

**On-line Course Planning Guide:
Pilot Application for the University of Cincinnati
Information Technology Web Development Department**

By

Tom Angel

Submitted to
the Faculty of the Information Technology Program
in Partial Fulfillment of the Requirements for
the Degree of Bachelor of Science
in Information Engineering Technology

University of Cincinnati
College of Applied Science

June 2007

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Acknowledgements

I would like to give special thanks to Paul Schmidt and Jane Combs for accepting my proposal and supporting me throughout this process. I thank you both for giving me the opportunity to implement my ideas and giving me access to the resources needed to do so.

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Abstract

The On-line Course Planning Guide (OCPG) is a pilot web application for the University of Cincinnati Information Technology (UCit) Web Development department. It allows students, and other public users, to view the availability of all the courses offered by the University of Cincinnati for the coming quarters or school year. The OCPG also allows university faculty and staff to manage the availability of courses, colleges, disciplines, and OCPG users.

As it stands now, the University of Cincinnati displays the availability of all of its courses in a 36-page Adobe Acrobat file. This is an enormous amount of unnecessary data for the typical student who generally cares only about his or her college and major. Searching through and finding a specific course can be frustrating and time consuming. Furthermore, PickList, the application currently used by the University of Cincinnati to manage the availability of courses and other related data, is out of date and inefficient. Also, PickList must be installed on a computer for use. In addition, Novell must also be installed so that a user can properly authenticate being an UC employee.

The On-line Course Planning Guide addresses all of these issues. The OCPG allows students to quickly find courses relevant to their majors, and it allows faculty and staff to easily manage courses from any Internet-enabled computer.

On-line Course Planning Guide: Pilot Application for the University of Cincinnati Information Technology Web Development Department

1. Statement of the Problem

1.1 Definition of Need

The University of Cincinnati needs a better method of scheduling and displaying the availability of its courses. Currently, this data is displayed in a thirty-six page Adobe Acrobat file called the Course Planning Guide (3). The Course Planning Guide contains the availability of all of the courses for the entire university. The typical student who views this file is only concerned about his or her particular college or major. He or she should not have to search through over thirty pages to find a course.

To input these courses, and their corresponding availability, the University of Cincinnati uses an application called PickList (2). The PickList application is several years old and was created as a client-side software program which requires it to be installed on a user's computer, as well as a Novell client program to authenticate the user as being a university employee. In addition, PickList is unappealing and has some design flaws (see Appendix C). Several different colors are used for various menu buttons, and many of the menu button functions are duplicated elsewhere but displayed as a different title which can easily confuse a user.

2. Description of the Solution

In May 2006, the University of Cincinnati Information Technology (UCit) Web Development Department planned for an application to be created to address these issues (2, 9). Ideally, they hoped that this application would replace the PickList and Course Planning Guide. However, due to other departmental responsibilities, design

documentation was never completed and development was never started. Nevertheless, UCit still had great interest in seeing this application or one similar to it created.

The On-line Course Planning Guide pilot application for the Web Development Department of UCit enables staff and students greater accessibility and usability to course availability data. Students can search and sort for courses much like they can within the University of Cincinnati's One Stop "view class offerings" site (8). Additionally, students can view a brief description of any course that they click on. University staff, involved in determining course availability, can view a list of courses and signify what quarters (fall, winter, spring, and summer) they are to be offered. This list can also be searched and sorted. An administrator for this application has full access to all of its data and functions. In addition, he or she is able to manage university staff users who are responsible for inputting the availability of courses for their specific college or discipline. The Central Login Service (CLS), recently implemented by the University of Cincinnati as a secure standard for logging into to a private section of a university owned Web site, is used to log in users (2). Since the CLS maintains users' passwords, the administrator only needs to maintain a list of CLS usernames for a specific user to access this application.

Essentially, this application provides both students and university staff the same features as the current PickList and Course Planning Guide applications, but with greater usability and accessibility. Since this is an on-line application, university staff responsible for inputting course availability data no longer must have a specific program installed on their computers. They can complete their work on virtually any university computer or from the luxury of their Internet-enabled computer from home.

2.1 User Profiles

There are four distinct user groups for the On-line Course Planning Guide. With the exception of consumers, all users entering a private or restricted section of this application will be required to log in through the University of Cincinnati's Central Login Service (CLS). The CLS securely authenticates all users who are enrolled, employed, or affiliated with the University of Cincinnati (10). Since all CLS users have a unique user name, secondary validation will be performed on a SQL database table, specific to this application, containing all the valid users and their access levels.

2.1.1. System Administrators

These users oversee the entire application and have access to all of its functionality. A system administrator can manage all users, colleges, disciplines, and course data.

