Michigan State University has implemented a World Wide Web based course request system that allows departments, schools, and colleges to process through academic governance requests to add, modify, or delete courses offered at the University. The system also allows an international population to view the approved courses and their descriptions via the World Wide Web. It requires authorization for use and will send electronic mail notifying reviewers to signoff or approve a course. Users can view the status of course requests in the review process. “Agendas” for university curriculum committees can be created.
Course Request System

Introduction and Background

As a respected research and teaching university, Michigan State University (MSU) is committed to intellectual leadership, and to excellence in both developing new knowledge and conveying that knowledge to its students and to the public. And as a pioneer land-grant institution, MSU strives to discover practical uses for theoretical knowledge, and to speed the diffusion of information to residents of the state, the nation, and the world. It was founded in 1855 and has an enrollment of 42,603 students. The campus offers instruction in 140 undergraduate and greater than 60 graduate programs taught by approximately 4,000 academic staff in 14 degree-granting colleges. As a major research institution it offers a wide range of courses. During a major semester, there are over 6000 individual section offerings from among over 4,000 courses. In order to help meet the commitment to provide a superior quality of academic programs, these courses must pass through an academic review process that includes review and approval by a department curriculum committee, a college curriculum committee, and university curriculum committees.

In 1992 MSU switched from a quarter system to a semester system. This change necessitated all courses offered at the university be evaluated. To do this a distributed course request system was implemented to process all 6000+ courses that required academic review.

Although this system was useful it presented a number of operational limitations. Each department, school, and college had their own copy of the database and software. Each time a change was made to the application a disc with a new copy of the software was delivered to each of the units. Periodically during the academic year updated versions of the units’ databases were distributed. E-mail notices asking for signoff or approval action of a request from other units were sent to an account set up only for that purpose. Frequently, users of the account could not remember the password. To obtain the status of the request a user had to call the University Catalog and Curriculum office who then traced down the information. The campus community felt the academic review process was taking too long. The “Description of Courses” catalog available on gopher was created from the FoxPro database using four different software products. It was a time consuming process that was seldom up-to-date. There was also a great deal of difficulty getting verbiage from the units that was appropriate for the “Description of Courses” catalog as quite often they did not understand what information was required on the form.

In the spring of 1997 a campus quality initiative (CQI) committee of academics and academic support staff was established to review the course request process. They recommended a new system be developed that would 1) speed the time required to get a course request through the academic review process, 2) allow users to view the status of a course request at any time, 3) send email messages to personal email accounts, 4) provide an up-to-date course catalog on the web, and 5) provide for required changes in course review process due to policy changes being implemented by the Provost.

In response to the recommendation the Course Request System (COURSES) was developed which would meet the following institutional goals:

- Provide a timely means of processing a course request through academic review.
- Provide department/schools/colleges with up-to-date status information about their course requests.
- Provide a signoff/approval process that was easier to use.
- Eliminate the need to distribute software and databases to individual departments, schools, and colleges.
- Provide accurate and timely course information to the international population.
• Create agendas for use by the various review committees.
• Provide a means of standardizing verbiage entered on the form and used in course descriptions.
• Provide help, instruction, and policies to guide the user in entering the data required.

Course Request System - Description of the Major Components

Before courses can be offered by MSU they go through a review and approval process. The process starts with a Professor’s idea which is routed through department, college and University curriculum committee structures. These committees determine if the course fits into the established curriculum or not.

The Course Request System (COURSES) provides a means of entering a course request from any computer that has a web browser and an internet connection. Netscape Navigator and Internet Explorer were used in development and testing. Since these browsers are also available for the Macintosh they satisfied the requirements of all our users. The project began with the recommendations of the CQI committee and an attempt to meet the stated goals. Courses is comprised of seven major subsystems: 1) Security, 2) Creation of a Course Request, 3) View of Course Requests, 4) the Signoff/Approval Process, 5)”Description of Courses” catalog on the Web, 6) Agenda Creation and Action Recording, and 7) Help System. Each is described briefly below.

Security

In order to gain access to this system a user must be authenticated via a login screen. Once authenticated the users menu is dynamically built from authorization records in the security system. Access to each page is also controlled and audited by the security system. Access can be controlled at several levels including inquire, add, change and delete. Access to specific content can also be controlled. A user is associated with groups. Either the user and/or their associated group can be granted access to courses for specific departments, schools, or colleges.

