The University of Alabama does not presently offer an integrative program in transportation and logistics. The goal of this effort was to develop a multi-disciplinary curriculum for such a program. To accomplish this task, the researchers benchmarked existing programs at 18 universities that are recognized leaders in this field of study. Based on the course contents of these programs and the knowledge of the researchers, three major fields were defined: Information Technology, General Body of Knowledge, and Technical Analysis. These three fields were subdivided into 22 sub-component areas. Using the course descriptions, each of the benchmarked programs was evaluated on the extent of coverage of these areas. Furthermore, a review of the literature – using both academic and trade journals – was performed to identify emerging trends in the marketplace. These two distinct sources were distilled to identify the components of an ideal curriculum that was used as the foundation for the program at The University of Alabama. This program combined the talents of two departments housed in the College of Commerce and Business Administration, the Department of Geography in the College of Arts and Sciences, and the Department of Computer Science in the College of Engineering. The proposed curriculum has been informally approved by the separate departments in the College of Commerce and Business Administration and will be submitted to the Faculty Executive Board in the near future for implementation. When approved, both the Department of Information Systems, Statistics, and Management Science, and the Department of Management and Marketing will offer a new major in Transportation / Supply Chain Management.
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Executive Summary

The University of Alabama does not presently offer a program in transportation and logistics. The motivating purpose behind this proposal was to develop an outstanding multidisciplinary transportation/logistics program at The University of Alabama, Tuscaloosa to produce undergraduate degreed students that will meet the growing needs of the Nation and the State of Alabama. To accomplish this task, the researchers benchmarked existing programs at 18 universities that are recognized leaders in this field of study. (Please see Appendix A.) Based on the course contents of these programs and the knowledge of the researchers, three major fields were defined: Information Technology, General Body of Knowledge, and Technical Analysis. These three fields were subdivided into 22 sub-component areas. Using course descriptions, each of the benchmarked programs was evaluated on the extent of its coverage in these areas. Secondly, a review of the literature – using both academic and trade journals – was performed to identify emerging trends in the marketplace. These two distinct sources were combined to create the components of an ideal curriculum for the proposed program at The University of Alabama. This program combined the talents of two departments housed in the Culverhouse College of Commerce and Business Administration, plus the Department of Geography in the College of Arts and Sciences, and the Department of Computer Science in the College of Engineering.

The proposed curriculum consists of a 27 credit hour major on top of the standard college-wide business curriculum, and an 18 credit hour minor in Geographic Information Systems (GIS). This curriculum can be completed with 128 credit hours, which is only four credit hours more than the 124 hours required for a business degree. (Please see Appendix B.) The major combines existing courses from two undergraduate business programs: Marketing and Industrial Management. These courses cover all of the activities and processes involved in managing supply chains, including transportation, manufacturing operations, inventory management and distribution. The minor combines four courses from the Geography Department in the College of Arts and Sciences, and two courses from the Computer Science Department in the College of Engineering. The combination of courses in both the major and minor provide students with knowledge and skills to understand and apply GIS, as well as design add-in supply chain models and implement them within a GIS. This program compares favorably with the six “best of the best” transportation / logistics / supply chain management programs identified by this research. (Please see Figure 4-2.)

The proposed curriculum has been formally approved by the two affected departments in the Culverhouse College of Commerce and Business Administration and is being submitted to the College’s Faculty Executive Board in November for approval and implementation. When approved, both the Department of Information Systems, Statistics, and Management Science, and the Department of Management and Marketing will offer a new major in Transportation / Supply Chain Management.

Since this program uses only existing courses and faculty resources, there is an opportunity for improvement. Longer-term, this program will benefit from the inclusion of additional topics, such as purchasing/procurement and transportation management. Further benefits can be achieved from eliminating overlapping topical coverage and integrating the concepts and processes related to managing the total supply chain across all of the courses in the major.
Section 1
Introduction, Problem Statement, Overall Project Approach

Introduction
A new managerial focus is emerging in today’s high cost, competitive and ever changing business environment: the integration of transportation and logistics activities across the entire supply chain. The supply chain refers to the flow of goods from raw material sources to manufacturer to wholesaler to retailer to consumer/end user, and the flow of information in the opposite direction. This business environment has recognized that the typical distribution channel contains redundant and unnecessary functions and processes.

Globally, the logistics industry is among the largest industries. In the U.S. this industry will contribute approximately $1 trillion to the Nation’s economy in the year 2000. Transportation consumes approximately 60 percent of these annual expenditures. Logistics costs can exceed the cost of manufacturing, and exceed 50% of overall marketing costs. Logistics related assets can represent as much as 75% of a company’s total assets. Consequently, better management of transportation / logistics offers every member of the supply chain significant opportunities for improving corporate profitability and return on assets.

