INFM 747 - Web-Enabled Databases

Fall 2017 - Tentative Syllabus

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Office Hours: By appointment

Class meeting time and place:
This is an asynchronous online class.

Catalog-type Description:
Basic methods and tools for developing dynamic, database-driven web sites. Acquiring, installing, and running web servers, database servers, and connectability applications. Developing web interfaces and application-layer components.
Prerequisite: INFM603, LBSC690, or LBSC671; and INST733. Or permission of instructor.
Restriction: Permission of INFO-College of Information Studies. Credit only granted for: INFM747 or INFM718N. Formerly: INFM718N.

Extended Description:
Contemporary web applications go beyond plain HTML pages, providing interfaces to dynamic databases, and adding several other key functionalities to websites. These functionalities enrich the user experience, and facilitate porting of many information tasks to web environment. INFM 747 Web-Enabled Databases will introduce tools and methods for developing database driven websites. The course will introduce initial steps of building a dynamic website, such as installing and maintaining a web server and a database server, as well as developing web interfaces and server-side applications that provide added functionality to the website.

1 This syllabus is subject to change. Please check the course ELMS space frequently for updates.
Learning Outcomes:
After completing this course students will be able to:
- Articulate the basic approaches and key development elements to building dynamic websites.
- Acquire, install and maintain a web server, a database server, and application modules that provide connectivity between different layers of the site architecture.
- Build basic web interfaces for interacting with underlying databases.
- Program basic application components that will add functionality to websites.

Elements of the Course:
Skill Level Self-Assessment: Your first assignment in this course is to fill out the Skill Level Self-Assessment on the Canvas (ELMS) site. This assignment is not graded if completed by the deadline, but may affect a student’s grade negatively, if it is not completed by the deadline. To complete the assignment, you will provide your preferred email address for communications regarding this course, and state your self-assessed skill level in server-side scripting and relational databases. You should fill out and submit the survey by the deadline specified on the Canvas site.

Modules: The course will be delivered as a sequence of modules on Canvas (ELMS), each of which will cover one or a few key skills in PHP scripting and database development and management on the MySQL database server. Each module will combine one or more learning components, such as videos, slideshows, example scripts, exercises and assignment. (Not all modules will involve all of these components.) Each module will have a due date by which it should be completed with all of its components, including assignments, if any. Students may choose to complete the modules at a faster pace, but have to complete each module by its due date in order to stay on track, and be on time with assignment submissions. See the Course Plan further below for the list of modules and completion due dates. Note that this is a summer-long course, and the course plan is spread over the 12 weeks of the summer term.

Examples and Exercises: Some modules will include examples and exercises. Students are expected to observe and analyze the examples, and then try applying what they have learned on a number of ungraded exercises. You are encouraged to seek the instructor’s help if and when you encounter problems working on the exercises. Students’ work on and solutions for the exercises will not be submitted and will not be graded.
Optional Online Help Sessions: Students will have the opportunity to work with the instructor online if they need and want to. Online sessions will be scheduled based on the need and the availability of the student and the instructor. We will use Webex (https://umd.webex.com/meet/vdiker) and Team Viewer (http://www.teamviewer.com) for online help sessions, as needed. Students will not be required to attend any of these sessions. Attending or not attending the sessions will not have any grade consequences.

Assignments: Students will work on a number of graded assignments throughout the semester. These will generally focus on improving and extending the module examples. Students are expected to work on these assignments individually, and not receive any help from classmates or other individuals. If any of the assignment due dates is a holiday for you, please inform the instructor in advance, so an alternate due date can be set for you. Students’ work on and solutions for the assignments will be submitted via Canvas (ELMS) and will be graded.

