

CS5334.251/252, Spring 2020

Advanced Internet Information Processing

Time: W: 6:30 – 9:20pm
Classrooms: 366 Avery at RRC and 114-C Derrick Hall at TxState

Instructor: Wuxu PENG
Office: 309B Comal, TxState & 464X Avery, RRC
Office Hours: Office hours are updated weekly and posted online on my web site
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Web: <https://keystone.cs.txstate.edu/teaching/cs5334/sp-20/>
WebPage Username/Password: cs5334/AIIP20 (The password will be enhanced and announced in class)

Prerequisites: CS5332, or knowledge of query languages and approval of instructor.

Optional Textbooks (Any textbooks that cover the material will be fine)

- (1) Luke Welling and Laura Thomson. *PHP and MySQL Web Development (3rd ed.)*. Pearson Education, Oct. 2004. ISBN 0672326728
- (2) Matt Zandstra. *Sams Teach Yourself PHP in 24 Hours*. Sams, 2002. ISBN 0-672-32311-7.
- (3) Deitel, Deitel & Santry, *Advanced Java 2 Platform: How to Program*. Prentice-Hall, 2002, ISBN 0-13-089560-1.
- (4) Susan Anderson-Freed. *Weaving a Website: Programming in HTML, Javascript, Perl, and Java*. Prentice-Hall, 2001. ISBN 0-13-028220-0.
- (5) ORACLE 10g Documentation Library: Oracle Application Development (*SQL Reference*, *JDBC Developer's Guide and References*, and *Pro* C/C++ Precompiler Programmer's Guide*). Oracle Corporation, 2004. This document is accessible on-line at Oracle's web site. We are also going to place a copy in the SUN lab for class access on-line locally.
- (6) MySQL documentation: <http://dev.mysql.com/doc/mysql/en/index.html>
- (7) All lecture notes will be released to the class prior to the beginning of the lecture.

Course Objectives:

As the course name suggests, this course studies topics in Internet information processing. We focus on the client-server model of Internet applications. More specifically, we focus on the applications on the server side that accept clients requests, process them, and send replies back to the clients. This type of server applications consist of several cooperating components to fulfill the service requirements:

- A component that parses client requests. This component can be an explicit CGI interface, and more recently can also be an integrated part of a server application program.
- A server application program, invoked by a CGI interface or directly by an HTTP server, that carries out the actual processing of client requests. For many more sophisticated Internet applications, this application program has to access one or more database system and then process information from database systems according to the service requests.

- A component that takes the output from the application program, formats it properly, and sends it as reply to clients. This component again can be part of an explicit CGI, or an integrated part of the server application program.

This course will mainly study the central part of this type of applications: the server application program. Whenever possible, we will also attempt to look at the relationships of the three components and their integrations. As foundations the course will first briefly introduce and discuss several important tools, including:

- The programming language Perl;
- The programming language PHP;
- The SQL language (under Oracle database systems);
- Oracle Pro*C/C++ precompiler and Oracle dynamic SQL programming;
- MySQL database systems;
- Java Servlets and JavaServer Pages (JSP)

After these preparations, a complete demonstration application will be presented to demonstrate the core idea of sophisticated Internet information processing. The demonstration application consists of three components:

- (1) A collection of web pages that function as front end of the database. These web pages together provide a sample job search service.
- (2) An underlying database, which stores job, member, and employer information needed to support the sample job search service.
- (3) A collection of application programs that perform sophisticated processing of client requests (job search, member registration, new job insertion, employer registration, and etc.).

To stay with the state of art of Internet information processing, the application program portion of the demo will be implemented in three different facilities:

- Perl plus Oracle embedded C/C++ programs (under Oracle database);
- Java Servlets plus JavaServer Pages (JSP) (under Oracle database plus Apache tomcat Servlet container);
- PHP (under MySQL database)

Course Project:

Besides programming assignments, a programming project is required for this course. The project involves extending the functionality of the demo application. The basic ideas and code of the demo application will serve as a guide for your project. Although the project and programming assignments can be implemented under either LINUX or Windows platform, for the purpose of uniform grading, I have to designate specific platform for programming assignments and project.

Date/Time of Final Exam:

8:00 – 10:30pm, Wednesday, May 6, 2020

The final exam will be at one location for the entire class. One of the two sections will have to travel to the same location. The specific location for the final will be determined and announced about a week before the final exam day.

Attendance and Incomplete Policies:

It is your responsibility to attend the class and follow the course progress. Regularly attending the class is required. **Regularly missing class meetings will adversely affect your final grade.**

The CS Department has a very strict policy and procedure for granting incomplete grades. The instructor has to provide convincing information in writing to the department Chair to get approval. Therefore incomplete will not be granted unless convincing reasons are provided. Reasons such as too much workload are not acceptable for requesting incomplete grade.

Grading Policy:

Home assignments are due on time. All assignments are to be submitted electronically through the *homework/project management panel* of class forum web site. For programming assignment, a copy of your program is required to be uploaded on time. A single Word/PDF/PS/ASCII file is not sufficient for programming problems. Please do not submit Windows RAR formatted files/bundles. Details of homework/project submissions are posted on the class forum.

As always, I will try my best to maintain fairness in grading. You are encouraged to bring any discrepancy in grading to me and I will try to resolve it promptly and fairly.