2.1.2. College Administrators

These users oversee all the courses for a specific college. These users can manipulate discipline and course availability data for their assigned college. They can also create departmental users specific to a discipline within their college. For example, a college administrator for the College of Applied Science can create a departmental user for the Information Technology (IT) Department and manage all courses the College of Applied Science offers.

2.1.3. Departmental Users

Departmental users are typically assigned by college administrators. (They can also be assigned by system administrators.) These users are only able to manipulate course data for the specific discipline they have been assigned to. For example, a college

administrator of the College of Applied Science might assign the department head of the IT program the responsibility for inputting data for all IT courses.

2.1.4. Consumers

Consumers are typically students enrolled at the university but can be anyone accessing a public section of this application. These users are only able to view, sort, and search for course availability data.

2.2. Design Protocols

2.2.1. Programming

The On-line Course Planning Guide will be developed as an ASP.NET 2.0 application. It will also utilize functions within the ASP.NET AJAX 1.0 framework to increase and streamline performance (1).

2.2.2. Graphics

The main purpose of this application is to provide functionality; thus, graphical content will be minimal. Nevertheless, the On-line Course Planning Guide adheres to the color and logo standards of University of Cincinnati and that of UCit's Web Development Department. In addition, the On-line Course Planning Guide utilizes the Cascading Style Sheet (CSS) and Content Management System (CMS) template for the University of Cincinnati's registrar site. This is where the current Course Planning Guide resides.

2.2.3. Database

The PickList application uses data stored in an existing FoxPro database. However, the structure of this database is inefficient. A new SQL 2005 database has been created, and most data from the FoxPro database has been imported. In addition,

several stored procedures and database users were created to insure security and efficiency.

2.2.4. UCit Utilities

The Web Development Department of UCit has created a class containing several functions and methods that are commonly used in their applications. This class is called Utilities. Utilities is used extensively throughout the On-line Course Planning Guide. The utilization of this class not only helps decrease development time, but it will make it easier for employees of the Web Development Department of UCit to understand the inner workings of this project. Ultimately, this project will be handed over to UCit upon its completion. Some of the methods and functions contained within Utilities used in this project are:

- Central Login Service control – allows the CLS to easily be implemented on an ASP.NET page.
- Error handling – displays or E-mails in-depth results if an error occurs during runtime.
- Conversion functions – converts any data type to another data type (either string, int, or boolean).
- Include page control – parses a university CMS template file and includes it into an ASP.NET page.

3. Deliverables

3.1. Users

The following deliverables pertain to the functionality of users:

- Departmental users, college administrators, and system administrators will be able to log in using the Central Login Service (CLS).

- System administrators will be able to add/edit/delete all Course Planning Guide users and their associated profile data (access level, assigned college/discipline).
- College administrators will only be able to add/edit/delete all Course Planning Guide departmental users that are associated to their assigned college. (i.e. A college administrator of the College of Business will only be able to manage departmental users of the College of Business.)

3.2. Courses

The following deliverables pertain to the visibility and management of courses:

- All users will be able to view courses in a data table.
- Departmental users will only be able to manage courses associated with their assigned department (i.e. only IT courses offered by the College of Applied Science).
- College administrators will only be able to manage courses associated with their assigned college (i.e. all courses offered by the College of Business).
- System Administrators will be able to manage all courses for the entire university.
- To maintain quality performance, users will only be able to view the courses from a selected college and discipline - much like the One Stop's view class offerings page (8). Once a college is selected from a drop down list, the disciplines of that selected college appear. Once a discipline is chosen, the courses pertaining to that particular college *and* discipline are displayed.
- Courses can be assigned a combination of availability symbols for a given year (A – Autumn, W – Winter, S – Spring, U – Summer). This signifies what quarter a particular course will be held.

3.3.Colleges and Disciplines

The following deliverables pertain to the management of colleges and disciplines:

- System administrators will be able to add / update / delete all colleges and disciplines in the On-line Course Planning Guide database.
- College administrators will be able to add / update / delete all disciplines for their assigned college.
- Departmental users will *not* be able to add / update / delete any discipline or college data.

4. Design and Development

4.1. Budget

This project was developed using both UCit's and my own personal resources. The total retail cost was \$13,066. However, all these items were already purchased by UCit, or I had received them through the student academic licensing which the University of Cincinnati has with Microsoft. The cost of all the hardware and software resources needed for this project is listed below in Figure 1.

Item	Description	Retail Cost	Actual Cost
Development Client Computer	Already exist	\$1,000.00	\$0.00
Development Web Server	Provided by UCit	2,000.00	0.00
Development Database Server	Provided by UCit	2,000.00	0.00
512 Mb USB Drive	Already exist	69.00	0.00
Windows Server 2003	Provided by UCit	1,199.00	0.00
Microsoft SQL Server 2005	Already exist	5,999.00	0.00
Microsoft Visual Studio.NET 2005	Already exist	799.00	0.00
Microsoft ASP.NET AJAX 1.0	Downloaded	0.00	0.00
	Retail Total:	\$13,066.00	
	Actual Cost Total:		\$0.00

Figure 1. Budget
Sources (1, 5, 6, 7, 9)

4.2. Timeline

This project was developed over the span of three school quarters. Each quarter required specific tasks to be performed to continue the development of the project.

