quality of research available from a doctoral program will lead to greater external support for these and other facilities. External resources are being solicited to support further development of these facilities.

3. Library and Information Resources:

   Library and information resource support requirements will include some emphasis on improving the quality and quantity of traditional texts and periodicals. Industry-based professional societies have and will continue to support these collections. A new emphasis will include access to on-line databases and research networks. On-line systems in the School and in the Library will be required to properly support research and instructional needs. The Information Technology Center should include funds for maintaining access to appropriate technology-oriented information systems.

4. Student Support Network:

   While some increase in state funds for graduate fellowships would be expected, the School's existing support network is a model for the discipline. During the past three years, 10 to 12 graduate students have been placed in industry-funded internship positions. The proposed doctoral program would promote expansion of this program as well as funded on-campus research projects. Regional industries may be expected to provide fellowships for twenty or more students per year.

Doctoral Program Development Milestones

Year	Proposed Activities
90-91	Prepare concept proposal as part of UNC-GA Mission Review
91-92	Conduct Formal Needs Assessment Surveys and Curriculum Reviews
92-93	Request Permission to Plan Degree
93-94	Develop Curriculum Model and Program Implementation Plan
94-95	Develop All Courses and Begin Student Recruitment Plan
95-96	Offer First Courses
96-	Refine and Improve Academic Programs and Student Recruitment

ENROLLMENT PROJECTIONS:

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Black					1	2	3	4	4	4
White					6	8	10	10	12	12
Other					0	1	2	2	2	3
Total					8	11	15	16	18	19

Percent non-resident: 35

ADDITIONAL FACULTY AND STAFF REQUIREMENTS:

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Faculty					1		1			
Staff										
Total					1		1			

BUDGETARY IMPLICATIONS:
(A: Annual continuation dollars; B: One-time dollars)

YEAR: 1994

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel								
Operating		2,000						
Library					1,000			
Computing								
Other								
Total		2,000			1,000			

Revised 9/20/90

BUDGETARY IMPLICATIONS:

YEAR: 1995

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel					50,000			
Operating	2,000			30,000				
Library					1,000			
Computing				5,000				
Other				*20,000				
Total	2,000			55,000	51,000			

*Addition Graduate Internship

YEAR: 1996

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel								
Operating				35,000				
Library								
Computing				7,000				
Other				30,000				
Total				72,000				

YEAR: 1997

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel					50,000			
Operating				45,000				
Library								
Computing				10,000				
Other				35,000				
Total				90,000	50,000			

ENROLLMENT PROJECTIONS:

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Black					1	2	3	4	4	4
White					6	8	10	10	12	12
Other					0	1	2	2	2	3
Total					8	11	15	16	18	19

Percent non-resident: 35

ADDITIONAL FACULTY AND STAFF REQUIREMENTS:

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Faculty					1		1			
Staff										
Total					1		1			

BUDGETARY IMPLICATIONS:
(A: Annual continuation dollars; B: One-time dollars)

YEAR: 1994

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel								
Operating		2,000						
Library					1,000			
Computing								
Other								
Total		2,000			1,000			

Revised 9/20/90

BUDGETARY IMPLICATIONS:

YEAR: 1995

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel					50,000			
Operating	2,000			30,000				
Library					1,000			
Computing				5,000				
Other				*20,000				
Total	2,000			55,000	51,000			

*Addition Graduate Internship

YEAR: 1996

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel								
Operating				35,000				
Library								
Computing				7,000				
Other				30,000				
Total				72,000				

YEAR: 1997

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel					50,000			
Operating				45,000				
Library								
Computing				10,000				
Other				35,000				
Total				90,000	50,000			

EAST CAROLINA UNIVERSITY
UNC-GA Mission Review
Academic Program Development Form

COLLEGE/SCHOOL: Industry and Technology DEPARTMENT: Engineering Technology

API DISCIPLINE SPECIALTY TITLE: Electronics Engineering Technology

API DISCIPLINE SPECIALTY NUMBER: 0925

LEVEL: Bachelor X Master _____ 1st professional _____ Doctoral _____

PROPOSED YEAR OF: Establishment 1992 Deletion _____ Redesign _____

DESCRIPTION OF PROGRAM AND RELATIONSHIP TO INSTITUTIONAL MISSION AND UNIT VISION:

The proposed bachelors degree program in Electronics Engineering Technology will provide a four year field of study that will graduate individuals capable of supporting the engineering profession with the implementation and applications of engineering solutions within the electronics discipline. The curriculum of the proposed program differs from the current program of Industrial Technology in terms of certain science, math, technical and non-technical curriculum requirements. Engineering Technology does not emphasize the management related theory of an Industrial Technology Program. Engineering Technology requires greater depth in the sciences and mathematics through the addition of calculus and science at the higher level. These additional requirements allow technical courses to focus on basic scientific and mathematical theory. This preparation prepares graduates to successfully gain employment and progress in engineering support positions and applied-design positions as members of engineering teams. Industrial Technology programs while including science and mathematical requirements within the curricula do not reach the level or intensity of those programs within Engineering Technology. By contrast, Industrial Technology programs produce graduates more suited to enter management positions requiring a level of technical expertise different from that required for engineering support positions. The philosophy of the proposed program of Engineering Technology will stress in-depth electrical and electronic circuit analysis with emphasis placed on analytical skills and problem solving relative to applying established engineering practices. The proposed Electronics Engineering Technology program would provide eastern North Carolina with the human resources capable of assisting the engineering profession in the implementation of engineering solutions. This program fully supports the University's and the School's educational and service missions.

RATIONALE FOR PROGRAM ADDITION/DELETION/REDESIGN:

Electronics Engineering Technology exist at Western Carolina University and The University of North Carolina at Charlotte. No comparable program exist at the baccalaureate level in eastern North Carolina. In 1984, the National Center for Education Statistics recognizing that Engineering Technology was producing over 17,000 bachelor degrees per year created a separate category of identity for the discipline. Figures released in 1984 indicated that Engineering Technology programs had a 94% growth increase during the previous five year period and a 251% increase over a ten year period. The School of Industry and Technology's Electronics concentration has evolved to the point of almost being an Engineering Technology program. The program's technical course offerings and facilities can be easily modified to meet accreditation standards for the discipline. The School has faculty members with engineering backgrounds. Appropriate math and science offerings are readily available on campus. Many graduates of the Electronics Concentration are presently employed in engineering and/or engineering technician positions.

Proposed Bachelors Program in Engineering Technology

Expanded Rationale Statement

During the 1980's growth rates for Engineering Technology programs were only exceeded by the rate for degrees offered in the computer information sciences. Engineering Technology became the sixteenth largest undergraduate degree-granting discipline in 1984. At the time these figures were reported, Engineering Technology was the eighth largest of the disciplines with a positive growth rate. Current literature reflect that the number of programs has not leveled off and enrollment has continued to grow at the rate of approximately 13 percent per year.

