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Integration of Student Academic Record and Major Requirements through XML.

Zhujun Hou
East Tennessee State University

Integration Of Student Academic Record And Major Requirements Through XML

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Zhujun Hou

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Neil Thomas: Chair
Martin Barrett
Terry Countermine

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ABSTRACT

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The purpose of this thesis is to develop a software application based on previous studies by 1997 Oak Ridge Design Studio Team that matches students' progress with major requirements in their college career. This study addresses the problems of previous studies and suggests a solution. A powerful new technique, XML, is used to model, store, and process the data of major requirements and student records. This application produces an HTML file that provides detailed information of a student's academic progress towards graduation.

CONTENTS

LIST OF TABLES

Table Page

LIST OF FIGURES

Chapter 1

INTRODUCTION

College education has become more complex today. Many new majors have been created. Some majors contain several different concentrations to make the study more specific. In addition, the requirements for a major might keep changing. Therefore, it has become more complicated and difficult for students, advisors, and graduation counselors to track a student's academic progress.

In a personal interview on April 20th 1999, Susan Burkey, a graduation counselor at East Tennessee State University, explained that there are about seven hundred undergraduate students who graduate from ETSU every semester. All these students' records have to be checked. Besides these seven hundred records, she also has to check the records of students who are going to graduate in one or two semesters. Therefore, a total of two thousand student records are reviewed each semester. As Mrs. Burkey said, the worst part is that she has to go through all the procedures by hand. There is currently no software that can be used to help this process. Although she can remember most of the requirements for many majors due to years of experience, she still has to look up the updated published requirements in the undergraduate catalog because they change from time to time. Mrs. Burkey would be pleased if a simple checklist

can be generated to help her to look through a student's progress towards graduation when she specifies a student ID.

Several systems are implemented to record student information and registration at ETSU, such as SROL (Student Records On-line), SIS (Student Information System), and SISPLUS (Kristen Cornett, 1997). 'On Course' is a component of SIS, used to determine if a student completed the required courses for the major that he or she is pursuing. 'On Course' asks for student name and major as input, and then outputs a checklist on the screen. However, the checklist contains twelve pages and its format lacks clarity.

Statement of the Problem

The Department of Computer and Information Sciences has put some effort into the development of systems that would produce an advising checklist at ETSU. The STAR (Systematic Tracking Academic Records) and METEOR (matching student progress with major requirements) systems are two major products. The STAR system evaluates a student's transcript and major requirements and creates the output to the screen or printer in the form of an advising checklist (Oak Ridge Design Studio Team, 1997).

METEOR is a software application that produces a definition language for academic majors (APPENDIX A) (Kristen Cornett, 1997). The output produced by METEOR should allow a department secretary or undergraduate student

advisor to create a file of requirements for any major. The file should contain information like required courses, required credit hours, required GPA, or any other requirement information. However, METEOR fails to achieve this goal. In addition, METEOR was developed for only four majors, Computer and Information Science, Mathematics, Engineer Design Graphics, and Interior Design.

The primary problem of the METEOR language is that it fails to capture course constraints and alternate information. Course constraints include course prerequisites, minimum course grades, minimum GPA, and others. Course alternates are a set of courses that a student can choose from to satisfy some requirements. There are many kinds of alternates. Students could select courses from a list of given courses. Students could choose courses offered by a certain department. Students could choose courses at a certain level. Students could choose a block of courses from several given blocks. Students could choose a pair of courses from several given pairs. Students could choose courses from a certain area. Some of these alternates are represented in the METEOR language, but some of them are not. In addition, intensive requirements and residency requirements must also be evaluated before granting a bachelors degree to a student. Intensive requirements include writing intensive requirements, oral intensive requirements and using information technology requirements. ETSU requires a student to complete a minimum number of intensive courses for each type. A transfer student must completed

enough work in residence at ETSU in both the major and minor (East Tennessee State University Undergraduate Catalog, 1999-2000). METEOR failed to provide all the intensive and residency information as well. Therefore, designing the language to capture all the requirement information for all majors becomes the first task.

A graduation counselor may need to review a student's minor performance in order to determine if a student is able to graduate, because most of the majors require a student to complete a minor. However, METEOR did not produce a definition language for any minor. Therefore, the language for minors needed to be built as well.

STAR has two incoming data streams: DLAM (Descriptive Language for Academic Majors) and SIS (Oak Ridge Design Studio Team, 1997). STAR accesses a student's transcript from SIS and retrieves the major requirements from a DLAM file. DLAM files contain data describing academic programs for each major and concentration in any catalog year (APPENDIX B). DLAM files are manually generated text rather than produced by METEOR. However, DLAM files follow the logic and language established by METEOR. STAR creates a tree structure to demonstrate a student's academic progress by comparing the student's record with the corresponding major requirement. The tree view has the same format as the major requirement file but includes a student's grade on the completed courses (APPENDIX C). Since DLAM files fail to illustrate course

prerequisite information, alternate information, intensive information and residency information, STAR is not able to provide sufficient academic progress information to students and to their advisors.

In order to produce a software to analyze a student's graduation progress, the language created by METEOR needed to be redefined to capture the major information in much more detail. For STAR, a simple tree structure is not able to provide sufficient information to an advisor, graduation counselor or student. A much more complex user-friendly interface needed to be developed to represent all the constraints and other information. The interface should give students or their advisors a view of academic progress, and it could also be used to help students make a better plan for their rest of college education career.

Research Objectives

In this study, the two research objectives are to, (1) formally define major requirements and, (2) to integrate major requirements and student transcripts. A major requirement could be extremely complicated due to course constraints and alternates. The complexity of major requirements increases the difficulties of data modeling and event modeling. In this study, a new technique, XML, was used to organize and format the data of major requirements and the data of student transcripts.

Chapter 2

THEORETICAL APPROACHES

This chapter describes two theoretical approaches to specify major requirements, event modeling and data modeling.

Event Modeling

The process of pursuing a degree can be decomposed into a set of course taking events. For a given major requirement, some of those events can occur concurrently, but some events must occur sequentially depending on the prerequisite requirement. A Petri net is an appropriate technique to model this process. A Petri net is a widely used abstract model for describing and analyzing a process that contains asynchronous and concurrent activities (Peterson, 1977).

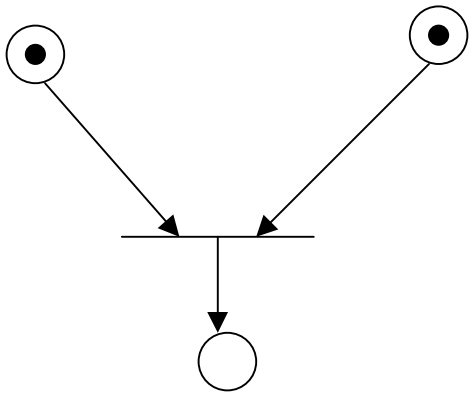
A process usually involves a state change of an object. A course-taking event involves a state change of a course. A course usually falls into one of the following three primary states: waiting state, ready state, and completed state. In a waiting state, a course can't be taken until its prerequisite has been satisfied. A student may take a course at any time if the course is in a ready state. A course is in a completed state when the student completes the course and meets the grade requirement. A course is in a ready state when all his prerequisite courses are in completed states; otherwise, it is in a waiting state. The initial state of a

course could be a waiting state or a ready state, depending on whether the course has prerequisites or not.

Figure 1 and Figure 2 show two simple Petri nets for triggering course state changes. The diagrams contain circles (called places) and bars (called transitions). If an arc is directed from a circle A to a bar B (or a bar A to a circle B), then A is an input to B, and B is an output of A. The markers inside circle are called tokens. The position and movement of tokens control the execution of a Petri net (Peterson, 1977). The firing of a transition causes the movement of token. A transition is enabled to fire when all its input places have a token in them. In Figure 1, the transition is enabled. The transition fires by removing the tokens from its input places and placing a token in the output place. Figure 2 displays the movement of token after the transition fires.

According to the language defined in METEOR, a ***major*** is split into several ***advising units***. An ***advising unit*** is composed of ***groups***, and a ***group*** is made up of ***courses***. For an ***advising unit*** or a ***group***, there are two states, uncompleted and completed. The uncompleted state is the initial state. A student completes a ***group*** when he or she completes all the ***courses*** inside the ***group***. If a ***group*** contains alternative ***courses***, a student has to obtain the required credit hours and meet the GPA requirement to complete the ***group***. In other words, a ***group*** can not be in completed state unless all or some of its ***courses*** are in completed state. The same logic can apply to an ***advising unit***.

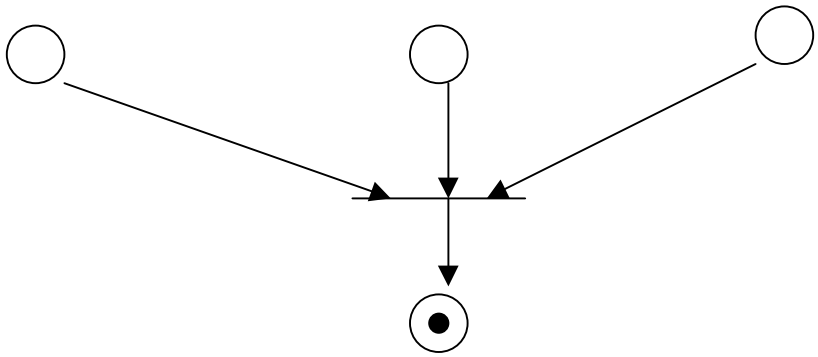
A course is in transcript **Earned grade >= required grade**



Course completed

Figure 1: Petri net for triggering course to completed state.

Prerequisite 1 completed **Prerequisite2 completed** **….**



Course is ready to take

Figure 2: Petri net for triggering course is ready to take

An ***advising unit*** is not able to move to completed state until all its ***groups*** move to completed state. Finally, a ***major*** requirement is satisfied when all ***advising units*** are in completed state. Figure 3 shows the overall Petri net.

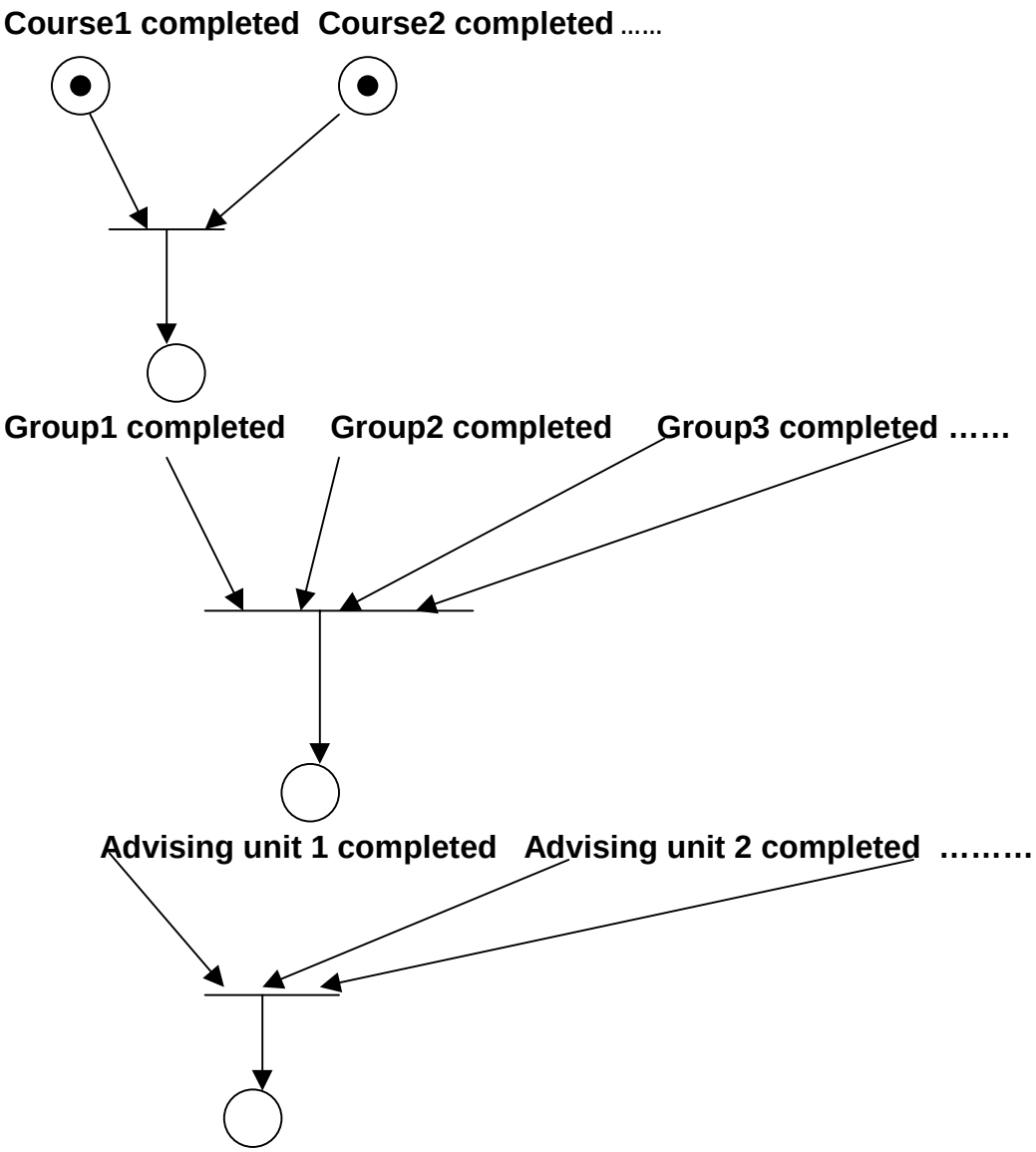


Figure 3: Petri net representation for the process of pursuing a degree

A goal of the program developed for this thesis is to determine the state of each ***course***, ***group*** and ***advising unit*** and then show those states through an interface to let students and their advisors understand where the students stand.

Data Modeling

"Data modeling is the first step in designing an object-oriented program. Data modeling is the analysis of data objects and the identification of the relationships among these data objects" (Sally Schlaer and Stephen J. Mellor, 1988). In order to determine the state of each ***course***, ***group***, ***advising unit*** and ***major***, the data of those objects were first collected, modeled and analyzed. There are primary two major sets of data, major requirements and student records shown on his/her transcript. The major must be the one claimed by the student. Minor requirement is optional, because some majors do not require a student to claim a minor.

There are several traditional database approaches that are usually used to organize and format data, such as relational data model, hierarchical data model, and object-oriented data model. In this study, a new technique, XML, will be applied for data handling.

XML, eXentsible Markup Language, is an approach to capture data for computing, serving and processing on the web (Ann Navarro, Chuck White, and Linda Burman, 2000).

XML was initially "developed by a W3C Generic SGML Editorial Review Board formed under the auspices of the W3 (World Wide Web) Consortium in

1996" (*Robin Cover, 2000)*. XML is not the first generation of markup language. Instead, both XML and HTML (HyperText Markup Language) are the children of SGML (Standard Generalized Markup Language).