There are tremendous opportunities in the transportation and logistics industries for energetic, properly educated students. Presently, there is no cohesive strategy within the University of Alabama System to meet this challenge. In fact, the state of Alabama lags in the development of both higher education programs in this area, and the building of integrated relationships between the transportation industry and shippers (manufacturers, wholesalers and retailers).

Problem Statement
The objective of this effort was to establish a truly multi-disciplinary transportation / supply chain management undergraduate program that combined the expertise of two departments within the Culverhouse College of Commerce and Business Administration as well as reached out to other colleges, Engineering and Arts & Sciences, to provide outstanding preparation in the business logistics area.

Overall Project Approach
The strategic approach adopted for this research was to create an initial curriculum that used only existing resources, and to describe enhancements that would lead to a future curriculum. This will permit the number of students enrolled in the program to grow to a viable level before the faculty would need to commit their energies to the required improvements. In addition, this approach will permit the faculty to observe where new resources may best be spent in developing the program in the future.
To develop the initial curriculum, existing and recognized transportation / logistics programs across the country were evaluated to serve as a benchmark. This process enabled the researchers to compare the University of Alabama’s current resources and expertise to the “Best of the Best.” Furthermore, current trends in transportation / logistics and supporting advances in technology were identified. This information allowed the design of a new program that uses existing resources to meet future needs in the logistics industry. The identification of an educational niche will provide students of this program with special skills that will give them a competitive edge in the job market.
Section 2
Background

History
Prior to and immediately following the deregulation of the various modes in the transportation industry in 1980, the University offered a program in transportation in the Culverhouse College of Commerce and Business Administration’s Department of Economics, Finance and Legal Studies. As the emphasis in transportation management shifted from a regulatory environment to a competitive free market, the required knowledge base evolved toward an integrative logistics view involving the management of inventory flows in the total supply chain. As a result, this program was disbanded several years ago.

The trends in the marketplace, described in Section 4 of this report, are changing the historic role of transportation in the distribution of products to manufacturers, wholesalers, retailers and consumers. For example, manufacturers can now access customer demand information directly from retailers. These data are being used to plan production schedules. These schedules, in turn, are shared with suppliers, so that they can provide “Just-in-Time” deliveries of raw materials and component parts to the manufacturer. Transportation provides the linkages between suppliers, manufacturers and retailers. This tight and complex coordination requires special skills on the part of suppliers, manufacturers and retailers that are typically outside their core competencies. As a result, these firms are outsourcing their transportation needs to traditional transportation companies. These firms are evolving into a new industry, commonly referred to as “Third Party Logistics” (3PL). These 3PL companies manage warehouse inventories, provide coordinated, on-time deliveries of raw materials, components and finished goods, and link all of these transactions and physical flows with state-of-the-art information systems, including internet based technology.

Opportunity
Managers are demanding courses that integrate activities across the entire supply chain and emphasize information technology. There is a real need to train current and prospective employees to meet these challenges. The proposed program is a first step toward meeting these needs.
Section 3
Methodology

Curriculum Design Process
The first step in designing a curriculum for a transportation / supply chain management program was to benchmark similar programs at other well-known and respected institutions across the country. These programs were identified and program representatives were contacted and requested to provide details of their curriculum. See Table 3.1 for a list of these institutions, the colleges in which the programs are housed, and the program names.

Table 3-1. Institution, College, and Program Name of Benchmarked Programs

<table>
<thead>
<tr>
<th>Institution</th>
<th>College</th>
<th>Program Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona State University</td>
<td>Business</td>
<td>Supply Chain Management</td>
</tr>
<tr>
<td>University of Arkansas</td>
<td>Business</td>
<td>Transportation &amp; Logistics</td>
</tr>
<tr>
<td>Florida International University</td>
<td>Business</td>
<td>Logistics</td>
</tr>
<tr>
<td>Iowa State University</td>
<td>Business</td>
<td>Transportation &amp; Logistics</td>
</tr>
<tr>
<td>University of Maryland</td>
<td>Business</td>
<td>Logistics &amp; Transportation</td>
</tr>
<tr>
<td>Miami of Ohio</td>
<td>Business</td>
<td>Purchasing &amp; Procurement Management.</td>
</tr>
<tr>
<td>Michigan State University</td>
<td>Business</td>
<td>Supply Chain Management</td>
</tr>
<tr>
<td>Mississippi State University</td>
<td>Business</td>
<td>Transportation</td>
</tr>
<tr>
<td>University of Nevada</td>
<td>Business</td>
<td>Logistics</td>
</tr>
<tr>
<td>University of No. Texas</td>
<td>Business</td>
<td>Logistics</td>
</tr>
<tr>
<td>Ohio State University</td>
<td>Business</td>
<td>Transportation &amp; Logistics</td>
</tr>
<tr>
<td>Penn State University</td>
<td>Business</td>
<td>Business Logistics</td>
</tr>
<tr>
<td>Syracuse University</td>
<td>Business</td>
<td>Supply Chain Management</td>
</tr>
<tr>
<td>University of Tennessee</td>
<td>Business</td>
<td>Logistics &amp; Transportation</td>
</tr>
<tr>
<td>Texas A&amp;M University</td>
<td>Engineering</td>
<td>Industrial Distribution</td>
</tr>
<tr>
<td>Wayne State University</td>
<td>Business</td>
<td>Logistics</td>
</tr>
<tr>
<td>Weber State University</td>
<td>Business</td>
<td>Logistics</td>
</tr>
<tr>
<td>Western Michigan University</td>
<td>Business</td>
<td>Integrated Supply Management</td>
</tr>
</tbody>
</table>