The region could benefit from the presence of an accredited Engineering Technology program at East Carolina University. The large and small manufacturing facilities in eastern North Carolina have traditionally recruited engineers by looking to other regions for this talent. However, as recruiting pressures have continued from other regions of the state and nation, these firms have expressed concern over their ability to attract employees with the educational backgrounds required to enhance their engineering capabilities. These problems have become more critical as industry has geared-up to meet the challenges of "World-Class" competition.

In tracking career placement of Industrial Technology graduates, it has become apparent that though not an Engineering Technology program, the Industrial Technology program has been placing individuals into positions that have traditionally had engineering-related titles and responsibilities. These students have performed admirably within their limits, and have opened the doors to many new employment opportunities for the School's graduates. This demand has caused programs within Industrial Technology to shift curriculum emphasis toward greater development of greater depth in technical areas. The best example of this change in program emphasis has been the Electronics Concentration. This program provides more than 30 semester hours of theory intensive electronics instruction.

Though further specialization in electronics is needed, the added instruction cannot be provided in a manner that will allow the program to meet the current accreditation guidelines of the National Association of Industrial Technology. These guidelines stipulate fields of study in other areas of business and management. Considering the depth and importance of the field of electronics, students could better be served with a program under the auspices of the Accreditation Board of Engineering Technology. Although the Electronics program has been successful in placing graduates in support positions within process control engineering, electrical and electronics engineering, utilities engineering, field engineering, and other related areas of specialization, graduates would be better prepared to progress in these careers if the program could be shifted to Engineering Technology. This move would provide graduates with stronger math and science backgrounds which would permit development of stronger engineering theory orientation courses in electronics.

ENROLLMENT PROJECTIONS: Based On 5% Growth Rate/Current National Average 13%. Projected Enrollment Increase In 1996 Due To Program Maturity.

	1991	1992	*1993	1994	1995	1996	1997	1998	1999	2000
Black	25	26	27	29	30	39	41	43	45	48
White	55	58	60	62	66	87	92	97	102	107
Other	3	3	4	4	4	4	4	4	4	4
Total	83	87	91	95	100	130	137	144	151	159

Percent non-resident: 15

*Reflects Change To Engineering Technology Program

ADDITIONAL FACULTY AND STAFF REQUIREMENTS:

	*1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Faculty	1	0	1	0	0	0	0	0	1	0
Staff	0	0	1	0	0	0	0	0	0	0
Total	* 1	0	** 2	0	0	0	0	0	1	0

*Required To Meet Current Growth
**Implementation Date For Engineering Tech Program

BUDGETARY IMPLICATIONS:
(A: Annual continuation dollars; B: One-time dollars)

YEAR: 1993
Year Of Program Start-Up

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations Secretary Position		Total	
	A	B	A	B	A	B	A	B
Personnel	-	-	-	-	19,000	-	19,000	-
Operating	10,000	10,000	-	20,000	10,000	-	20,000	30,000
Library	150	2,000	-	-	-	-	150	2,000
Computing	-	12,000	-	10,000	-	-	-	22,000
Other	-	-	-	-	-	-	-	-
Total	10,150	24,000	-	30,000	29,000	-	39,150	54,000

Revised 9/20/90

BUDGETARY IMPLICATIONS:

YEAR: 1994

Category	Unit Resources Continuation		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel	19,000						19,000	
Operating	21,000			40,000			21,000	40,000
Library	1,000						1,000	
Computing				10,000				10,000
Other								
Total	41,000			*50,000			41,000	50,000

*Based On Current Ability To Attract Funds

YEAR: 1995

Category	Unit Resources Continuation		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel	19,000						19,000	
Operating	22,050			42,000			22,050	42,000
Library	1,000						1,000	
Computing				10,500				10,500
Other								
Total	42,050			*52,500			42,050	52,500

*Based on Current Ability To Attract Funds

*Project 10% Increase In Budget Needs Due To Growth YEAR: 1996

Category	Unit Resources Continuation		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel	19,000						19,000	
Operating	24,255			46,200			24,255	46,200
Library	1,000						1,000	
Computing				1,155				1,155
Other								
Total	44,255			*47,355			44,255	47,355

*Based On Current Abliity To Attract Funds

DRAFT

Proposal for the Establishment of a Bachelors of Engineering Technology

The School of Industry and Technology seeks permission to establish a bachelors degree program in Engineering Technology. This program will provide a four-year field of study that will graduate individuals capable of supporting the engineering profession with the implementation and applications of engineering solutions within the electronics discipline.

Background on Engineering Technology

In the early stages of program development in Engineering Technology, predictions were made that such programs were ill-fated because no niche existed for such a graduate. In 1984, the National Center for Education Statistics recognizing that Engineering Technology was producing over 17,000 bachelor degrees per year, created a separate category from the disciplines of engineering and education. The conclusion of these events indicate that the program is a demand-driven program to the contrary of earlier projections. Figures released in 1984 indicated that Engineering Technology programs had: 94% growth increase in a five-year period and a 251% increase over a ten-year period. These rates were only exceeded by degrees offered in the computer information sciences. This accounts for Engineering Technology programs becoming the sixteenth largest undergraduate degree-granting discipline in 1984. At the time these figures were reported, Engineering Technology was the eighth largest of the disciplines with a positive growth rate. Though present figures are not available on the last two years, indications within the literature reflect that programs have not leveled off and have continued to grow at a rate of approximately 13 percent per year.

Engineering Technology programs exist to only compliment engineering programs. Engineering Technology programs seek to provide the engineering profession with the human resources capable of assisting the engineering profession in the implementation of engineering solutions. The tremendous success of the programs across the nation only reinforces the fact that there are students who seriously wish to study engineering technology, institutions who wish to teach it, faculty who wish to develop it, and employers who wish to hire the graduates.

Engineering Technology as a discipline is an emerging field of study that truly has a niche and body of knowledge all of its own. The body of knowledge of any program lies in its journal. Engineering Technology was slow to develop a journal, but now has *Engineering Education, The Journal of Engineering Technology*, and two international journals, *The International Journal for Development Technology*, and *The International Journal of Applied Engineering Education*. With two other journals in

developmental stages, Engineering Technology has vehicles in place to define its body of knowledge in the years to come.

When defining Engineering Technology programs, it has become apparent that there exists another program that closely parallels another program called Industrial Technology. The programs of Industrial Technology and Engineering Technology are accredited by the National Association of Industrial Technology and the Accreditation Board for Engineering Technology. These two programs in the past have experienced confusion within the academic world on the distinct missions and objectives each program maintains. In order to implement both programs within the same institution, one needs to clearly understand that each has its own well-defined field and can only compliment each others niches in the industrial and business world.

Definition of Industrial Technology

The National Association for Industrial Technology (NAIT) accreditation handbook states that Industrial Technology is a field of study designed to prepare technical and/or management-oriented professionals for employment in business, industry, and government. It further states that the discipline includes the application of:

-theories, concepts, and principles found in the humanities and the social and behavior sciences, while emphasizing the development of sound communication skills.

-the principles and concepts of mathematics, science, and computer fundamentals.

-concepts derived from a variety of technical and related disciplines such as materials and production processes, industrial management, human relations, marketing, communications, electronics, and graphics.