SGML is defined in ISO (International Organization for Standardization Standard) 8879:1986 with the full name "ISO 8879 Information processing -- text and office systems -- Standard Generalized Markup Language". Its first edition was published in 1986 (*Martin Bryan, 1992).* SGML provides an internationally recognized, non-proprietary language for designing an user's own markup schemes. Generally speaking, "markup" is character text or binary codes added to data content in order to pass particular information about that data. In a document produced by a typical word processor file, "markup" is represented by the proprietary codes that the software inserts into the files to indicate which words should be printed in a certain font, which paragraphs should be centered, where page breaks occur, and so on. In the case of a database system, "markup" is represented by proprietary codes in the data file which indicate where one field or record ends and another begins, what is the attribute of the records and so on (International SGML Users' Group, 1997).

As a simple subset of SGML, XML is primarily designed for representing data, and is usually considered as a relatively new document and data description language (Richard Lander, 2000). An XML file looks very similar to an HTML file. Like HTML, XML uses tags (words bracketed by '<' and '>') and

attributes (of the form name ="value") to describe a class of data objects. HTML specifies the meaning of each tag and attribute. XML uses the tags only to delimit pieces of data, and leaves the interpretation of the data completely to the application that reads it (Bert Bos, 1999). For example, <P> in HTML means "paragraph", but <P> in XML means nothing to a browser, and "P" is only the name of a data element given by a XML document developer. Each XML document works as a database, and elements are the primary logical components of a XML document. An element is bound by a start tag and an end tag. An element can have one or more than one attributes, which define the property of the element. Element content is not limited to text. Elements can contain other elements.

An XML document is constructed as a tree of elements. There is no limit to the depth of the tree, and the elements can repeat. An element that encloses another element is called a parent. The element that is enclosed in a parent is called a child (Ann Navarro, Chuck White, and Linda Burman, 2000).

Table 1 gives a simple example of an XML document. There are nine elements in Table 1, ***employee***, ***name***, ***address***, ***street***, ***city***, ***state***, ***zipcode***, ***country***, and ***tel***. It is important to distinguish the tag sets that delimit elements and the element itself. For example, <***name***> is not an element, but a tag set that describes the element. The entire chunk, "<name>John Simth</name>", is the actual element, which is called a document component (Ann Navarro, Chuck

Table 1: An example of an XML document for "employee"

```
<?xml version="1.0">
<!DOCTYPE employee SYSTEM "employee.dtd">
< employee >
        <entry>
                <name>Kate Smith</name>
                <SSN>0116667878</SSN>
                <address>
                        <street>1429 Maple Road</street>
                        <city>Johnson City</city>
                        <state>Tennessee</state>
                        <zip-code>37601</zip-code>
                        <country>US</country>
                </address>
                <tel preferred="true">423-967-9879</tel>
                <tel>423-282-4343</tel>
        </entry>
        <entry>
                <entry>
                <name>Jone Levy</name>
                <SSN>0116665656</SSN>
                <address>
                        <street>2001 Walnet Street</street>
                        <city>Johnson City</city>
                        <state>Tennessee</state>
                        <zip-code>37604</zip-code>
                        <country>US</country>
                </address>
                <tel preferred="true">423-969-9800</tel>
                <tel>423-282-4343</tel>
        </entry>
</ employee >
```

White, and Linda Burman, 2000). There is only one attribute in Table 1, ***preferred***, which is the attribute of element ***tel***. Attributes usually attach to an element to provide additional information about the element. An attribute has a name and a value, like ***preferred*** is the name of the attribute and ***true*** is the value.

A tree structure can be simply constructed according to the XML document in Table 1 (Figure 4). ***Employee*** is the root element in the tree. Any XML document must contain one and only one root element. All other elements must be the children or grandchildren of the root element (Benoit Marchat, 1999). Different database approaches, like the relational data model, network data model, object-oriented data model and hierarchical data model, have their own data definition language (Rames Elmasri and Sharmkant B. Navathe, 1994). XML has its own data definition language as well. A data definition language is used by database designer to describe a database. The description of a database is called the database schema. A data definition language defines the structure and instances of a database in a human-readable and machine-readable form (DDL Reference Manual, 1991). In other words, a data definition language is used to describe the structure of the whole database, the relationship between data item, the data type of each data items, and the constraints of each data item for a group of users.

Broadly speaking, the Document Type Definition (DTD) is the data definition language or schema for XML. An XML document can adopt many kinds of structure. Developing a DTD to formally specify the structure of an XML document allows an XML processor to check if the documents are syntactically correct and also ensures that they follow the structures described in the DTD. The main purpose of using a DTD is to let the XML processor enforce the structure as defined in the DTD. Based on a DTD, an application, like an XML editor, can access the document structure to perform a task such as

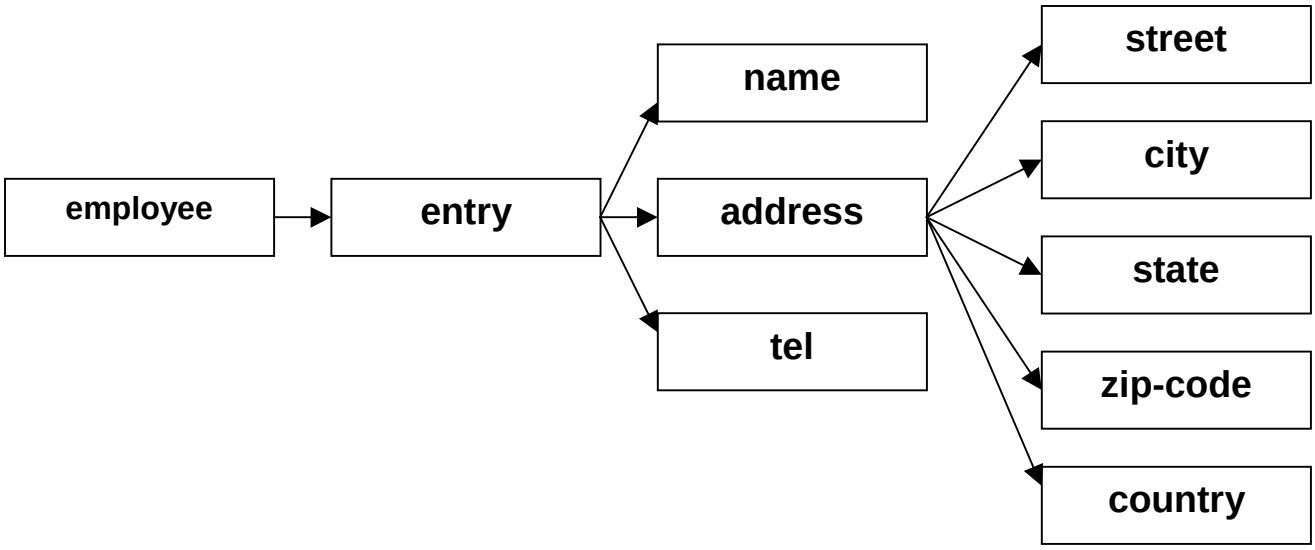


Figure 4: Tree of " employee"

populating an element list. A DTD also gives hints to the XML processor to separate indenting from content (Benoit Marchat, 1999).

Based on the same set of data shown in Table 1, a simple DTD is developed (Table 2). In Table 2, each element associates with tag <!ELEMENT>. Some elements contain a list of other elements, like ***address***, which contains ***street***, ***city***, ***state***, ***zip-code,*** and ***country***. Some elements only contain text, like ***street***, ***city,*** and ***state*** . If an element has attributes, the list of attributes is specified by <! ATTLIST, the element name, the attribute name, the attribute type, a default value>. Fox example, ***preferred*** is an attribute of element ***tel***. Its type is Boolean ("true" or "false"), and its default value is "false". There are several special key words using in a DTD, such as "#PCDATA", "?","*", and "+". "#PCDATA" stands for parsed character data and means the element can

Table 2: The DTD for the "employee"

```
<!ELEMENT employee (entry+)>
<!ELEMENT entry (name,address*,tel*)>
<!ELEMENT name(#PCDATA | fname |lnamt)+>
<!ELEMENT fname (#PCDATA)>
<!ELEMENT lname (#PCDATA)>
<!ELEMENT address (street, city, state, zip-code, country?)>
<!ELEMENT street (#PCDATA)>
<!ELEMENT city (#PCDATA)>
<!ELEMENT state (#PCDATA)>
<!ELEMENT zip-code (#PCDATA)>
<!ELEMENT country (#PCDATA)>
<!ELEMENT tel (#PCDATA)>
<!ATTLIST tel preferred (true | false) "false")
```

contain text (Benoit Marchal, 1999). Key word "?" means the element is optional and it can have one or zero occurrence. Key word "*" means the element is optional and it can occur zero or more than one times. Key word "+" means the element is required and it must occur one or more than one times. For example "***entry***+" means an ***employee*** element must enclose one or more than one ***entry*** elements.

Although a DTD is usually treated as an XML data schema, and it may provide most of the information that an XML data schema provides, a DTD is not equal to an XML data schema. DTDs place minimal constraints on data, but XML data schemas place more specific constraints on data, like content constraints and datatype constraints. Content constraints determine where and when elements may be used, and datatype constraints govern what types of data may appear in an element (Ann Navarro, Chuck White, and Linda Burman, 1997).

The difference between a DTD and a standard data definition language (data schema) can be easily addressed by comparing the DTD shown in Table 2 and the HDDL show in Table 3. Table 3 displays a simple example of a hierarchical data definition language (HDDL). It defines the data fields of each record type, the data type of each field, any key constraints on the data fields and finally the parent and child relationship among records. The data types specified in the HDDL include string, integer, and so on. However, there is only one data type specified in the DTD, which is #PCDATA.

Compared to the HDDL and DTD examples, the language built by METEOR is not a data definition language. It works more like a database. It defines each major requirement in detail (Appendix A). Figure 5 displays the data structure that is abstracted from the language of METEOR. METEOR constructs a hierarchical structure for all courses required by a major. From top to bottom, a ***major*** is split into several ***advising units***, each ***advising unit*** containing several ***groups***, and each ***group*** including ***courses***. Although METEOR does not define data objects or classes specifically, several components can be treated as data objects, such as ***major***, ***advising unit***, ***group,*** and ***course***, because they have attributes and play an important role in the data structure.

components can be treated as data objects, such as ***major***, ***advising unit***, ***group,*** and ***course***, because they have attributes and play an important role in the data structure.

Table 3: An example of HDDL. Child number specifies the left-to-right order of a child record type under its parent record type.

```
RECORD
        NAME = DEPARTMENT
        TYPE = ROOT
        DATA ITEMS =
                DNAME       CHARACTER20
                DNUMBER     INTEGER
                KEY = DNAME
                KEY = DNUMBER
                ORDER BY DNAME

RECORD
        NAME = DLOCATION
        PARENT = DEPARTMENT
        CHILD NUMBER = 1
        DATA ITEMS
                LOCATION    CHARACTER 15

RECORD
        NAME = PROJECT
        PARENT = DEPARTMENT
        CHILD NUMBER = 2
        DATA ITEMS
                PNAME           CHARACTER 20
                PNUMBER         INTERGER
                PDESCRIPTION    CHARACTER 20
                KEY = PNAME
                KEY = PNUMBER
                ORDER BY PNAME
```

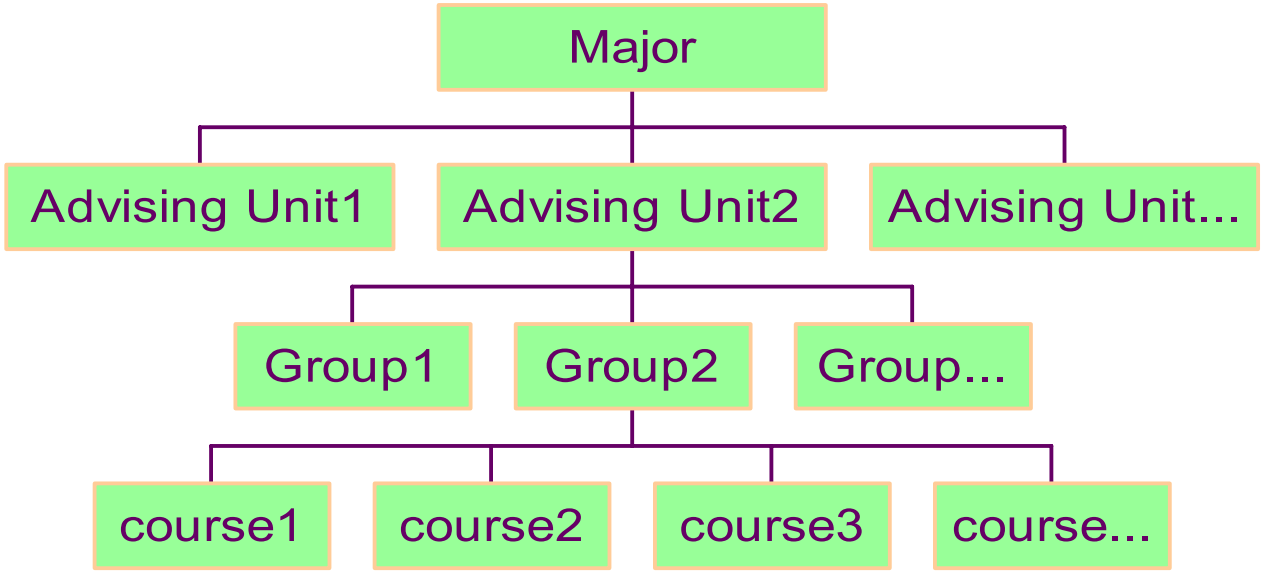


Figure 5: Data structure of major requirement abstracted from METEOR

In METEOR, the attributes assigned to each data item are not sufficient to provide the information of major requirements (Table 4). That may be the main reason that METEOR fails to capture all the major requirements. A ***major*** only has six attributes, which are ***name***, ***abbreviation***, ***type***, ***concentration***, ***catalog,*** and ***required credit hours***. An ***advising unit*** and a ***group*** contain two attributes each, ***name*** and ***required credit hours***. A ***course*** has two attributes as well, ***course identification number*** and ***credit hours***. However, there should be other requirements besides the minimum required credit hours for a ***major***. These requirements could be minimum overall GPA, minimum credit hours earned at ETSU, minimum intensive courses, and so on. In order to

Table 4: The attributes of each data objects in METEOR

- Major
  - name, abbreviation, type, concentration, catalog, credit hours
- Advising Unit
  - name, credit hours
- Group
  - name, credit hours
- Course
  - course ID, credit hours

represent major requirements accurately, a high-level definition language has to be developed to represent the data structure. The definition language will be written in the form of DTD. In the language, more attributes have to be added to the ***course*** object, such as required grade, prerequisite information and intensiveinformation. Required grade reflects that a student has to make certain grade to obtain the credits. Some courses require a higher grade, like "C", but other courses only require student to pass. For some types of ***major***, students have to take certain courses in strict order. For those courses, prerequisites have to be specified. Intensive courses are categorized into writing intensive, communicating orally intensive, and using information technology intensive. Students must complete a minimum number of these intensive courses before graduating. For some types of ***advising unit***, there are other requirements

besides required credit hours. For example, students with computer sciences major have to earn 2.5 GPA in the **Common Core Course unit**. Therefore, an attribute ***Required GPA*** must added to ***advising unit***.

After the construction of a ***major*** DTD, a ***major*** XML document is developed by following the data structure specified in the DTD. Meanwhile, a ***student transcript*** DTD and ***student transcript*** XML document are created as well. If the major requires a minor, a ***minor*** DTD and a ***minor*** XML document must be developed as well. The next step is to integrate those two (or three) XML documents and demonstrate the student's academic progress through a user-friendly interface. In order to accomplish this, a series of extensible style sheets (XSL) had to be developed.