Individual Project: Students will work on a semester-long individual project where they will build a small-scale, non-trivial web-enabled database application running on PHP and MySQL. Students will choose their topic and develop the underlying database structure in consultation with the instructor. If you have taken INST 733 - Database Design, you are strongly advised to use your INST 733 project database as the underlying database. Note that you are not allowed to use a database that was used as the basis for another INFM747 project in a previous semester. You are also not allowed to use a database that is going to be used by another student as the basis for their INFM747 project this semester. Usually, if two or more students propose the same database, the student who is the original author of the database will be allowed to use it for the purposes of the INFM747 project. The project application will be developed after the topic and the database is fully approved by the instructor. The application will perform basic functions that would be expected from a web-enabled database application, such as displaying, adding, editing, and deleting data. Students are expected to work on this project individually, and not receive any help from classmates or other individuals. Students’ work on and deliverables for the individual project will be submitted via Canvas (ELMS) and will be graded.
Progress Updates: You are required to submit weekly updates via Canvas (ELMS) about your progress. Since the course does not include any required in-class or synchronous online meetings, these updates are necessary so that the instructor can assess the progress of each student over the semester. See the course plan further below for exact dates by which to the updates via Canvas (ELMS). Your grade may be adversely affected if you fail to send the instructor regular updates on each due date.

Grading:

Assignments: 40%

Individual Project: 60%

There will be no mid-term exam or final exam for this course. Your grade will be based on your performance on the assignments and the individual project.

Text, Video and Online Resources:

Over the years, I have observed that students come to this course with different levels of existing knowledge and experience on databases and server-side scripting. Furthermore, students have different learning styles and benefit from different types of resources. While written materials works for some students, other students find audio-visual materials more helpful. I have also had numerous students who do most of their learning via reading online forums on PHP and MySQL. Consequently, there are no “required” textbooks or any other resources that I ask all students acquire and use. Instead, I give you an annotated list of text, video and online resources that will be conducive to your learning depending on your existing level of knowledge of web-enabled databases and your learning style. Feel free to contact me if you would like to discuss any of the items listed below.

Books:

  (A very balanced book that should appeal to both absolute new-comers, as well as students on an “intermediate” level. This is the book I will use most as a basis for my examples. If you are very new to scripting and databases, this may be a good choice as far as books go. An electronic version of this text is also available. A 5th Edition of this book is slated for release in September 2017.)
(A pretty fun book which provides a gentle introduction to PHP and MySQL. Should work nicely for the visual learner, but may be a little “too cute” for more experienced students who are willing move more directly through topics. **O’Reilly titles are available electronically to UMD students through the library website at [http://lib.umd.edu](http://lib.umd.edu).**)

(This is the most recently released title on this list, and consequently the least likely to include outdated code.)

(Nota that this book is more than a decade old and it is likely that at least some of the code in it does not work optimally with the current versions of PHP and MySQL. The main reason I still keep this book on this list is because its ebook version is freely available to UMD students through the library website at [http://lib.umd.edu](http://lib.umd.edu). This book covers topics in a straightforward and simple style, but may expect you to be already familiar with some basic web-enabled database concepts. May appeal more to students with some experience in programming and/or databases.)

(This book covers more advanced topics compared to the other books listed. The progress through topics is faster than the other books, too. This might be of interest to students who come to the course with existing experience with scripting and databases.)

**Video Resources:**

• Lynda.com (access at [http://www.it.umd.edu/lyndatraining/](http://www.it.umd.edu/lyndatraining/))
(A video training website which offers a few courses on PHP and MySQL among many other topics. This service is available to UMD students free of charge, accessible at [http://www.it.umd.edu/lyndatraining/](http://www.it.umd.edu/lyndatraining/). This is a great resource whether you want to follow a full course, or just need to look up certain topics.)
• **Youtube** ([http://youtube.com](http://youtube.com))
  Youtube features a large number of videos on PHP and MySQL. (A simple search for “PHP MySQL” returned over 230,000 hits.) However, finding a structured, high-quality course might be tricky, if not totally impossible. Still, this should be a good source for looking individual topics or problems up, whenever you need to see some extra examples.

• **Module videos on Canvas (ELMS)**
  (Some of the course modules on Canvas will include videos produced by the instructor.)

**Websites:**

• **w3schools.com** ([http://w3schools.com](http://w3schools.com))
  (This site features some quick, to-the-point lessons on PHP and SQL. These lessons may be a little terse for people who prefer detailed, step-by-step explanations, and should work better for “looking things up”, as a reference guide or checking out some extra examples.)

  (A comprehensive and authoritative reference manual for MySQL.)

  (A comprehensive and authoritative reference manual for PHP.)

