FMS Course Management System

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This thesis is submitted in partial fulfillment of the academic requirements
For the degree of
Bachelor in Computer Science
In the Faculty of Mathematical Sciences
University of Khartoum
25, June 2013
Abstract:

This project aims to solve courses management problems inside faculty of mathematical sciences through developing website to automate course management processes to help professors and students in educational process.

This website enables professors in managing their courses through adding course materials, announcements, tests, and discussion topics to give the chance for students for collaboration, participation and knowledge sharing.

In addition to that this website will help students to obtain course materials in an easy way at any time, also facilitate the process of academic collaboration between professors and their students and between students themselves.
ملخص:

هذا المشروع يهدف إلى حل مشاكل إدارة الكورسات داخل كلية العلوم الرياضية عبر تطوير موقع الكتروني يقوم بتنفيذ عملية إدارة الكورسات لمساعدة الأستاذة و الطلاب في العملية التعليمية.

يمكن هذا الموقع الأستاذ من إدارة الكورسات التي تخصصهم من خلال إضافة المواد الدراسية، الإعلانات، الواجبات الدراسية، عمل مواضيع للنقاش، وإبادة الفرصة للمشاركة كبارانهم.

يساعد هذا الموقع الطلاب في الحصول على المواد الدراسية بسهولة في أي وقت بعد أن يتم رفعها بواسطة الأستاذ. أيضاً يساعد على تسهيل عملية التواصل الأكاديمي بين الأستاذة و الطلاب وبين الطلاب فيما بينهم.
Acknowledgment:

First we would like to say Alhamdulillah, for giving us the strength to do this project work until it done.

Then a lot of thank to our families for providing everything, not forgetting our friends whom sharing ideas with us.

We thank everyone that gave us a hand for making this project, God bless them all, and make this work a useful for our faculty in the future.
Declaration:

I declare that this is all my own work and does not contain unreferenced material copied from any other source. I understand the definition of plagiarism. If it is shown that material has been plagiarised, or I have otherwise attempted to obtain an unfair advantage for myself or others, I understand that I may face sanctions in accordance with the policies and procedures of the University.
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Chapter 1 Introduction

1.1 Overview

As a result of the increasing numbers of students, professors face some difficulties in managing their courses and basically in delivering of course materials, assignments, informing students about new events in an organized way and also in the communication with their students. So a reasonable number of professors prefers to deliver course materials and assignments in a digital format rather than papers. From here there is a need to find a comprehensive system to manage the courses, that system is called Course management system (CMS) that allows the professor to post information on the web and easily creation of online courses content and subsequently teaching and management operations of that course including various interactions with students taking the course, without that professor having to know or understand any programming language.

1.2 History

Over time, the development of computer software and hardware directed toward education that led to fundamental changes from courses delivered in the traditional face-to-face method to those delivered via video cassette and television, to deliver course contents via computer technologies where no Internet service was available to the general public. The earliest commercial CMS software came in boxes of floppy disks developed with funding for the U.S. military training. Later it became available to the public in computer stores.

During the mid-1990s, several universities and commercial companies expected the need for more user-friendly approaches for putting course materials on the web and the need for increased availability to learners via the Internet. Simultaneously, these entities began developing systems that would be relatively easy to use, requiring little or no knowledge about programming language (HTML, Java). Subsequently between 1995 and 1997, several commercial CMS were launched in higher education market.
1.3 Problem Statement

Difficulties that face professors in managing their courses, and obstacles that meet students in communicating with their professors and classmates inside and outside the class.

1.4 Benefits

Course management system provides benefits to professors and students such as:

1. Reduce the cost of publishing and acquiring course materials.

2. Faster methods for delivering course materials.

3. Ensure consistency in the delivery and evaluation since each student sees the exact same material in the exact same manner and can be evaluated through common assignment.

4. Enable students to interact with professors and classmates from different locations using the available communication mechanisms.

5. The announcement function in the system guarantee that all students are informed equally and also reduces the administrative work for faculty.

1.5 Project aim

The aim of the research is to develop CMS as a web application to help professors manage their courses from central locations, and to facilitate communications between professors and students.
1.6 Project Objectives

The objectives of this research are:

✓ To develop a system which enables creation, storing, managing and sharing of learning materials.
✓ To provide mechanisms to facilitate the communication between professors and students.

1.7 Scope

This project will be applied on faculty of mathematical science at university of Khartoum as a case study.

1.8 Research motivation

This project is to help professors to focus on course content instead of worrying about how to manage it, due to the increase in the number of students attending the course.

1.9 Research Questions:

✓ How learning materials can be made available through several professors and students?
✓ How can communication be facilitated between professors and students?
✓ In what way can professors be helped in managing their courses?
Chapter 2 Literature Review

2.1 Introduction:

Previous chapter introduced background about the problem, key research and aim of research. This chapter will discuss the importance of management system especially content management system and its types, the role of management systems in education, effect of using course management system on student achievement, technology misuse and finally some types of course management systems.

2.2 Overview:

The whole world is changing and in order to prepare our self for this new world we need to change the way of education. In the 21st century professors have to create a syllabus that will help students connect with the world and deal with it. And also educational institutions must use modern learning mechanisms to facilitate the learning process and the use of modern technologies may range from the point of online registration till the delivery of results[1].

Actually before the 21st century, reasonable number of professors preferred to use electronic mechanisms in the education process such as using the computer and projector to introduce lectures instead of using blackboards and hard copies of books, And also using email to deliver and collect assignments to and from students instead of using papers, although these mechanisms are useful but they need to be used in an organized and controlled way to get the most out of it.

2.3 What Is Content Management System?

To understand the concept of content management system we have to define each part of the concept separately [2].
What is content?
Content is in essence any type or unit of digital information such as: text, images, records, and documents that can be managed in an electronic format.

What is content management?
Is the administration of digital content throughout its life cycle from creation to storage and deletion.

Now the concept of content management system can be defined as a tool that enable technical and nontechnical staff to create, edit, manage and publish content such as documents, graphics and video using a set of rules, processes and work flows that ensure coherent, validated electronic content[3].

2.4 Why Content Management System?
In the past majority of the websites used to be static that means they need to call the web designer to modify them.

In contrast content management system provided some benefits that guided people to use it such as[4]:

1. Easy to update:
Updating the website becomes easy, this mean no technical knowledge is required. It just requires an Internet connection to access the website and make any modifications with few clicks.

2. Upgradeable and more secure:
When a new version of content management is system released, it can easily upgrade the current version, in addition to this, the website becomes more secure against online threats like viruses and malware.

3. Availability of plug-ins:
Plug-ins help extend the functionality of a website, content management system by definition provides minimum functionality and enables users add/remove additional functionality as they need for example adding Twitter widget to enable social functionality.
4. Portability:
Most content management systems can operate on multiple platforms. In addition to that it is easy to take backup of the site and store it safely in a computer or hard drive.

2.5 Types of Content Management Systems:
There are different types of content management systems for different types of content and the nature of the content dictates the types of content management system and there are four major categories of content management systems[5]:

1. Web content management system (WCMS):
   Designed for novice user as well as expert user to create, edit, publish and maintain the content of a website. This type is suitable for large organizations such as government department.
   WCMS is based on collection of templates that form the structure of a website. The content's author inserts content into these templates then he/she publishes it onto the site. And this is applied to Internet, Intranet or extranet websites.

2. Enterprise content management system (ECMS):
   This system deals with the content, assets, records and other information that define the structure and hierarchy of an organization.
   CMS aims to improve access of employees to company information quickly instead of forcing them to search through multiple software application beside that it enables visitors to interact with the site without modifying its content and structure.

3. Mobile content management system (MCMS):
   Appears as a result of the rapid growth in mobile technology industry, and the increasing demands to apply systems to manage content for smart phones, PDA and other portable devices.
   MCMS were originally designed for business to consumer market especially development of mobile system to manage content such as ring tones, text messages, news and games.
4. Component content management system (CCMS):

This type of system manages content at a deeper level by breaking it into smaller units such as word, image and store it rather than a complete document.

The main advantage of this system is that of being able to reuse content in multiple documents and it's suitable for companies that have a wide range of content which targets diverse audience such as "translators".

2.6 Management System in Education:

Content management system can be used to support educational processes by providing capabilities for multiple users with different levels of permission for creating, editing, publishing, collaborating, reporting, distributing website content, data and information[6].