-a field of specialization (for example; electronic data processing, computer integrated design, manufacturing, construction, energy, polymers, printing safety, and transportation.

In order to be accredited, Industrial Technology curricula must combine liberal education with professional-level technical management. In summary, Industrial Technology programs are designed to prepare students for management positions in areas such as industrial planning, production supply, product market research, and technical sales.

Definition of Engineering Technology

The discipline of Engineering Technology as stated in the Accreditation Board for Engineering Technology (ABET) accreditation handbook is that part of the technological field which requires the application of scientific and engineering knowledge and methods combined with technical skills in support of engineering activities. The program produces a graduate that lies in the occupational spectrum between the craftsman and the engineer while occupying that part of the spectrum closest to the engineer.

Engineering problems require solutions of varying complexity and are constrained by both technical and non-technical considerations. The engineer, as leader of the technical technical team, determines the policies employed in developing technical solutions. The engineer must exercise due responsibility to society in the non-technical dimensions. The technologist works in many functional capacities and responsive ways to assist with the design and execution of the solution.

Differences of Engineering and Industrial Technology Programs

The curricula of the two programs exhibit distinguishing differences in the sciences, mathematics, technical and non-technical nature of the courses which are offered. Engineering Technology requires greater depth in the sciences and mathematics through the addition of calculus and science at the higher level. These additional requirements result in technical courses being more intensive in the sciences and mathematical aspects of the theoretical bases. This preparation allows graduates to successfully gain employment in engineering support positions and applied-design positions as an engineering team member. Industrial Technology programs while including science and mathematical requirements within the curricula does not reach the level or intensity of those programs within Engineering Technology. This is, in part, due to the fact that Industrial Technology curricula strive to produce individuals with educational experiences in those sciences related to management. Thus Industrial Technology programs produce graduates more suited to enter management jobs requiring a level of technical expertise less than those required in engineering support jobs. The philosophy of Engineering Technology stresses in-depth electrical and electronic circuit analysis with emphasis placed on analytical skills and problem solving relative to applying established engineering practices. The Engineering Technology discipline also seeks to develop a strong technical science component emphasizing related technical science courses (i.e., statics, dynamics, etc.). The philosophy of Industrial Technology stresses technical subjects and management sciences with emphasis placed on problem solving activities relative to sound management practices within high technological oriented environments.

Rationale for Proposal

North Carolina and more specifically eastern North Carolina is a region of economic diversity. While this provides stability for the region during times of change it also requires resources to support growth for further diversification. While the region presently is a state leader in agricultural production, it is apparent that the region cannot continue to rely totally on its past and future success in this area.

Presently, the labor force in the region is predominantly service-oriented when compared to the manufacturing and agricultural sectors. However, small these two latter components are, their importance to the region's economic health and well-being cannot be underestimated. The effects of international competition and productivity has served to cause fluctuations in these two economies in a manner that influences the for the area to grow economically. The Industrial Technology program along with the other fine programs at East Carolina University have and will continue to provide leaders to make cam important decisions which will provide eastern North Carolina with a promising future. It must be noted that North Carolina has fine engineering institutions which provide many leaders in the engineering disciplines. Irrespective to the numbers of new graduates they are graduating, there still remains a problem of recruiting the quantity, of individuals needed to develop the region's technical base in the engineering sciences.

The larger manufacturing facilities in eastern North Carolina have attracted and recruited engineers to obtain their objectives by looking to other regions for this talent. However, as recruiting pressures have continued from other regions of the state and nation, these firms have expressed concern over their ability to attract those types of individuals needed to enhance the engineering capability. Retention of qualified individuals also poses problems. By investigating graduate placement of Industrial Technology graduates it has become apparent that though not an engineering technology program, the Industrial Technology program has been placing individuals into positions that have traditionally carried engineering-related responsibilities. These students have performed admirably within their limits, and opened further requests from companies for more referrals. This demand has continued to drive programs within Industrial Technology to shift their programs further toward curricula of greater depth within certain technical areas. One example of such a program has been the Electronics specialization. The program presently provides on a continued basis 30+ hours of electronics electives. Though further specialization could be provided it has become apparent this cannot happen under current NAIT accreditation guidelines, which stipulate fields of study in other areas of business and management. Considering the depth and importance of the field of electronics, students could better be served under the auspices of an ABET accredited program. Based on the fact that the electronics program has placed graduates in positions within process control engineering, electrical and electronics engineering, utilities

engineering, field engineering, and other related areas of specialization with success. It can only be assumed that enhanced benefits would come forth if graduates were provided further cognitive skills in engineering related subjects. The new program in Engineering Technology would provide graduates capable of solving problems within technical areas and assist engineers on implementing engineering solutions, which could help the region become more productive and efficient in coping with the problems of the future.

The rationale for implementing an Engineering Technology program is based on the fact that if current programs are placing students into support positions of engineering because of high industrial demand. It would only be logical to compliment such an activity with a program more suited to produce graduates with greater capability in those area. This is not to belittle the importance of a strong Industrial Technology program within eastern North Carolina. There is definitely a need for a management-oriented program such as Industrial Technology which produces good managers with technical skills. The Engineering Technology program would complete the Industrial Technology program by providing a more qualified candidates for those professions requiring detailed implementation of technical aspects of our technological society here in eastern North Carolina.

Advantages for Implementation of an Engineering Technology Program at East Carolina University

1. East Carolina would be capable of attracting good candidates from the large number of Engineering Technology Programs at the community college level throughout the state and nation. Currently most Electronics Engineering Technology graduates at the Associate Degree level with intentions of pursuing their education further in electronics are attending the University of North Carolina at Charlotte.

2. The University would be placed in a better position to further influence the technical resources of the region which could enhance the growth and quality of life in the regions business and industrial world.

3. University research activities could be enhanced and complimented by a program that attracts engineering faculty in the electronics discipline.

4. The University would be capable of providing an alternative program to students of eastern North Carolina in engineering related fields.

5. The Engineering Technology Program would compliment the Industrial Technology program with electives within the technical fields.

6. The existence of an engineering technology program with faculty representing engineering discipline would provide the regions resources to better adapt to the technical changes of tomorrows problems within

the engineering field. The program would compliment the expertise of other existing programs on campus such as computer science, physics, chemistry, and environmental science on future team-based research projects.

Disadvantages of Not Implementing an Engineering Technology Program in Eastern North Carolina

1. The University will continue to loose its young student resources to institutions that have Engineering Technology programs in other parts of the nation and state.

2. Eastern North Carolina will continue to look to other engineering faculty at other institutions in North Carolina for technical solutions within the electronics field. This has in the past been an inadequate situation because of difficulties incurred from conducting business with other institutions located at a distance..

3. East Carolina University would not be in a position to provide leadership in the field of electronics and controls similar to other institutions with Engineering Technology programs.

East Carolina's Strengths for a Good Engineering Technology Program

1. Present electronics specialization within the Department of Manufacturing has enough core electronics courses with the addition of contact hours to support an Electronics Engineering Technology under present ABET accreditation guidelines.

