CS 207: Applied Databases Practicum

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Credits: 0L-0T-3P-2C

Elective or Compulsory: Compulsory for 2nd year CSE B. Tech.

Semester: February - June, 2021

Preamble:
The new curriculum calls for a sequence of 3 Practicum courses for CSE, viz. CS207 Applied Databases Practicum, CS307 Systems Practicum and CS308 Large Applications Practicum. The erstwhile CS211 Networks and Database Practicum included both networks and databases tools and programming. Now, the networks material is shifted to CS307 and CS204 focuses only on database applications.

Course Outline:

The students will learn how to build useful applications involving databases with GUI for access. Learning will include basics of SQL (table schema, queries, indexing), form/report GUI design, UML diagrams, and web-based applications. Skills will include open-source tools such as GUI builders, HTML, PHP, MySQL, Linux, Perl or Python, measuring the efficiency of applications. Exercises to include handling very large data (>100 MB table), making applications tolerant to network problems, use of colors and online help in GUI design.

Course Modules:

A few lab lectures (8 hours spread over the semester):

- Architectures of DB applications: Client-server; UI-Business logic-DBMS; Browser UI-Web Server-Business logic-DBMS.
- Introduction to SQL
- Introduction to E-R modelling and MVC
- Transactions – what, how and when?
- Introduction to a scripting language, e.g. PHP, Python
- Introduction to HTML and especially HTML5
- Introduction to JavaScript and Ajax/Comet
- Introduction to NoSQL

Lab assignments (listed below) require 3 hours in the lab, preceded by at least 3 hours at home. The weekly assignments are stage-wise demonstrations of the evolution of a mini-project – stages are as follows:

- Week 1-2 Choice of mini-project – a useful web-based tool.
- Week 3-4 Designing the data model and table schemas, testing the tables manually.
- Week 5-6 Design the UI flow – the user view.
- Week 7 Creating the GUI forms and reports.
- Week 8-9 Putting together the Web UI flow with the appropriate data access.
- Week 10 Basic tool ready with full functionality
- Week 11 Improving UI using JavaScript and HTML5 features.
- Week 12 Using AJAX for better user-interaction.
- Week 13 Substituting portions of the data model using NoSQL databases

Textbooks:

This course will use web-resources to cover course topics.

Class requirements

The grade in the class will be determined as follows:
10% Lab Activities
30% Assignments
15% Quiz 1
15% Quiz 2
30% Final Exam

Please don't cheat or plagiarize. Be honest in the class. If you have taken material from a source, then please cite the source. If you cheat or plagiarize, then the consequences would be catastrophic (consequences could tantamount to failing the course).

Lab Activities: In each lab class, students will be asked to execute certain activities. These activities are meant improve students' understanding of class topics. Student groups need to complete these activities during lab hours and show the results to the instructor/TA. All students in a group will get full credit for the assigned activity provided they attend the lab class and are able to complete the activity. All students in a group will get half credit if they attend the lab class but are unable to complete the activity. Those students in a group who are absent from the lab class **will not get any credit** for the assigned activity. Those who are absent could showcase their activity in a future class. There may be a makeup class for showcasing any activity that was not showcased on time by the student.

Assignments: Each week assignments will be given out in class. Student groups will be expected to finish assignments and submit them before the deadline. Failure to submit the assignment on time will likely carry penalty in points earned by a group. While submitting the assignments, students are expected to submit a MS Word document along with their solution/code/attempt as a zipped file. The MS Word document will be graded (in conjunction with the solution/code/attempt) and the document needs to explain the solution/code/attempt **in sufficient detail**. The names of all students who are part of the group should be mentioned on the MS Word Document.

Mid-term: A mid-term exam will take place as per the schedule announced in class. The material for mid-term exam will be what has been covered in class lectures, activities, and readings from the start of the semester till the mid-term.

Final Exam: This course will culminate with a final exam. The final exam will take place as per the schedule announced by IIT Mandi. It will cover class lectures, activities, quizzes, and readings for the whole course.