In spite of the advantages of content management systems and its support in the educational processes but it is a content-centric system that focuses on the management of content to be used during learning processes. And professors need a learner-centric system that focuses on the management of learning processes[7].

So reasonable amount of educational institutions moved toward using dedicated management systems to manage the entire educational processes such as the course management systems (CMS) to plan, deliver, and manage all the learning needs of an organization.

But content management system and course management system cannot replace each other because of the separate learning activities that they support. It is necessary to understand that education is gaining long term knowledge while training is gaining knowledge for immediate application. Therefore, a content management system supports long term classroom sessions, while course management system supports a number of short training events[8].
2.7 Effect of using Course management System on student achievement:

The use of course management systems by professors has direct and indirect impacts on the achievement of students and that appears in:
1. When students possess lecture materials such as: notes, references, or using lecture capturing (recording and distributing lectures using special software) immediately after each lecture that may guarantee to professors that some students will study or at least review this lecture before the next one to eliminate mounting of lessons that need to be studied and that will lead to problems in studying[9].

Traditional method of acquiring course (using storage media or hard copies) materials are boring for students and also it may waste their time when they attempt to find the person who holds materials or even if they decide to print it they face problems of cost and crowd of print shops which makes careless students delay the collection of course materials till end of semesters, and absolutely the time will not aid them to study with concentration and that may lead to low levels of grades.

As opposite when professors use course management system course materials are accessible immediately when professors upload them, and students can access it without any problems.

2. Similarly collaboration and interaction among students have been viewed as an important factor in improving student’s achievement and success through knowledge sharing[10].

In the past study in groups between students was limited to face to face interaction and often within the faculty boundary but with the advent of internet and using of course management systems in universities, students have additional chance to interact with each other and to create specific study groups using discussion groups or video conferencing.
3. Continuous tests have a direct impact on student’s achievement and also help professors to specify points of weakness on students and also track students’ performance and take correct actions when performance delays[11]. But this mission becomes harder for professors these days because numbers of students became larger leading to difficulties in delivery, correcting, grading and analyzing of tests results for all students so some professors depend only on final examinations and reduce periodic tests. In contrast when professors use assessment tools provided by course management systems the testing process becomes independent from numbers of students. Correction, grading and analyzing becomes automatically by the system.

2.8 Technology misuse:

In spite of all advantages provided by course management systems but their misuse it by some students may leave negative impacts and other issues such as [12]:

- Sitting in front of computers for long hours and using CMS may cause diseases such as headache and eyes inflammation.
- Some students may use chat tools in the CMS for hours just for joking with other students and that leads to waste of time that could have been used for doing their homework or studying, and sometimes that may even lead to missing their meals.

2.9 Some Course Management Systems:

There are different types of course management systems used globally and below are some of them:
2.9.1 WebCT Course Management System:

WebCT (Web Course Tool) is a course management system developed to facilitate the online distribution of course contents such as: lecture slides, course outlines, course notes, lab notes, tutorials, assignments, and grades in environmentally secure and private manner by using authorization mechanisms. In the way WebCT developed to facilitate communication and discussion among professors and their students and among students themselves[13].

WebCT was developed at the University of British Columbia (UBC) in 1990 as part of research to study the imprint of online learning on student outcomes and to enhance the learning experience via new technologies. The first edition of WebCT was called WebCT Campus Edition (CE) and it’s operated on UBC.

However, the claim by the WebCT vendor to be “A global market-leading course management system”[14] was overshadowed by some difficulties. A survey among some of the UBC’s faculty members showed some problems with the (CE) as mentioned below:

- Slow updating of pages.
- Not very user friendly.
- Not flexible enough.
- Posting materials is boring.
- Time consuming.
- Hard to learn.
- Limitations in grading process.
- Discussion forum is unfriendly.

Not only that, but there are some other technical challenges appeared like:

- Performance and scalability ceiling.
- Privacy implications.
- Integration problems.
And as a result of all these problems UBC was faced with making a decision on an enterprise CMS to replace the (CE) and it was decided to choose WebCT Vista the enterprise edition of WebCT because it has overcome most of the problems with the previous edition.

In 2005 Blackboard Inc., the owner of Blackboard learning management system merged with the WebCT incorporation and at that time they dominate up to 80 percent of the course management system market in North America [15].

2.9.1.1 Advantages of WebCT:

Everyone can install a trial version of WebCT with full functionality and inexpensive to get the license but the cost increased according to the growing numbers of users and courses, in addition to that it’s easy to access via common browsers and can handle large customer base.

2.9.1.2 Disadvantages of WebCT:

Hard to learn to users who suffer from limited English proficiency and limited computer skills.

Institutions that use it are responsible for their own security system by using firewalls, encryption of login information and authorized access to the system by granting suitable necessary access rights to different types of users (professors, students, and administrator).

2.9.1.3 Components of WebCT:

WebCT consists of number of tools necessary for each educational institution and they are:

1. Course content:
   This tool holds all of the content that the professor thinks as particularly important. The content of this tool varies widely from course to course - some courses may put only the course outline or a welcome message here, and other courses may put all of the lecture notes, slides, grades, etc.
2. Announcements:
   This tool shows new news posted by administrators or professors as a pop-up message when user log into the course.

3. Assignments:
   This tool holds all assignments uploaded by professor and via it students can view, complete, submit and publish assignments.

4. Chat:
   By using this tool the user can view all chat rooms available for that course, also the doors of the chat room can be locked to facilitate private conversation.

5. Discussions:
   The discussion area is usually broken up into topics for various sections of the course, by clicking on a topic; a list of messages associated with that topic appears.

![Figure 2.1 Course View of WebCT](image)
2.9.2 Angel Learning Management Suite:

Angel is a set of web based tools that facilitate development, delivery and management of courses in educational institutes in an effective way that guarantee high level of learning outcomes.

Angel was created at Indian university Purdue University Indianapolis in 2000, by Cyber Learning Labs Inc. Later this incorporation changed its name to Angel Learning Inc.

The evolution of Angel continued and the evidence on success is its winning of the software and information Industry Association (SIIA) CODiE award for the best Postsecondary Course Management System for the third time in four years.

After successful nine years Angel learning Inc. was acquired by Blackboard Inc. in May 2009[16].

2.9.2.1 Advantages of Angel:

Angel provides a friendly and customizable learning environment easy to use and facilitate the accomplishment of tasks.

And also Angel in its own is a secure web server as opposite to WebCT and uses SQL Database Management System.

2.9.2.2 Disadvantages of Angel:

The Angel administrator should enroll in the online administration training course when Angel has been installed, and also the total cost of ownership increased based on increasing number of users and courses.

2.9.2.3 Components of Angle:

Angel offers a number of course tools that help in managing the learning process:

1. Syllabus: Enables professors to upload the syllabus files into the course page.
2. Course materials: The upload utility simplifies the upload of contents such as: Files, Images, and Web pages.
3. Calendar: Enable professors to post entries to the entire class, specific group, or specific student. And events entered on the course calendar automatically appear on the personal calendar of the user.

4. Communication Tools (discussion boards, chat): Enable professors and students to make synchronous interaction with peers in a way that simulates face to face interaction. (Interaction forum of education).

5. Course Email: is a secure Angel Course mail that handles folders, attachments, Blind Carbon Copies, and massages without the need of personal email account.

6. Quizzes: This tool optimizes assignment creation by easily creating questions or imports them from external resource.

7. Grading Tools: Simplify the process of grading and insure that students are evaluated using the same criteria. And then using the gradebook to show them their grades.

Figure 2.2 Course View of Angel
2.9.3 Sakai Course Management System:

Sakai is an online collaborative learning environment that provides tools for managing, delivering, and assessing student learning process, and to bring professors and students together for knowledge sharing and discussion.

Sakai project is a community source software development effort to develop learning system for higher education, the project began in January 2004 when Andrew W. Mellon foundation granted $2.4 million to Indian university, university of Michine, MIT, and Stanford foundation to use their own learning system and combine them to create new open source learning systems which is known today as Sakai, and it's differ from existing learning system such as blackboard and WebCT in it is free and open source nature[17].

2.9.3.1 Advantages of Sakai:

Sakai course management system suites for small to medium sized organizations and can handle up to 200,000 users, and gives the chance to them for innovation and development because it's free and open source and users can adapt the system as they need.

And also by using the group project (wiki pages) groups of students can work on the same document and edit it.

2.9.3.2 Disadvantages of Sakai:

Complexity in installation of Sakai makes it less suitable for rapid development projects that require course management system, and also it's difficult to integrate with other university software systems such as HR software, ERP software.