• **Discussion boards** (such as stackoverflow.com, [http://programmers.stackexchange.com](http://programmers.stackexchange.com), [http://www.phphelp.com](http://www.phphelp.com))
  (You may be able to find solutions to individual coding problems on online forums. A good way to start is to do a search on the problem in question on your favorite search engine.)

**Software:**

We will use a number of freely available open source software for this course. Specifically we will use:

- **Apache web server** (or some other web server, if you already know how to install and administer it.)

- **PHP 5** *(This is required. No other scripting module will do.)*

- **MySQL database server** *(This is required. No other database server will do.)*

- **MySQL Workbench or MySQL GUI tools 5.0** *(One of these is required. Feel free to use phpMyAdmin or any other GUI tool in parallel, but I will require you to send me*
your database backups in one of MySQL Workbench or MySQL Administrator formats. MySQL Administrator is part of the MySQL GUI Tools suite. **I recommend MySQL Workbench, which has now replaced the MySQL GUI Tools suite.**

The recommended way to acquire these components is to download a "distro" that bundles these software, such as XAMPP (available free of charge at [http://apachefriends.org](http://apachefriends.org)). Distro installations are generally simpler, and XAMPP is recommended by the textbook from which I will assign readings; (chapters will be provided to you.) XAMPP includes Apache, PHP and MariaDB, a fork of MySQL. You will still need to download and install MySQL Workbench or MySQL GUI Tools separately, since neither of those is not included in XAMPP. Please install these software at your earliest convenience and no later than the end of the first week of the course. You may want to consider alternative distros such as WAMP (for Windows computers), MAMP (for Mac computers), and LAMP (for Linux computers). Please refer to “Module 03 - Software Installation and Tests” on the ELMS course space for more information.

**Policy on Academic Misconduct**

Cases of academic misconduct will be referred to the Office of Student Conduct irrespective of scope and circumstances, as required by university rules and regulations. It is crucial to understand that the instructors do not have a choice of following other courses of actions in handling these cases. **There are severe consequences of academic misconduct, some of which are permanent and reflected on the student’s transcript.** For details about procedures governing such referrals and possible consequences for the student please visit [http://osc.umd.edu/OSC/Default.aspx](http://osc.umd.edu/OSC/Default.aspx).

**University of Maryland Code of Academic Integrity:**

"The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit [http://shc.umd.edu/SHC/default.aspx](http://shc.umd.edu/SHC/default.aspx)."
Special needs

Students with disabilities should inform the instructor of their needs at the beginning of the semester. Please also contact the Accessibility and Disability Services (301-314-7682 or https://counseling.umd.edu/ads/). ADS will make arrangements with the student and the instructor to determine and implement appropriate academic accommodations. Instructors are not allowed to assess and accommodate special needs themselves, without ADS involvement. Students experiencing personal problems that hamper their course work are referred to the Counseling Center (301-314-7651 or http://www.counseling.umd.edu/) for expert help.
### Course Plan