Course Evaluation:

There are four written homework assignments, one programming project, plus the final exam. About 80% of the homework assignments involves programming. Final grade for this course will be calculated as follows:

3-4 homework assignments:	40%
Programming project:	25%
Class attendance:	5%
Final exam:	30%

Class forum::

A class forum is maintained by the instructor. The class forum is the primary venue of information exchanges. Registration of class forum is required, not optional. The URL for the class forum is: https://keystone.cs.txstate.edu/teaching/class_bbs/ When you register on class forum, please use a valid email account which will be used to receive a registration confirmation message. Please also provide an easily recognizable username so that I can recognize your forum posts.

Dropping Classes and Withdrawing (Extracted from <http://mycatalog.txstate.edu/graduate/registration-course-credit/>)

Dropping a class is an official action whereby a student drops one or more courses, yet remains enrolled in at least one other course. Refer to the Registration Instructions at <http://www.registrar.txstate.edu> for details on dropping a class.

1. The drop deadline is the first 60% of the semester. Please refer to the academic calendar on the Registrar's website for the most current dates.
2. A 'W' grade will be assigned automatically when a student drops one or more classes by the automatic 'W' deadline, the first 60% of the semester.

Withdrawing from the University (dropping all classes) is an official action whereby a student informs the University Registrar, who in turn informs the instructor(s) of record, that the student will cease attending all classes in which enrolled.

1. The deadline to receive an automatic 'W' is the first 60% of the semester. Please refer to the academic calendar on the Registrar's website for the most current dates.
2. After the automatic 'W' period, faculty assigns grades to students who officially withdraw from the University. Faculty assign a 'W' grade only to those students who have a passing average at the time the withdrawal action is officially completed. Otherwise, faculty assigns an 'F' grade.
3. Please refer to the academic calendar on the Registrar's website for the withdrawal deadline.

The student must contact the University Registrar in person, by letter, or by fax to withdraw officially from the University. Visit the Registrar's Office website at <http://www.registrar.txstate.edu/> or contact the Registrar's Office at 512-245-2367 for the proper procedures. Students living in university residence halls must also contact the Residence Life Office in person, by letter, or by fax.

Academic Calendar for Spring 2020:

Disclaimer: Information here is for your reference only. Please check with Registrar's Office for official academic calendar.

Last day to register without late fee	12/01/2019
First class day	01/21/2020
Late registration/schedule changes	01/16-01/29/2020 (ends at 4:45pm on 01/29)
Last day to add a course	01/29/2020
Official 12th class day available	02/06/2020
Official 12th class day certified	02/12/2020
Last day to drop course with full refund	02/05/2020 (ends at 11:59pm 02/05/2020)
May graduation application available	01/21/2020
May graduation application deadline	03/06/2020
Registration for Summer 2020 begins	03/30/2020
Last day to drop/automatic "W" deadline	03/31/2020 (both end at 11:59pm 03/31/2020)
Last day to withdraw, go to zero hours	04/23/2020 (ends at 11:59pm 04/23/2020)
Spring break begins	03/15/2020
Spring break ends	03/22/2020
Last class day	05/04/2020
Reading day	05/05/2020
Final exam	05/06-13/2020
Commencement	05/14-16/2020
Grades available online	05/19/2020

Academic Integrity:

Academic integrity is an integrated part of high education. Please consult appropriate Texas State documents for university's academic integrity requirements and policies.

Tentative Topics:

1. Introduction (1 week)
 - a. Data and file processing; database systems and DBMS
 - b. Computer applications and services
 - c. Information processing and WEB applications
2. The client-server model, interfaces, and CGI (1/2)
 - a. Main components of a client-server application
 - b. Three views of client-server model
 - c. Format of client requests, their processing, CGI
 - d. DBMS SPIs
 - e. Perl vs PHP
3. The HTTP Protocol and HTML Language (1/2)
 - a. The HTTP protocol
 - b. The HTML language
 - c. Web client/server Interactions
 - d. CGI interfaces and format of server replies
4. Introduction of programming language Perl (1)
 - a. Overview, examples, constants and literals, variables
 - b. Operators and expressions
 - c. Control constructs and functions
 - d. Patterns and pattern matching operators
 - e. Input and output
5. Introduction of programming language PHP (1)
 - a. Overview, examples, constants and literals, variables
 - b. Control constructs, functions, input and output
 - c. Web related operations and functions
 - d. Database access and manipulations
6. Introduction of SQL and Oracle Pro* C/C++ precompiler (1)
 - a. Elements of database systems and query languages
 - b. SQL and query languages
 - c. Embedded SQL in C/C++
 - d. Dynamic SQL programming
7. Introduction of Java Servlets and Java ServerPages (JSP) (1)
 - a. An example
 - b. Basic structure of Servlets and JSP Web applications
 - c. Input/output, and CGI operations
 - d. Interacting with database systems
8. Advanced Internet information processing with Oracle embedded C/C++ and Perl (2)
 - a. Learning by example: the demonstration application
 - b. Hierarchy of Internet information processing
 - c. The front end: the web pages
 - d. The bridges: the CGI programs
 - e. The back end: the databases and application programs
 - (a) The base and other classes
 - (b) Use of *cursors* in dynamic SQL
 - (c) Defining the needed queries and cursors
 - (d) Algorithms for processing the information returned from queries and cursors
 - (e) Output and their format
9. Advanced Internet information processing with Java Servlets and JSP (2)
 - a. Advantages
 - b. The search example implemented in Java Servlets
10. Advanced Internet information processing with PHP and MySQL (2)

- a. The search example implemented in JavaServer Pages
- 11. Comparison of C++ version, Servlet version and the PHP version (1/2)
 - a. Advantages
 - b. Problems