The extensible style sheet language is a powerful tool to transform, format and style XML documents. XSL can render XML documents on screen, on paper, or in an editor. Also, XSL can transform an XML document into another XML document, or to an HTML file. Finally, XSL can manipulate, compute, or retrieve data (XML content) from a XML document.

An XSL document is examined and executed by an XSL processor. The XSL processor takes an XML document and an XSL document as input, then outputs a new XML document or an HTML document based upon the transformation and formatting instruction in the XSL document.

There are many advantages of using XML to handle data. First, the data in an XML document can be posted on the Internet through XSL. Second, all the data can be loaded into only one XML document. There is no need for multiple tables, multiple classes, and foreign keys across tables. The main disadvantage of XML is slow execution of XSL.

Chapter 3

METHODOLOGY

The project is divided into two components. The first component is to develop a software (METEOR) that allows an advisor to specify the corresponding major requirements in the form of an XML file. The second component is to generate a new version of STAR. The new version of STAR is called STARX (STAR eXtensible version). STARX compares a student's record with the corresponding major requirements and creates an interface to display a student's academic progress. STARX also produces output in the form of checklists for graduation counselor to decide whether a student can graduate or else what classes a student needs to take towards graduation. This study focuses on the second section, developing STARX.

Before the software is developed, a data definition language for major requirements, minor requirements and student transcripts will be generated. Table 5 displays the ***major*** DTD, Table 6 shows the ***minor*** DTD and Table 7 shows the ***student*** DTD. Based on these three DTDs, a tree named ***major*** (Figure 6), a tree named ***minor*** (Figure 7) and a tree named ***student*** (Figure 8) are constructed to allow better view of those three sets of data.

The data structure ***major*** basically follows the hierarchical structure constructed in METEOR. A ***major*** contains several ***advising units***, an ***advising***

Table 5: DTD of "major"

```
<!ELEMENT major (majorName, majorAbbreviation,
concentration,synthesis?,catalog, totalCreditHours, minorRequirement,
ETSUCreditHours, ETSUMajorFieldCreditHours, residencyRequirement,
overallGPA, majorGPA, majorCreditHours, totalWritingIntensive,
majorFieldWritingIntensive, level3000WritingIntensive, totalOralIntensive,
majorFieldOralIntensive, totalTechnologyIntensive,
majorFieldTechnologyIntensive,
advisingUnit+)>
<!ELEMENT majorName (#PCDATA)>
<!ELEMENT majorAbbreviation (#PCDATA)>
<!ELEMENT concentration (#PCDATA)>
<!ELEMENT synthesis (#PCDATA)>
<!ELEMENT catalog (#PCDATA)>
<!ELEMENT totalCreditHours (#PCDATA)>
<!ELEMENT minorRequirement (#PCDATA)>
<!ELEMENT  ETSUCreditHours (#PCDATA)>
<!ELEMENT ETSUMajorFieldCreditHours (#PCDATA)>
<!ELEMENT residencyRequirement (#PCDATA)>
<!ELEMENT overallGPA (#PCDATA)>
<!ELEMENT majorGPA (#PCDATA)>
<!ELEMENT majorCreditHours (#PCDATA)>
<!ELEMENT totalWritingIntensive(#PCDATA)>
<!ELEMENT majorFieldWritingIntensive (#PCDATA)>
<!ELEMENT lever3000WritingIntensive (#PCDATA)>
<!ELEMENT totalOralIntensive (#PCDATA)>
<!ELEMENT majorFieldOralIntensive (#PCDATA)>
<!ELEMENT totalTechnologyIntensive (#PCDATA)>
<!ELEMENT majorFieldTechnologyIntensive (#PCDATA)>
<!ELEMENT advisingUnit (unitName, unitCreditHours, unitGPA,
group+)>
<!ELEMENT unitName (#PCDATA)>
<!ELEMENT unitCreditHours (#PCDATA)>
<!ELEMENT unitGPA (#PCDATA)>
<!ELEMENT group (groupName, groupCreditHours,groupGPA,
sequence?, otherGroup?, otherRequirement?, level?, field?, course+)>
<!ELEMENT groupName (#PCDATA)>
<!ELEMENT grouptCreditHours (#PCDATA)>
<!ELEMENT groupGPA (#PCDATA)>
<!ELEMENT sequence (#PCDATA)>
<!ELEMENT otherGroup (#PCDATA)>
<!ELEMENT otherRequirement(#PCDATA)>
<!ELEMENT level(#PCDATA)>
<!ELEMENT field (#PCDATA)>
```

Table 5: DTD of "major" (cont'd)

<!ELEMENT course (courseId, courseName,courseCreditHours, courseQpt, courseGrade, intensive, prerequisite+, selectPrerequisite?,pairNumber?,sequenceNumber?)>
<!ELEMENT courseId (#PCDATA)>
<!ELEMENT courseName (#PCDATA)>
<!ELEMENT courseCreditHours (#PCDATA)>
<!ELEMENT courseQpt (#PCDATA)>
<!ELEMENT courseGrade(#PCDATA)>
<!ELEMENT intensive (#PCDATA)>
<!ELEMENT prerequisite(preId,preQpts?,preGrade?)>
<!ELEMENT preId (#PCDATA)>
<!ELEMENT preQpts (#PCDATA)>
<!ELEMENT preGrade(#PCDATA)>
<!ELEMENT selectPrerequisite (number,prerequisite+)>
<!ELEMENT number(#PCDATA)>
<!ELEMETN prerequisite(preId, preQpts, preGrade)
<!ELEMENT preId(#PCDATA)>
<!ELEMENT preQpts(#PCDATA)>
<!ELEMENT preGrade(#PCDATA)>
<!ELEMENT pairNumber(#PCDATA)>
<!ELEMENT sequenceNumber(#PCDATA)>

Table 6: DTD of "minor"

```
<!ELEMENT minor (minorName, minorCreditHours, minorGPA, group+)>
<!ELEMENT minorName (#PCDATA)>
<!ELEMENT minorCreditHours (#PCDATA)>
<!ELEMENT minorGPA (#PCDATA)>
<!ELEMENT group (groupName, groupCreditHours,groupGPA,
sequence?, otherGroup?, otherRequirement?, level?, field?, course+)>
<!ELEMENT groupName (#PCDATA)>
<!ELEMENT grouptCreditHours (#PCDATA)>
<!ELEMENT groupGPA (#PCDATA)>
<!ELEMENT sequence (#PCDATA)>
<!ELEMENT otherGroup (#PCDATA)>
<!ELEMENT otherRequirement(#PCDATA)>
<!ELEMENT level(#PCDATA)>
<!ELEMENT field (#PCDATA)>
<!ELEMENT course (courseId, courseName,courseCreditHours, courseQpt,
courseGrade, intensive, prerequisite+,
selectPrerequisite?,pairNumber?,sequenceNumber?)>
<!ELEMENT courseId (#PCDATA)>
<!ELEMENT courseName (#PCDATA)>
<!ELEMENT courseCreditHours (#PCDATA)>
<!ELEMENT courseQpt (#PCDATA)>
<!ELEMENT courseGrade(#PCDATA)>
<!ELEMENT intensive (#PCDATA)>
<!ELEMENT prerequisite(preId,preQpts?,preGrade?)>
<!ELEMENT preId (#PCDATA)>
<!ELEMENT preQpts (#PCDATA)>
<!ELEMENT preGrade(#PCDATA)>
<!ELEMENT selectPrerequisite (number,prerequisite+)>
<!ELEMENT number(#PCDATA)>
<!ELEMETN prerequisite(preId, preQpts, preGrade)
<!ELEMENT preId(#PCDATA)>
<!ELEMENT preQpts(#PCDATA)>
<!ELEMENT preGrade(#PCDATA)>
<!ELEMENT pairNumber(#PCDATA)>
<!ELEMENT sequenceNumber(#PCDATA)>
```

Table 7: DTD of "student"

```
<!ELEMENT student(name, Id, major, concentration?,
emphasis?,totalCreditHours,overallGPA,type,transfer?, nontransfer)>
<!ELEMENT name(#PCDATA)>
<!ELEMENT Id(#PCDATA)>
<!ELEMENT major(#PCDATA)>
<!ELEMENT concentration(#PCDATA)>
<!ELEMENT synthesis(#PCDATA)>
<!ELEMENT totalCreditHours (#PCDATA)>
<!ELEMENT overallGPA (#PCDATA)>
<!ELEMENT type (#PCDATA)>
<!ELEMENT nontransfer(semester+)>
<!ELEMENT semester(semesterName,course)>
<!ELEMENT semesterName(#PCDATA)>
<!ELEMENT course(courseId,courseName,grade,qpts,creditHours)>
<!ELEMENT courseId(#PCDATA)>
<!ELEMENT courseName(#PCDATA)>
<!ELEMENT grade(#PCDATA)>
<!ELEMENT qpts(#PCDATA)>
<!ELEMENT creditHours(#PCDATA)>
<!ELEMENT transfer(course+)>
<!ELEMENT course(courseId,courseName,grade,qpts,creditHours)>
<!ELEMENT courseId(#PCDATA)>
<!ELEMENT courseName(#PCDATA)>
<!ELEMENT grade(#PCDATA)>
<!ELEMENT qpts(#PCDATA)>
<!ELEMENT creditHours(#PCDATA)>
```

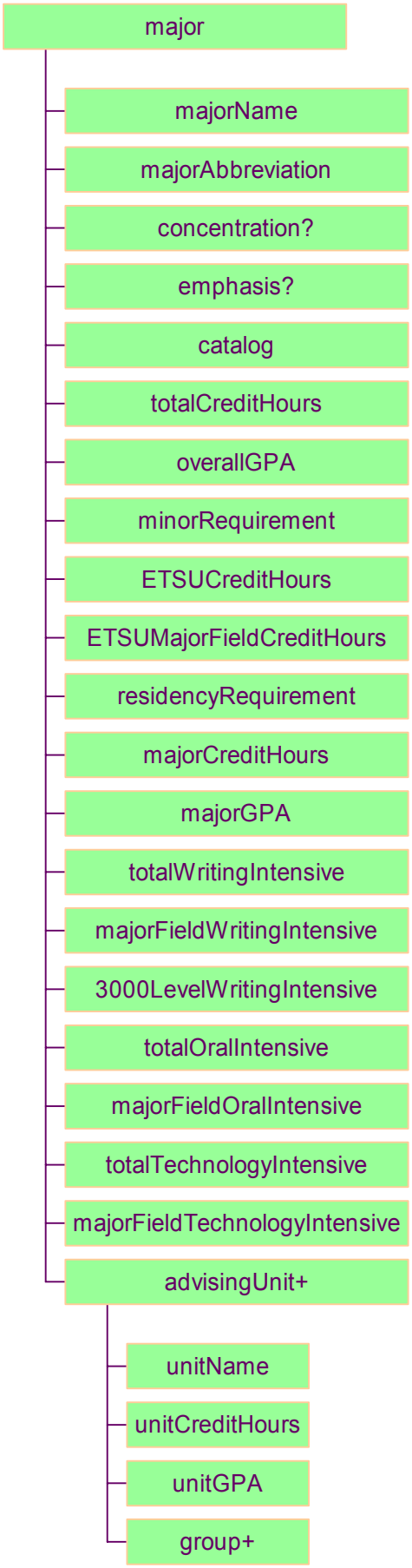


Figure 6: Tree of "major"

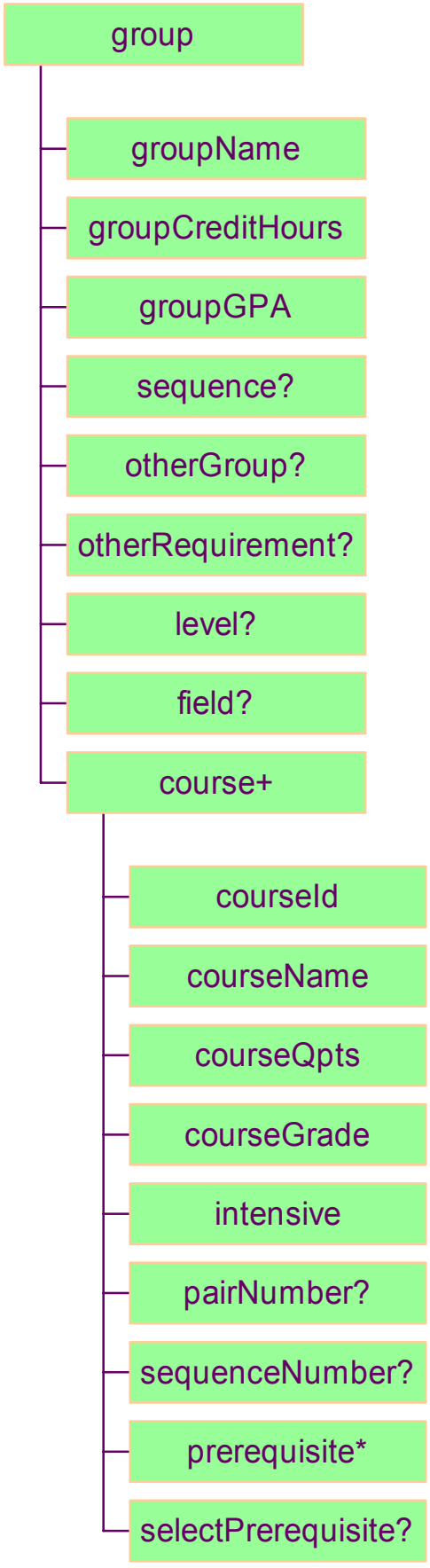


Figure 6: Tree of "major" (cont'd)

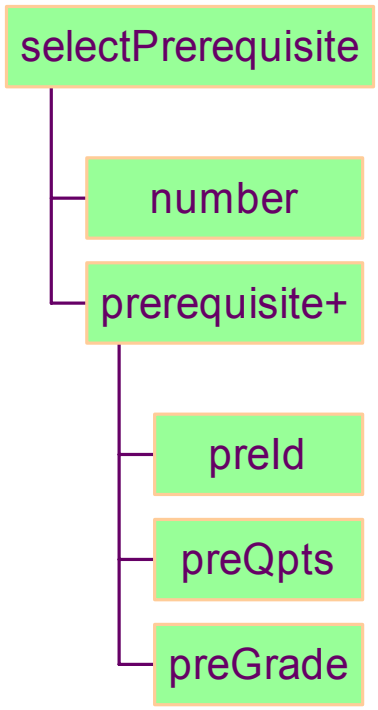


Figure 6: Tree of "major" (cont'd)