The curricula at these benchmark institutions were categorized to identify common elements that must be included in an ideal curriculum. These elements were then matched against existing courses and programs at the University of Alabama. In addition, strengths and weaknesses of the benchmarked programs were identified based upon their perceived depth and breadth across the identified common elements. Next, “gaps” between an ideal curriculum and existing courses were identified throughout the University’s Tuscaloosa campus.
In parallel with the above process, trends were identified in the transportation and logistics industries that need to be considered in designing a current, up-to-date curriculum. Academic and trade journals were searched to identify these trends.

In developing a draft of the curriculum-without-additional-resources, representatives of the Department of Computer Science and the Department of Geography were informed of the programmatic concept. Their assistance was enlisted to select the courses appropriate for the curriculum. This process identified a potential lack of resources that could arise in the future if and when demand for the program increases.

As the program grows, there will be a need to provide a more integrative set of courses. This will require faculty time and energy to design and develop curricular enhancements. The researchers identified a set of enhancements that can be implemented in the near future. For the longer term, a curriculum is envisioned that will provide stronger preparation in the general background knowledge of purchasing, transportation, supply chain management, and logistics. This will necessitate the gradual evolution of the curriculum and the addition of new faculty positions to handle the growth of this program in terms of both course offerings and the number of students enrolled.

The final project task was to recommend specific ways in which course “gaps” can be filled, as well as to identify the associated resources that will be required.
Section 4

Project Findings and Results

Summary
The project findings and results are three-fold. First, they identified trends in the marketplace that will influence how business logistics are to be performed in the future. Second, the research screened the curricula of 18 of the top programs in the US and developed a methodology for characterizing the common elements of these programs. The output of this process consisted of a summary of the strengths and weaknesses of these programs, and the identification of the six most outstanding programs. The third and final result of the effort consisted of the description of a multi-disciplinary, transportation and supply chain management curriculum that can be implemented at The University of Alabama without any additional resources. This final phase included the detail specifications of the curriculum, and a comparison of the proposed curriculum against the top six programs identified during the benchmarking process.

Business Logistics Trends
Three major trends will have an impact on the way business logistics will be conducted in the future. The first is the ever-increasing level of electronic commerce in the marketplace. This new business paradigm is having a tremendous impact in the transportation and logistics industry. While orders can be taken over the Internet, the products to be delivered still must travel through more traditional channels. In addition to the increased demand for transportation capacity, the firms in these industries must provide informational services since customers desire to initiate, track and acknowledge shipments online. In effect, transport and logistics companies have to become an integrated part of their e-business customers’ supply chains. [Wilson 1999]

The second of these trends is the growing use of Third Party Logistics (3PL) providers. 3PL’s provide an array of services, including warehousing, carrier selection, dedicated fleet operations, transportation, and inventory management. Many analysts contend that third-party distribution is the fastest growing segment of the logistics market. [Cooke 1998] It has been estimated that corporate use of third-party logistics services has nearly doubled from 1995 to 1999 with estimated expenditures expected to exceed $100 billion by the end of year 2000. [Andel and Harrington 1999] According to a handful of very large third-party logistics providers, the trends of globalization and outsourcing have created a need for one-stop shopping on a global scale. For example, in April 1999 disk-drive manufacturer Western Digital decided to turn over management of its $50 million global supply chain to a single logistics provider, GeoLogistics. Such arrangements, while rare today, will become the norm in the future. [Parker 1999]