In addition to that Sakai developed in Java so organizations that use it need a java developer to help them to customize and integrate the system, and demanding java developer is very costly. But this problem can be addressed if the organization trains some of its IT staff to be java developers and this is cheaper than demanding external java expert.
2.9.3.3 Components of Sakai:

Sakai Course Management System is composed of set of tools that helps educational institutes to operate their environment and these tools are:

1. Announcement:
   Using this tool professor can publish important information for his/her course site at three levels (public, all course participant, or specific group of students), and the professor can attach links, files, or other items with the posted announcement.

2. Email Archive tool:
   Used to exchange emails between professors and their students, and save old emails and when the user reviews it a notification will appear with the number of unread emails and in the list of emails it highlights the unread ones.

3. Presentation Tools:
   Allows professors to upload images (.jpg, .gif, .png) format and present information to participants and when the professor uploads the image the tool turn all images into thumbnails for quick and easy viewing.

4. Syllabus Tool:
   Allows professors to create and post syllabus in their courses using the provided text editor or by importing the syllabus file from external location.

5. Chat Tool:
   The chat rooms enables professors and students to have real time chat conversations with other participants in the course, multiple chat rooms can be created within the course, however only one chat room can be active at any given time.

6. Discussion Tool:
   Enables professor to create predefined discussion topic for students or grant permissions to students to create their own topics.

7. Resources Tool:
   Appears within any course site and acts as an electronic storage area for documents, when a professor creates a document in his/her local computer
The main purpose for designing Moodle was to support a social constructionist framework of teaching and learning and helps teachers to build courseware that could be easily shared, and it is free software so that everyone can redistribute or modify it under the terms of the General Public License (GNU) as published by the Free Software Foundation, then everyone have computer that can run PHP, and can support an SQL type database, can install Moodle but under Windows and Mac operating systems and many flavors of Linux[18].

2.9.4.1 Advantages of Moodle:

It's an open source which means that everyone can freely download and install it then can modify its source code with higher levels of security especially in the classroom setting which is characterized by Password difficulty, Captcha to ensure that you're actually a person, and limited numbers of Login Attempts.

Also the technical support from the Moodle community helps the user setup his/her own Moodle environments. In addition to that Moodle enables the import of data from other learning systems such as (Blackboard, Sakai, and WebCT).

2.9.4.2 Disadvantages of Moodle:

In spite of all previous benefits Moodle suffer from some problems such as:

1. Inability to integrate with human resource systems and student information systems.
2. Has a flat structure for organizing and navigating learning materials.
3. Inability to support sophisticated assessment and grading capabilities.
4. Inefficient use of space in the user interface.
5. Reporting is difficult.

2.9.4.3 Components of Moodle:

Functionality provided by Moodle can be classified into four broad categories:
he/she can use this tool to upload the document to the course site then this tool saves and shares it with other participants.

8. **Assignment Tool:**

    Enables professor to create (import), distribute, collect, and grade assignments. Also professor can choose to grade the assignment or not and to set the due date of the assignment after which students can't submit their solutions.

9. **Gradebook Tool:**

    Allows professors to store and distribute grade information to students online, and it's integrated with the assignment tool to automate the calculation of grades and export those in one of the three formats (Point value, Letter grade, Pass/Fail).

![Sakai](image)

**Figure 2.3 Course View of Sakai**

### 2.9.4 Moodle Course Management System:

Was originally developed by Martin Dougiamas, from Curtin University, Australia in 1999, and it stands for Modular Object Oriented Dynamic Learning Environment.
- Quizzes can have time limits and provide feedback based on the overall grade achieved, also can contain a wide range of question types including (multiple choices, true/false, short answers, matching, essays, and fill in the blanks).
- Question Bank
  In this bank the main components of any Quiz activity are stored and created.
- Assignments which professors can post to be submitted later by students in specific time.
- Gradebook responsible for delivery of assignments and quizzes grades to students.

![Figure 2.4 Course View of Moodle](image-url)
2.9.5 Edmodo Course Management System:

Edmodo is free, secure, social learning platform which enable teachers and students anywhere at any time to post messages, discuss classroom topics, assign and grade class work, share content, materials, links and videos in addition to exchange of ideas with their peers, statistics shows that Over 500,000 students are using Edmodo worldwide.

In late 2008, Nic Borg and Jeff O’Hara who are technologists working at separate schools in the Chicago area, realized the need for secure social platform for professors and student as continuation of their effort In 2010 Edmodo was published to close the gap between how students live their lives and how they learn in school by creation parent accounts for communicating with teachers, parents, and students[19]

2.9.5.1 Advantages of Edmodo:

Simple interface for sharing ideas between students, and professors in real time beside that it is secure and each forum can be set with a specific password that the teacher can set up and only those invited will have access to the forum.

2.9.5.2 Disadvantages of Edmodo:

Simply, if certain or multiple students are not fortunate enough to have access to a computer at home this can cause an issue in using the site altogether.

Also some students with learning disabilities may need help with working with a computer and web based software such as this. They may not be able to work at home alone on this site and may need additional help.

2.9.5.3 Edmodo Components:

Like other kinds of course management systems Edmodo course management system has number of tools and they are:
1. Calendar:
Enables professors to enter an event that spans multiple days on the calendar by selecting "Date Range". Students also can create and view their own calendar events.

2. Library:
The Edmodo Library is a great place to collect sources to use in the classroom. These can be files (of any format), links, videos, images, etc.

3. Suggestion box:
Social networking tools can be a great source of professional development. To keep all participants up with the latest stories and break news in the Education world tree.

4. Assignment:
Using this tool professor can create assignments such as multiple choices, true/false, short answer, or fill in the blank self-grading quiz, and assign it as homework. And then the system automatically grades that assignment and shows results of students in a graphic format.

5. Collaboration:
Enables professors and students to interact with each other using instant massages (chat) or via groups, and also professor can create small groups within his/her main groups to make communication simple and give privileges to student as needed.
The researcher summarizes the difference between the 5 CMS in the next table:

<table>
<thead>
<tr>
<th></th>
<th>Angel</th>
<th>Moodle</th>
<th>Sakai</th>
<th>WebCT</th>
<th>Edmodo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>Annual License.</td>
<td>Free</td>
<td>Free.</td>
<td>Annual or Optional license.</td>
<td>Free</td>
</tr>
<tr>
<td>Unique Tool</td>
<td>Question Bank</td>
<td>-</td>
<td>Presentation</td>
<td>-</td>
<td>Library</td>
</tr>
<tr>
<td>Customization</td>
<td>Pre-Defined Themes</td>
<td>Local Customization</td>
<td>Local Customization</td>
<td>Need to request change</td>
<td>Local Customization.</td>
</tr>
<tr>
<td>Client Browser</td>
<td>IE, Firefox, Netscape.</td>
<td>Any browser work with HTML3 or higher</td>
<td>IE, Firefox, Netscape</td>
<td>IE, Firefox, Netscape.</td>
<td>IE, Firefox, Netscape.</td>
</tr>
<tr>
<td>Database Requirements</td>
<td>SQL Server 2000 or higher</td>
<td>MySQL or PostgreSQL</td>
<td>Oracle 9i or later, or MySQL 4.1</td>
<td>SQL Server 2005 or higher.</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 2.1 Summary of 5 CMSs
2.10 Conclusion:

This chapter discussed the role of technology in improving Educational processes and the main concepts of management systems especially content and course management systems.

This chapter also mentioned the positive and negative effects of using course management system on student achievements. In addition to some developed course management systems with their advantages and disadvantages.
Chapter 3 Methodology:

3.1 Introduction:

The previous chapter discussed the concepts of management systems and their role in education, and also the content management systems and their types and why educational institutions replaced them by course management systems. In addition to that there was a description of some current course management systems used by some institutes.

This chapter will introduce the requirements and specifications for developing Faculty of Mathematical Sciences Course Management System (FMS CMS).

3.2 Methodology of Research:

The researchers used semi-structured interviews with sample contains 25 students to identify the weaknesses in the current methods used to manage courses at Faculty of Mathematical Sciences, 70% of students said there are suffer from the existing manual methods and 30% of students doesn’t care about the way of management of courses.

And it was found that the main problem in the manual process of management of courses is represented in delivery of course contents, posting of announcements and communication among course classmates and professors.