Departments, schools, and colleges determine who they want to have access to the system and submit an Access Request Form to the University Catalog and Curriculum office. This form indicates what type of access a user should have: inquire, add, change and delete a course request, approval authorization, signoff authorization, or any combination of the above. The units may register as many people as they require. It is suggested Assistant/Associate Deans have authorization for all activities at the college level, department chairpersons have authorization for all activities at the department level, a person at each level be designated as a surrogate for those authorized to signoff or approve, and those staff at each level who enter the request data.

Courses are administered by a primary department and college. Users of the system can only modify or add courses that their unit administers. Colleges can modify or change any course for a department within their college. All users can view all approved or pending courses for the university.

Create a Course Request

Users may choose to create: 1) a request to add a new course to the university curriculum, 2) a request to modify an existing course, or 3) a request to delete an existing course.

If Add a New Course is chosen, the user is given a list of subject codes they have access to. This is determined by the unit they are associated with. They choose the subject code of the course they are about to create. The additional pages of the form are then entered.

If the user has chosen to change or delete an existing course, they are presented with a list of courses, again specific to their unit, and may pick the course required. A duplicate of the existing course record is created and the user is
presented with a form that has this information filled in. This information can then be modified as required.

As each page of the form is submitted, various edits take place to ensure integrity in the data. If all edits are passed the data is then saved in the database. Users are able to transverse between any of the nine pages of the form. They are able to view the complete form from any page. The form can be printed if needed by clicking of the print icon of the browser.

**View a Course Request**

The View a Course Request component allows users to view courses at various status levels: 1) An approved course, 2) an interim course, 3) a pending course, 4) an course for another unit, or 5) courses that are no longer being offered at the university. They may also view the review status of a course request.

An approved course is one which has been approved by all levels of curriculum review (department, college, university committees, and academic council) and is available for student enrollment. An interim course is a course which has passed department and college level curriculum review but has not yet been through university review. This course may, but not necessarily, be available for student enrollment. A pending course is a course that is in the process of development and may or may not have been through department level curriculum review.

Users may view courses for their own unit, courses for another unit, or courses that are no longer being offered at the university. They may also view the status of where a course request is in the review process.

When a view option is picked the user is presented with a list of courses that have the chosen status. When one of the courses is selected a completed course request form is presented to the user. The form also shows all requests for signoff/approval action that have been generated for that course request. The information provided includes the name of the unit, whether or not the unit has responded, and if so the signoff/approval signature and date, and any related comments.

**Signoff/Approval Process**

When a course request is created requests for approval from the primary administrative department and the primary administrative college are automatically generated by the system. These requests are in the form of email messages and are sent to effected users individual email accounts. That user, or their surrogate, accesses the course request system to respond with their action.

The system will also generate requests for action if a course is interdepartmental with another unit. An interdepartmental course has one department that is the primary administrator and the remaining departments are considered non-primary. An approval from the non-primary unit is required.

There are also times when another department, school, or college should be notified of the proposed change in curriculum as a courtesy. A signoff from the indicated units is asked for. The notified units then have fourteen days to respond with their comments before the primary administrative college can give their approval to the request.

In both cases, approval and signoff, notifications for action are automatically generated and sent via e-mail by the system to a specified persons personal e-mail account.

A user has two options by which they can record signoff/approval action; from the last page of the request form or from the Approval/Signoff option on the system menu. Primary administrative units may use either option. Non-primary units use the Approval/Signoff option.
When giving signoff/approval from the last page of the form, the users authorization is first checked. If they are authorized to proceed, the system generates a dynamic web page that lists all units that are required to respond and action or non-action that has been taken by each. If the user is not authorized to take signoff or approval action they are denied access to that page.

When using the Approval/Signoff option on the system menu, users are presented with a pull-down list of all courses they have been asked to take action on. Each item in the list identifies whether the request for action is a signoff or an approval and whether it is a department level action or a college level action. Upon selecting a course request to take action on the system proceeds as for the last page of the course request form.

Edits ensure that all requested approvals have been received and a 14 day response period for signoffs has been met before the primary college is allowed to give their approval to the request. Users may go back and modify a request at any time up until the primary administrative college gives their approval. When this approval occurs only the University Catalog and Curriculum office may make any changes.

**Description of Courses Catalog On the Web**

The “Description of Courses” catalog is a dynamically created application accessible from COURSES or the Michigan State University home page on the Web. It allows a user to search for courses by specifying a subject code, a subject code/course number combination, or a key word search. Active server pages dynamically generate the web page(s) displayed when a course or courses are selected. AltaVista generates the index and search for the key word option.