The third trend is the growing sophistication of software tools to meet the needs of transportation and logistics managers. One of these tools is logistics execution systems (LES), which consists of suites of software modules that handle major logistics systems tasks, such as transportation
management, warehousing management, order management, inventory control and employee scheduling. Several software firms now offer LES that integrate logistics operations. It appears that the worldwide market for an integrated logistics execution system could readily exceed a billion dollars. [Cooke 1999] Another is the use of global satellite positioning (GSP) to track exact locations of vehicles in real-time. Such information is critical input to freight and yard management and computer-assisted routing software. [Weinstein 1999] A third software tool is geographic information systems (GIS). GIS is being used in a wide variety of organizations to aid in decision-making. It is a robust tool having display and analysis capabilities, as well as the ability to link with existing database systems and incorporate optimization models. When enhanced with GPS data, GIS can be used for real-time tracking and dispatching of vehicle delivery fleets. GIS also can enhance solution approaches to facility location problems within a supply chain’s distribution network. [Grimshaw 2000]

These trends indicate that the logistics industry will have a significant demand for individuals who understand how to design and use information systems, possess a broad foundation of knowledge on supply chain and logistics operations, and are familiar with analytic software tools that convert data into useful information upon which to make transportation and logistics decisions.

**Benchmarking Results**

The benchmarking results are organized into three areas: Characterization Schema of the curricula, Strengths and Weaknesses of the Benchmarked Programs, and the Top Six Programs.

**Characterization Schema**

The first task in analyzing the curricula of the 18 programs used in the benchmarking process was to identify their common elements. Each University’s program offerings were assigned to three primary components. These three components were, in turn, further segregated into relevant sub-components. Table 4-1 identifies these three primary components and constituent sub-components, as well as provides a brief definition for each sub-component.

To define an ideal curriculum, the three sub-components were split into a set of six base courses and a set of four integration topics. Common sub-components across the higher ranked programs in the General Body of Knowledge component were used to form the six “base courses”, while sub-components from the Information Technology and Technical Analysis areas were combined to form an “integration module”. Table 4-2 lists this set of ten elements that constitute the “ideal” curriculum.

**Strengths and Weaknesses of the Benchmarked Programs**

Each curriculum at the 18 benchmarked programs was evaluated using this schema. The evaluation form listed the courses in each program’s curriculum across rows, and the sub-components identified in Table 4-1 comprised the columns. For each course, an “X” was recorded in the column corresponding to the sub-components that the course covered. These decisions were based on the course descriptions that were either solicited from each benchmarked program or obtained from the Internet. The 18 benchmarked curriculum evaluation forms are provided in Appendix A.
A summary of these 18 programs is presented in Figure 4-1. The first column identifies the program by university. The remaining columns reflect the researchers’ assessments of each program’s focus, strengths, weaknesses, extent of non-business content, and the breadth of its business school curriculum.
<table>
<thead>
<tr>
<th>Primary Component</th>
<th>Sub-component</th>
<th>Brief Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Technology</td>
<td>Efficient Consumer Response (Vender Managed Inventory, Continuous Replenishment Process, etc.)</td>
<td>Retailers’ shelves are replenished automatically by manufacturers’ forecast of consumer demand, based on retailers’ Point-of-Sale data. Integrated data bases and operating systems that manage the flow of product &amp; information across the entire supply chain</td>
</tr>
<tr>
<td>Information Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Body of Knowledge</td>
<td>Channel Management</td>
<td>Managing the relationships among the various echelons in the supply chain &amp; marketing channels</td>
</tr>
<tr>
<td></td>
<td>Outsourcing</td>
<td>Managing supply chain functions that have been transferred to “third party” service providers.</td>
</tr>
<tr>
<td></td>
<td>Supply Chain Management</td>
<td>Managing the flow of information and inventories from raw material suppliers to end-use / consumption.</td>
</tr>
<tr>
<td></td>
<td>Customer Service / Quality Management / Total Quality Management</td>
<td>Identifying and meeting customers’ supply chain service expectations to gain competitive advantage</td>
</tr>
<tr>
<td></td>
<td>Logistics Management</td>
<td>Integrating transportation, warehousing, inventories &amp; customer service activities to minimize total cost, and achieve desired service levels.</td>
</tr>
<tr>
<td>Organization</td>
<td></td>
<td>The role and impact of various organizational structures on the operation of the supply chain.</td>
</tr>
<tr>
<td>Transportation</td>
<td></td>
<td>The various legal implications, modes and cost principles required to manage the movement of goods</td>
</tr>
<tr>
<td>Warehousing</td>
<td></td>
<td>Decision making with respect to warehouse design, storage and handling costs and operating principles.</td>
</tr>
<tr>
<td>Packaging / Material Handling</td>
<td></td>
<td>Managing the design of packaging to minimize damage and maximize transportation economies.</td>
</tr>
<tr>
<td>Global Logistics</td>
<td></td>
<td>Managing the flow of imports and exports to minimize global pipeline inventories and coordinate the timely transfer of goods across national boundaries.</td>
</tr>
<tr>
<td>Environmental</td>
<td></td>
<td>Evaluating issues affecting the environment, such as recycling, green manufacturing, bio-degradability.</td>
</tr>
<tr>
<td>Manufacturing</td>
<td></td>
<td>Planning, scheduling and operating processes related to the conversion of raw materials and components into finished product.</td>
</tr>
<tr>
<td>Purchasing</td>
<td></td>
<td>Managing the acquisition of raw materials, components and services (e.g., transportation) required to satisfy supply chain demands.</td>
</tr>
<tr>
<td>Technical Analysis</td>
<td>Financial Dimensions</td>
<td>Evaluating all of the costs across the entire supply chain and performing cost trade-off analyses.</td>
</tr>
<tr>
<td></td>
<td>Performance Measurement</td>
<td>Defining and analyzing financial and service performance to improve operating processes.</td>
</tr>
<tr>
<td></td>
<td>Inventory Management</td>
<td>Setting safety stock and target inventory levels, and deploying inventories across the supply chain.</td>
</tr>
<tr>
<td></td>
<td>Benchmarking and Business Process Reengineering</td>
<td>Identifying and eliminating duplicate or non-value adding processes and assets in the supply chain.</td>
</tr>
<tr>
<td></td>
<td>Network Design</td>
<td>Planning the optimum number and location of production and distribution facilities.</td>
</tr>
<tr>
<td></td>
<td>Strategic Planning</td>
<td>Deploying supply chain services and capabilities as a corporate competitive strategy.</td>
</tr>
<tr>
<td></td>
<td>Software Tools</td>
<td>Computer based modeling and problem solving.</td>
</tr>
</tbody>
</table>
### Table 4-2. 10 Elements of an Ideal Supply Chain Management Curriculum