2. Faculty presently on-staff within the school would allow a program in Bachelors of Electronics Engineering Technology to meet minimum accreditation requirements for faculty.

3. The present program has a student organization sponsored and approved by the Institute of Electrical and Electronics Engineering (IEEE) which is the society that submits accreditation standards for the Bachelors of Electronics Engineering Technology programs to ABET.

4. Current industrial support provides a sound foundation for a required advisory board upon approval of program.

5. Since the present program of Electronics would be retrofitted to the Engineering Technology program, no initial equipment start-up cost would be required by the University. The program would seek to grow

through external funding which presently far exceeds present University budget funds. There would be an initial outlay of funds to ABET to initiate accreditation cost. This however will be far less than the benefits incurred in the coming years.

Administrative Steps Required to Implement an Electronics Engineering Program

1. Establish a separate Department of Engineering Technology to provide autonomy of the program from existing Industrial Technology as required by ABET accreditation.

2. Administrative staff would be shared with Department of Manufacturing which presently serves faculty and program of electronics now in existence. Though another secretary would be nice this would not prove necessary until future growth and position availability warranted a change.

3. One additional faculty position with full time responsibility in electronics would be needed to compliment the already existing two positions.

4. The following academic requirements would be required to meet ABET accreditation criteria. Note: Most requirements for academic changes can be handled internally without the addition of faculty.

Minimum Course Requirements for Accreditation of Engineering Technology Programs by the Accreditation Board of Engineering Technology (ABET).

Based on a national survey average, the following courses represent a high-end model of a program best representing the above criteria within Electronics Engineering Technology. Following the high-end model, a low-end model of accrediting programs is provided to illustrate a range of criteria which a program at East Carolina University could fit.

a) Minimum of 124 hour credits:

The average hours of credit found within Electronics Engineering Technology programs are 130. The lower division contains 66 hours and the upper division averages 64 credit hours.

The present program within Industrial Technology consists of 126 hours.

b) 48 semester hours of technological courses including technical sciences, technical specialties, and technical electives.

National EET Program Averages:

* Those courses represented with an asterisk are courses already in place that meet requirements.

	Generic Course	Math Prerequisites	Yr	Hrs.	ECU/Course
		Freshman year:			
*	DC Circuits	MCR: Calculus 1	FR2	3	ELEC 2054 ELEC 2055
		Sophomore Year:			
*	AC Circuits	MPR: Calculus 1	SO1	3	ELEC 2150
*	AC Circuits Lab	MPR: Calculus 1	SO1	1	ELEC 2151
*	Active Devices 1	MPR: None	SO2	3	ELEC 3056
*	Active Devices 1 Lab	MPR: None	SO2	1	ELEC 3057
		Junior year:			
	Networks 1	MPR: Calculus 1	JU1	3	
	Active Devices 2	MPR: None	JU1	3	
	Active Devices 2 Lab	MPR: None	JU1	1	
	Instruments	MPR: Calculus 1	JU1	3	
*	Power	MPR: Calculus 1	JU1	3	ELEC 2056
	Networks 2	MPR: Calculus 1	JU2	3	
*	Active Devices 3	MPR: None	JU2	3	ELEC 5552
	Active Devices 3 Lab	MPR: None	JU2	1	
*	Digital Circuits	MPR: Col Algebra	JU2	3	ELEC 3150 ELEC 3151
*	Communications	MPR: Applied Diff EQ	JU2	3	ELEC 3058 ELEC 3059

Senior:

*	Communications	MPR: Applied Diff EQ	SE1	3	ELEC 4050 ELEC 4051
*	Senior Project 1		SE1	3	ELEC 4505
*	Senior Project 2		SE2	3	ELEC 5502

Electronics Specialty Subtotal 46 hours

Electronic courses within the Industrial Technology program presently being offered on a normal rotation:

ELEC 2054	Electricity and Electronics	3 .
ELEC 2150	Circuit Analysis	3
ELEC 3056	Industrial Control Systems	3
ELEC 3058	Communication Systems	3
ELEC 3150	Digital Systems	3
ELEC 4050	Microprocessors	3
ELEC 4052	Computer-Based Industrial Control	3
ELEC 4505	Electronics: Lab Problems	3
ELEC 5502	Independent Study: Electronic Communications	3
ELEC 5552	Robotics in Computer-Aided Manufacturing Environments	3

Electronics Subtotal 30 hrs

c) 24 hours of an appropriate combination of basic sciences and mathematics of the type, level, and subject coverage specified in the criteria submitted by IEEE.

Course requirements not stipulated may be fulfilled by appropriate course work in basic sciences or mathematic electives. Course work in computer programming may not be utilized to satisfy this requirement.

1) Basic Sciences component must include 8 hours

National EET Program Averages:

* Those courses represented with an asterisk are courses already in place that meet requirements.

	Generic Course	**Math Prerequisites**	**Yr**	**Hrs.**	**ECU/Course**
*	Physics 1	MCR: Col Alg. & Trig.	FR1	3	PYHS 2150
*	Physics 1 Lab	MCR: Col Alg. & Trig.	FR1	1	PHYS 2151
*	Chemistry	MPR: None	FR1	3	CHEM 1150
*	Physics 2	MCR: Col Alg. & Trig.	FR2	3	PHYS2160
*	Physics 2 Lab	MCR: Col Alg. & Trig.	FR2	1	PHYS 2161

Basic Science Subtotal credit hours 11 hrs

Science Requirement in present Industrial Technology program:

Physics 2150/51	General Physics	4
Physics 2160/61	General Physics	4
Chemistry Elective		4
		12 hrs

2.) Mathematics requirement must include 12 hours

National EET program averages:

	Generic Course	Math Prerequisites	Yr	Hrs.	ECU/Course
*	Col Alg. & Trig	MPR: None	FR1	3	MATH 1065
*	Calculus 1	MPR: Col. Alg. & Trig.	FR2	3	MATH 1074
*	Calculus 2	MPR: Calculus 1	SO1	3	MATH 2283
	Applied DEQ	MPR: Calculus 2	SO2	3	
			Mathematics subtotal	12 hrs.	

Math requirements in present Industrial Technology program:

MATH 1065	College Algebra	2
MATH1074	Trigonometry	3
MATH 2283	Statistics	3
		8 hrs

d) 24 semester hour credits consisting of social sciences and/or humanities and instruction in written and oral communications appropriate to the program. Remainder of course work not stipulated by ABET may be of either types.

1) 9 hours of study must be of communications.

National EET program averages:

* Those courses represented with an asterisk are courses already in place that meet requirements.

	Generic Course	Yr	Hrs.	ECU/Course	
*	English 1	FR1	3	ENGL 1100	3
*	English 2	FR2	3	ENG L1200	3
		Subtotal	6 hrs		

Present program within Industrial Technology:

ENG 1100	Composition	3
ENG 1200	Composition	3
ITEC 3290	Technical Writing	3
SPCH 2001	Speech	2
	Communications Total	11 hrs

2) 8 hours of credit must be in social sciences and/or humanities.