Below are the tasks and accomplishments during each quarter of senior design.

4.2.1. Senior Design I

The focus of Senior Design I was to create a proposal for a valid Senior Design project.

Some of the other tasks involved were:

- Analyze the problem and discuss project idea with UCit.
- Analyze PickList FoxPro database for re-structuring.
- Research ASP.NET AJAX.
- Create project proposal.

4.2.2. Senior Design II

The development of my project began in Senior Design II. This phase constituted the following tasks:

- Create SQL database.
- Develop project prototype.
- Create design freeze.
- Begin Testing.

4.2.3. Senior Design III

The completion of my project was accomplished in Senior Design III. Some of the other tasks involved were:

- Complete end user testing.

- Complete project and meet deliverables.
- Create final report.

A complete Gantt chart of the entire project can be seen in Appendix A.

4.3. Hardware

- **Development computer**

Computer used to develop the application.

- **Development Web server**

Server which allowed UCit employees and other university staff test the application.

- **Development database server**

Server which stored all the application specific data required for this application.

- **512 Mb USB Drive**

Device used to backup and store the application.

4.4. Software

- **Windows Server 2003**

Operating system with Internet Information Services (IIS) version 6 required to host ASP.NET 2.0 applications.

- **Microsoft SQL Server 2005**

Database server which will store application specific data.

- **Microsoft Visual Studio.Net 2005**

Integrated Development Environment (IDE) used to create C# ASP.NET 2.0 applications.

- **Microsoft ASP.NET AJAX 1.0**

Microsoft ASP.NET extension that allows one to easily implement AJAX into ASP.NET applications.

5. Proof of Design

5.1. Creating the Database

The existing PickList application interacts with a FoxPro database. The Web Development Department of UCit is standardizing all newly-created databases to SQL Server. After analyzing the existing FoxPro database, I determined that its structure was inefficient. Several data tables had duplicate data, and some tables were simply not needed. I decided it would be best to create a new database and import the data in the existing database. The newly-created database structure can be seen in Figure 2.