<table>
<thead>
<tr>
<th>Week No. [Dates]</th>
<th>Module No.</th>
<th>Learning Module Title</th>
<th>Technology</th>
<th>Completion due date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 [8/28-9/4]</td>
<td>01</td>
<td>Database basics and normalization</td>
<td></td>
<td>Tuesday, Sept. 5</td>
</tr>
<tr>
<td>1 [8/28-9/4]</td>
<td>02</td>
<td>Introduction to web-enabled databases</td>
<td></td>
<td>Tuesday, Sept. 5</td>
</tr>
<tr>
<td>1 [8/28-9/4]</td>
<td>03</td>
<td>Software installation and tests</td>
<td></td>
<td>Tuesday, Sept. 5</td>
</tr>
<tr>
<td>2 [9/5-9/11]</td>
<td>05</td>
<td>Backing up and restoring databases</td>
<td>MySQL</td>
<td>Tuesday, Sept. 12</td>
</tr>
<tr>
<td>2 [9/5-9/11]</td>
<td>06</td>
<td>Queries for viewing/listing data</td>
<td>MySQL</td>
<td>Tuesday, Sept. 12</td>
</tr>
<tr>
<td>3 [9/12-9/18]</td>
<td>07</td>
<td>PHP introduction</td>
<td>PHP</td>
<td>Tuesday, Sept. 19</td>
</tr>
<tr>
<td>3 [9/12-9/18]</td>
<td>08</td>
<td>Variables, Operators</td>
<td>PHP</td>
<td>Tuesday, Sept. 19</td>
</tr>
<tr>
<td>3 [9/12-9/18]</td>
<td>09</td>
<td>Conditionals</td>
<td>PHP</td>
<td>Tuesday, Sept. 19</td>
</tr>
<tr>
<td>4 [9/19-9/25]</td>
<td>10</td>
<td>Arrays, Array functions</td>
<td>PHP</td>
<td>Tuesday, Sept. 26</td>
</tr>
<tr>
<td>4 [9/19-9/25]</td>
<td>11</td>
<td>Loops</td>
<td>PHP</td>
<td>Tuesday, Sept. 26</td>
</tr>
<tr>
<td>4 [9/19-9/25]</td>
<td>12</td>
<td>User-defined Functions</td>
<td>PHP</td>
<td>Tuesday, Sept. 26</td>
</tr>
<tr>
<td>5 [9/26-10/2]</td>
<td>13</td>
<td>HTML forms</td>
<td>HTML</td>
<td>Tuesday, Oct. 3</td>
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<tr>
<td>5 [9/26-10/2]</td>
<td>14</td>
<td>Handling HTML forms in PHP (POST method)</td>
<td>PHP</td>
<td>Tuesday, Oct. 3</td>
</tr>
<tr>
<td>5 [9/26-10/2]</td>
<td>15</td>
<td>Basic form validation, Form stickiness</td>
<td>PHP</td>
<td>Tuesday, Oct. 3</td>
</tr>
<tr>
<td>6 [10/3-10/9]</td>
<td>16</td>
<td>Running queries through PHP and HTML forms</td>
<td>PHP + MySQL</td>
<td>Tuesday, Oct. 10</td>
</tr>
<tr>
<td>6 [10/3-10/9]</td>
<td>17</td>
<td>Viewing/listing records based on a criterion</td>
<td>PHP + MySQL</td>
<td>Tuesday, Oct. 10</td>
</tr>
<tr>
<td>6 [10/3-10/9]</td>
<td>18</td>
<td>Populating drop-down menus via queries</td>
<td>PHP + MySQL</td>
<td>Tuesday, Oct. 10</td>
</tr>
<tr>
<td>Week No. [Dates]</td>
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<td>Technology</td>
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<tr>
<td>7 [10/10-10/16]</td>
<td>19</td>
<td>Viewing/listing records from a join table</td>
<td>PHP + MySQL</td>
<td>Tuesday, Oct. 17</td>
</tr>
<tr>
<td>7 [10/10-10/16]</td>
<td>20</td>
<td>Record-specific HTML links and pages (GET method)</td>
<td>PHP + MySQL</td>
<td>Tuesday, Oct. 17</td>
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<tr>
<td>8 [10/17-10/23]</td>
<td>21</td>
<td>Queries for adding records through PHP</td>
<td>PHP + MySQL</td>
<td>Tuesday, Oct. 24</td>
</tr>
<tr>
<td>8 [10/17-10/23]</td>
<td>22</td>
<td>Queries for deleting records through PHP</td>
<td>PHP + MySQL</td>
<td>Tuesday, Oct. 24</td>
</tr>
<tr>
<td>8 [10/17-10/23]</td>
<td>23</td>
<td>Queries for editing records through PHP</td>
<td>PHP + MySQL</td>
<td>Tuesday, Oct. 24</td>
</tr>
<tr>
<td>9 [10/24-10/30]</td>
<td>24</td>
<td>Paginating query results</td>
<td>PHP + MySQL</td>
<td>Tuesday, Oct. 31</td>
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<tr>
<td>10 [10/31-11/6]</td>
<td>25</td>
<td>Displaying query results on sortable columns</td>
<td>PHP + MySQL</td>
<td>Tuesday, Nov. 7</td>
</tr>
<tr>
<td>12 [11/14-11/20]</td>
<td>27</td>
<td>Cookies and sessions</td>
<td>PHP + MySQL</td>
<td>Tuesday, Nov. 21</td>
</tr>
</tbody>
</table>

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3 You are required to send your progress update emails to the instructor by these completion due dates.