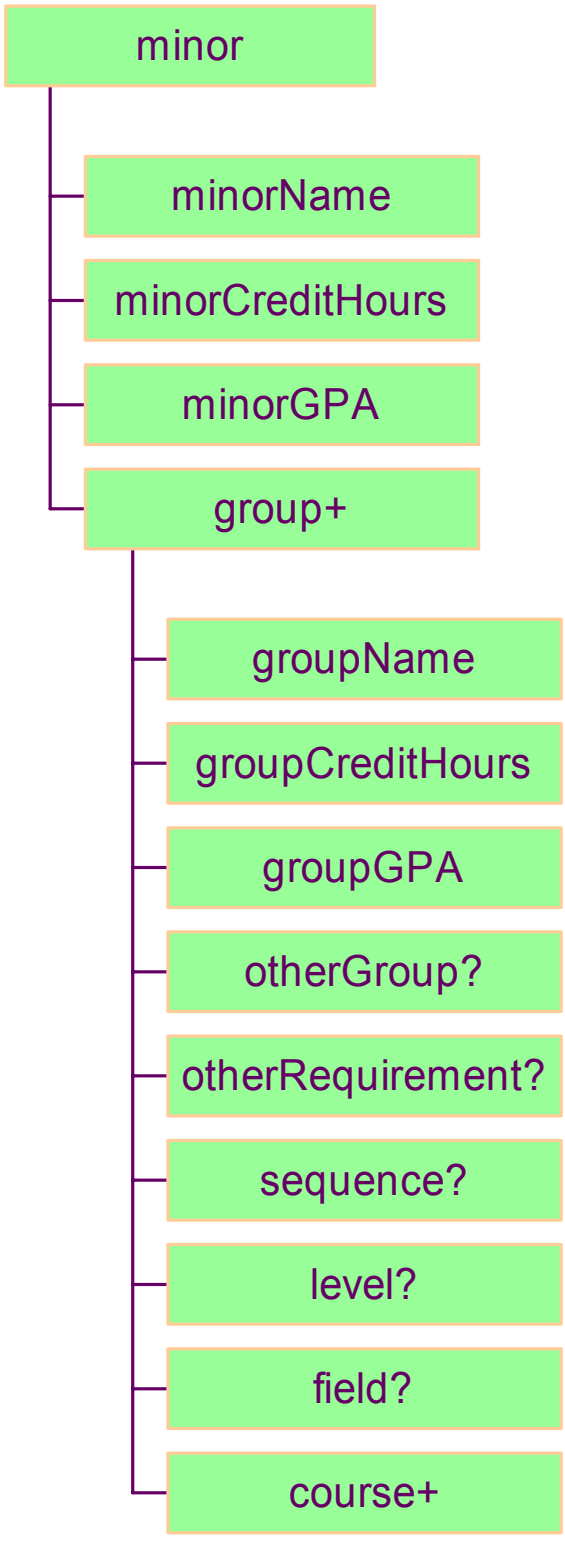


Figure 7: Tree of "minor"

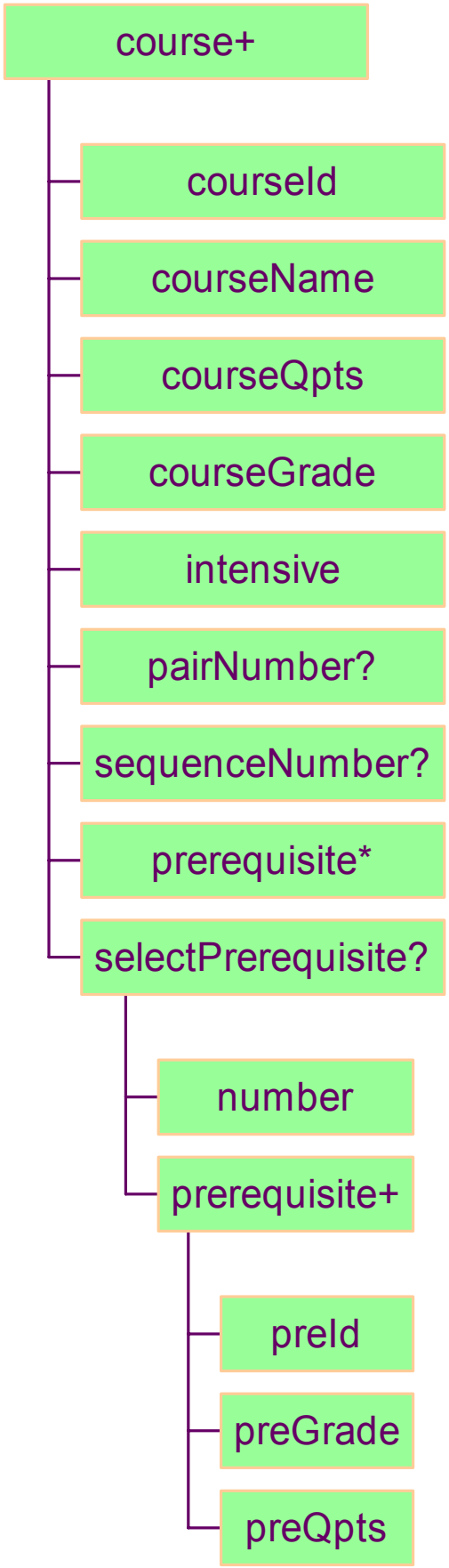


Figure 7: Tree of "minor" (cont'd)

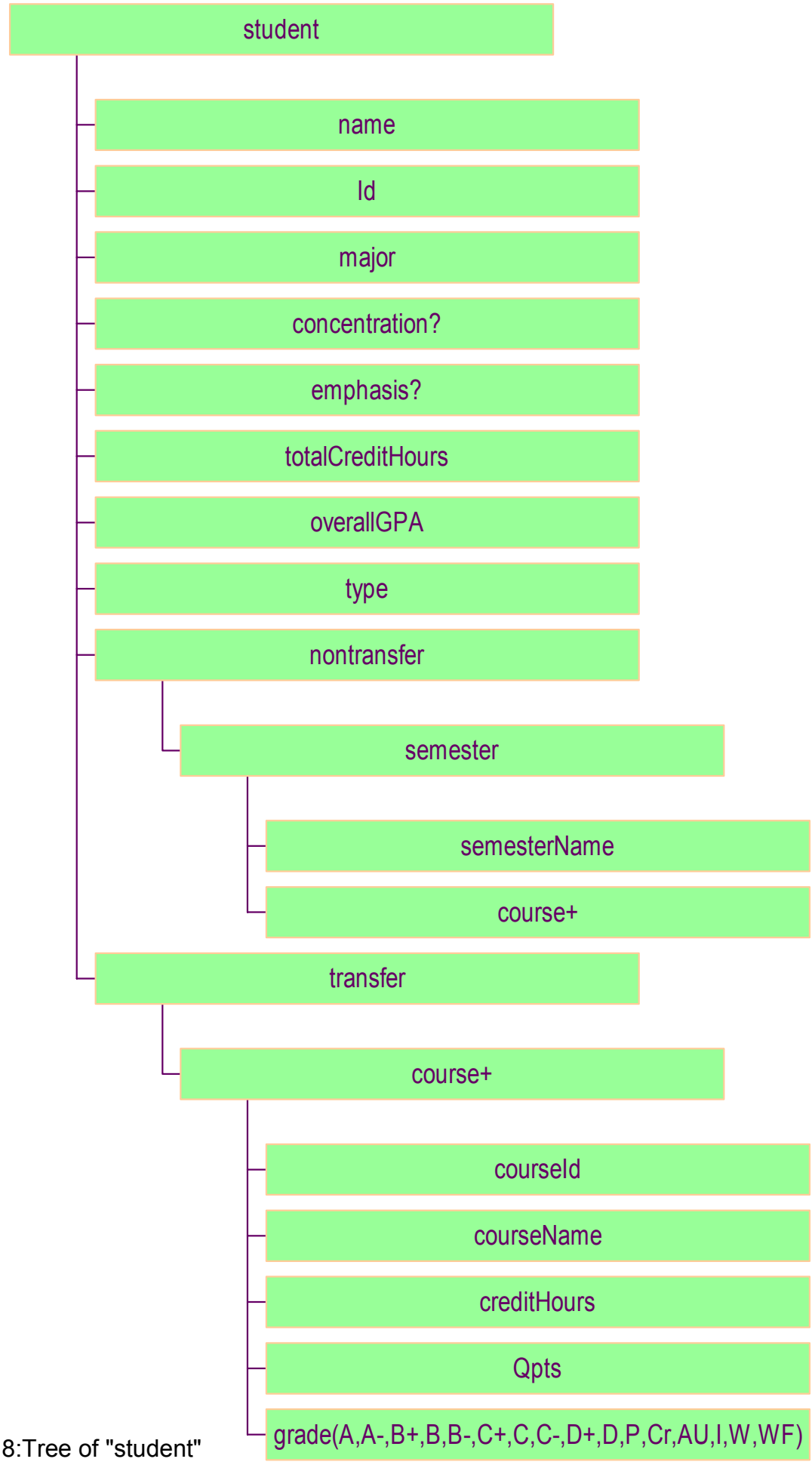


Figure 8:Tree of "student"

unit includes ***groups,*** and a ***group*** contains ***courses***. However, the structure of a ***minor*** is somewhat different. A ***minor*** contains ***groups*** but not ***advising units***, and a ***group*** includes ***courses***. All courses within a student transcript fall into two categories, "transfer" and "nontransfer". Element ***transfer*** groups all courses that are not taken at ETSU. Element ***nontransfer*** includes all courses that are taken at ETSU. The courses within ***nontransfer*** are grouped again into ***semester,*** based on the term of course taking.

By the name of each child element of ***major***, ***minor***, ***advising unit***, ***group***, or ***course***, the contents of those child elements are easily known. For example, ***majorName*** must mean the name of major. However, some of the names may not be very obvious, like ***minorRequirement***, ***ETSUCreditHours***, ***ETSUMajorFieldCreditHours***, ***3000LevelWritingIntensive***, ***otherGroup***, ***level***, ***field***, ***sequence***, ***pairNumber***, ***sequenceNumber***, and ***selectPrerequisite***. Element ***minorRequirement*** tells if the major requires a minor or not. ***ETSUCreditHours*** means the required credit hours taken at ETSU. ***ETSUMajorFieldCreditHours*** means the required credit hours taken in the major department at ETSU. ***3000LevelWritingIntensive*** means the required number of writing intensive courses at 3000 and 4000 level. Because a ***group*** may contain other ***groups***, element ***otherGroup*** provides the name of a sub group. For an elective ***group***, courses can be elected by level, by field or by both, such as CSCI electives, 3000-4000 electives or CSCI 3000-4000 electives. Element ***level*** and element ***field*** is used to provide these kinds of information.

The content of ***field*** is usually a major's abbreviation, like CSCI. The possible value of ***level*** can be SX, EX, LX. X can be any integer from 1 to 4. S means "smaller", E means "equal to" and L means "larger". So, "E4" means that the elective level must be 4000. Because a ***group*** of natural science courses have to be taken in sequence or in pairs, element ***sequence*** is the child element of ***group*** to give the sequence requirement. Element ***sequenceNumber*** and element ***pairNumber*** are attached to natural science courses to illustrate which courses should be paired and which courses are in the same sequence. If a student does not have to finish taking all the prerequisite courses, but only several of them, those ***prerequisites*** must become the children of element ***selectPrerequisite***. The child element ***number*** means the number of prerequisite course a student has to take from the list of prerequisite courses. Under element ***prerequisite***, there are three child elements, ***preID***, ***preGrade***, ***preQpts***. ***PreID*** stands for prerequisite course ID. ***PreGrade*** means required grade for the prerequisite course. ***PreQpts*** means required grade points.

An application written in Visual Basic will combine a ***student*** XML document and a corresponding ***major*** XML document into a final ***evaluation*** XML document (Appendix D). If the student claims a minor, the corresponding ***minor*** XML document will be added to ***evaluation*** XML file as well. Figure 9 displays the tree of ***evaluation.*** First, the VB application accepts the ***major*** XML file created by METEOR. Then, it retrieves a student's transcript from the SQL server and organizes the data into a ***student*** XML file by following the rules

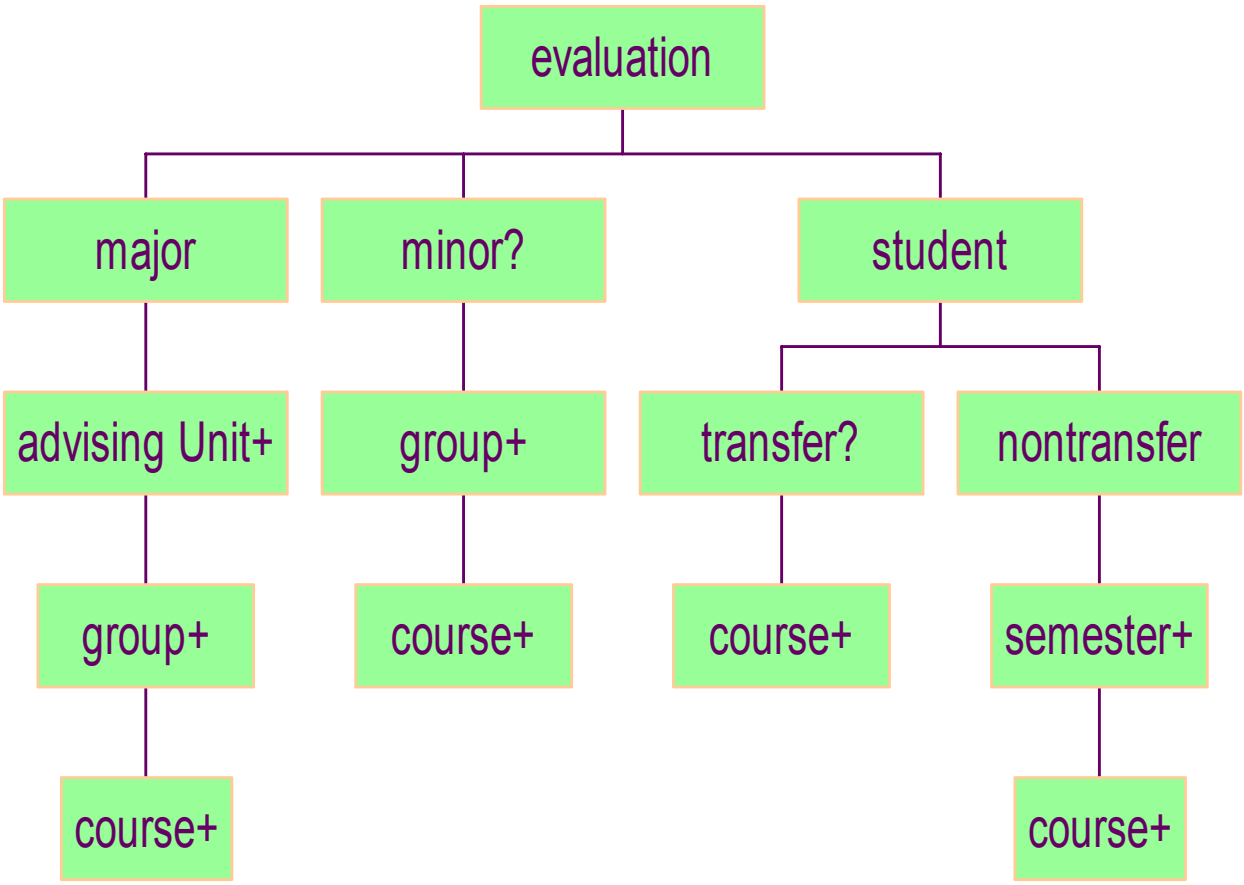


Figure 9: Tree of "evaluation"

list in the DTD of ***student***.

After the ***evaluation*** XML document is generated, seven extensible style sheets are developed to transform the original XML document to a final XML file by integrating the two (or three) sets of data. XT is used as the XSL processor to execute those style sheets. Besides the elements in the original XML document, there are many new elements listed in the final XML document. Most of these new elements provide information about how well a student performed with

regards to each major requirement. For example, if there is an old element "required overall GPA ", the final XML file must include a new element "earned overall GPA".