Subject Code and Subject Code/Course Number searches are completed using Active Server Page programs to directly access the COURSES database through the indexes. SQL server will not index text fields preventing a keyword search of fields used to publish the course catalog. To provide the keyword search we created a course catalog index for MSU’s AltaVista search engine. An ASP program creates a page of links, one to each approved or interim course as displayed in the course catalog. The AltaVista crawler is pointed to this program as a starting point and follows the links to each course indexing the contents of each page. The same ASP program displays the course description for both the index search and key word search so changes are updated when the crawler revisits the site.

Using AltaVista allows all of the advanced search features available to find courses you are looking for a restricting the crawler keeps the index free of pages outside of the course catalog. The main problem using AltaVista is the time between visits by the crawler cannot be controlled. Course updates approved in the database may not appear in the key word search for days to weeks. We can compensate for this by completely rebuilding the index from time to time, but have not received complaints to indicate that is required.

Courses are identified as being approved or interim. An approved course is one that has proceeded through the academic review process and has been added to the university curriculum. An interim course is one that has been through the primary administrative college level academic review process and may be open for enrollment for a two year period while final review takes place.

**Agenda Creation and Action Recording**

After a course request has received primary administrative college level approval it is available to be placed on an agenda for a University Committee on Curriculum. Agendas are created for three subcommittees, a full committee, and Academic Council. There are about 30 agendas created in an academic year. The agendas list each of the courses to be reviewed by the committee and description of each course. The description is similar to the information provided in the “Description of Courses” catalog on the web. If the request is to change an existing
course the agenda will also show the old version and the requested version of the course. Each of the university’s more than 140 subject codes is assigned to a specific subcommittee. The agendas include a copy of the course request and a synopsis of the course. Once a committee has taken action on a request that action, the date of the action, and committee comments are entered and made available to users of COURSES.

**Help System**

Pop-up windows and pull-down lists appear below each question on the form. They provide instructions, examples, and policy statements about the information that is required. Users may cut and paste an example from one of the windows or from another application (such as a word processor) and place the information into any relevant field on the form. Pop-up windows are done using client side JScript.

**Course Request System - Implementation and Approach**

**A. Development Partnership**

In order to develop and deploy the components of the COURSES system successfully, several different relationships were formed. A relationship was established with the client. They were responsible for writing the instructions, examples, and policy statements used in the help function, aided in the functional design of the system, and did much of the testing of the application.

The second relationship was between the internal teams of Administrative Information Services. A member of Technical Services provided support for the various servers and developed the security system, the Help & Support Center processed security applications and provided first line help and support to users, the Database Administration group provided database technical support and advice, and Student Academic Services provided systems analysis and programming.

**B. Hardware/Software**

The COURSES system was developed on a WindowsNT system. The application itself was written in VBScript using Visual Interdev. It uses Internet Information Server and active server pages. Netscape Navigator 3.0 or greater and Internet Explorer 3.0 or greater browsers are supported. The database is Microsoft SQLServer. The system can be run from any computer with a browser and an internet connection. We recommended to users they have a pentium processor with at least 75 mhrz.

**C. Problems We Encountered**

Lack of expertise was the biggest problem that was dealt with in writing the Course Request System. In our department there were few people who had done any web development. Visual Interdev provided a means of working with both the active server pages and the database at the same time. However, a beta copy of the software was used and when unexpected results occurred it was difficult to know what actually created the problem.

Using SQLServer for a highly textual application was, and continues to be, a challenge. Learning how to use text (unlimited in size) fields in the active server pages without crashing the system presented lots of challenges.

Learning that every time a recordset was created from a sql call in the active server page a session was opened with the database and not closed until the database connection was closed indicated it was better to use stored procedures.
Maintaining state between the pages of the request form and the best use of session variables was learned by trial and error.

How much data is reasonable to send between the client and the server was a problem. Some of the pull-down lists contained several hundred options that were dynamically created from records in a database. On some systems it would take 20 minutes for one of the larger colleges to receive their data. Gathering the information for the lists was then divided into a two step process. First the college would select the subject code they wanted to deal with. A list of courses was then generated based on the chosen subject code.

When the course request form was originally designed it was on one web page. It quickly became apparent that it would be almost impossible for a user to complete the form before their session timed out. The form was then divided into nine pages.

The users of the system had to be educated in the difference between using a web application and using an application that resided on their personal computer. They learned such things as when edits could/would take place, where edit messages would be displayed, when the data they entered was actually saved in the database, and what would happen if they were away from their terminal for a length of time.

Convincing the users not to use the back button on their browser but to rely on the submit buttons at the bottom of each page is still in process.

What’s Next?

The next step is to write a similar application to handle academic programs offered at the university. The business process is essentially the same but there is an even higher degree of text involved. When the Program Request System (PROGRAMS) is written the intent is to link it with COURSES.