<table>
<thead>
<tr>
<th><strong>Six Base Courses</strong></th>
<th><strong>Four Key Integration Components</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation Basics</td>
<td>Information Technology: Management Information Systems, ECR</td>
</tr>
<tr>
<td>Integrated Logistics and Customer Service</td>
<td>Financial Dimensions and Performance Measurements</td>
</tr>
<tr>
<td>Manufacturing Operations and Inventory Management</td>
<td>Strategic Planning and Network Design</td>
</tr>
<tr>
<td>Purchasing and Procurement</td>
<td>Model Building and Decision Support Systems</td>
</tr>
<tr>
<td>Global Logistics</td>
<td></td>
</tr>
<tr>
<td>Supply Chain Management</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UNIVERSITY</th>
<th>PROGRAM FOCUS</th>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
<th>EXTENT OF NON-BUS CONTENT</th>
<th>BREADTH OF BUS SCHOOL CURRICULUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona State University</td>
<td>Supply Chain Mgmt</td>
<td>Breadth over General body of knowledge; Network design</td>
<td>Lack of IT, lack of global issues</td>
<td>none</td>
<td>standard business curriculum</td>
</tr>
<tr>
<td>University of Arkansas</td>
<td>Transportation / Logistics</td>
<td>depth in Transportation</td>
<td>Lack of IT integration w/ program; lack of Supply Chain Mgmt; No manufacturing connection</td>
<td>none</td>
<td>standard business curriculum</td>
</tr>
<tr>
<td>Florida International University</td>
<td>(Global) Logistics</td>
<td>Global transportation</td>
<td>Lack of depth (only 5 courses)</td>
<td>none</td>
<td>standard business curriculum</td>
</tr>
<tr>
<td>Iowa State University</td>
<td>Transportation</td>
<td>Transportation</td>
<td>Lack of SCM, Mfg, Integration, IT &amp; Inv. Mgt</td>
<td>none</td>
<td>standard business curriculum</td>
</tr>
<tr>
<td>University of Maryland</td>
<td>Material Logistics Mgmt</td>
<td>Breadth of coverage of general body of knowledge; Technical skills</td>
<td>IT, Supply Chain Mgmt</td>
<td>none</td>
<td>standard business curriculum</td>
</tr>
<tr>
<td>Miami of Ohio</td>
<td>Mfg. &amp; Purchasing</td>
<td>Mfg. &amp; Purchasing</td>
<td>Lack of Breadth re transp. &amp; logistics</td>
<td>none</td>
<td>standard business curriculum</td>
</tr>
<tr>
<td>Michigan State University</td>
<td>Purchasing &amp; Supply Chain Mgmt</td>
<td>Breadth of coverage of general body of knowledge</td>
<td>Apparent lack of organizational &amp; Internet</td>
<td>none</td>
<td>standard business curriculum</td>
</tr>
<tr>
<td>Mississippi State University</td>
<td>Transportation</td>
<td>Transportation</td>
<td>SCM, IT, Logistics, Technical Skills</td>
<td>none</td>
<td>standard business curriculum</td>
</tr>
<tr>
<td>University of Nevada</td>
<td>Supply Chain Mgmt</td>
<td>General body of knowledge, technical skills</td>
<td>none</td>
<td>none</td>
<td>standard business curriculum with strong integration of logistics</td>
</tr>
<tr>
<td>University of No. Texas</td>
<td>Global Logistics</td>
<td>Global transportation &amp; Technical Analysis Skills</td>
<td>No I.T.: Little SCM, Mfg. courses are all electives</td>
<td>none</td>
<td>standard business curriculum</td>
</tr>
<tr>
<td>Ohio State University</td>
<td>Transportation &amp; Logistics</td>
<td>Transportation &amp; Technical Analysis</td>
<td>Little Supply Chain Mgmt &amp; I.T., Mfg. Purchasing</td>
<td>Two electives in Geography</td>
<td>standard business curriculum</td>
</tr>
<tr>
<td>Penn State University</td>
<td>Logistics</td>
<td>Transportation and Logistics Mgmt</td>
<td>Lack of breadth along supply chain, lack of IT</td>
<td>none</td>
<td>standard business curriculum</td>
</tr>
<tr>
<td>Syracuse University</td>
<td>SCM</td>
<td>Integration of mfg. &amp; IT</td>
<td>Survey coverage of topics (no depth)</td>
<td>none</td>
<td>standard business curriculum</td>
</tr>
<tr>
<td>University of Tennessee</td>
<td>Transportation</td>
<td>Transp. &amp; Logistics</td>
<td>Minimal IT, SCM, Tech. Analysis &amp; Mfg Integration</td>
<td>none</td>
<td>standard business curriculum</td>
</tr>
<tr>
<td>Texas A&amp;M University</td>
<td>Channel Management of intermediaries</td>
<td>View intermediary relationships from multiple disciplines</td>
<td>Lack of manufacturing</td>
<td>Requires 24 hrs of business/24 hrs of engineering tech</td>
<td>In engineering but have 24 hrs of business courses</td>
</tr>
<tr>
<td>Wayne State University</td>
<td>Strong interface with Marketing</td>
<td>Standard Logistics course</td>
<td>Lack of depth, potential lack of breadth</td>
<td>none</td>
<td>standard business curriculum</td>
</tr>
<tr>
<td>Western Michigan University</td>
<td>Logistics</td>
<td>Technical Analysis</td>
<td>Mfg, Supply Chain Mgmt</td>
<td>none</td>
<td>standard business curriculum</td>
</tr>
<tr>
<td>University of Alabama</td>
<td>Mfg. &amp; Logistics</td>
<td>Inter-disciplinary nature of proposed program (e.g., GIS minor)</td>
<td>Lack of integration &amp; SCM concepts across courses</td>
<td>Good (minor in geography &amp; computer science)</td>
<td>standard business curriculum</td>
</tr>
</tbody>
</table>