Two of the new elements are total credit hours earned for a ***major*** and GPA earned for a ***major***. Credit hours earned for the ***major*** are the sum of obtained credit hours, but exclude the credit hours earned for ***General Education advising unit*** and ***Free Elective advising unit***. The new elements for ETSU residency include credit hours earned at ETSU, credit hours earned at ETSU in major field, and the number of semesters being full time student at ETSU. The new elements for writing intensive information include the number of writing intensive courses taken by a student, the number of writing intensive courses in major field taken by a student, and the number of 3000-4000 level writing intensive courses taken by a student. The new elements for oral intensive information include the number of oral intensive courses taken by a student, and the number of oral intensive courses in major field taken by a student. The elements for technology intensive information include the number of technology intensive courses taken by a student and the number of technology intensive courses in major field taken by a student. The final XML also lists the credit hours earned for each ***advising unit***, credit hours earned for each ***group***, earned GPA of each ***advising unit*** and earned GPA of each ***group***. Finally, each ***advising unit***, ***group*** and ***course*** are assigned a child element ***state***. The possible ***state*** content for an ***advising unit*** and a ***group*** could be "finished", "not

finished" or "GPA not satisfied". The possible value of ***state*** for a ***course*** could be "done", "ready to take" "grade not satisfied", "prerequisite has not been taken", "prerequisite's grade not satisfied" or "determined by your advisor". The ***state*** of each object is determined by Petri net implementation in the style sheets.

After the final XML file has been created, one more style sheet is developed to transform the final XML file to an HTML file. The HTML file provides an interface to display a student's academic progress through a web browser (Appendix F). The interface contains two major parts. The first part is a series of checklists, and the second part is a series of detailed tables. The checklists only provide completed or uncompleted information for each requirement. For example, if a student completes a course, a check mark will be placed in front of the course Id. However, if a student wants to know the detailed information about that course, like grade, intensive, and others, he/she must click the course Id to go to the detailed table to read the information.

For the purpose of application testing, XML files of several major requirements are manually generated as the input to STARX. According to Mrs. Susan Burkey's suggestion, we will start with three majors: Nursing, Computer Sciences, and Early Education Development. Nursing has the simplest and most straightforward requirements. Early Education Development contains the most complicated requirements. Computer Sciences requirements are ordinary.

Chapter 4

SUMMARY

This study addressed problems identified in the previous studies and provides more detail information about students' academic progress in their college career. However, several limitations still exist. One of the problems is that STARX only allows a user to specify one major and one minor. If a student has multiple majors, then the user has to run the application for each major. The second problem is that the maximum number of ***advising units*** in a ***major*** has to be set before running the application, as well as the maximum number of ***groups*** in a ***advising unit*** and the maximum number of ***groups*** in a ***minor***. However, the maximum number can be set as high as the user requires. This problem is caused by a limitation of HTML syntax for linking pages. The third problem is that STARX is not able to calculate the optimal GPA for a ***group*** with alternative courses. For example, if a student is only required to complete two courses within a ***group***, but he/she complete three, STARX is unable to filter out the course with the worst grade and calculate GPA for the other two courses. Instead, STARX calculates the GPA of all three courses. Finally, the application can't move the excess credit hours from a ***group*** to ***Free Elective advising unit***. It is up to the user to complete the task and determine if ***Free Elective*** is completed or not.

The accurateness and robustness of STARX could not be fully tested until the use of STARX for all majors of any catalog year. However, we can conclude

that XML is a feasible technique to achieve the goal for matching a student academic progress to their major requirement.

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APPENDIX A

DEFINITION LANGUAGE IN METEOR FOR COMPUTER SCIENCE MAJOR

Computer Science

```
MAJOR                Computer Science
ABBREVIATION    CSCI
TYPE                 BS
CONCENTRATION CSCI
CATALOG              1995
CREDIT HOURS    128
ADVISING UNIT
        Free Electives (14)
        General education (46)
        CS Concentration (6)
        Common Core (44)
        Additional Requirements (18)
END
END

GROUP       Free Electives
CREDIT HOURS    (14)
        COURSE      ???? ???? (?)
END

GROUP       General Education
CREDIT HOURS    (46)
        GROUP       Arts and the Artistic Vision (3)
        GROUP       Heritage (9)
        GROUP       Humanities (3)
        GROUP       Identity Ethics and Social Responsibility (3)
        GROUP       Institutions and Society (6)
        GROUP       Science (8)
        GROUP       Using Information Tech (2)
        GROUP       Using Math (4)
        GROUP       Writing (6)
        GROUP       Physical (3)
END

GROUP       Arts and the Artistic Vision
CREDIT HOURS    (3)
        COURSE      ARTA 2040 (3)
```

```
        COURSE      ARTA 3040 (3)
        COURSE      HUMT 2310 (3)
        COURSE      HUMT 2320 (3)
        COURSE      MUSC 2100 (3)
        COURSE      MUST 2110 (3)
        COURSE      PEXS 3500 (3)
        COURSE      THEA 1500 (3)
END

GROUP       Heritage
CREDIT HOURS    (9)
        COURSE      *HIST 2010 (3)
        COURSE      *HIST 2020 (3)
        COURSE      ENGL 2220 (3)
        COURSE      ENGL 2240 (3)
        COURSE      ENGL 2260 (3)
        COURSE      ENGL 2262 (3)
END

GROUP       Humanities
CREDIT HOURS    (9)
        COURSE      ENGL 2250 (3)
        COURSE      ENGL 3280 (3)
        COURSE      ENTC 3020 (3)
        COURSE      HIST 1010 (3)
        COURSE      HIST 1020 (3)
        COURSE      PHIL 2640 (3)
        GROUP       Heritage (3)
        GROUP       Arts and the Artistic Vision (3)
        GROUP       Identity Ethics and Social Responsibility (3)
END

GROUP       Identity Ethics and Social Responsibility
CREDIT HOURS    (9)
        COURSE      ENGL 3150 (3)
        COURSE      PHIL 2020 (3)
        COURSE      PHIL 2025 (3)
        COURSE      PHIL 2210 (3)
        COURSE      PSCI 1110 (3)
        COURSE      SOAA 2020 (3)
        COURSE      WMST 2010 (3)
END


GROUP       Institutions and Society
CREDIT HOURS    (6)
```

```
        GROUP       Economics
        COURSE      GEOG 1012(3)
        COURSE      PSCI 1120 (3)
        COURSE      PSYC 1310 (3)
        COURSE      SOAA 1020 (3)
        COURSE      SOAA 1240 (3)
END

GROUP       Economics
CREDIT HOURS    (3)
        COURSE      ECON 1050 (3)
        COURSE      ECON 2210 (3)
END


GROUP       Science
CREDIT HOURS    (8)
        GROUP       Gen Chemistry (8)
        GROUP       Gen Biology (8)
        GROUP       Gen Physics (8)
END

GROUP       Gen Chemistry
CREDIT HOURS    (8)
        COURSE      CHEM 1110/1111 (4)
        COURSE      CHEM 1120/1121 (4)
END


GROUP       Gen Biology
CREDIT HOURS    (8)
        COURSE      BISC 1100/1101 (4)
        COURSE      BISC 1200/1201 (4)
        COURSE      BISC 1300/1301 (4)
END

GROUP       Gen Physics
CREDIT HOURS    (8)
        COURSE      PHYS 2110/2111 (4)
        COURSE      PHYS 2120/2121 (4)
END

GROUP       Intro. Chemistry
CREDIT HOURS    (4)
        COURSE      CHEM 1320/1321 (4)
END
```

GROUP Using Information Tech
CREDIT HOURS (2)
COURSE CSCI 1100 (2)
END

GROUP Using Math
CREDIT HOURS (4)
COURSE MATH 1110 (4)
END

GROUP Writing
CREDIT HOURS (6)
COURSE ENGL 1110 (3)
COURSE ENGL 1120 (3)
END

GROUP Physical
CREDIT HOURS (2)
COURSE PEXS 1??? (1)
COURSE PEXS 2??? (1)
COURSE MUSC 1201 (1)
COURSE MSCI 1130 (1)
COURSE MSCI 1217 (1)
COURSE MSCI 3217 (1)

END

GROUP CS Concentration
CREDIT HOURS (6)
COURSE *MATH 2250 (3)
COURSE CSCI 4257 (3)
COURSE CSCI 4267 (3)
END

GROUP Common Core
CREDIT HOURS (44)
COURSE CSCI 4727 (3)
COURSE CSCI 4717 (3)
COURSE CSCI 4417 (3)
COURSE CSCI 3350 (3)
COURSE CSCI 3250 (3)
COURSE CSCI 3220 (3)
COURSE CSCI 2230 (3)

```
        COURSE      CSCI 2210 (3)
        COURSE      CSCI 2160 (3)
        COURSE      CSCI 2150 (3)
        COURSE      CSCI 1510 (3)
        COURSE      CSCI 1260 (3)
        COURSE      CSCI 1250 (3)
END

GROUP       Additional Requirements
CREDIT HOURS    (18)
        GROUP       Additional Mathematics (10)
        GROUP       Additional Science (8)
END

GROUP       Additional Mathematics
CREDIT HOURS    (10)
        COURSE      MATH 1120 (4)
        COURSE      MATH 2710 (3)
        COURSE      MATH 4047 (3)
END


GROUP       Additional Science
CREDIT HOURS    (8)
        COURSE      BISC 1100/1101 (4)
        COURSE      BISC 1200/1201 (4)
        COURSE      BISC 1300/1301 (4)
        COURSE      CHEM 1110/1111 (4)
        COURSE      CHEM 1120/1121 (4)
        COURSE      CHEM 1320/1321 (4)
        COURSE      PHYS 2110/2111 (4)
        COURSE      PHYS 2120/2121 (4)
END
```

APPENDIX B

A SAMPLE OF DLAM FILE

cscicsci94.dlm

General Education (43-45)

Writing	(6)	
	ENGL 1110	3
	ENGL 1120	3
Math	(3)	
	MATH 1060	3
Info Tech	(0-2)	
	CSCI 1100	2
Science	(8)	
	CHEM 1110	3
	CHEM 1111	1
	CHEM 1120	3
	CHEM 1121	1
	PHYS 2110	3
	PHYS 2111	1
	PHYS 2120	3
	PHYS 2121	1
	BISC 1100	3
	BISC 1101	1
	BISC 1201	3
	BISC 1201	1
Heritage	(9)	
	*HIST 2010	3
	*HIST 2020	3
	ENGL 2220	3
	ENGL 2240	3
	ENGL 2260	3
	ENGL 2262	3
Arts	(3)	
	ARTA 2040	3
	ARTA 3040	3
	HUMT 2310	3
	HUMT 2320	3
	MUSC 2100	3
	MUSC 2110	3
	PEXS 3500	3
	THEA 1500	3
Identity	(3)	
	ENGL 3150	3

- PHIL 2020 3
- PHIL 2025 3
- PHIL 2210 3
- PSCI 1110 3
- SOAA 2020 3
- WMST 2010 3

Humanities (3)

- ENGL 2250 3
- ENGL 3280 3
- ENTC 3020 3
- HIST 1010 3
- HIST 1020 3
- PHIL 2640 3

Institutions (6)

- ECON 1050 3
- ECON 2210 3
- GEOG 1012 3
- PSCI 1120 3
- PSYC 1310 3
- SOAA 1020 3
- SOAA 1240 3

CSCI-Core (44)

Requirements (44)

- CSCI 1510 3
- CSCI 1250 4
- CSCI 1260 4
- CSCI 2150 3
- CSCI 2160 4
- CSCI 2210 4
- CSCI 2230 4
- CSCI 3220 3
- CSCI 3250 3
- CSCI 3350 4
- CSCI 4417 3
- CSCI 4717 3
- CSCI 4727 3

CSCI-CS Concentration (6)

Course (6)

- *MATH 2250 3
- CSCI 4257 3
- CSCI 4267 3

APPENDIX C

A SAMPLE OF CHECKLIST PRODUCED BY STAR

Name:
Student ID:
Major: CSCI
Concentration: CSCI

General Education (43-45)

Writing	(6)		
	ENGL 1110	3	B
	ENGL 1120	3	C-
Math	(3)		
	MATH 1060	4	C
Info Tech	(0-2)		
	CSCI 1100	2	C-
Science	(8)		
	CHEM 1110	3	
	CHEM 1111	1	
	CHEM 1120	3	
	CHEM 1121	1	
	PHYS 2110	3	
	PHYS 2111	1	
	PHYS 2120	3	
	PHYS 2121	1	
	BISC 1100	3	
	BISC 1101	1	
	BISC 1201	3	
	BISC 1201	1	
Heritage	(9)		
	*HIST 2010	3	C+
	*HIST 2020	3	C
	ENGL 2220	3	
	ENGL 2240	3	C
	ENGL 2260	3	
	ENGL 2262	3	
Arts	(3)		
	ARTA 2040	3	
	ARTA 3040	3	
	HUMT 2310	3	
	HUMT 2320	3	
	MUSC 2100	3	
	MUSC 2110	3	

	PEXS 3500	3	
	THEA 1500	3	C
Identity (3)			
	ENGL 3150	3	
	PHIL 2020	3	
	PHIL 2025	3	
	PHIL 2210	3	B
	PSCI 1110	3	
	SOAA 2020	3	
	WMST 2010	3	
Humanities (3)			
	ENGL 2250	3	
	ENGL 3280	3	
	ENTC 3020	3	
	HIST 1010	3	B-
	HIST 1020	3	
	PHIL 2640	3	
Institutions (6)			
	ECON 1050	3	
	ECON 2210	3	B
	GEOG 1012	3	
	PSCI 1120	3	
	PSYC 1310	3	C+
	SOAA 1020	3	B-
	SOAA 1240	3	
CSCI-Core (44)			
Requirements (44)			
	CSCI 1510	3	B+
	CSCI 1250	4	C+
	CSCI 1260	4	
	CSCI 2150	3	
	CSCI 2160	4	
	CSCI 2210	4	
	CSCI 2230	4	
	CSCI 3220	3	
	CSCI 3250	3	
	CSCI 3350	4	
	CSCI 4417	3	
	CSCI 4717	3	
	CSCI 4727	3	
CSCI-CS Concentration (6)			
Course (6)			
	*MATH 2250	3	
	CSCI 4257	3	
	CSCI 4267	3	