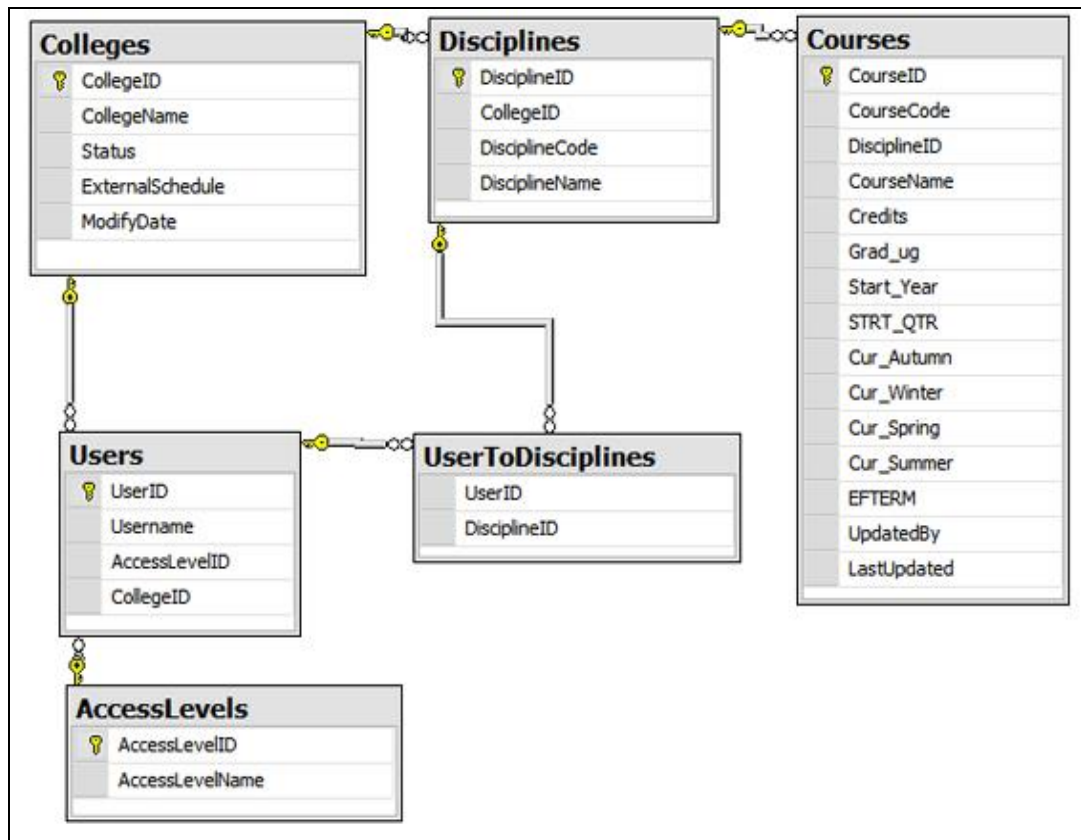


Figure 2. Database Structure

All the tables are related in some way to another (as illustrated by the “links” between the tables). These relationships enforce the integrity of the data. For example, a newly-inserted course *must* have a discipline ID that matches with a record in the Discipline table. In addition, the relationship for the Colleges, Disciplines, and Courses tables have deletion cascading enabled. Thus, when a college is deleted, all of its corresponding disciplines and courses will also be deleted.

However, the PickList FoxPro database is updated periodically by the University of Cincinnati’s mainframe UniverSIS. In addition, other applications are used by staff and faculty to input courses and other data into UniverSIS (2). For security and performance reasons, instead of applications interacting with the mainframe directly, UniverSIS updates specific SQL server databases periodically and vice versa. A service currently exists which handles the communication between the PickList FoxPro database and UniverSIS. However, due to the new structure of the SQL database, this service must be reconfigured. Unfortunately, this reconfiguration is beyond the scope of this project, and I am not able to gain access to UniverSIS (again for security reasons). In the end, if the On-line Course Planning Guide is to be used by UCit, some type of service must be created.

5.2. Viewing Courses

The On-line Course Planning Guide has two sections: consumer and administrative. The consumer section, which enables the user to view courses and their availability, has a slightly different appearance than the administrative section. If this pilot application is to replace the Course Planning Guide, it will be placed under the university’s registrar site. The template (a file containing menu and image links, formatting and style) for this site is managed by the university’s content management

system. The On-line Course Planning Guide uses a function within the Utilities class that parses and displays this template on the consumer page (see Figure 3).

Office of the Registrar

UNIVERSITY OF CINCINNATI

Course Planning Guide

The Course Planning Guide displays the availability of courses offered throughout the University of Cincinnati. The data below should be used as a guide to help you in determining when you should enroll for specific courses. The availability of a course does not guarantee that it will be offered for a specific quarter or semester. If you have any questions regarding the availability of a specific course, and why it is or is not offered, please contact your college administrator.

32 - College of Applied Science

IT - Information Technology

[Print List](#)
[Link to this list](#)

Course #	Course Title		Autumn	Winter	Spring	Summer
32IT160	MICROSOFT WIN	(3U)	A	W	S	
32IT170	IT:CONCPTS & FACIL	(3U)	A	W	S	
32IT171	PROG LOGIC & METHOD	(3U)	A	W	S	
32IT181	PROG LOG&METH(TECH)	(3U)	A	W	S	
32IT191	INT MICROCMPS I	(3U)	A	W	S	
32IT192	INT MICROCMPS II	(3U)	A	W	S	
32IT201	WORD PROC APPL	(3U)		W	S	
32IT236	INTRO E-BUSINESS	(3U)	A			
32IT241	COBOL PROG I	(3U)	A			
32IT242	COBOL PROG II	(3U)		W		

Figure 3. Consumer Page

This page lists all of the courses and their associated data for a specific college and discipline for the current school year. Since students are typically concerned with their particular college and discipline, two drop-down lists are used to narrow the number of courses displayed. Displaying all the courses offered by the university at once is unnecessary and would not be feasible from a performance standpoint. The format in which the data is displayed is nearly identical to that of the Course Planning Guide file

(3). The standardized (by the University of Cincinnati) one letter initials indicate whether or not a course is being held in a specific quarter. For example, a “U” in the Summer column indicates that a course is going to be available during the summer quarter of the current year.

Many other features on this page enable students and staff to easily access and view courses for a particular college or major.

- Users are able to perform a sort on any data grid column. For example, if a student wants to see all the courses available for the spring quarter, all he or she has to do is click the spring column heading and all the courses available for the spring will be listed first.
- Each course name is a hyperlink (noted in red). When a course name is clicked, a brief description of that course comes up in a “pop-up” window. This feature already exists within the University of Cincinnati’s OneStop’s “view class offering” site. However, the OneStop “view class offering” site only displays classes offered for a particular quarter (8).
- University staff and faculty will be able to easily access and display this data to others. When clicked, the “Link to this list” hyperlink displays a “pop-up” window with a Web site address for the specific list the user is viewing. This address contains query string variables that tell the application what courses to display. Because of the use of AJAX, these query string variables cannot be updated and some type of “pop-up” window was needed.
- The “Print list” hyperlink displays a “pop-up” window with a “printer friendly” version of the current list being viewed. The application basically strips out all content except for the list itself (see Appendix C).