National EET program averages:

* Those courses represented with an asterisk are courses already in place that meet requirements.

Generic Course	Yr	Hrs.	ECU/Course
* Humanities & Social-Science 1	SO1	3	ECON 2113
* Humanities & Social-Science 2	SO2	3	PSYC 1050
* Humanities & Social-Science 3	JU1	3	PSYC 3241
* Humanities & Social-Science 4	JU2	3	Soc. Sci. Elective
* Humanities & Social-Science 5	SE1	3	Soc. Sci. Elective
* Humanities & Social-Science 6	SE2	3	Humanities Elective
Humanities and Social Sciences Subtotal		18 hrs	

Present program within Industry and Technology:

Social Sciences		13 sh
ECON 2113	3 sh	
PSYC 1050	3 sh	
PSYC 3241	3 sh	
Electives	5 sh	
Humanities and Fine Arts (at least one from each)		10 sh.
Humanities elective		
Fine Arts elective (Speech Required)		
Electives from either		
Subtotal		23 sh

e) The balance of the program should be designed to achieve an integrated and well-rounded engineering technology program. The additional time allows for the implementation of the educational objectives of the institution and/or the individual as they relate to ensuring adequate educational preparation of the graduate to perform as an engineering technologist. This section should develop the students ability to solve technical problems with the computer. Additional course work in engineering technology is required to fulfill such an objective. A maximum of 8 hours of cooperative education may be included in this section provided half of these hours does not occur in the upper division.

National EET program averages:

* Those courses represented with an asterisk are courses already in place that meet requirements.

	Generic Course	**Math Prerequisites**	**Yr**	**Hrs.**	**ECU/Course**
*	Technical Drawing 1	MPR: None	FR1	2	ITEC 2034
*	Technical Drawing 2	MPR: None	FR2	2	
*	Programming 1	MCR: Int Alg	SO1	3	CSCI 2600
	Statics	MPR: Col Alg & Trig	SO1	3	
	Dynamics	MPR: Col Alg & Trig	SO2	3	
*	Material Science	MPR: None	SO2	3	ITEC 2020
*	Technical Elective 1		SE1	3	ITEC 2088
*	Technical Elective 2		SE2	3	ITEC 3292
*	Technical Elective 3		SE2	3	ITEC 4300
			Related Technical Electives Subtotal	25 hrs	

Balance of Program Electives

Free Electives	SE1	3
Free Electives	SE2	3
Balance of Program Subtotal		6 hrs

Present Program within Industrial Technology:

ITEC	2034	Engineering Graphics	3 s
CSCI	2600	Introduction to Digital Computation	3
ITEC	2020	Materials Technology	3
ITEC	2088	Hydraulics and Pneumatics	3
ITEC	3292	Industrial Safety	3
ITEC	4300	Quality Assurance	3
		Related Technical Subtotal	18 hrs

Free Electives 10 hrs

Low End Program Pattern Exhibited by Accreditable Engineering Technology Programs

Italics indicates those classes not already required in present Electronics program.

Generic Course Title	Math Requirements	Year/Semester	Credit Hours
Col Alg & Trig	MPR: Int Alg	FR1	4
• *Calculus 1*	*MPR: Col Agl & Trig*	*FR2*	*4*
	Basic Mathematics Subtotal:		**8**
Physics 1	MPR: Col Alg & Trig	S01	3
Physics 1 Lab	MPR: Col Alg & Trig	S01	1
Physics 2	MPR: Col Alg & Trig	S02	3
Physics 2 Lab	MPR: Col Alg & Trig	S02	1
	Basic Sciences Subtotal:		**8**
English 1		FR1	3
English 2		FR2	3
Technical Writing		JU1	3
	Human Communications Subtotal:		**9**
Literature		SO1	3
Humanities Elective		SO2	3
Psychology		FR2	3
History 1		JU1	3
History 2		JU2	3
Economics		JU2	3
Man, Society & Technology		SE1	3
	Humanities & Social Science Subtotal:		**21**
DC & AC Circuits	MPR: none	FR2	4
AC Circuits	MPR: none	SO1	3
Active Devices 1	MPR: Calculus 1	SO1	4
• *Active Devices 2*	*MPR: Calculus 1*	*SO2*	*4*
Digital Circuits	MPR: none	JU2	4
Computers	XXX	SE1	3
Communications	MPR: Calculus 1	SE2	3
• *Electronic Fabrication*	*MPR: Calculus 1*	*JU1*	*3*
Electronics Elective 1	XXX	SE1	3
Electronics Elective 2	XXX	SE2	3
	Electronics Specialty Subtotal:		**34**
Computer Introduction	MPR: none	FR1	1
Programming 1	MPR: none	SO1	4
• *Programming 2*	*MPR: none*	*SO2*	*3*
Technical Drawing	MPR: none	FR1	4
Machine Processes	MPR: none	JU1	4
Technical Problems	MPR: none	FR1	3
Reliability	MPR: none	SE1	3
Technical Mgmt. 1	MPR: none	JU2	4
Technical Mgmt. 2	MPR: none	SE2	3
• *Technical Seminar*	*MPR: none*	*SE2*	*2*
Management	MPR: none	JU2	3

	Related Technical Subtotal:		**34**
PE-Health 1		FR1	1
PE-Health 2		FR2	1
Free Elective 1		SO2	3
Free Elective 2		JU1	3
Free Elective 3		SE1	3
Free Elective 4		SE2	3
	Balance of Program Subtotal:		**14**
	TOTAL PROGRAM CREDIT HOURS:		**128**

Proposed Curricula For Bachelors Degree in Electronics Engineering Technology

DEPARTMENT OF MANUFACTURING
EAST CAROLINA UNIVERSITY
B.S.P. DEGREE REQUIREMENTS

Courses in italics indicate changes from current program offerings.

General Education Requirements ..... 44 s.h.
- English 1100, 1200 ..... 6 s.h.
- Library Science 1000 ..... 1 s.h.
- Science ..... 8 s.h.
  - Physics 1250/51 ..... 4 s.h.
  - Physics 1260/61 ..... 4 s.h.
- Social Science (select from three areas) ..... 13 s.h.
  - ECON 2113 ..... 3 s.h.
  - PSYC 1050 ..... 2 s.h.
  - PSYC 3241 ..... 3 s.h.
  - Social Science Electives ..... 5 s.h.
- Mathematics 1065 ..... 3 s.h.
- Humanities and Fine Arts (SPEECH REQUIRED) ..... 10 s.h.
- Health and Physical Education ..... 3 s.h.

Required Cognate Courses. ..... 15 s.h.
- Mathematics ..... 8 s.h.
  - MATH 1074 ..... 2 s.h.
  - MATH 2283 ..... 3 s.h.
  - • ***MATH 2119 ..... 3 s.h.***
  - • ***Computer Selection: ASIP 2212/ 2213; CSCI 2600 ..... 3 s.h.***
- Chemistry Elective (not to include CHEM 0150) ..... 4 s.h.