APPENDIX D

A SAMPLE OF "EVALUATION" XML FILE

```
<?xml version='1.0'?>
<?xml-stylesheet type='text/xsl' href='step0.xsl'?>
<evaluation>
<major>
        <majorName>Computer and Information Science</majorName>
        <majorAbbreviation>CSCI</majorAbbreviation>
        <concentration>Computer Science</concentration>
        <catalog>Undergraduate-1999</catalog>
        <totalCreditHours>128</totalCreditHours>
        <overallGPA>2.5</overallGPA>
        <majorCreditHours>86</majorCreditHours>
        <majorGPA>2.5</majorGPA>
        <minorRequirement>Minor is not required for this
        major</minorRequirement>
        <ETSUCreditHours>34</ETSUCreditHours>
        <ETSUMajorFieldCreditHours>6</ETSUMajorFieldCreditHours>
        <residencyRequirement>funish 12 credit hours in each of two semester
        during the junior and senior years, including the last
        semester</residencyRequirement>
        <majorFieldGPA>2.5</majorFieldGPA>
        <totalWritingIntensive>4</totalWritingIntensive>
        <majorFieldWritingIntensive>2</majorFieldWritingIntensive>
        <level3000WritingIntensive>2</level3000WritingIntensive>
        <totalOralIntensive>2</totalOralIntensive>
        <majorFieldOralIntensive>1</majorFieldOralIntensive>
        <totalTechnologyIntensive>2</totalTechnologyIntensive>
        <majorFieldTechnologyIntensive>1</majorFieldTechnologyIntensive>
        <minor>Not required for the major</minor>
        <advisingUnit>
                <unitName>General Education</unitName>
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APPENDIX E

STARX USER'S MANUAL

Hardware and Software Specification

STARX can be run via Windows. The system is designed to be used with a mouse. However, if the user does not have a mouse, tab key can be used.

User Manual

Student ID Screen

To evaluate a student's academic progress, you have to specify a student's id or last name first in Figure 10. Then click "Find" button. The student id contains nine digits. If the student id or the last name is valid, the student data will be displayed in the DATAGRIB table underneath and pointed by an arrow. Otherwise, a message box will pub up to tell that the student is not in the list (Figure 11). Under the DATAGRIB table, a message shows the student's major and catalog year. There are four buttons at the bottom. The user must hit the "Open a major file" button first, otherwise a message box will pub up to tell you to do so (Figure 12). After the "Open a major file" button is clicked, the "Open" dialog box pubs up (Figure 13). The user selects a corresponding file from a appropriate directory. For example, if the student is in computer science

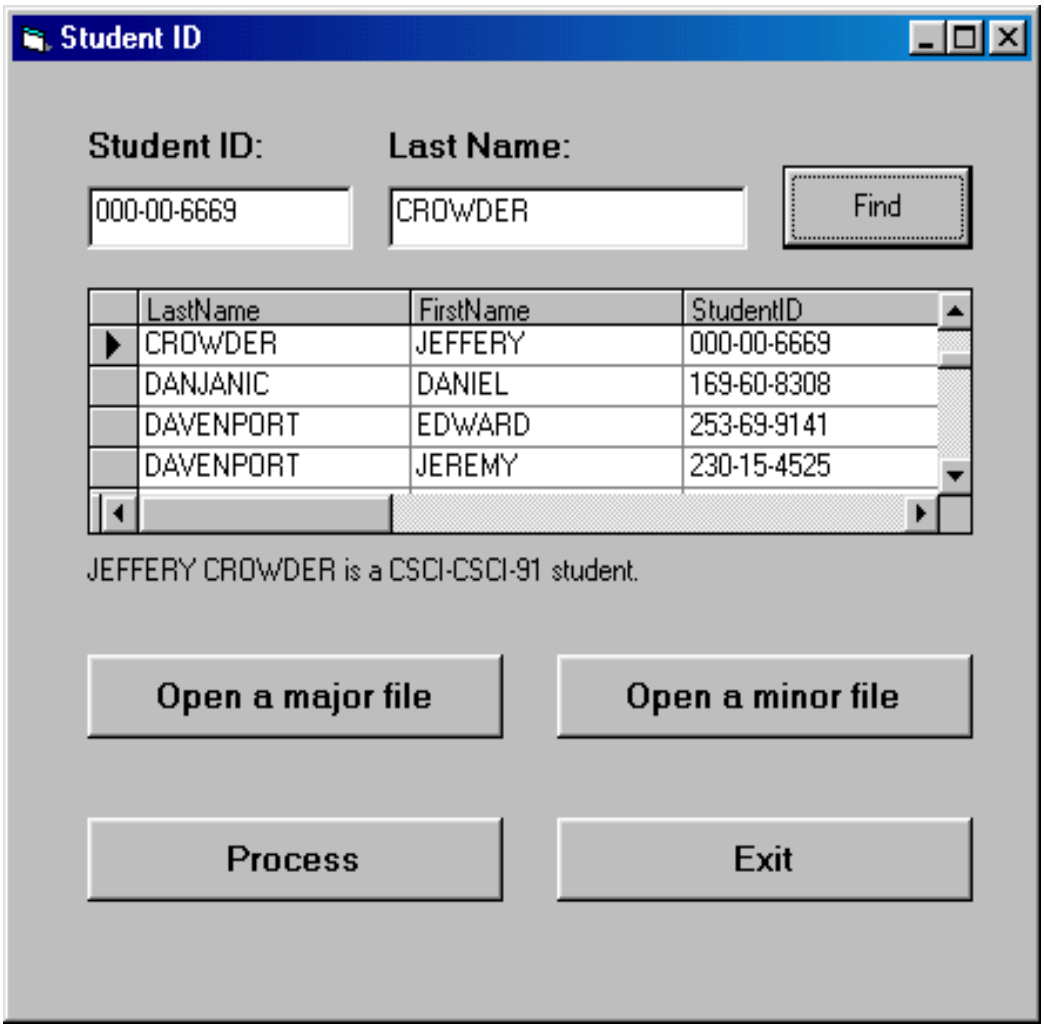


Figure 10: Student ID Screen

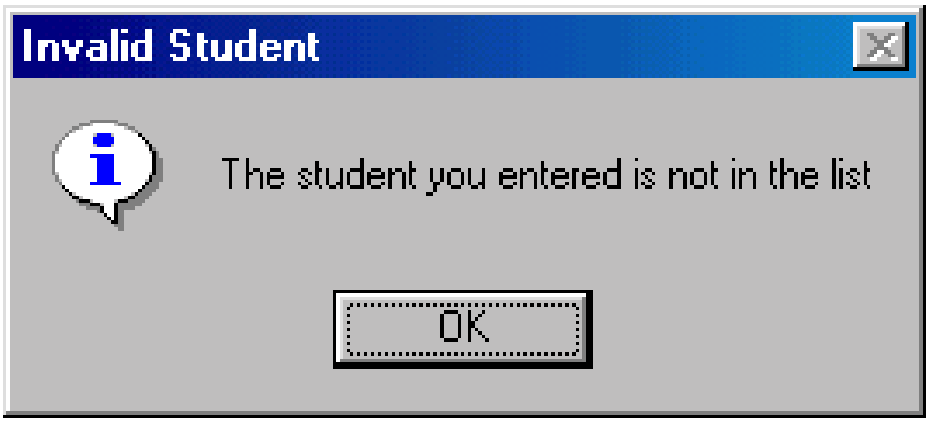


Figure 11: Invalid Student ID Message Box

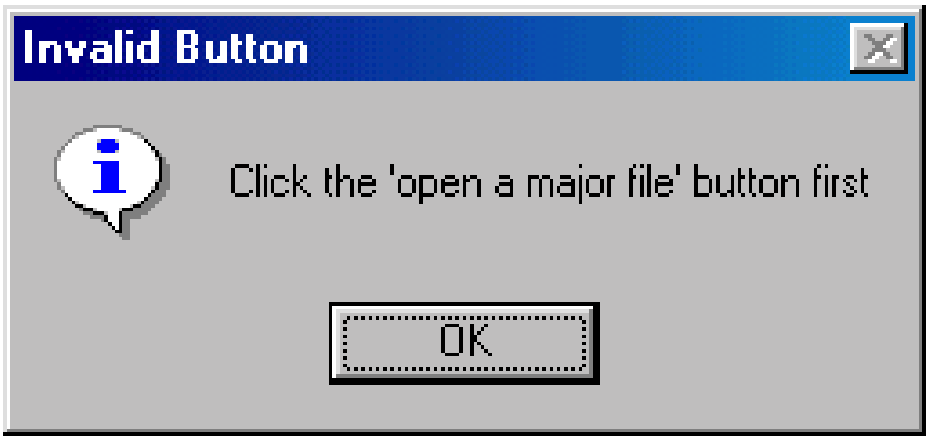


Figure 12: Invalid Button Message Box

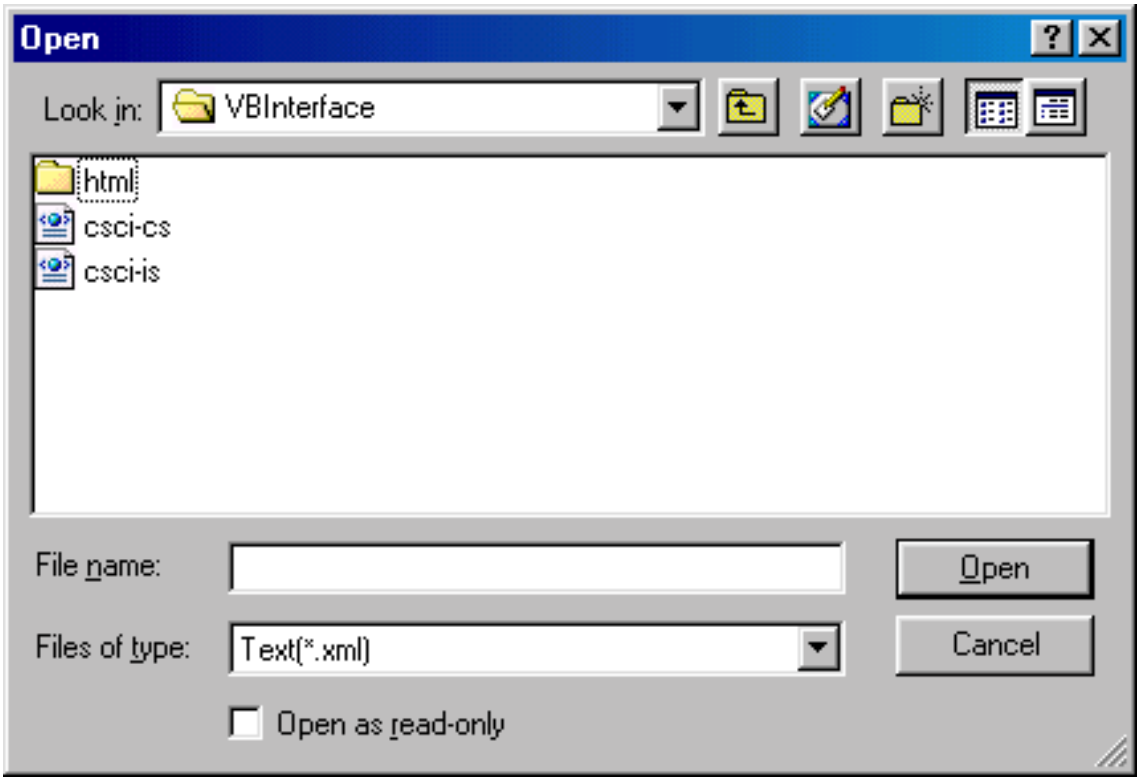


Figure 13: "Open" Dialog Box

concentration, the file "csci_cs.xml" should be opened. If the user accidentally selects a ***minor*** XML file, a message box will pub up to tell that the selected file is not a ***major*** XML files (Figure 14). After the ***major*** file is open, the "Open" dialog box will disappear. Then, the user follows the same procedure to open a ***minor*** file if the student claims a minor. The user hits the "Process" button, a "Progress Evaluation" screen shows up.

Figure 14: Invalid File Message Box

Progress Evaluation Screen

The "Progress Evaluation" screen (Figure 15) tells the user that the *Evaluation* XML file for the student is created and asks the user to click "OK" button to view the progress or click " Cancel" to go back to "Student ID Screen". If the user clicks "OK", a WebBrowser screen pubs up.

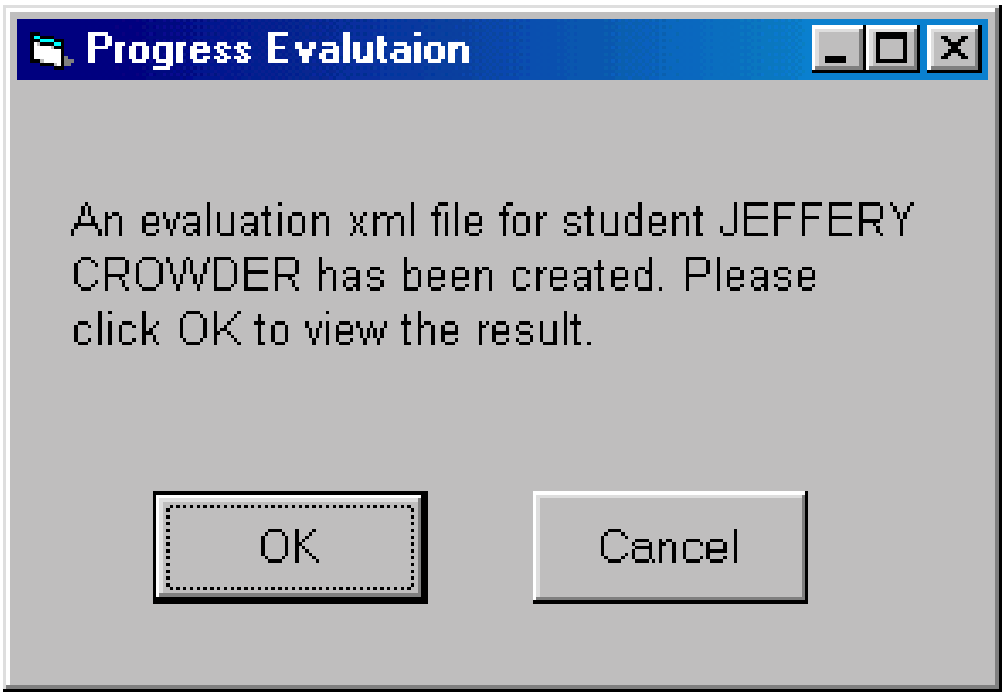


Figure 15: Progress Evaluation Screen

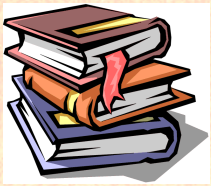
WebBrowser Screen

The WebBrowser screen displays the final HTML file, which provides the student progress information (APPENDIX F). The screen contains two major parts. The first part is a series of checklists, and the second part is a series of detailed tables. The checklists only provide completed or uncompleted information for each requirement. For example, if a student completes a course, a check mark will be placed in front of the course Id. A user can also add a check mark to the WebBrowser screen or delete a check mark from the WebBrowser screen. If a student wants to know the detailed information about

that course, like grade, intensive, and others, he/she must click the course Id to go to the detailed table to read the information.

APPENDIX F

WEBBROWSER SCREEN OF THE FINAL HTML FILE



ETSU Student Academic Progress Evaluation

Index

Residency Check List

Back to index

Intensive Check List

Back to index

Major Course Check List

- **General Education: 46 credits**
  - Using Mathematics: **3 credits**
    - MATH1032 Calculus for Business
    - MATH1060 Analtic Geometry and Differential Calculus
    - MATH1080 Probability and Statistics
    - MATH1110 Calculus
  - Science: **8 credits**
    - ASTR1015 Astronomy I
    - ASTR1025 Astronomy II
    - BISC1040 Biology for Non-majors I
    - BISC1041 Biology for Non-majors I Lab
    - BISC1050 Biology for Non-majors II
    - BISC1051 Biology for Non-majors II Lab
    - BISC2100 Principles of Biology I
    - BISC2101 Principles of Biology I Lab
    - BISC2200 Principles of Biology II
    - BISC2201 Principles of Biology II Lab
    - BISC2300 Principles of Biology III
    - BISC2301 Principles of Biology III Lab
    - CHEM1110 General Chemistry
    - CHEM1111 General Chemistry Lab
    - CHEM1120 General Chemistry
    - CHEM1121 General Chemistry Lab
    - CHEM1320 Introductory Chemistry
    - CHEM1321 Introductory Chemistry Lab
    - PHYS2110 General Physics I
    - PHYS2111 General Physics I Lab
    - PHYS2120 General Physics II
    - PHYS2121 General Physics II Lab
    - GEOL1001 Physical Geology
    - GEOL1002 Historical Geology
    - GEOL1010 Earth Science: Weather and Climate
    - GEOL1011 Earth Science: Landforms and Processes
    - HSCI1210 Anatomy and Physiology I
    - HSCI1211 Anatomy and Physiology I Lab
    - HSCI1220 Anatomy and Physiology II
    - HSCI1221 Anatomy and Physiology II Lab
    - CHEM1000* Science and Society I
    - PHYS1010* Science and Society II

- BISC1020* Science and Society III

⊞ Arts and the Artistic Vision: **3 credits**

- ARTA2040 Art History Survey I
- ARTA3040 Art History Survey II
- HUMT2310 Introduction to the Humanities I
- HUMT2320 Introduction to the Humanities II
- MUSC2100 Music Appreciation
- MUST2110 History of Jazz
- PEXS3500 Dance as Human Experience
- THEA1500 Introduction to the Theatre

⊞ Heritage: **6 credits**

- HIST2010 The United State to 1877
- HIST2020 The United State Since 1877

⊞ Heritage Elective: **3 credits**

- ENGL2220 American Major Authors
- ENGL2240 British Major Authors
- ENGL2260 Literature of Western Civilization
- ENGL2262 World Literature

⊞ Humanities Elective: **3 credits**

- HIST1010 World History and Civilization to 1500
- HIST1020 World History and Civilization Since 1500
- PHIL2640 Science and the Modern World
- ENGL2250 Great Books
- ENGL3280 Mythology
- Group: Arts and the Artistic Vision, **0 credits are available**
- Group: Heritage, **0 credits are available**
- Group: Heritage Elective, **0 credits are available**
- Group: Identity Ethis and Social Responsibility, **0 credits are available**

⊞ Identity Ethis and Social Responsibility: **3 credits**

- ENGL3150 Literature, Ethics, and Values
- PHIL2020 Values and Society
- PHIL2025 Self and World
- PHIL2040 Philosophy as Conversation
- PHIL2210 Intro. to the Study of Religion
- PSCI1110 Political Life
- SOAA2020 Social Problems and Human Values
- WMST2010 Introduction to Women's Studies

- Insitutions and Society: **6 credits**
  - ECON1050 Economics and Society
  - ECON2210 Principles of Economics Part I
  - GEOG1012 Introduction to Cultural Geography
  - PSCI1120 Introduction to American Government
  - PSYC1310 Introduction to Psychology
  - SOAA1020 Introduction to Sociology
  - SOAA1240 Introduction to Cultural Anthropology

- Using Information Technology: **2 credits**
  - CSCI1100 Using Information Technology

- Writing: **6 credits**
  - ENGL1110 Critical Reading and Expository Writing
  - ENGL1120 Critical Thinking and Argumentation

- PEXS1XXX: **1 credits**

CSCI Common Core: 50 credits

- Common Core: **44 credits**
  - CSCI1250 Intro. to Computer Science I
  - CSCI1260 Intro. to Computer Science II
  - CSCI1510 Student in University
  - CSCI2150 Computer Organization
  - CSCI2160 Assembly Language
  - CSCI2210 Data Structure
  - CSCI2230 File Processing
  - CSCI3220 Data Base Management
  - CSCI3250 Software Engineering I
  - CSCI3350 Software Engineering II
  - CSCI4417 Data Communications
  - CSCI4717 Computer Architecture
  - CSCI4727 Operating Systems

- CSCI Elective: **6 credits**
  - CSCI1010 COMPUTER CONCEPT
  - CSCI9141 PROGRAMMING II
  - CSCI9101 DATA PROC MGMT
  - CSCI9162 EQUIPMENT SURVEY
  - CSCI1270 BUS ORIENT PRGRM
  - CSCI2100 INTRO TO "C"
  - CSCI3710 OS JOB CNTRL LNG
  - CSCI4957 SP TOP COMP SCI

- **CS Concentration: 36 credits**
  - Math: **17 credits**
    - MATH1110 Calculus
    - MATH1120 Calculus II
    - MATH2180 Foundation of Prob. and Stat.
    - MATH2250 Linear Algebra
    - MATH2710 Discrete Structures
  - CSCI: **3 credits**
    - CSCI4257 Nurmerical Analysis
    - CSCI4267 Numerical Linear Algebra
  - Science I: **8 credits**
    - CHEM1110 General Chemistry I
    - CHEM1111 General Chemistry I Lab
    - CHEM1120 General Chemistry II
    - CHEM1121 General Chemistry II Lab
    - BISC2100 Principles of Biology I
    - BISC2101 Principles of Biology I Lab
    - BISC2200 Principles of Biology II
    - BISC2201 Principles of Biology II Lab
    - GEOL1001 Physical Geology
    - GEOL1002 Historical Geology
    - PHYS2110 General Physics I
    - PHYS2111 General Physics I Lab
    - PHYS2120 General Physics II
    - PHYS2121 General Physics II Lab
  - Science II: **8 credits**
    - CHEM1110 General Chemistry I
    - CHEM1111 General Chemistry I Lab
    - CHEM1120 General Chemistry II
    - CHEM1121 General Chemistry II Lab
    - CHEM1320 Organic and Biochem
    - CHEM1321 Organic and Biochem Lab
    - BISC2100 Principles of Biology I
    - BISC2101 Principles of Biology I Lab
    - BISC2200 Principles of Biology II
    - BISC2201 Principles of Biology II Lab
    - BISC2300 Principles of Biology III
    - BISC2301 Principles of Biology III Lab