5.3. Managing Courses

The administration section is a bit different. The users for this section are primarily concerned with functionality. Nevertheless, I used a master page to implement the header and menu images from the registrar site. This master page also includes the CSS files from the registrar site (which configures the font color and type to match that of the registrar site) and AJAX error handling for the entire administration section. The menu seen in the Consumer Course View is replaced with specific links that enable them to input and manage colleges, disciplines, users, and course availability data.

While consumers are only able to view courses, system administrators, college administrators, and departmental users must also be able to edit and add courses. To do so, they must be provided with a more-detailed view of courses and their associated data. A screenshot of the administrative manage course page can be seen in Figure 4.

Course #	Course Title	Start Year	Cur_A	Cur_W	Cur_S	Cur_U	Last Updated
32IT160	MICROSOFT WIN	(3U) 2002	A	W	S		4/10/2007 Edit Delete
32IT170	IT:CONCPTS & FACIL	(3U) 2002	A	W	S		4/10/2007 Edit Delete
32IT171	PROG LOGIC & METHOD	(3U) 2002	A	W	S		4/10/2007 Edit Delete
32IT181	PROG LOG&METH(TECH)	(3U) 2002	A	W	S		4/10/2007 Edit Delete
32IT191	INT MICROCMPS I	(3U) 2002	A	W	S		4/10/2007 Edit Delete
32IT192	INT MICROCMPS II	(3U) 2002	A	W	S		4/10/2007 Edit Delete
32IT201	WORD PROC APPL	(3U) 2002		W	S		4/10/2007 Edit Delete

Figure 4. Manage Courses

There are several similarities between the consumer course view page and the administrator page. However, administrators are able to view more data such as the year in which a course was added, and the date that it was last updated. Currently, when administrators or departmental users are determining the availability of courses for next

year, they begin by “rolling over” the previous year’s data. This data is then compiled into the Course Planning Guide document for the next school year. However, the On-line Course Planning Guide continuously displays this data and eliminates the need to compile a list each year. In addition, about 80% of the courses the university offers maintain the same availability each year (2). Thus, there is no need to retain data containing the availability of courses for the previous year (which is currently being done in the PickList application).

The administration course view page also contains edit-and-add hyperlinks. Clicking the “Add Course” link displays a form allowing the user to input a course’s name, graduate type, number, credits, college, and discipline. When the “Edit” link is clicked, this form displays again, but all of its fields are populated and labels and buttons are changed to indicate that the selected course is being updated (see Figure 5).

The screenshot shows a web-based form titled "Update Courses". On the left is a navigation menu with links: "Update Courses", "Manage Users", "Manage Disciplines", "Manage Colleges", "Help", and "Logout". The main form area contains the following fields and controls:

- College:** A drop-down menu showing "32 - College of Applied Science".
- Discipline:** A drop-down menu showing "IT - Information Technology".
- Course Name:** A text input field containing "MICROSOFT WIN".
- Course Code:** A text input field containing "160".
- Credits:** A text input field containing "3".
- Grad Type:** A drop-down menu showing "U".
- Start Year:** A drop-down menu showing "2002".
- Availability:** Four radio buttons labeled "Autumn", "Winter", "Spring", and "Summer". The "Autumn", "Winter", and "Spring" buttons are checked.
- Buttons:** "Update" and "Cancel" buttons at the bottom.

Figure 5. Update Courses

The drop-down college and discipline lists from the administrative course view are re-used for the edit page. Drop-down lists are used for the graduate type (Grad Type) and

start year to prevent users from inputting incorrect data. Validation is also performed on the edit-and-add course view page to insure that all fields have been inputted correctly. For example, two courses cannot have the same college, discipline, and course code. These three variables uniquely identifies a course. As seen in the figure above, because the user has selected to edit a course, the course code text box has been disabled to prevent this from being changed.

5.4. Managing Users

Users are managed similarly to that of courses. As mentioned before, depending on a user's access level, he or she is only able to view and manage certain users. A screenshot of the manage-users page can be seen in Figure 6.

ID	Username	College	Disciplines	Edit	Delete
10000059	MCGURRIN	Univeristy College	ACCT, BA, BLAW, CSTN, ECON, FIN, IT, LGTN, MGMT, MKTG, STAT, HMG	Edit	Delete
10000075	FUHRMACB	McMicken College of Arts and Sciences	SOC	Edit	Delete
10000078	SAMKAY	McMicken College of Arts and Sciences	BIOL	Edit	Delete

Figure 6. Manage Users

Much like the administration course view page, users and their profile data are listed in a table with delete and edit buttons to the right. Depending on the selected access level, certain columns and data will appear. For example, in the above figure, the college and disciplines for each user appear because all departmental users have an associated college and discipline. However, for system administrators, only the users' ID and name appear.