Although there are some attempts to automate the process of managing courses at faculty of mathematical sciences but there are problems represented in the web classes but the specialist who is responsible for improving the web classes he explained to the researchers in an interview with him that “the functionality of web classes is incomplete and doesn’t support necessary feature’s required by any course such as announcement, discussion and real time chat” so he prefers delivery of course materials using flash disk and office hours to meet students for any questions.
And it was found that reasonable number of students suffer from the problem of getting course materials when some professors send softcopy from them to specific students and the rest of students have to track who holds materials by themselves in order to take them.

Also the researchers found problems in the communication between professors and students and between students themselves and that when a professor specifies office hours for students to meet him for discussion or to ask any questions related to the course, but sometimes it conflicts in time with student's lectures and sometimes it may not be long enough for all students to participate and meet professor.

In addition to that the interaction between students is limited within the faculty boundary and they need another ways to organize the interaction that enables them to discuss many topics in groups with the supervision of professors and work in a group work even in holidays and weekends.

So to facilitate the management of courses in FMS we started to develop the system to convert the manual process of management into automatic one.

### 3.3 System requirements:

It is the hardware and software components that are required to installing and using the system efficiently and system requirements categorized as below:

**Hardware requirements:**

There is important hardware components needed to develop and operate the system which include:

1/ PC.

2/ server.

**Software requirements:**
In order to implement required system there are necessary software components as shown below:

1/ web server: internet information service (IIS) server.
2/ Client: web browser.
3/ Microsoft visual studio 2010.
5/ Windows operating system.

3.4 Analysis of developing tools:

Developing tools are the totality of software, programming languages and other tools used to build the system and they are:

I. Microsoft visual studio (VS)

Visual studio is an integrated development environment (IDE) from Microsoft Company for build ASP web applications, XML web services, desktop applications and mobile applications.

And visual studio supports different programming languages such as C/C++, VB.NET, C# and F# and all use the same IDE which allow them to share tools and facilitate the creation of mixed-language solutions, and also there is support for other languages like Python and Ruby, and in this project we used visual C# [20]

II. C# programming language:

C# or "C sharp" is an object oriented programming language used with XML-based web services on the .NET platforms, introduced by Microsoft to
compete with sun's java language and to improve productivity in the development of web applications [21].

C# made it easier to write programs and the results will be more reliable and maintainable and it is completely rules out certain kinds of program errors such as accidentally confusing the type of an object or attempting to dereference a pointer that has been allocated.

Advantages of C#:

C# has some advantages over C and C++ and they are [22]:

1. While no programming language allows programmers write entirely bug free programs, C# goes a long way in comparison with C and C++.
2. With windows form and later on windows presentation foundation (WPF) C# is great for Rapid Application Development.
3. C# is safer to operate, since C# program is compiled into an intermediate language and the operating system can always check it to see that no malicious code is about.
4. C# combines the old and the new in an almost perfect balance. C# duplicates much of the syntax of C and adds modern ones.
5. Cost of maintenance for C# is lower than that of C++ and helps programmers to write programs that are as bug free as possible.

III. ASP.NET:

Stands for Active Server Pages and developed by Microsoft and it is built on the programming classes of the .NET framework providing a web application model with a set of controls that make it simple to build ASP web applications.

ASP.NET Includes a set of controls that encapsulate common HTML user interface elements such as text boxes and drop-down menus and it is operated on the web server.
IV. Microsoft SQL Server:

Is a relational database management system (RDBMS) developed by Microsoft. As a database, it is a software product whose primary function is to store and retrieve data as requested by other software applications from the same computer or other computers across a network[23].

With SQL server clients do not talk directly with the tables but with an intelligent data manager on the server. So if a client machine crashes the underlying tables will not be affected[24].

In addition to that the data integrity in SQL server is enhanced by the use of 'triggers' which can be applied whenever a record is added, updated or deleted and this occurs at the table level and cannot thus be forgotten by the client machine.

3.5 Components of FMS CMS:

The system will contain eight components that integrate together to automate the process of managing courses at faculty of mathematical sciences and the graph below shows the different components:
3.5.1 Syllabus:

Will help professors to distribute syllabus file which contains names of all topics related to this course that he/she will teach, the criteria of assessment, the way in which course grade are distributed, and names of references which the course relies on.

On the other hand it will help students to access syllabus files when they open the course page.

3.5.2 Resources:

Act as an electronic storage area for documents which helps professor to upload all course content in any format such as course reference books and lecture notes in short time.

Students will benefit from this component in accessing course's resources and then open or download it.
3.5.3 Announcement:

An important component in the course management system because students may participate in a number of courses and need to see the announcements and important information about courses continuously such as assignment delivery deadlines and other critical events, so it represents an area for broadcasting. This information will be visible in dedicated places where all students are expected to find any news on it. And also this feature will reduce the effort on management in news distribution and print paper to distribute it over all boards.

3.5.4 Assignments:

This component will help professors in organizing the process of distribution of assignment files and collection of student's solutions. Also students will be able to view or download assignment files uploaded by the professor and after that the student can upload answers files.

3.5.5 Real time chat:

One of the biggest problems that face students is how to communicate with professor and their classmates out of faculty border in weekends and holidays.

This component is expected to solve the above problems by stimulating face to face interaction and enable multiple students to interact with others using instant messaging which helps in knowledge sharing through course participants and other students at the faculty.

3.5.6 Discussion:

When students work together they learn from one another and get knowledge that they may not capture without sitting in group discussion. But busy schedule and home locations issues often make it difficult to coordinate group work.

But this component will help professors and students to asynchronously collaborate with each other by creating discussion and engage students in problem solving and critical thinking about issues related to the course.
3.5.7 Email:

Report in April 2012 by technology market research firm The Radicate Group estimated that there are 3.3 billion email accounts and that indicates the importance of emails and how people become familiar with it so it is important to include email functionality into our course management system.

This component can help professors to send email messages to individual or all students in the course using their own account and also students can send emails to their professors and classmate.

3.5.8 Calendar:

This component will help professors to create calendar of events in each course including event title, starting date and ending date. And also students will be able to view list of events associated with specific course.

Chapter 4 Analyses and Design:

4.1 Introduction

The main purpose of system requirements analysis is to obtain detailed understanding of user's need and to break it down into discrete requirements and then define them clearly.

In this chapter the researchers developed the framework for the system including functional requirements, non-functional requirements, hardware, and software requirements. In addition to that we included the description of various development platforms and languages.

Finally we mentioned the general design of the system and its architecture as well as the database design and tables.

4.2 Requirement specifications:
Outlines the general user's requirements to identify the systems functional and non-functional requirements

A. Functional requirements:
   It describes the intended behavior, specific functions or tasks the system must perform and support.
   And in software engineering a function is described as a set of inputs, behavior and output. Functional requirements may be calculations, technical details or data processing. And next there is a description of modules and functional requirements:

   1. Administrator module:
   This module includes the administrative functionalities for the administrator and the allowed administrative tasks for other users.
   The user with administrator type can manage the global data and set the data that will be used by other users and it includes:

      1.1 User registration:
      - Each user can register his/her new account in the system.
      - The administrator must activate every new account.

      1.2 User login:
      - Each user in the system has to login before doing any interaction.

      1.3 Course creation:
      - Each professor can create new course at the system.
      - The administrator has ability to delete any course.

   2. Document module:
   Used to manage documents used by all system users and it is classified into four sub types:
2.1 Syllabus:
- Professor can upload syllabus file into the course page.
- Student can view or download syllabus file.

2.2 Resources:
- Professor can upload course resources and edit them.
- Students can view or download resources.

2.3 Calendar:
- Every professor can add events to the course with their times and modify them.
- Student can view details of each event in the course.

2.4 Assignments:
- Every professor can upload assignments into the course page.
- Student can download assignment and upload solutions.
- The system must enter the submission date of student's solution.

3. Communication module:

Important module in the system used to facilitate the interaction between faculty members such as administrators (management), teaching staff and students and the functional requirements in this module can be categorized as:

3.1 Announcements:
- Any professor can publish and edit announcements in his or her course.
- Any student can view announcements posted by professor in course page.

3.2 Chat:
- Every course has chat room associated with.
- Professors and students can join one chat room at a time.

3.3 Email:
- Any user can send email from the site using his/her own email account.

4. Discussion module:
- Professor can add discussion topics to the course page and edit them.
- Student can comment on topics.
B. Non-functional requirements:

Non-functional requirements include constraints and properties of the system that their stakeholders care about and they are:

1. User interface considerations:

User interfaces are designed to be user friendly and easy to understand by end users and also for consistency in the layout design.