    - GEOL1001 Physical Geology
    - GEOL1002 Historical Geology

- PHYS2110 General Physics I
- PHYS2111 General Physics I Lab
- PHYS2120 General Physics II
- PHYS2121 General Physics II Lab
- PHYS2610 Technical Physics I
- PHYS2620 Technical Physics II

- **Free Elective: 9 credits**
  - Free Elective Group: **9 credits**
    - MATH1040 PRE-CALCULUS
    - MATH9084 SYMB LOG and SET THEORY
    - MGMT9043 ADMN THEORY
    - PHYS1010 SCIENCE AND SOCIETY II
    - PHYS9016 PHYSICAL SCIENCE II
    - ECON2220 PRIN OF ECONOMICS II
    - ENGL9089 COMMUNICATION SKILLS
    - MGMT9012 INTRO TO MGMT
    - OFMG9002 BUS MATH
    - PEXS9005 PHYS ED ACTIVITIES
    - SPAN1013 BEGINNING SPANISH I
    - MATH1070 INTEGRL CAL TECH
    - ACCT2010 PRINCIPLES OF ACCT I
    - MATH1010 COLLEGE ALGEBRA
    - ENTC2010 TECH WRITING
    - MGMT3220 MGMT INFORMATION SYS

Back to index

Minor Course Check List

- No Minor Claimed

Back to index

Student

Student Id	220683465
Student Name	DINA WISE
Type	BS, Transfer Student
Major	Computer and Information Science
Concentration	Computer Science

Catalog		Undergraduate-1999	
Required Overall Credits	128	**Earned Credits**	122
Required Overall GPA	2.5	**Overall GPA**	3.2
Required Major Credit Hours	86	**Major Credit Hours**	39
Required Major GPA	2.5	**Major GPA**	3.61
Major State		**Not Finished, see advising units for the detail**	
Minor Requirement		Minor is not required for this major	
Minor		Not Claimed	

Back to Index

ETSU Residency Information

Required Credits Earned at ETSU	34	Earned Credits at ETSU	36
Required Credits Earned at ETSU in Major Field	6	**Earned Credits at ETSU in Major Field**	24
Residency Requirement	funish 12 credit hours in each of two semester during the junior and senior years, including the last semester	**Full semester at ETSU**	0 Full Semester

Back to Residency Check List

Intensive Information

Required writing intensive courses	total	4	Earned writing intensive courses	total	1 (ENGL2220/)
	major field	2		major field	0
	3000-4000 level	2		3000-4000 level	0
Required oral intensive courses	total	2	Earned oral intensive courses	total	0
	major field	1		major field	0
Required technology intensive courses	total	2	Earned technology intensive courses	total	0
	major field	1		major field	0

Back to Intensive Check List

Major Information

Advising Unit___General Education

Required Credit Hours	46	**Earned Credit Hours**	33
Required GPA	N/A	**Earned GPA**	2.67
State		**Not finished**	

Back to Major Check List

Using Mathematics

Required Credit Hours	3	**Earned Credit Hours**	6
Required GPA	N/A	**Earned GPA**	3.85
State		**Finished, exceed 3 credit hours**	

***Courses in Group: Using Mathematics**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
MATH1032	3	Not Defined	None	------	No	**Ready To Take**
MATH1060	3	Not Defined	None	A	Yes	**Done**
MATH1080	3	Not Defined	None	A-	No	**Done**
MATH1110	4	Not Defined	None	------	No	**Ready To Take**

Back to major Check List

Science

Required Credit Hours	8	**Earned Credit Hours**	0
Required GPA	N/A	**Earned GPA**	0
Notes*		**Courses with the same pair number must be both completed to obtain the credits**	
Notes*		**Course with (*) only open to nonscience majors**	
State		**Not Finished**	

***Courses in Group: Science**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	Pair number	Sequence number	State
ASTR1015	4	Not Defined	None	------	No	------	------	**Ready To Take**
ASTR1025	4	Not Defined	None	------	No	------	------	**Ready To Take**
BISC1040	4	Not Defined	None	------	No	1	------	**Ready To Take**

BISC1041	0	Not Defined	None	------	No	1	------	**Ready To Take**
BISC1050	4	Not Defined	CHEM1100	------	No	2	------	**Prerequisite (CHEM1100) has not been taken!**
BISC1051	0	Not Defined	None	------	No	2	------	**Ready To Take**
BISC2100	4	Not Defined	None	------	No	3	------	**Ready To Take**
BISC2101	0	Not Defined	None	------	No	3	------	**Ready To Take**
BISC2200	4	Not Defined	BISC2100	------	No	4	------	**Prerequisite (BISC2100) has not been taken!**
BISC2201	0	Not Defined	None	------	No	4	------	**Ready To Take**
BISC2300	4	Not Defined	BISC2100	------	No	5	------	**Prerequisite (BISC2100) has not been taken!**
BISC2301	0	Not Defined	None	------	No	5	------	**Ready To Take**
CHEM1110	4	Not Defined	None	------	No	6	------	**Ready To Take**
CHEM1111	0	Not Defined	None	------	No	6	------	**Ready To Take**
CHEM1120	4	Not Defined	None	------	No	7	------	**Ready To Take**
CHEM1121	0	Not Defined	None	------	No	7	------	**Ready To Take**
CHEM1320	4	Not Defined	CHEM1100	------	No	8	------	**Prerequisite (CHEM1100) has not been taken!**
CHEM1321	0	Not Defined	None	------	No	8	------	**Ready To Take**
PHYS2110	4	Not Defined	MATH1040	------	No	9	------	**Ready To Take**
PHYS2111	0	Writing	None	------	No	9	------	**Ready To Take**
PHYS2120	4	Not Defined	None	------	No	10	------	**Ready To Take**
PHYS2121	0	Not Defined	None	------	No	10	------	**Ready To Take**
GEOL1001	4	Not Defined	None	No Data	No	------	------	**Grade is not satisfied! (require D)**
GEOL1002	4	Not Defined	None	------	No	------	------	**Ready To Take**

GEOL1010	4	Not Defined	None	------	No	------	------	**Ready To Take**
GEOL1011	4	Not Defined	None	------	No	------	------	**Ready To Take**
HSCI1210	4	Not Defined	None	------	No	11	------	**Ready To Take**
HSCI1211	0	Not Defined	None	------	No	11	------	**Ready To Take**
HSCI1220	4	Not Defined	None	------	No	12	------	**Ready To Take**
HSCI1221	0	Not Defined	None	------	No	12	------	**Ready To Take**
CHEM1000*	4	Not Defined	None	------	No	------	------	**Ready To Take**
PHYS1010*	4	Not Defined	None	------	No	------	------	**Ready To Take**
BISC1020*	4	Not Defined	None	------	No	------	------	**Ready To Take**

Back to major Check List

Arts and the Artistic Vision

Required Credit Hours	3	**Earned Credit Hours**	3
Required GPA	N/A	**Earned GPA**	3.69
State		**Finished**	

***Courses in Group: Arts and the Artistic Vision**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
ARTA2040	3	Not Defined	None	------	No	**Ready To Take**
ARTA3040	3	Not Defined	None	------	No	**Ready To Take**
HUMT2310	3	Not Defined	None	A-	No	**Done**
HUMT2320	3	Not Defined	None	------	No	**Ready To Take**
MUSC2100	3	Not Defined	None	------	No	**Ready To Take**
MUST2110	3	Not Defined	None	------	No	**Ready To Take**
PEXS3500	3	Not Defined	None	------	No	**Ready To Take**
THEA1500	3	Not Defined	None	------	No	**Ready To Take**

Back to major Check List

Heritage

Required Credit Hours	6	**Earned Credit Hours**	6
Required GPA	N/A	**Earned GPA**	2
State		**Finished**	

***Courses in Group: Heritage**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
HIST2010	3	Not Defined	None	C	Yes	**Done**
HIST2020	3	Not Defined	None	C	Yes	**Done**

Back to major Check List

Heritage Elective

Required Credit Hours	3	**Earned Credit Hours**	3
Required GPA	N/A	**Earned GPA**	2
State		**Finished**	

***Courses in Group: Heritage Elective**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
ENGL2220	3	Writing	ENGL1110 ENGL1120	C	Yes	**Done**
ENGL2240	3	Writing	ENGL1110 ENGL1120	------	No	**Ready To Take**
ENGL2260	3	Writing	ENGL1110 ENGL1120	------	No	**Ready To Take**
ENGL2262	3	Not Defined	ENGL1110 ENGL1120	------	No	**Ready To Take**

Back to major Check List

Humanities Elective

Required Credit Hours	3	**Earned Credit Hours**	0
Required GPA	N/A	**Earned GPA**	0, (this group contains subgroups,GPA may not be accurate.)
State		**Not Finished**	

***Courses in Group: Humanities Elective**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
HIST1010	3	Not Defined	None	------	No	**Ready To Take**
HIST1020	3	Not Defined	None	------	No	**Ready To Take**
PHIL2640	3	Not Defined	None	------	No	**Ready To Take**
ENGL2250	3	Not Defined	None	------	No	**Ready To Take**
ENGL3280	3	Writing	None	------	No	**Ready To Take**

 # Subgroup: Arts and the Artistic Vision

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
ARTA2040	3	Not Defined	None	------	No	Ready To Take
ARTA3040	3	Not Defined	None	------	No	Ready To Take
HUMT2310	3	Not Defined	None	A-	No	Done
HUMT2320	3	Not Defined	None	------	No	Ready To Take
MUSC2100	3	Not Defined	None	------	No	Ready To Take
MUST2110	3	Not Defined	None	------	No	Ready To Take
PEXS3500	3	Not Defined	None	------	No	Ready To Take
THEA1500	3	Not Defined	None	------	No	Ready To Take

 # Subgroup: Heritage

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
HIST2010	3	Not Defined	None	C	Yes	Done
HIST2020	3	Not Defined	None	C	Yes	Done

 # Subgroup: Heritage Elective

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
ENGL2220	3	Writing	ENGL1110 ENGL1120	C	Yes	Done
ENGL2240	3	Writing	ENGL1110 ENGL1120	------	No	Ready To Take
ENGL2260	3	Writing	ENGL1110 ENGL1120	------	No	Ready To Take
ENGL2262	3	Not Defined	ENGL1110 ENGL1120	------	No	Ready To Take

 # Subgroup: Identity Ethis and Social Responsibility

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
ENGL3150	3	Writing	ENGL1110 ENGL1120	------	No	Ready To Take
PHIL2020	3	Writing	None	------	No	Ready To Take
PHIL2025	3	Not Defined	None	------	No	Ready To Take
PHIL2040	3	Oral	None	------	No	Ready To Take
PHIL2210	3	Writing	None	------	No	Ready To Take
PSCI1110	3	Writing	None	------	No	Ready To Take
SOAA2020	3	Writing	SOAA1020	------	No	Prerequisite (SOAA1020) has not been taken!
WMST2010	3	Writing	None	------	No	Ready To Take

Back to major Check List

Identity Ethis and Social Responsibility

Required Credit Hours	3	Earned Credit Hours	0

Required GPA	N/A	Earned GPA	0
State		Not Finished	

*Courses in Group: Identity Ethis and Social Responsibility

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
ENGL3150	3	Writing	ENGL1110 ENGL1120	------	No	Ready To Take
PHIL2020	3	Writing	None	------	No	Ready To Take
PHIL2025	3	Not Defined	None	------	No	Ready To Take
PHIL2040	3	Oral	None	------	No	Ready To Take
PHIL2210	3	Writing	None	------	No	Ready To Take
PSCI1110	3	Writing	None	------	No	Ready To Take
SOAA2020	3	Writing	SOAA1020	------	No	Prerequisite (SOAA1020) has not been taken!
WMST2010	3	Writing	None	------	No	Ready To Take

Back to major Check List

Insitutions and Society

Required Credit Hours	6	Earned Credit Hours	9
Required GPA	N/A	Earned GPA	2.33
State		Finished, exceed 3 credit hours	

*Courses in Group: Insitutions and Society

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
ECON1050	3	Not Defined	None	------	No	Ready To Take
ECON2210	3	Not Defined	None	B	Yes	Done
GEOG1012	3	Not Defined	None	------	No	Ready To Take
PSCI1120	3	Not Defined	None	B	Yes	Done
PSYC1310	3	Not Defined	None	D	Yes	Done
SOAA1020	3	Not Defined	None	------	No	Ready To Take
SOAA1240	3	Not Defined	None	------	No	Ready To Take