Maintaining this repetitive style and functionality greatly reduces the amount of time needed for existing PickList users to adapt to this application. If a user understands

and is able to use one section (i.e. manage users), he or she will be able to use any section. This can be seen in the update-users form in Figure 7.

The screenshot shows a web interface titled "Manage Users" with a "List Users" link in the top right. On the left is a navigation menu with "Update Courses", "Manage Users", "Manage Disciplines", "Manage Colleges", "Help", and "Logout". The main form contains the following fields:

- Username: test1 (with a tooltip "User's 6+2")
- AccessLevel: Departmental User (dropdown menu)
- College: 32 - College of Applied Science (dropdown menu)
- Discipline(s): ACCT - Accounting, CET - Computer Engineering Technology, COMM - Communication (list box)

Below the disciplines list is an "Add Discipline" link. At the bottom of the form are "Update" and "Cancel" buttons.

Figure 7. Update Users

Again, this update form is used for both adding and editing of users. In the figure above, a departmental user is being edited. If the user chooses the system administrator access level, the disciplines list box and the college drop down list will disappear.

(System administrators do not have associated colleges or disciplines.) Departmental users can add multiple disciplines by clicking the add discipline button. When this is done, a drop- down list contains all the disciplines associated with the user's college

5.5. Managing Colleges

Managing colleges is the least complex task within the On-line Course Planning Guide. The manage-college page can be seen in Figure 8.

CollegeID	CollegeName	Edit	Delete
11	TEST	Edit	Delete
15	McMicken College of Arts and Sciences	Edit	Delete
16	College-Conservatory of Music	Edit	Delete
17	Univeristy College	Edit	Delete
18	College of Education	Edit	Delete
20	College of Engineering	Edit	Delete
21	School of Social Work	Edit	Delete
22	College of Business Administration	Edit	Delete
23	College of Design, Architecture, Art and Planning	Edit	Delete
24	College of Law	Edit	Delete

Figure 8. Manage Colleges

Colleges only have two associated elements: name and college ID. Much like courses and users, colleges are displayed in a data grid with edit and delete options. Colleges can also be added by clicking the “Add College” button in the upper right portion of the page. Clicking this button brings up a form to input a college’s data. This form can be seen below in Figure 9.

Figure 9. Update Colleges

This form is used for adding and updating colleges. In the figure above, the College of Applied Science is being updated; or rather its name is being updated. The ID of a college must be unique. Thus, the college ID text box becomes disabled when updating a college.

Since courses are related to disciplines and disciplines are related to colleges (see Figure 2), a confirmation message appears when a user selects to delete a college with related disciplines. When a college is deleted, all disciplines and courses related to that college must also be deleted. This insures that there are not any unnecessary records in the database.

5.6. Managing Disciplines

The manage-discipline page is very similar to the other pages within this application. It employs the same tabular display of data and similar functionality as the other administrative pages. This page can be seen in Figure 10 below.

ID	Code	Name	College	
257	IT	Information Technology	17 - Univeristy College	Edit Delete
258	IT	Information Technology	30 - College of Evening & Continuing Education	Edit Delete
532	IT	Information Technology	32 - College of Applied Science	Edit Delete

Figure 10. Manage Disciplines

A user can display disciplines by college or by discipline code. Figure 10 above is an example of a search performed on the discipline code IT. Once an item is selected from the drop-down list, the disciplines are displayed below.

Keeping with the functionality of the other pages, disciplines can be edited and deleted by selecting their corresponding grid buttons and disciplines can be added by selecting the Add Disciplines button in the upper right.

5.7. Help

Since many users will not be familiar with this application, I added a help section to answer any questions they may have. The data in this section is static and can only be changed by editing the code of the actual page. A screen shot of the help section can be seen in Figure 11.