Figure 4-1. Summary of Supply Chain Management Programs at Benchmarked Universities.

**Top Six Programs**

Based on a review of the 18 benchmarked curriculums, six “best of the best” programs were chosen. The selection process was based on the following criteria: 1) the overall strengths and/or lack of weaknesses of each program; 2) the inclusion (or exclusion) of critical course offerings that were determined to be directly related to transportation, logistics and supply chain management, as depicted in Appendix A; and, 3) a comprehensive review of the description of each relevant course in the program. Table 4-3 lists these top six programs and provides the justification for their selection. Note that only the program at Texas A&M appears to be multidisciplinary.
Table 4-3. Top Six Programs

<table>
<thead>
<tr>
<th>Institution</th>
<th>Motivation for Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michigan State University</td>
<td>Strong breadth in General Body of Knowledge</td>
</tr>
<tr>
<td>University of Nevada</td>
<td>Strong breadth in General Body of Knowledge and Technical Analysis; No weaknesses</td>
</tr>
<tr>
<td>Texas A&amp;M University</td>
<td>Interdisciplinary program: engineering, business, and engineering technology</td>
</tr>
<tr>
<td>Western Michigan University</td>
<td>No weaknesses; Integrates manufacturing and logistics</td>
</tr>
<tr>
<td>Arizona State University</td>
<td>Strong breadth in General Body of Knowledge</td>
</tr>
<tr>
<td>Weber State University</td>
<td>Strong breadth in Technical Analysis</td>
</tr>
</tbody>
</table>

Figure 4-2 presents a qualitative comparison of these programs. The basis for the comparison consisted of the strength of each program across the six base courses and four key integration components detailed in Table 4-2. All of the “Top Six” benchmarked programs have medium to strong coverage in at least five of the six base courses, as well as varying degrees of coverage with regard to the four key integration components.