2. Performance:

The system must be able to process queries reasonably fast to reduce the performance time, and also must provide reliable information for user based on their queries.

3. Response time:

The response time should be within a reasonable interval or time and users should not wait long time for the results.

4. Reliability:

The system should be reliable and shall not cause unnecessary downtime.

5. Security:

The system must be able to do authentication to verify user's identity using the userID and password during the login session and the administrator should have control over the information in the system database.

4.3 UML Diagrams:

There are three types of UML Diagrams in our project as described below:

1. USECASE diagram
Specifies action (processing performed by the system) or interaction (communication between the system and one of the actors who participates in the use case).

The next three graphics show the use case diagrams of Admin/Professor/Student.

The Administrator can login, view/delete accounts, view/delete courses and activate accounts.

The Professor can login, register, view courses, create new courses, upload assignments, download student's solutions, create discussion topics, upload resources, add announcements, send email and enter chat room

The student can login, register, view courses, upload assignment's solution, participate in discussion, view calendar, enter chat room, send email and download resources.

Admin Course Management System

![Diagram of Admin Course Management System]

Figure 4.1 Use case diagram for Administrator
Figure 4.2 Use case diagram for Professor

Figure 4.3 Use case diagram for Student
II. SEQUENCE diagram

The sequence diagram represents the sequence of operations that take place in FMS CMS. The following is a general description for operations that take place at the system:

1. The user logs into the CMS by entering the user ID and password then the system checks for the authentication of login (success or failure).
2. If the login succeeds, a list of courses appears and user can open any course from the list and review it. As a Professor list of courses assigned to it appears and then he/she can open any one and manage it adds new materials or modifies the course site. The events can be set in a calendar by the Administrator or the professor.
3. The professor can create the discussion topic in the discussion area associated with the course he/she has selected.
4. He/she will be able to participate in the forums by sending and receiving back and forth messages.
5. Professor can post resources to students and students can download them. The professor can even post announcements to notify students with important event like the quiz date or notification that he/she has posted some resource or deadline for submitting specific assignments.
6. The student uploads the completed assignment and takes the quiz before the deadline.
7. The professor evaluates the student with feedback by viewing the assignments and discussion.

The next four figures show the sequence diagram for main modules as described above:
Figure 4.4 Sequence diagram for Administration module

Figure 4.5 Sequence diagram for Document module
4.4 System design:

4.4.1 Introduction:

System design is an important stage of system development during which the design for architecture, software components, interfaces and data are created, documented and verified to satisfy requirements. and it contains logical design and physical design, where logical design describes the structure and features like inputs, outputs, files and database. The physical design realizes the software and a working system.

4.4.2 Database Architecture and Design:

The system database must be logically designed to exploit the advantages of database technology, and we used the entity relationship diagram to illustrate the relationships between entities in the database as shown below:

![ER diagram for FMS CMS](image)

Figure 4.8 ER diagram for FMS CMS

In our system we use one SQL server database consist of the following tables:

1. Login table for user's information.
2. Course table for all faculty courses.
3. Announcement table for announcement details.
4. Resource table for all course’s materials.
5. Assignment table for assignment details.
6. Discussion table for all discussion topics.
7. Comment table for comments on discussion topics.
8. Calendar table for all events in courses.
9. Student’s solution table for solutions submitted by students.

The tables which were used are described in appendix A.

4.4.3 User Interface Design:

In our project there will be several screens and the design of them will looks like:

1. System main Page for all users

```
FMS Course Management System

Please enter your ID and password and register if you don't have an account

User Id
Password
Login

Faculty Image

Calendar
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31

About The Faculty
```

2. Professor home page to create new course or open existing course
3. Student home page shows list of his/her courses
4. Account registration page contains form to create new account in the system.

5. Course page represents template filled by details of specific course every time.
6. Announcement page for professor and student with little different (Student can view announcements but he/she cannot add, edit or delete them).

7. Resources page for professors and students but students cannot edit or resources at the page.
8. Assignments page for professor and the student can upload files at this page but he/she cannot modify assignments uploaded by the professor.

9. Calendar page for professors with modification abilities and students without modification abilities.
10. Chat page for all Professors and students.

**FMS Course Management System**

Chat room

Comment

Send

11. Discussion page for professor to new add topics and view existing topics, the student can only see existing topics and open one of them.

**FMS Course Management System**

<table>
<thead>
<tr>
<th>Home</th>
<th>Announcement</th>
<th>Resources</th>
<th>Assignment</th>
<th>Calendar</th>
<th>Chatting</th>
<th>Discussion</th>
<th>Email</th>
<th>Login</th>
</tr>
</thead>
</table>

Course Name [ ]

<table>
<thead>
<tr>
<th>Topic Name</th>
<th>Course Code</th>
<th>Details</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edit Delete</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edit Delete</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Add new Topic  Back to course List

<table>
<thead>
<tr>
<th>Topic Name</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Add Topic
12. Comments page for professor to manage comments on his/her topic and for students to add or view comments.

<table>
<thead>
<tr>
<th>FMS Course Management System</th>
<th>Login</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>Announcement</td>
</tr>
</tbody>
</table>

**Course Name** [ ]

**Discussion Details**

<table>
<thead>
<tr>
<th>Topic Name</th>
<th>Course Code</th>
<th>Details</th>
</tr>
</thead>
</table>

**Comments**

<table>
<thead>
<tr>
<th>Comment</th>
<th>CurrentDate</th>
<th>UserName</th>
<th>CommentID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delete</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delete</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

13. Email page for both professors and students to send emails to others

<table>
<thead>
<tr>
<th>FMS Course Management System</th>
<th>Login</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>Announcement</td>
</tr>
</tbody>
</table>

**Course Name** [ ]

<table>
<thead>
<tr>
<th>From</th>
<th>Recipient</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Body</th>
<th>send</th>
</tr>
</thead>
</table>
4.5 Conclusion:

This chapter specifies functional and nonfunctional requirements of the system and also UML diagrams represented in use case and sequence diagrams.

This chapter also contains the architecture of the database represented in its ER diagram and its tables, and also the design of user interfaces by Edraw Max program.
Chapter 5 Implementation:

5.1 Introduction:

Previous two chapters contain the requirements and design of FMS Course Management System and analysis of tools used for design and why we choose them. This chapter discusses the implementation of the system and how it work.

5.2 How System Works:

User visit FMS Course Management System web site and view calendar of events without login to the system and to do any other interactions he or she has to login to the system and register if he or she hasn’t account. The researchers start to mention snapshot of system pages.

This is a snapshot of system home page used by all users:
The system consist of three different levels of accounts and its Administrator, Professor and Student.

5.2.1 Administrator account:

Next is a snapshot of accounts page and the admin can delete any account from the system.

Next is a snapshot of activation page. The admin modify the active value into 1 to activate account and optionally send email to notify the user.
Below is a snapshot of courses page that shows list of courses in the system and the admin can delete any course.

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Code</th>
<th>Professor ID</th>
<th>Level</th>
<th>Specialization</th>
<th>Semester</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction To Computer</td>
<td>101</td>
<td>160</td>
<td>First</td>
<td>Information Technology</td>
<td>One</td>
<td>2011</td>
</tr>
<tr>
<td>Operation Research</td>
<td>102</td>
<td>160</td>
<td>Second</td>
<td>Information Technology</td>
<td>One</td>
<td>2012</td>
</tr>
<tr>
<td>Modern Communication Technologies</td>
<td>103</td>
<td>160</td>
<td>Fifth</td>
<td>Information Technology</td>
<td>One</td>
<td>2013</td>
</tr>
</tbody>
</table>

5.2.2 Professor account:

This is a snapshot from professor page that list all courses associated with that professor and link to add new course.

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction To Computer</td>
<td>101</td>
</tr>
<tr>
<td>Operation Research</td>
<td>102</td>
</tr>
<tr>
<td>Modern Communication Technologies</td>
<td>103</td>
</tr>
</tbody>
</table>
Next is a snapshot from new course page that professor use to register new course:

![FMS Course Management System](image)

This is a snapshot from announcement page that professor use to add new announcements or modify existing announcements:

![FMS Course Management System](image)
Next is a snapshot from discussion page that professor use to add discussion topics or to modify old topics.

This is a snapshot from comments page associated with each discussion topic that professors use to add comments and delete some comments.

Other professor pages are in Appendix C.
5.5.3 Student account:

This is a snapshot from student page that list all courses for that student.