Back to major Check List

Using Information Technology

Required Credit Hours	2	Earned Credit Hours	0
Required GPA	N/A	Earned GPA	0
State		Not Finished	

***Courses in Group: Using Information Technology**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
CSCI1100	2	Not Defined	None	------	No	**Ready To Take**

Back to major Check List

Writing

Required Credit Hours	6	**Earned Credit Hours**	6
Required GPA	N/A	**Earned GPA**	2.5
State		**Finished**	

***Courses in Group: Writing**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
ENGL1110	3	Not Defined	None	B	Yes	**Done**
ENGL1120	3	Not Defined	ENGL1110	C	Yes	**Done**

Back to major Check List

PEXS1XXX

Required Credit Hours	1	**Earned Credit Hours**	0
Required GPA	N/A	**Earned GPA**	0
State		**Not Finished**	

***Courses in Group: PEXS1XXX**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State

Back to major Check List

Required Credit Hours	1	**Earned Credit Hours**	0
Required GPA	N/A	**Earned GPA**	0, (this group contains subgroups,GPA may not be accurate.)
State		**Not Finished**	

***Courses in Group: PEX2XXX**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State

 # Subgroup: Physical Education in Lifetime Activities

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
MUSC1201	2	Not Defined	None	------	No	**Ready To Take**
MSCI1217	1	Not Defined	None	------	No	**Ready To Take**
MSCI2130	2	Not Defined	None	------	No	**Ready To Take**
MSCI3217	1	Not Defined	None	------	No	**Ready To Take**

Back to major Check List

Physical Education in Lifetime Activities

Required Credit Hours	0	**Earned Credit Hours**	0
Required GPA	N/A	**Earned GPA**	0
State		**Finished**	

***Courses in Group: Physical Education in Lifetime Activities**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
MUSC1201	2	Not Defined	None	------	No	**Ready To Take**
MSCI1217	1	Not Defined	None	------	No	**Ready To Take**
MSCI2130	2	Not Defined	None	------	No	**Ready To Take**
MSCI3217	1	Not Defined	None	------	No	**Ready To Take**

Back to major Check List

Advising Unit___CSCI Common Core

Required Credit Hours	50	**Earned Credit Hours**	39
Required GPA	2.5	**Earned GPA**	3.61
State		**Not finished**	

Back to Major Check List

Common Core

Required Credit Hours	44	**Earned Credit Hours**	15
Required GPA	2.5	**Earned GPA**	4
State		**Not Finished**	

***Courses in Group: Common Core**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
CSCI1250	4	Technology	MATH1040	------	No	**Ready To Take**
CSCI1260	4	Not Defined	CSCI1250	A	No	**Done**
CSCI1510	4	Writing	None	------	No	**Ready To Take**
CSCI2150	3	Not Defined	CSCI1250	A	No	**Done**
CSCI2160	4	Not Defined	CSCI2150	A	No	**Done**
CSCI2210	4	Not Defined	CSCI1260	A	No	**Done**
CSCI2230	4	Not Defined	CSCI2210 CSCI2150	No Data	No	**Grade is not satisfied! (require C-)**
CSCI3220	3	Technology	CSCI2210	No Data	No	**Grade is not satisfied! (require C-)**
CSCI3250	3	Oral	CSCI2230	------	No	**Prerequisite (CSCI2230), grade is not satisfied! (require C-)**
CSCI3350	3	Writing	CSCI3250	------	No	**Prerequisite (CSCI3250) has not been taken!**
CSCI4417	3	Not Defined	CSCI2210 CSCI2160	No Data	No	**Grade is not satisfied! (require C-)**
CSCI4717	3	Not Defined	CSCI2210 CSCI2160	No Data	No	**Grade is not satisfied! (require C-)**
CSCI4727	3	Writing	CSCI2210 CSCI2160	No Data	No	**Grade is not satisfied! (require C-)**

Back to major Check List

CSCI Elective

Required Credit Hours	6	**Earned Credit Hours**	24
Required GPA	2.5	**Earned GPA**	3.37
State		**Finished, exceed 18 credit hours**	

***Courses in Group: CSCI Elective**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
CSCI1010	3	N/A	N/A	B	Yes	**Done**
CSCI9141	3	N/A	N/A	C	Yes	**Done**
CSCI9101	3	N/A	N/A	B	Yes	**Done**
CSCI9162	3	N/A	N/A	B	Yes	**Done**
CSCI1270	3	N/A	N/A	A	Yes	**Done**
CSCI2100	3	N/A	N/A	A	No	**Done**
CSCI3710	3	N/A	N/A	A	No	**Done**
CSCI4957	3	N/A	N/A	A	No	**Done**

Back to major Check List

Advising Unit___CS Concentration

Required Credit Hours	36	**Earned Credit Hours**	0
Required GPA	N/A	**Earned GPA**	0
State		**Not finished**	

Back to Major Check List

Math

Required Credit Hours	17	**Earned Credit Hours**	0
Required GPA	N/A	**Earned GPA**	0
State		**Not Finished**	

***Courses in Group: Math**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
MATH1110	4	Not Defined	Two years of high school algebra	------	No	
MATH1120	4	Not Defined	MATH1110	------	No	**Prerequisite (MATH1110) has not been taken!**
MATH2180	3	Not Defined	MATH1110 MATH1120	------	No	**Prerequisite (MATH1110) has not been taken!** **Prerequisite (MATH1120) has not been taken!**
MATH2250	3	Not Defined	MATH1060 MATH1110 MATH1032 Note*: must complete 1 course(s) from (MATH1060/MATH1110/MATH1032/)	------	No	**Ready To Take**
MATH2710	3	Not Defined	MATH1060 MATH1110 Note*: must complete 1 course(s) from (MATH1060/MATH1110/)	------	No	**Ready To Take**

Back to major Check List

CSCI

Required Credit Hours	3	**Earned Credit Hours**	0
Required GPA	N/A	**Earned GPA**	0
State		**Not Finished**	

***Courses in Group: CSCI**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
CSCI4257	3	Not Defined	CSCI1250 CSCI1310 MATH1120	------	No	**Prerequisite (CSCI1250) has not been taken! Prerequisite (CSCI1310) has not been taken! Prerequisite (MATH1120) has not been taken!**
CSCI4267	3	Not Defined	CSCI1250 CSCI1310 MATH2250	------	No	**Prerequisite (CSCI1250) has not been taken! Prerequisite (CSCI1310) has not been taken! Prerequisite (MATH2250) has not been taken!**

Back to major Check List

Science I

Required Credit Hours	8	**Earned Credit Hours**	0
Required GPA	N/A	**Earned GPA**	0
Notes*		**Must complete courses with the same sequence number to furnish 8 credit hours. Courses with the same pair number must be both completed to obtain the credits**	
State		**Not Finished**	

***Courses in Group: Science I**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	Pair number	Sequence number	State
CHEM1110	4	Not Defined	None	------	No	1	100	**Ready To Take**
CHEM1111	0	Not Defined	None	------	No	1	100	**Ready To Take**
CHEM1120	4	Not Defined	None	------	No	2	100	**Ready To Take**

CHEM1121	0	Not Defined	None	------	No	2	100	**Ready To Take**
BISC2100	4	Not Defined	None	------	No	3	200	**Ready To Take**
BISC2101	0	Not Defined	None	------	No	3	200	**Ready To Take**
BISC2200	4	Not Defined	BISC2100	------	No	4	200	**Prerequisite (BISC2100) has not been taken!**
BISC2201	0	Not Defined	None	------	No	4	200	**Ready To Take**
GEOL1001	4	Not Defined	None	No Data	No	------	300	**Grade is not satisfied! (require D)**
GEOL1002	4	Not Defined	None	------	No	------	300	**Ready To Take**
PHYS2110	4	Not Defined	MATH1040	------	No	5	400	**Ready To Take**
PHYS2111	0	Not Defined	None	------	No	5	400	**Ready To Take**
PHYS2120	4	Not Defined	None	------	No	6	400	**Ready To Take**
PHYS2121	0	Not Defined	None	------	No	6	400	**Ready To Take**

Back to major Check List

Science II

Required Credit Hours	8	**Earned Credit Hours**	0
Required GPA	N/A	**Earned GPA**	0
Notes*		**Courses with the same pair number must be both completed to obtain the credits**	
State		**Not Finished**	

***Courses in Group: Science II**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	Pair number	Sequence number	State
CHEM1110	4	Not Defined	None	------	No	1	------	**Ready To Take**
CHEM1111	0	Not Defined	None	------	No	1	------	**Ready To Take**
CHEM1120	4	Not Defined	None	------	No	2	------	**Ready To Take**
CHEM1121	0	Not Defined	None	------	No	2	------	**Ready To Take**

CHEM1320	4	Not Defined	CHEM1100	------	No	3	------	**Prerequisite (CHEM1100) has not been taken!**
CHEM1321	0	Not Defined	None	------	No	3	------	**Ready To Take**
BISC2100	4	Not Defined	None	------	No	4	------	**Ready To Take**
BISC2101	0	Not Defined	None	------	No	4	------	**Ready To Take**
BISC2200	4	Not Defined	BISC2100	------	No	5	------	**Prerequisite (BISC2100) has not been taken!**
BISC2201	0	Not Defined	None	------	No	5	------	**Ready To Take**
BISC2300	4	Not Defined	BISC2100	------	No	6	------	**Prerequisite (BISC2100) has not been taken!**
BISC2301	0	Not Defined	None	------	No	6	------	**Ready To Take**
GEOL1001	4	Not Defined	None	No Data	No	------	------	**Grade is not satisfied! (require D)**
GEOL1002	4	Not Defined	None	------	No	------	------	**Ready To Take**
PHYS2110	4	Not Defined	MATH1040	------	No	7	------	**Ready To Take**
PHYS2111	0	Not Defined	None	------	No	7	------	**Ready To Take**
PHYS2120	4	Not Defined	None	------	No	8	------	**Ready To Take**
PHYS2121	0	Not Defined	None	------	No	8	------	**Ready To Take**
PHYS2610	4	Not Defined	MATH1110 MATH1120 Note*: must complete 1 course(s) from (MATH1110/MATH1120/)	------	No	------	------	**Prerequisite(MATH1110) has not been taken** **Prerequisite(MATH1120) has not been taken**
PHYS2620	4	Not Defined	None	------	No	------	------	**Ready To Take**

Back to major Check List

Advising Unit___Free Elective

Required Credit Hours	9	**Earned Credit Hours**	48
Required GPA	N/A	**Earned GPA**	3.21
State		**Finished**	

Back to Major Check List

Free Elective Group

Required Credit Hours	9	**Earned Credit Hours**	48
Required GPA	N/A	**Earned GPA**	3.21
State		**Finished, exceed 39 credit hours**	

***Courses in Group: Free Elective Group**

Course ID	Credit Hours	Intensive	Prerequisite	Grade	Transfered?	State
MATH1040	3	N/A	N/A	B	Yes	**Done**
MATH9084	3	N/A	N/A	A	Yes	**Done**
MGMT9043	3	N/A	N/A	B	Yes	**Done**
PHYS1010	3	N/A	N/A	A	Yes	**Done**
PHYS9016	3	N/A	N/A	A	Yes	**Done**
ECON2220	3	N/A	N/A	B	Yes	**Done**
ENGL9089	3	N/A	N/A	B	Yes	**Done**
MGMT9012	3	N/A	N/A	B	Yes	**Done**
OFMG9002	3	N/A	N/A	A	Yes	**Done**
PEXS9005	1	N/A	N/A	P	Yes	**Done**
SPAN1013	3	N/A	N/A	B	Yes	**Done**
MATH1070	5	N/A	N/A	C	Yes	**Done**
ACCT2010	3	N/A	N/A	C	Yes	**Done**
MATH1010	3	N/A	N/A	B	Yes	**Done**
ENTC2010	3	N/A	N/A	A	No	**Done**
MGMT3220	3	N/A	N/A	A	No	**Done**

Back to major Check List

VITA

Zhujun Hou

Personal Data:	Date of Birth:	September 1, 1968
	Place of Birth:	Guangzhou, P. R. China
	Marital Status:	Married

Education:

Jinan University, Guangzhou, P. R. China; Biological Engineering, B.S., 1990

East Tennessee State University, Johnson City, Tennessee; Biology, M.S., 1995

East Tennessee State University, Johnson City, Tennessee; Computer and Information Science, M.S., 2001

Professional Experience:

Research Assistant, Department of Biological Science, East Tennessee State University, Tennessee, 1993-1995

Teaching Assistant, Zoology Department, Duke University, Durham, 1995-1996

Teaching Assistant, Department of Computer and Information Science, East Tennessee State University, Tennessee, 1999-2000

Honor: Upsilon Epsilon, 1999