New Transportation / Supply Chain Management Curriculum

The primary result of this research is a proposed transportation / supply chain management program that can be implemented without any additional resources on the main campus of The University of Alabama in the Culverhouse College of Commerce and Business Administration. This program combines courses from the undergraduate programs offered in Marketing and Industrial Management that constitute a program major of 27 credit hours. In addition, there is a recommended minor in Geographic Information Systems that consists of four courses from the Department of Geography and two courses from the Department of Computer Science. The details of this program are presented in Figure 4-3. The curriculum meets all Culverhouse College of Commerce and Business Administration guidelines and requires 128 credit hours – only four credit hours more than a standard CBA degree program. See Appendix B for the
Academic Advising Checksheets for the proposed majors in Industrial Management or Marketing, with a concentration in Transportation / Supply Chain Management.

The resulting program of study has also been assessed using the same curriculum evaluation form that was used to evaluate the 18 benchmarked programs. This analysis is contained in Appendix C. In addition, the proposed multidisciplinary program was evaluated against the top six “best of the best” programs. The result is included in Figure 4-2, which indicates that The University of Alabama’s program compares favorably to these top six programs. While the proposed program provides adequate coverage of the six base courses, it excels in the four key integration components. Further improvements can be made to score better on the six base courses once the program has reached a viable level of student enrollment. Recommendations of how to identify and implement these improvements are provided in the next section.

**General Education Courses**
- EC 110 Principles of Microeconomics
- EC 111 Principles of Macroeconomics
- EH 101 English Composition I
- EH 102 English Composition II
- MATH 112 Pre-calculus Algebra
- MATH 121 Calculus and its Applications
- CS 114 Intro. to Computer Programming
- CS 116 Lab for CS114

**Functional Field Courses**
*Lower Division*
- AC 210 Introduction to Accounting
- LGS 200 Legal Environment of Business
- ST 260 Statistical Data Analysis

*Upper Division*
- MGT 300 Org. Theory and Behavior
- MKT 300 Marketing
- IM 300 Intro. to Production Management
- FI 302 Business Finance
- MGT 395 Managerial Communications
- GBA 490 Strategic Management

**Recommended Electives (Choose 2)**
- IM 422 Scheduling
- St 475 Quality Control
- MKT 310 Principles of e-Commerce
- MKT 427 Business to Business Mktg.

**Prescribed Minor in GIS (18 Hrs.)**
*Geography (12 credits, including GY 110)*
- GY 110 Principles of Human Geography
- GY 430 Geographic Info. Systems
- GY 436 Adv. Geographic Info Systems
  - One of the following two courses:
    - GY 304 Map & Air Photo Interpretation
    - GY 335 Computer Mapping Apps In Bus.

*Computer Science (6 credits)*
- CS 302 Computerized Database Systems
- CS 385 Visual Basic Programming

1: This course may be used to satisfy the SS requirement.
2: This course may be used to satisfy the C requirement.
3. CS 114 has been substituted for CS 102 in the “General Education” requirements section. As a result, students can take both CS 302 & CS 385.
4. AC 351 may be substituted for MKT 446

**Required Major Courses (27 Hrs.)**
- MIS 385 Intro. to Mgmt. Info Systems
- MGS 310 Intro. to Mgmt Science
- IM 321 Production Planning and Control
- IM/MGS 420 Computer Simulation
- IM 423 Inventory Management
- MKT 411 Supply Chain Management
- MKT 422 Strategic Logistics Mgmt.
- MKT 455 International Marketing
- MKT 446 Measuring Mktg. Effectiveness

Figure 4-3. Proposed Multi-Disciplinary Program in Transportation / Supply Chain Management.
Section 5
Project Conclusions and Recommendations

Summary Statement
Based on this research, The University of Alabama can implement a multidisciplinary program in transportation / supply chain management that compares favorably with the top programs currently offered at other major universities – without adding additional faculty resources.

Implementation Issues
The current plan is to create a program that will be shared across the departments of Management and Marketing, and Information Systems, Statistics and Management Science. Specifically, each department will offer this program as a concentration option within their respective department’s existing overall undergraduate major (that is “Marketing” in the Management and Marketing Department, and “Industrial Management” in the Information Systems, Statistics & Management Science Department).

This approach will minimize the time required to implement the program and ensure its inclusion in the next undergraduate catalog, since only approval by the faculty of the Culverhouse College of Commerce and Business Administration is required. It will also eliminate the time consuming requirement of preparing a formal proposal to ACHE (the Alabama Committee on Higher Education).

Recommendations for Long-Term Curriculum
The major priority, long-term, is to revise the content of MKT 422, Strategic Logistics Management. This course needs to be expanded into a capstone format that incorporates and enhances the content of all of the required major courses. This course would be case-based, require integrative concepts and solutions, including network modeling, and focus on the application of supply chain concepts to support corporate strategies.