Engineering Technology Requirements ..... 68 s.h.
- Technical Core ..... 24 s.h.
  - ITEC 2020 - Materials Technology ..... 3 s.h.
  - DESN 2034 - Engineering Graphics ..... 3 s.h.
  - ITEC 2088 - Hydraulics & Pneumatics ..... 3 s.h.
  - ITEC 3290 - Technical Writing ..... 3 s.h.
  - ITEC 3292 - Industrial Safety ..... 3 s.h.
  - ITEC 4293 - Industrial Supervision ..... 3 s.h.
  - • ***ITEC 4300- Quality Assurance ..... 3 s.h.***
  - • ***MANF 2076- Quality Assurance ..... 3 s.h.***
- Area of Concentration ..... ***44 s.h.*** was 24
  - Electronics Core:
  - ELEC 2054 - Electricity/ Electronics ..... 3 s.h.
  - ELEC 2150 - Circuit Analysis ..... ***4 s.h.*** was 3
  - • ***ELEC 3050 Networking ..... 3 s.h.***
  - ELEC 3056 - Industrial Solid-State Control ..... ***4 s.h*** .was 3
  - ELEC 3058 - Communication Electronics ..... 3 s.h.
  - • ***ELEC 3060- Operational Amplifiers ..... 3 s.h.***
  - ELEC 2056 - Electronic Power Systems ..... ***4 s.h*** .was 3
  - ELEC 3150 - Digital Systems ..... ***4 s.h.*** was 3
  - ELEC 4050 - Microprocessor: System & Appl. ..... ***4 s.h*** was 3
  - ELEC 4052 - Computer-Based Industrial Control ..... ***4 s.h.*** was 3
  - ELEC 4505 - Electronic: Lab Problems ..... ***4 s.h*** was 3
  - ELEC 5552- Robotics in Comp. Aided Manf. Env. ..... ***4s.h.*** was 3
- Free Electives 3hrs

Total Hours Required ..... 127 s.h.

EAST CAROLINA UNIVERSITY
UNC-GA Mission Review
Academic Program Development Form

COLLEGE/SCHOOL: E.C.U.-Industry & Technology DEPARTMENT: Construction Mgmt.

API DISCIPLINE SPECIALTY TITLE: Constructor

API DISCIPLINE SPECIALTY NUMBER: Applied for (see attached)

LEVEL: Bachelor _x_ Master ____ 1st professional ____ Doctoral ____

PROPOSED YEAR OF: Establishment _1991_ Deletion _____ Redesign _____

DESCRIPTION OF PROGRAM AND RELATIONSHIP TO INSTITUTIONAL MISSION AND UNIT VISION:

The proposed restructuring of the Construction Management Department will include establishing three concentration tracks in construction management; General Building Construction, Heavy and Highway Construction, and Residential Development. This restructuring is positively related to both the institutional mission and the Unit mission. The Department is the only Construction Management program serving the eastern geographic area of the state and is rapidly moving toward being the only fully accredited program in the state by the prestigious American Council for Construction Education. One of the Department goals is to become one of the ten best construction management programs in the country within ten years; a goal which the Construction Management Advisory Council feels is attainable.

RATIONALE FOR PROGRAM ADDITIONAL/DELETION/REDESIGN:

These changes will facilitate the establishment of a Bachelor of Science Degree program in Construction Management and will have all ACCE* accreditation concentrations in one autonomous department. This proposal is endorsed by the Advisory Council and will serve to reinforce the mission of the unit and the University.

The employment of constructors is expected to rise significantly through the year 2000. Indeed, the current number of construction program graduates is not expected to meet demand for at least five years. Three factors contribute to this bright outlook.

First, the construction industry is becoming more complex. New and improved construction materials and technologies are being developed; complex safety, health, and environmental requirements are being placed on construction; and new management techniques are called for in dealing with a changing workforce.

Second, is the increasing need to improve, expand, or rebuild the existing infrastructures of our cities.

Third, new construction, both residential and non-residential, will be needed.

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*ACCE - American Council for Construction Education--accreditation in process

OCCUPATIONAL DESCRIPTION FOR "CONSTRUCTOR"

(July 20, 1990 Draft)

AGC CONSTRUCTION EDUCATION COMMITTEE

CONSTRUCTOR RECOGNITION TASK FORCE

July 1, 1990 Draft

OCCUPATIONAL DESCRIPTION FOR "CONSTRUCTOR"

New NEGIS classification

A new occupational title with attendant description is to be created for the U. S. Dept. of Labor (BLS) Occupational Outlook Handbook. It would be included within the section now reserved for "Engineers, Surveyors, and Architects" as outlined below (Changes appear in bold).

ENGINEERS, SURVEYORS, ARCHITECTS, AND **CONSTRUCTORS**
Engineers
- Aerospace engineers
- Chemical engineers
- Civil engineers
- Electrical and electronics engineers
- Industrial engineers
- Mechanical engineers
- Metallurgical, ceramic, and materials...
- Mining...
- Nuclear...
- Petroleum...

Architects and Surveyors
- Architects
- Landscape architects
- Surveyors

Constructors

Some occupational sections of the Handbook contain an overview. This is true for "Engineers." It is not true for other sections such as "Management and Management Related Occupations" or Subsections such as "Architects and Surveyors" or "Physical Scientists."

All Handbook occupational descriptions, be they overview or standard, follow an identical format. The narrative headings are, in order:

- Nature of the Work
- Working Conditions
- Employment
- Training, Other Qualifications, and Advancement
- Job Outlook
- Earnings
- Related Occupations
- Sources of Additional Information

To create an occupational description for constructors basic facts and/or presumptions must be established.

OCCUPATIONAL DESCRIPTION FOR CONSTRUCTORS

The draft on the following pages is based upon certain presumptions:

I. The document must be readable at the high school level.

II. The majority of constructors can be found filling important jobs such as:

1. Estimator
2. Estimator-Scheduler
3. Scheduler
4. Assistant Superintendent
5. Superintendent
6. General Superintendent
7. Project Engineer
8. Project Manager
9. Construction Manager

Constructors may also have the following titles and/or functions:

1. Owner
2. Partner
3. Chief Executive/Operating Officer
4. President
5. Vice President

III. Most constructors are found in the following firms:

a. Construction companies
b. Construction management (CM) companies
c. Specialty contracting companies

IV. Some constructors are employed by governmental agencies such as public works departments, highway/transportation departments, the Bureau of Reclamation, and the U.S. Army Corps of Engineers in supervisory or administrative capacities.

V. Some constructors are involved in construction education as faculty at colleges, universities, and technical institutes.

CONSTRUCTORS

Nature of the Work

A constructor is an individual who utilizes skills and knowledge, acquired through education and experience, to manage the execution of all or a portion of a construction project. The constructor can be involved in building many types of facilities including, but not limited to, commercial (i.e., office buildings and shopping centers), institutional (i.e., hospitals and schools), industrial (i.e., factories and refineries), residential (i.e., homes and apartments), and civil (i.e., highways and utilities).

A constructor is primarily employed by or works as a general (or prime) contractor or a sub (or specialty) contractor. One can also find constructors working in other types of organizations such as construction management firms, architectural offices, material suppliers, governmental agencies, financial institutions, and for users of construction which have their own in-house construction management personnel.