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modern Communication Technologies</td>
<td>103</td>
</tr>
<tr>
<td>Operating Systems</td>
<td>108</td>
</tr>
</tbody>
</table>

This is a snapshot from course home page that shows details of the course and the syllabus file for that course.

Welcome to Modern Communication Technologies

Course Description:

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modern Communication Technologies</td>
<td>103</td>
</tr>
<tr>
<td>Specialization</td>
<td>Information Technology</td>
</tr>
<tr>
<td>Academic Year</td>
<td>2013</td>
</tr>
</tbody>
</table>

This is the Syllabus File

Download
This is a snapshot from resources page that student use to view or download resources.

This is a snapshot from assignment page that student use to view or download assignments and also uploads solutions with assignment ID.
5.3 Conclusion:

FMS Course Management System helps in management of courses by making manual processes online.
Chapter 6 Evaluation

6.1 Techniques used for Evaluation:

The researchers used face to face interview to evaluate FMS CMS website and check it is ability to serve professors and students to solve problems they faced before.

Researchers used one laptop works as client and server to test the website by numbers of students from different levels in FMS and using two browsers (internet explorer and Google chrome) to test chat and discussion facilities in the system.

Why interview:

Face to Face (F2F) interviews are characterized by synchronous communication in time and place due to this feature researchers decide to use it in the evaluation of the website, as no other interview method face to face interviews can take its advantage of social cues such as voice and body language and give the interview a lot of extra information that can be added to the verbal answer of the interviewee.

Another important feature in F2F interviews is no time delay between question and answer.

6.2 Results:

The researchers made semi structured interview with 10 students to test functionality of the website and its design. And also if they will use it in the future if the faculty implements it.

7 students said the website is useful to help many problems that they face and they will use it in the future. 2 students said they not sure about if they will use it in future and one student said he preferred traditional method for course management. 4 students from the 7 recommended the researchers to add additional feature such as translate the website into Arabic version and provide online video for lectures.
Chapter 7 Conclusion and Recommendation:

7.1 Introduction:

In this chapter we conclude our research by representing the challenges that face faculty of mathematical sciences in managing course briefly, and our contribution to automate learning process in addition to our future recommendation.

7.2 Conclusion:

This research was an attempt to specify problems in current methods used to manage courses at faculty of mathematical science and trying to solve it. As observed all founded problems are related to the manual process of managing courses. For this reason we started to develop the system to solve those problems.

The FMS Course Management System developed to help professors to create, store, manage and share of learning materials using tools such as announcement, resources, assignment, discussion and calendar. And also facilitate communication between professors and students through various collaborations techniques such as chat, discussion and email.

7.3 Limitations:

There are several limitations that face researchers in this project:

There are some tools researchers wish to use it in their implementation, but they face some problems in time, such as using ready to use discussion forum.

Also researchers expect to evaluate the system on sample from professors and students at Faculty of Mathematical Sciences but with time constrains and some problems in the implementation we evaluated the system on small sample from students.
7.4 Recommendations:

We proposed in this research to build web site to facilitate the management of courses in faculty of mathematical science, and we recommend adding other features such as making Arabic version from the system, automatic correction and grading of assignments, mobile notification and enable students to watch lectures online via videos.
Appendix 'A' Database Tables

1/ Login Table:

<table>
<thead>
<tr>
<th>Column name</th>
<th>Data type</th>
<th>Constraint</th>
<th>Allow nulls</th>
</tr>
</thead>
<tbody>
<tr>
<td>userID</td>
<td>Int</td>
<td>Primary key</td>
<td>No</td>
</tr>
<tr>
<td>Username</td>
<td>nvarchar(50)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Usertype</td>
<td>nchar(10)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Gender</td>
<td>nvarchar(15)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Address</td>
<td>nvarchar(50)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Phone</td>
<td>nchar(20)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Email</td>
<td>nchar(20)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Password</td>
<td>nchar(20)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>ConfirmPassword</td>
<td>nchar(20)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Level</td>
<td>nchar(20)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Specialization</td>
<td>nchar(20)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Active</td>
<td>nchar(20)</td>
<td>-</td>
<td>No</td>
</tr>
</tbody>
</table>

2/ Faculty_Courses Table:

<table>
<thead>
<tr>
<th>Column name</th>
<th>Data type</th>
<th>Constraint</th>
<th>Allow nulls</th>
</tr>
</thead>
<tbody>
<tr>
<td>courseCode</td>
<td>Int</td>
<td>Primary key</td>
<td>No</td>
</tr>
<tr>
<td>courseName</td>
<td>nvarchar(50)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>userID</td>
<td>Int</td>
<td>Foreign Key</td>
<td>No</td>
</tr>
<tr>
<td>Level</td>
<td>nchar(10)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Specialization</td>
<td>nvarchar(30)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Semester</td>
<td>nvarchar(30)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Year</td>
<td>Int</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Path</td>
<td>varchar(50)</td>
<td>-</td>
<td>No</td>
</tr>
</tbody>
</table>
### 3/ Announcement Table:

<table>
<thead>
<tr>
<th>Column name</th>
<th>Data type</th>
<th>Constraint</th>
<th>Allow nulls</th>
</tr>
</thead>
<tbody>
<tr>
<td>announcementID</td>
<td>Int</td>
<td>Primary key</td>
<td>No</td>
</tr>
<tr>
<td>AnnouncementDetails</td>
<td>Text</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>courseCode</td>
<td>Int</td>
<td>Foreign Key</td>
<td>No</td>
</tr>
<tr>
<td>Date</td>
<td>Datetime</td>
<td>-</td>
<td>No</td>
</tr>
</tbody>
</table>

### 4/ Assignment Table:

<table>
<thead>
<tr>
<th>Column name</th>
<th>Data type</th>
<th>Constraint</th>
<th>Allow nulls</th>
</tr>
</thead>
<tbody>
<tr>
<td>assignmentID</td>
<td>Int</td>
<td>Primary key</td>
<td>No</td>
</tr>
<tr>
<td>topicName</td>
<td>Text</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>courseCode</td>
<td>Int</td>
<td>Foreign Key</td>
<td>No</td>
</tr>
<tr>
<td>Path</td>
<td>varchar(50)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>dueDate</td>
<td>nchar(20)</td>
<td>-</td>
<td>No</td>
</tr>
</tbody>
</table>

### 5/ Discussion Table:

<table>
<thead>
<tr>
<th>Column name</th>
<th>Data type</th>
<th>Constraint</th>
<th>Allow nulls</th>
</tr>
</thead>
<tbody>
<tr>
<td>TopicID</td>
<td>Int</td>
<td>Primary key</td>
<td>No</td>
</tr>
<tr>
<td>TopicName</td>
<td>nchar(255)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>courseCode</td>
<td>Int</td>
<td>Foreign Key</td>
<td>No</td>
</tr>
<tr>
<td>Details</td>
<td>varchar(50)</td>
<td>-</td>
<td>No</td>
</tr>
</tbody>
</table>
6/ Comment Table:

<table>
<thead>
<tr>
<th>Column name</th>
<th>Data type</th>
<th>Constraint</th>
<th>Allow nulls</th>
</tr>
</thead>
<tbody>
<tr>
<td>TopicID</td>
<td>Int</td>
<td>Foreign Key</td>
<td>No</td>
</tr>
<tr>
<td>CommentID</td>
<td>Int</td>
<td>Primary key</td>
<td>No</td>
</tr>
<tr>
<td>Comment</td>
<td>Text</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>CurrentDate</td>
<td>Datetime</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>userID</td>
<td>Int</td>
<td>Foreign Key</td>
<td>No</td>
</tr>
</tbody>
</table>

7/ Student's solution table:

<table>
<thead>
<tr>
<th>Column name</th>
<th>Data type</th>
<th>Constraint</th>
<th>Allow nulls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Id</td>
<td>Int</td>
<td>Primary key</td>
<td>No</td>
</tr>
<tr>
<td>userID</td>
<td>Int</td>
<td>Foreign Key</td>
<td>No</td>
</tr>
<tr>
<td>Username</td>
<td>username</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Path</td>
<td>varchar(50)</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>assignmentID</td>
<td>Int</td>
<td>Foreign Key</td>
<td>No</td>
</tr>
<tr>
<td>courseCode</td>
<td>Int</td>
<td>Foreign Key</td>
<td>No</td>
</tr>
</tbody>
</table>

8/ Calendar Table:

<table>
<thead>
<tr>
<th>Column name</th>
<th>Data type</th>
<th>Constraint</th>
<th>Allow nulls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Id</td>
<td>Int</td>
<td>Primary key</td>
<td>No</td>
</tr>
<tr>
<td>Title</td>
<td>nchar(100)</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Startdate</td>
<td>nchar(100)</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Enddate</td>
<td>varchar(50)</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>courseCode</td>
<td>nchar(10)</td>
<td>Foreign Key</td>
<td>No</td>
</tr>
</tbody>
</table>
### 9/ Student's solution table:

<table>
<thead>
<tr>
<th>Column name</th>
<th>Data type</th>
<th>Constraint</th>
<th>Allow nulls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Id</td>
<td>Int</td>
<td>Primary key</td>
<td>No</td>
</tr>
<tr>
<td>userID</td>
<td>Int</td>
<td>Foreign Key</td>
<td>No</td>
</tr>
<tr>
<td>Username</td>
<td>nvarchar(50)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Path</td>
<td>varchar(50)</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>courseCode</td>
<td>nchar(10)</td>
<td>Foreign Key</td>
<td>No</td>
</tr>
<tr>
<td>assignmentID</td>
<td>Int</td>
<td>Foreign Key</td>
<td>No</td>
</tr>
</tbody>
</table>

### Appendix 'B': Source Code

**Home page Code:**

```csharp
<%@ Page Language="C#" MasterPageFile="~/site.master" AutoEventWireup="true"
CodeBehind="UserLogin.aspx.cs"
Inherits="module2.UserLogin" %>

<asp:Content ID="HeaderContent" runat="server"
ContentPlaceHolderID="HeadContent">
    <style type="text/css">
        wrapper
        {
            width: 800px;
        }
    
        .left
        {
            float: left;
            width: 356px;
            height: 485px;
            margin-right: 29px;
        }
    
        .right
        {
            float: right;
            width: 267px;
        }
```
Please enter your ID Number and password. <a href="accountregistration.aspx" title="ASP.NET Website">Register</a> if you don't have an account.

<asp:Login ID="Login1" runat="server" BackColor="#EFF3FB" BorderColor="#000000" BorderPadding="4" BorderStyle="Solid"BorderWidth="1px" Font-Names="Verdana" Font-Size="0.8em"ForeColor="#333333" Height="185px"
OnAuthenticate="Login1_Authenticate" Style="margin-left: 39px; Width="270px">

<instructionTextStyle Font-Italic="True" ForeColor="#000000"/>

<LayoutTemplate>
<table cellpadding="4" cellspacing="0" style="border-collapse: collapse;">
<tr>
<td class="style3">
<table cellpadding="0" style="height: 185px; width: 250px;">
<tr>
<td align="center" colspan="2" style="color: White; background-color: #000066; font-size: small; font-weight: bold;">
Log In
</td>
</tr>
<tr>
<td align="right">
<asp:Label ID="UserNameLabel" runat="server"
AssociatedControlID="UserName">User ID: </asp:Label>
</td>
<td>
<asp:TextBox ID="UserName" runat="server" Font-Size="0.8em" Width="130px"></asp:TextBox>
<asp:RequiredFieldValidator ID="UserNameRequired" runat="server" ControlToValidate="UserName"
ErrorMessage="User Name is required." ToolTip="User Name is required." ValidationGroup="Login1"></asp:RequiredFieldValidator>
</td>
</tr>
<tr>
<td align="right">
<asp:Label ID="PasswordLabel" runat="server"
AssociatedControlID="Password">Password: </asp:Label>
</td>
<td>
<asp:TextBox ID="Password" runat="server" Font-Size="0.8em" TextMode="Password" Width="130px"></asp:TextBox>
<asp:RequiredFieldValidator ID="PasswordRequired" runat="server" ControlToValidate="Password"
ErrorMessage="Password is required." ToolTip="Password is required." ValidationGroup="Login1"></asp:RequiredFieldValidator>
</td>
</tr>
<tr>
<td colspan="2">
<asp:CheckBox ID="RememberMe" runat="server"
Text="Remember me next time." />
</td>
</tr>
<tr>
<td align="center" colspan="2" style="color: Red;">
<asp:Literal ID="FailureText" runat="server"
EnableViewState="False"></asp:Literal>
</td>
</tr>
<tr>
<td align="right" colspan="2"/>
&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbs...
protected void Login1_Authenticate(object sender, AuthenticateEventArgs e)
{
    string userId = Login1.UserName;
    string password = Login1.Password;
    DataSet ds = new DataSet();
    try
    {
        con.Open();
        SqlCommand cmd = new SqlCommand("select * from Login where userID="
+ userId + " and password=" + password, con);
        SqlDataAdapter da = new SqlDataAdapter(cmd);
        da.Fill(ds);
        con.Close();
    }
    catch (Exception)
    {
        Login1.FailureText="Invalid UserName Or Passwords";
        return;
    }

    // wrong username or passwordss
    if (ds.Tables[0].Rows[0] == null)
    {
        // Response.Redirect("userLogin.aspx");
        Login1.FailureText = "Invalid User Or Password";
        Login1.FailureAction = LoginFailureAction.RedirectToLoginPage;
        //Login1...
    }
    else
    {
    }
}
UserLoginModel currentUser = new UserLoginModel();
currentUser.userid = ds.Tables[0].Rows[0].Field<int>("userID");
currentUser.userName = ds.Tables[0].Rows[0].Field<string>("userName");
currentUser.password = ds.Tables[0].Rows[0].Field<string>("password");
currentUser.userLevel = ds.Tables[0].Rows[0].Field<string>("level");
currentUser.userSpecialization =
ds.Tables[0].Rows[0].Field<string>("specialization");
currentUser.userType = ds.Tables[0].Rows[0].Field<string>("usertype");
currentUser.active = ds.Tables[0].Rows[0].Field<string>("active");

Session[UserLoginModel.CURRENT_USER] = currentUser;

if (currentUser.userType.Trim() == "Professor" &&
currentUser.active.Trim() == "1")
{
    Response.Redirect("/professorhomepage.aspx");
}
else if (currentUser.userType.Trim() == "Student" &&
currentUser.active.Trim() == "1")
{
    Response.Redirect("/studentcourses.aspx");
}
else if (currentUser.userType.Trim() == "Admin" &&
currentUser.active.Trim() == "1")
{
    Response.Redirect("/allaccounts.aspx");
    Login1.FailureText = "Inactive Account";
}

Course Page Code:
<%@ Page Language="C#" AutoEventWireup="true"
    MasterPageFile="~/studentview.master"
    CodeBehind="coursehomestudent.aspx.cs" Inherits="module2.coursehomestudent"
%

<asp:Content ID="HeaderContent" runat="server"
    ContentPlaceHolderID="HeadContent">
    <style type="text/css">
        .style1
        {
            font-size: x-large;
            width: 377px;
            margin-left: 75px;
        }
        .style11
        {
            font-size: x-large;
        }
        .style22
        {
            text-align: center;
        }
        .style18
        {
            font-size: large;
            margin-left: 0px;
        }
        .style29
        {
            width: 205px;
            height: 8px;
            text-align: center;
        }
        .style30
        {
            width: 201px;
            height: 8px;
            text-align: center;
        }
        .GridView
        {
            margin-left: 173px;
        }
        .style31
        {
            color: #000000;
        }
    </style>
</asp:Content>
Welcome in

Course Description:

Back To Courses List
<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Code</th>
<th>Specialization</th>
<th>Course Level</th>
<th>Academic Year</th>
<th>Course Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This is the Syllabus file.