The second priority will be to expand, integrate and coordinate course content across the required major course module. The objectives will be to eliminate duplication of subject matter and to ensure the coverage of all relevant concepts and subject matter. For example, the current proposed curriculum lacks individual courses in transportation management and purchasing / procurement. The faculty teaching in this program will jointly design and implement courses in these areas that support and enhance the overall program’s objectives.

The researchers believe that the “major” track should apply to all students enrolled in this program. Creating separate tracks for Marketing students and another for Industrial Management students would defeat the primary purpose of a multi-disciplinary program and dilute the objective of an integrated “supply Chain” curriculum.
Section 6
References and Other Resources

References

Other Resources
Alabama, University of; 1998-2000 Undergraduate Catalogue.
Arizona State University; Program brochure and course descriptions for 1999-2000.
Arkansas, University of; Program and course descriptions found on-line at http://pigtrail.uark.edu/catalogofstudies/99-00/Walton/requirements.html and http://www.uark.edu/depts/mkt/tlogug.html.
Florida International University; 1999-2000 Undergraduate Catalog.
Maryland, University of; Program and course descriptions found on-line at http://www.rhsmith.umd.edu/undergrad/logistics.html and http://www.rhsmith.umd.edu/tbpp/bsprog.htm.
Michigan State University; Program brochure and course descriptions for 1999-2000.
Mississippi State University; Program and course descriptions found on-line at http://www.cbi.msstate.edu/dept/mkt/currictrans.html and http://www.cbi.msstate.edu/dept/mkt/courses.html.
Nevada, University of; Program and course descriptions found on-line at http://www.coba.unr.edu/mgrs/undergrad/logistics/logistics4year.asp.
Penn State University; Program and course descriptions found on-line at http://www.smeal.psu.edu/uprog/majors/sched/B_LOGsss2000.html and http://www.psu.edu/bulletins/bluebook/courses/b_log.htm.

Syracuse University; Undergraduate Catalogue, course descriptions found on-line at http://www.som.syr.edu/depts/supply/courses2.htm.

Tennessee, University of; Program and course descriptions found on-line at http://cba318.bus.utk.edu/Public/MLT/Programs.nsf/6dcdfb023511d2ae8525643b00067d212/e23ba9e3726b170585256430000f6214?OpenDocument

Texas A&M University; Program brochure and course descriptions for 1999-2000.

Wayne State University; Program and course descriptions found on-line at http://www.busadm.wayne.edu/academics/undergraduate/degree%20requirements/blg.htm.

Weber State University; Program and course descriptions found on-line at http://weber.edu/catalog19992000/pages/Lomb.htm and http://weber.edu/catalog19992000/pages/c-LOM.htm.

Western Michigan University; Program and course descriptions found on-line at http://spider.hcob.wmich.edu/ism/curic.html.
Appendix A
Curriculum Evaluation Forms for 18 Benchmarked Programs

Viewer - contact Dr. Jay U. Sterling for access to the comprehensive set of Evaluation Forms used in the project.
Appendix B

Proposed Academic Advising Checksheets:
  Industrial Management Majors
  Marketing Majors
Multi-Disciplinary Concentration in *Transportation / Supply Chain Management*

**Culverhouse College of Commerce and Business Administration**

Departments of: Management & Marketing and Information Systems, Statistics & Management Science

### HRS/GRD

#### General Education Courses
- EC 110 Principles of Microeconomics
- EC 111 Principles of Macroeconomics
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- IM/MGS 420 Computer Simulation
- IM 423 Inventory Management
- MKT 411 Supply Chain Management
- MKT 422 Strategic Logistics Mgmt.
- MKT 455 International Marketing
- MKT 446 Measuring Mktg. Effectiveness

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#### Recommended Electives (Choose 2)

**Recommended for IM Students**
- IM 422 Scheduling
- ST 475 Quality Control

**Recommended for Marketing Students**
- MKT 310 Principles of e-Commerce
- MKT 427 Business to Business Mktg.

**Recommended Minor in GIS (18 HRS.)**

*Geography (12 credits, including GY 110)*
- GY 110 Principles of Human Geography
- GY 430 Geographic Info. Systems
- GY 436 Adv. Geographic Info Systems

One of the following two courses:
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*Computer Science (6 credits)*
- CS 302 Computerized Database Systems
- CS 385 Visual Basic Programming

---

1: This course may be used to satisfy the SS requirement

2: This course may be used to satisfy the C requirement

3. CS 114 has been substituted for CS 102 in the “General Education” requirements section. As a result, students can take both CS 302 & CS 385.

4. AC 351 Managerial Acctg. Decisions may be substituted for MKT 446.
Appendix C
Curriculum Evaluation Form for the Proposed Multi-Disciplinary Program

*Viewer - contact Dr. Jay U. Sterling for access to the Multi-Disciplinary Program Evaluation Form*