Because the typical construction project is comprised of many different types of personnel, equipment, materials, and activities, the constructor must possess a wide variety of skills and knowledge. These include being able to read and interpret architectural/engineering drawings and specifications; understanding and complying with numerous local and state building codes, legal requirements, and construction standards; understanding and adhering to a variety of construction conditions and contractual requirements; efficiently planning, estimating, and scheduling all or a part of a project; and the performance of management duties required to effectively coordinate and communicate with all members of the construction process.

Working Conditions

The work environment of a constructor is varied, ranging from work in comfortable permanent offices to working on the project site in a small temporary office. Constructors spend a great deal of their time working with the project designers (owner representatives), clients (owner), and with other constructors, foremen, and/or other employees who are responsible for the day-to-day work in the field. Writing and reviewing reports in order to discuss work schedules and progress can consume a large portion of the constructor's time. Extensive travel is not unusual.

Constructors typically work long hours, and must meet critical production deadlines. Weekend work is common.

Employment

There are over 200,000 construction firms in the United States. The estimate is that there are a potential 500,000 constructors involved in the construction industry.

Many constructors own their own firm or are self-employed. The remainder work for public or private construction firms or governmental agencies such as city public works departments, state highway departments, the Bureau of Reclamation and the U.S. Army Corps of Engineers, or teach construction subjects in colleges, universities and technical institutes.

Education, Other Qualifications, and Advancement

The vast majority of today's constructors are college educated, and those planning a career in construction should strive for a baccalaureate degree. While the construction industry will always require many persons educated solely as architects, engineers, or in pure managerial skills, the most effective education for constructors, at all levels of managerial responsibility, is a meaningful synthesis of general education, math and science, construction design, construction techniques, and business management at the undergraduate level. Typical construction program courses include mathematics and English, history and economics, physics, strength of materials, structural design, mechanical and electrical systems, materials and methods, planning, estimating, scheduling, technical report writing, contract documents, business management, and contract law.

Degrees in Construction are now available at over 100 colleges and universities. Although they may have different titles all are generally classified as Construction, Construction Science, Construction Management, Construction Technology, Building Science, or Construction Engineering. The American Council for Construction Education (ACCE) accredits pure construction degree programs while the Accreditation Board for Engineering & Technology (ABET) accredits construction engineering and construction technology programs. In 1990 there were 24 ACCE accredited programs. There are also three construction engineering programs, and 45 construction technology programs accredited by ABET. Entrance requirements range from average to above average high school grades and scores on standardized tests (i.e., SAT, ACT). Students may transfer to construction degree programs from two-year junior and community colleges.

New graduates usually begin employment with construction firms as assistant estimators, assistant project managers, or at some other mid-management position. As such, they are immediately involved in the day-to-day operations of the firm or a construction project. Responsibility comes quickly, and advancement is relatively rapid in this fast paced occupation. However, it takes many years of experience and responsibility before a graduate is considered an accomplished constructor.

Although higher education is desirable, the construction industry remains one of the few American industries where one may start with little formal education and still reach the top by becoming a chief executive or owner of a construction firm. This path to the top, from trainee, to craftsman, to constructor, requires hard work and a great deal of personal dedication, and becomes more sophisticated as technology advances.

Job Outlook

The employment of constructors is expected to rise significantly through the year 2000. Indeed, the current number of construction program graduates is not expected to meet demand for at least five years. Three factors contribute to this bright outlook.

First, the construction industry is becoming more complex. New and improved construction materials and technologies are being developed; complex safety, health, and environmental requirements are being placed on construction; and new management techniques are called for in dealing with a changing workforce.

Second, is the increasing need to improve, expand, or rebuild the existing infrastructures of our cities.

Third, new construction, both residential and non-residential, will be needed.

Earnings

The starting salary of graduates from baccalaureate construction degree programs in 1990 was from the mid $20,000s to mid $30,000s. This equals or exceeds the starting salaries of the other professionals in the construction process (i.e. architects and engineers). The median annual earning for salaried constructors who worked full time in 1990 was about $45,000. The middle 50% earned between $30,000 and $45,000, with the top 10% earning more than $55,000.

Constructors who become owners, partners, or chief executives of construction firms generally earn more, but their incomes vary due to changing business conditions. In addition to the monetary reward earned by the constructor, there are significant intangible rewards. A major one is the sense of accomplishment associated with the completion of the construction project.

Related Occupations

Constructors are concerned with the building of structures or significant facets or portions of structures. Others who engage in related work are construction managers, architects, landscape architects, and civil, electrical, structural, and mechanical engineers.

Sources of Additional Information

General information about professional careers in construction can be obtained from:

Director, Construction Education Services, Associated General Contractors of America, 1957 E St., NW, Washington, DC 20006.

Specific questions on education for a career as a constructor should be addressed to:

Executive Director, American Council for Construction Education, 901 Hudson Lane, Monroe, LA 71201

Director, Construction Education Services, Associated General Contractors of America, 1957 E St., NW, Washington, DC 20006.

Information about voluntary certification of constructors is available from the:

Executive Director, American Institute of Constructors, 20 South Front Street, Columbus, OH 43215

1990

Admitted to Department		Not Yet Admitted	Total
CMGT	71	148	219
DESN	26	54	80
IDIS	44	90	134

ENROLLMENT PROJECTIONS: * Construction Management Only

		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
*	Black	12	13	15	16	18	19	21	23	26	28
	White	205	215	224	235	245	258	268	281	294	308
	Other	2	2	2	3	3	3	4	4	4	4
**	Total	219	230	241	254	266	280	293	308	324	340

* Increase recruitment effort ** Assume 5% growth rate

Percent non-resident: 25

ADDITIONAL FACULTY AND STAFF REQUIREMENTS: *Construction Management only

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Faculty	5	6	6	6	7	7	7	8	8	8
Staff	1	1	1	1	1	1	1	1	1	1
Total	6	7	7	7	8	8	8	9	9	9

BUDGETARY IMPLICATIONS: * Construction Management only
(A: Annual continuation dollars; B: One-time dollars)

YEAR: 1991

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel								
Operating			15,000	20,000			15,000	20,000
Library								
Computing				10,000				10,000
Other								
Total			15,000	30,000			15,000	30,000

Revised 9/20/90

BUDGETARY IMPLICATIONS:

YEAR: 1992

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel			20,000				20,000	
Operating			40,000	25,000			40,000	25,000
Library								
Computing								
Other								
Total			60,000	25,000			60,000	25,000

YEAR: 1993

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel		*(100,500)	40,000				40,000	
Operating			40,000	25,000			40,000	25,000
Library								
Computing								
Other								
Total		*(100,500)	80,000	25,000			80,000	25,000

* DESN, ITEC faculty moved to ITEC.