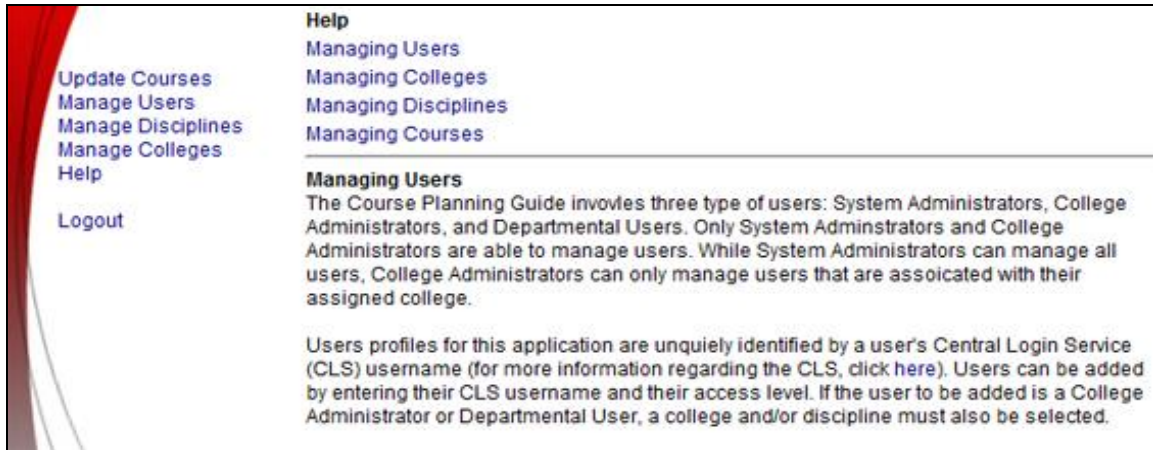


Figure 11. Help

There are “help links” for each menu item. Clicking a link will display help information in the space below. Not a lot of help information is needed. The application itself is quite simplistic. Users are not able to input any invalid data and all unnecessary input fields or text is hidden. Nevertheless, this Help section may provide staff and faculty some insight as to how they are supposed to interact with the application.

6. Conclusions and Recommendations

6.1. Conclusions

In conclusion, the On-line Course Planning Guide increases students’ and administrative users’ ability to efficiently view and manage the availability of courses at the University of Cincinnati. UCit and the registrar department of the University of Cincinnati have displayed great interest in moving this application to production in the

near future. However, as I mentioned above, this application will not be put into use unless some type of communication between the On-line Course Planning Guide's SQL database and UniverSIS (the university mainframe) is created. I have little control over this process, but UCit insures me that this will be done during the summer quarter of 2007. I have been told that the registrar department wants this application available for students to adjust their fall 2007 class schedules.

In addition, the existence of this application and the newly-created SQL database allows for the possibilities of other applications and features. E-mails could be sent to college administrators and departmental users notifying them that they should begin updating their assigned courses. Since this course data will ultimately be updated by UniverSIS, it can be easily implemented in other applications. Originally, I had wished to create some sort of degree planning application that would allow students to plan and keep track of all their courses. However, among other things, I came to realize that not only did the PickList FoxPro database needed to be converted, but an application to maintain the integrity of this data needed to be created – The On-line Course Planning Guide.

I should also note that I named this application “The On-line Course Planning Guide” for the sole purpose of differentiating it from the current Course Planning Guide. However, when my project is implemented, it will effectively replace the Course Planning Guide, thus taking on its name.

From the start of Senior Design I, my intention was to create a project that would help students schedule their classes. While the University of Cincinnati continues to improve the registration process, there are still many inconveniences and frustrating tasks. With the great amount of technology at its disposal, it seems a bit laughable that

student have to copy and paste a call number into a box to register for a class (8). I can only hope that others will utilize this application and data to address student needs in the future.

6.2. Recommendations

Although I was not unfamiliar with it, this is my first project in which I utilized ASP.NET AJAX. I learned a great deal about how AJAX works. There are two things that I would recommend for anyone who has decided to implement AJAX in their ASP.NET application.