AutoGenerateColumns="False"
BackColor="White" BorderColor="Black" BorderStyle="None"
BorderWidth="1px" CellPadding="3"
CssClass="GridView" DataKeyNames="Path"
DataSourceID="SqlDataSource1" Font-Size="Small"
Height="16px" PageSize="2" ShowHeader="False" Width="200px">
<FooterStyle BackColor="#000000"ForeColor="#000000" />
<HeaderStyle BackColor="#006699" BorderStyle="Solid" Font-Bold="True"
ForeColor="White" />
_Columns_
<asp:BoundField DataField="Path"HeaderText="Path"
SortExpression="Path"Visible="False" />
<asp:BoundField DataField="courseCode"HeaderText="courseCode"
ReadOnly="True" SortExpression="courseCode"
Visible="False" />
<asp:TemplateFieldHeaderText="Download">
<ItemTemplate>
<asp:LinkButton ID="inkDownload"runat="server"
OnClick="inkDownload_Click"Text="Download"></asp:LinkButton>
</ItemTemplate>
</Columns>
</Columns>
</PagerStyle BackColor="White"ForeColor="#000066"HorizontalAlign="Left">
</RowStyleForeColor="#000066"Height="30px"Width="80px">
<SelectedRowStyle BackColor="#669999"Font-Bold="True"
ForeColor="White" />
<SortedAscendingCellStyle BackColor="#F1F1F1" />
<SortedAscendingHeaderStyle BackColor="#007DBB" />
<SortedDescendingCellStyle BackColor="#CAC9C9" />
<SortedDescendingHeaderStyle BackColor="#00547E" />
</asp:GridView>
</asp:SqlDataSource ID="SqlDataSource1"runat="server"ConnectionString="@%$ConnectionStrings:ConnectionString2 %">
SelectCommand="SELECT [Path], [courseCode] FROM [facultyCourses] WHERE ([courseCode] = '@courseCode')">
<SelectParameters>
<asp:ControlParameter ControlID="coursecode" Name="courseCode"
PropertyName="Text"
    Type="String" />
</SelectParameters>
</asp:SqlDataSource>
</asp:Content>

namespace module2
{
    public partial class coursehomestudent : System.Web.UI.Page
    {
        private SqlConnection con = new
        SqlConnection(ConfigurationManager.ConnectionStrings["ConnectionString2"].ConnectionString);
        protected void Page_Load(object sender, EventArgs e)
        {
            try
            {
                coursename.Text =
((coursedetails)Session[coursedetails.CURRENT_COURSE]).CourseName;
        coursecode.Text =
((coursedetails)Session[coursedetails.CURRENT_COURSE]).coursecode;
    specialization.Text =
((coursedetails)Session[coursedetails.CURRENT_COURSE]).userSpecialization;
        level.Text =
((coursedetails)Session[coursedetails.CURRENT_COURSE]).userLevel;
    year.Text =
((coursedetails)Session[coursedetails.CURRENT_COURSE]).year.ToString();
   semester.Text =
((coursedetails)Session[coursedetails.CURRENT_COURSE]).coursesemester;
LibCourseName.Text =
((coursedetails)Session[coursedetails.CURRENT_COURSE]).CourseName;

}
catch (Exception)
{
}

}

protected void lnkDownload_Click(object sender, EventArgs e)
{
    LinkButton lnkbtn = sender as LinkButton;
    GridViewRow grvrow = lnkbtn.NamingContainer as GridViewRow;
    string Download = grvDetails.DataKeys[grvrow.RowIndex].Value.ToString();
    Response.ContentType = "image/jpg";
    Response.AddHeader("Content-Disposition", "attachment; filename=" +
    Download + ";
    Response.TransmitFile(Server.MapPath(Download));
    Response.End();
}

protected void Button1_Click(object sender, EventArgs e)
{
    Session[coursedetails.CURRENT_COURSE] = null;
    Response.Redirect("/studentcourses.aspx");
}

}

Assignment Code:

<%@ Page Language="C#" AutoEventWireup="true"
MasterPageFile="~/profedit.master"
<asp:Content ID="HeaderContent" runat="server"
ContentPlaceHolderID="HeadContent">


</asp:Content>
<asp:Content ID="BodyContent" runat="server" ContentPlaceHolderID="MainContent">

</asp:Content>


DeleteCommand="DELETE FROM [assignments] WHERE [assignmentID] = @assignmentID"
UpdateCommand="UPDATE [assignments] SET [topicName] = @topicName,
[DueDate] = @DueDate, [Path] = @Path WHERE [assignmentID] = @assignmentID"
InsertCommand="INSERT INTO [assignments] ([topicName], [DueDate], [Path])
VALUES (@topicName, @DueDate, @Path)"
DeleteParameters>
  <asp:Parameter Name="assignmentID" Type="Int32" />
</DeleteParameters>
<InsertParameters>
  <asp:Parameter Name="topicName" Type="String" />
  <asp:Parameter Name="DueDate" Type="String" />
  <asp:Parameter Name="Path" Type="String" />
</InsertParameters>
<UpdateParameters>
  <asp:Parameter Name="topicName" Type="String" />
  <asp:Parameter Name="DueDate" Type="String" />
  <asp:Parameter Name="Path" Type="String" />
  <asp:Parameter Name="assignmentID" Type="Int32" />
</UpdateParameters>
</asp.SqlDataSource>
&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&n
<span class="style2">&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbs

using System.Collections.Generic;
using System;
using System.Collections;
using System.Configuration;
using System.Data;
using System.Linq;
namespace module2
{
    public partial class assignmentprof : System.Web.UI.Page
    {
        private SqlConnection con = new
        SqlConnection(ConfigurationManager.ConnectionStrings["ConnectionString2", ConnectionString]);

        protected void Page_Load(object sender, EventArgs e)
        {
            Panel1.Visible = false;
            try
            {
                lblcoursecode.Visible = false;
                lblcoursecode.Text =
                ((coursedetails)Session[coursedetails.CURRENT_COURSE]).coursecode;
                Label3.Text =
                ((coursedetails)Session[coursedetails.CURRENT_COURSE]).CourseName;
catch (Exception)
{
    // throw;
}

protected void back_Click(object sender, EventArgs e)
{
    Session[coursedetails.CURRENT_COURSE] = null;
    Response.Redirect("./professorhomepage.aspx");
}

protected void back0_Click(object sender, EventArgs e)
{
    Panel1.Visible = true;
    Label2.Visible = false;
}

protected void uploadassignment_Click(object sender, EventArgs e)
{
    try
    {
        string filename = Path.GetFileName(assignmentfile.PostedFile.FileName);
        assignmentfile.SaveAs(Server.MapPath("~/assignments/" + filename));
        con.Open();
        SqlCommand cmd = new SqlCommand("insert into assignments(topicName,dueDate,Path,CourseCode) values(@topicName,@dueDate,@Path,@courseCode)", con);
        cmd.Parameters.AddWithValue("@topicName", topicname.Text);
cmd.Parameters.AddWithValue("@dueDate", duedate0.Text);
 cmd.Parameters.AddWithValue("@Path", "~/assignments/" + filename);
 cmd.Parameters.AddWithValue("@courseCode", lblcoursecode.Text);
 cmd.ExecuteNonQuery();
 Label2.Visible = true;
 Label2.Text = "Successful";
 con.Close();
}

catch (Exception)
{
    Label2.Visible = true;
    Label2.Text = "Invalid data";
}
}
Appendix 'C' System pages:

This is a snapshot from user registration page.

This is a snapshot from professor's Email page that professor use to send email to other users in the system.
This is a snapshot from calendar page that professor uses to add events in the course and modify old events.

This is a snapshot from the resources page that professor uses to add course resources and modify old resources.
This is a snapshot from assignment page that professor use to add new assignments or modify old assignments.

This is a snapshot from student's solution page that professor use to view submitted solutions by students in his or her assignments categorized by assignment ID.
This is a snapshot from chat room page selection page that professor and student use to select chat room to open.

This is a snapshot from chat room page that professor and student use to communicate with other.
This is a snapshot from announcement page that student use to view course announcements.

**FMS COURSE MANAGEMENT SYSTEM**

![Announcement Details](image)

- **Course Name**: Introduction To Computer
- **Announcement Details**:
  - Lecture Canceled for this week: 6/18/2013 5:38:25 PM
  - The Tutorial will be at SR2 this week: 6/17/2013 16:08:57 AM

This is a snapshot from calendar page that student use to view course events.

**FMS COURSE MANAGEMENT SYSTEM**

![Calendar Details](image)

- **Course Name**: Introduction To Computer
- **Title**: Graduation projects
  - **Start Date**: 1 may 2013
  - **End Date**: 1 may 2013 4pm

- **Title**: jnu k
  - **End Date**: jh
This is a snapshot from discussion page that student use to view discussion topics in the course.

<table>
<thead>
<tr>
<th>Topic Name</th>
<th>Course Code</th>
<th>Details</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>programming languages</td>
<td>101</td>
<td>what is your opinion in java</td>
<td></td>
</tr>
<tr>
<td>Networks</td>
<td>101</td>
<td>What is the difference between LAN and WAN</td>
<td></td>
</tr>
</tbody>
</table>

This is a snapshot from email page that student use to send email.
References:


[16] W. Angel, “Faculty ANGEL FAQs System Requirements.”


[23] “Microsoft SQL Server Skills LinkedIn.”