YEAR: 1994

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel			40,000				40,000	
Operating			40,000	30,000			40,000	30,000
Library								
Computing								
Other								
Total			80,000	30,000			80,000	30,000

EAST CAROLINA UNIVERSITY
UNC-GA Mission Review
Academic Program Development Form

COLLEGE/SCHOOL: E.C.U-Industry & Technology DEPARTMENT: Construction Mgmt.

TITLE OF PROPOSED INSTITUTE/CENTER: Global Shelter Research Center

PRIMARY PURPOSE: Research x Service ____ Training ____

PROPOSED YEAR OF: Establishment 1991 Deletion _____ Redesign _____

DESCRIPTION OF INSTITUTE/CENTER AND RELATIONSHIP TO INSTITUTIONAL MISSION AND UNIT VISION (NOTE: If Proposed Institute/Center is interdisciplinary, please describe):

The Global Shelter Research Center will be dedicated to studying, researching and developing solutions to the housing shortage in third world countries through the use of an interdisciplinary approach which encompasses construction techniques as well as other housing related issues that involve political scientists, anthropologists, sociologists, health scientists and others. In accordance with its mission the center intends to become a principle national forum for development workers, technicians and academics involved in appropriate technology and housing issues. The center will disseminate information on its positions through appropriate forums of communication and education.

Mission and Objectives: The mission of the Center for Third World Housing Research is to provide technical and scientific solutions to the critical worldwide housing shortage particularly in developing countries. The objectives of the Center are:

- to develop into a principal national forum for issues relating to shelter technology appropriate for the third world.

- to bring together academics, development workers and technicians who share a broad view of the global housing crisis and are willing to participate and pool their expertise to improve it.

- to identify important issues which impact the housing shortage, direct and support research, prepare and offer recommendations, and define the measurable results expected from implementation.

- to disseminate credible information and state-of-the-art knowledge to workers and third world countries through appropriate vehicles of communication and education.

- to establish and maintain appropriate liaison with other organizations active on global housing issues of mutual interest.

RATIONALE FOR INSTITUTE/CENTER ADDITION/DELETION/REDESIGN:

Many of the problems facing the poor in developing nations an be adequately addressed using appropriate technology, indigenous crafts and natural materials. Improvements can best be identified and accomplished in a cooperative effort of academics, western governmental and non-governmental agencies and developing countries. The center will provide for and coordinate research that can best be addressed using sound scientific practices.

With the worldwide housing shortage, particularly in developing countries, there is an urgent need for international efforts to accelerate the production and improvement of shelter. Housing problems afflict virtually all countries, and the shelter needs of the poor and disadvantaged will be almost impossible for developing countries to address without Western input. This will be the only center of its type in the world and will bring international research and recognition to East Carolina University.

D R A F T

CENTER FOR THIRD WORLD HOUSING RESEARCH

MISSION AND POLICIES

Preface

The Center for Third World Housing Research is an officially designated, organized research unit of the School of Industry and Technology, Department of Construction Management of East Carolina University. Its principal funding is from research contracts, grants and gifts.

Overview

The Center for Third World Housing Research is a non-profit institute dedicated to studying, researching and developing solutions to the housing shortage in the third world. This mission recognizes the suffering of millions of people from inadequate housing or no shelter at all.

The Center believes that many of the problems facing the poor in developing nations can be adequately addressed using appropriate technology, indigenous crafts and natural materials. It believes that real improvements can best be identified and accomplished in a cooperative effort of academics, western governmental and non-governmental agencies and developing countries. The institute is organized and

directed to facilitate that end.

In accordance with its mission the Center intends to become a principal national forum for development workers, technicians and academics involved in appropriate technology and housing issues. The Center will make recommendations only after it has arrived at positions which are based on careful study, appropriate justification and concern for cultural effects. This should assure that all positions taken will have the validity and creditability to make them broadly acceptable worldwide. The Center will disseminate information on its positions and findings through appropriate forms of communication and education.

The Center will be selective in the issues it studies. Among criteria for selection will be the impact the subject or issue can have on improving the quality of life for those with inadequate shelter and the degree to which the Center's membership and resources can make a significant contribution to the solution. Studies will be conducted by task forces or research committees specifically organized for the purpose. The task force or research committee will direct research, supervise the preparation of position papers, and recommend implementation strategies. In this process the Center will draw on different

departments within the University, other universities and allied organizations active on similar issues.

Participation (membership?) in the institute is open to individuals and organizations with interests in the mission of the Center.

Mission and Objectives

The mission of the Center for Third World Housing Research is to provide technical and scientific solutions to the critical worldwide housing shortage particularly in developing countries. The objectives of the Center are:

- to develop into a principal national forum for issues relating to shelter technology appropriate for the third world.
- to bring together academics, development workers and technicians who share a broad view of the global housing crisis and are willing to participate and pool their expertise to improve it.
- to identify important issues which impact the housing shortage, direct and support research, prepare and offer recommendations, and define the measurable results expected from implementation.
- to disseminate credible information and state-of-the-art knowledge to development workers and

third world countries through appropriate vehicles of communication and education.

- to establish and maintain appropriate liaison with other organizations active on global housing issues of mutual interest.

Policies of the Center

1. The Center will promote participation and communication among the development community as a primary activity.
2. The Center will work on problems in a business-like manner where the experience of its participants can make a significant contribution, and where the solution can have an important influence on the global housing shortage.
3. The Center will emphasize the quality of its work in order to assure its credibility and validity; if necessary, this will be at the sacrifice of the quantity or duration of work.
4. The Center will not publish work which does not meet its standards of quality.
5. The acceptance of research projects should consider the objective of enhancing and upgrading university programs which tend to strengthen the Center's resources.

6. The Center will concentrate on providing research, leadership and disseminating information. The Center shall draw upon departments within the University as a principal resource for talent, data, and expertise.

7. The Center will not duplicate work which is being performed satisfactorily by other institutions or organizations, but will encourage and utilize such work to further its mission.

8. The Center will devote attention to the fundamental problems of technology, terminology and measurement.

9. The Center shall not engage in any form of political activity.

ADDITIONAL FACULTY AND STAFF REQUIREMENTS:

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Faculty	1									
Staff	1									
Total	2									

BUDGETARY IMPLICATIONS:
(A: Annual continuation dollars; B: One-time dollars)

YEAR: 1991

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel			45,000				45,000	
Operating				10,000				10,000
Library								
Computing						5,000		5,000
Other								
Total			45,000	10,000		5,000	45,000	15,000

BUDGETARY IMPLICATIONS:

YEAR: 1992

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel			45,000				45,000	
Operating			10,000	25,000			10,000	25,000
Library								
Computing								
Other								
Total			55,000	25,000			55,000	25,000

YEAR: 1993

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel			50,000				50,000	
Operating			12,000	30,000			12,000	30,000
Library								
Computing								
Other								
Total			62,000	30,000			62,000	30,000

YEAR: 1994

Category	Reallocation of Unit Resources		Self-supporting funds (grants and contracts)		Additional Allocations		Total	
	A	B	A	B	A	B	A	B
Personnel			50,000				50,000	
Operating			15,000	45,000			15,000	45,000
Library								
Computing								
Other								
Total			65,000	45,000			65,000	45,000