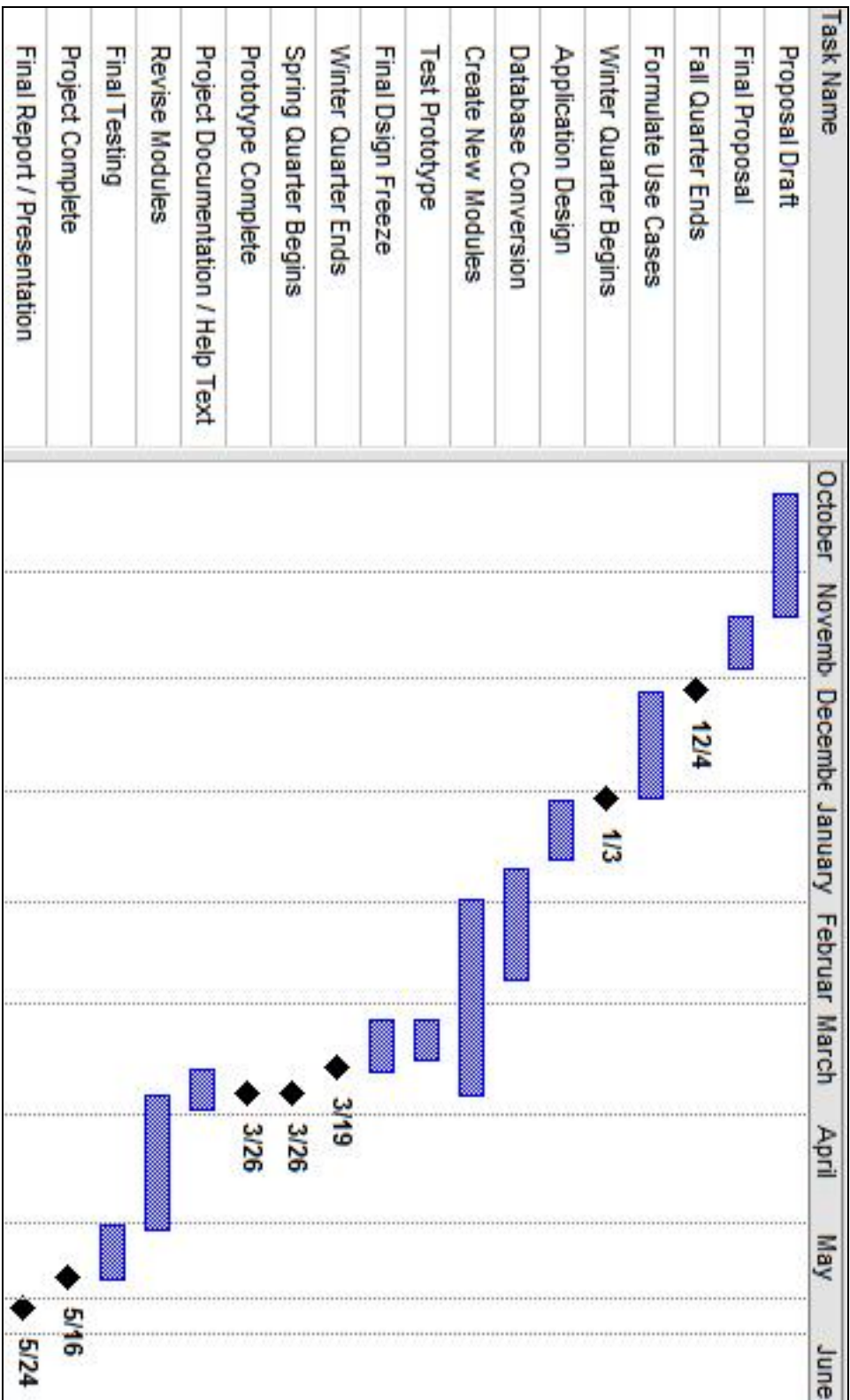
1. Disable AJAX or implement some type of error handling on the AsyncPostBackError Event of the scriptmanager control in the masterpage. When AJAX throws an error, a not-so-helpful error JavaScript alert message appears. Essentially, at first glance it is hard to know what is wrong. Within the AsyncPostBackError Event, this alert message can be changed with one line of code: `(ScriptManager1.AsyncPostBackErrorMessage = e.Exception.Message)`. A more descriptive message will now appear when an error occurs.
2. Prevent multiple AJAX calls from being queued. Most browsers will not respond when multiple calls are queued. Every time an AJAX call is made, it is stored in a queue until it is processed. This situation can easily become a problem if it takes more than a couple of seconds to process a request. Even though an updating message may appear, an impatient user may still “re-click” the AJAX enabled button and queuing up another request. This situation can easily be prevented by setting a control’s onclick or onchange event to the following JavaScript disable control function:

```
function DisableControl(ID)
{
    var Control = document.getElementById(ID);
    if(Control != null)
    {
        Control.disabled = true;
    }
}
```

When that control is clicked, it will be disabled and prevent anymore requests from being made.

Appendix A

Gantt Chart



Appendix B.

PickList



Appendix C.

Print List

32 - College of Applied Science IT - Information Technology						
Course #	Course Title		Autumn	Winter	Spring	Summer
32IT160	MICROSOFT WIN	(3U)	A	W	S	
32IT170	IT:CONCPTS & FACIL	(3U)	A	W	S	
32IT171	PROG LOGIC & METHOD	(3U)	A	W	S	
32IT181	PROG LOG&METH(TECH)	(3U)	A	W	S	
32IT191	INT MICROCMPS I	(3U)	A	W	S	
32IT192	INT MICROCMPS II	(3U)	A	W	S	
32IT201	WORD PROC APPL	(3U)		W	S	
32IT236	INTRO E-BUSINESS	(3U)	A			
32IT241	COBOL PROG I	(3U)	A			
32IT242	COBOL PROG II	(3U)		W		
32IT251	WWW -BASIC CONCEPTS	(3U)	A	W	S	
32IT252	WWW -DEV CONCEPTS	(3U)	A	W	S	
32IT253	WWW-MULTIMEDIA CPTS	(3U)	A	W	S	
32IT254	WEB SERVER ADMIN	(3U)	A	W	S	
32IT255	VISUAL BASIC I	(3U)	A	W	S	
32IT256	VISUAL BASIC II	(3U)		W	S	
32IT257	ACTIVE SERVER PAGES	(3U)	A	W	S	
32IT270	PASCAL PROGRAMMING	(3U)				

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