

## STEM TEACH III: IT-603 Summer II 2019 Information Management

<b>Dates:</b> 07/01-08/09/2019	<b>Mode:</b> Online	<b>Location:</b> <a href="http://blackboard.valpo.edu">http://blackboard.valpo.edu</a>
<b>Instructor:</b> Sonja Streuber	<b>Office Hours:</b> M-F 9am-12pm on Google Hangouts	<b>Contact:</b> <a href="mailto:sonja.streuber@valpo.edu">sonja.streuber@valpo.edu</a>

### Introduction



Welcome to IT-603, Information Management! This course examines data structures, file organizations, concepts and principles of various information management systems, as well as data analysis, database design, data modeling, database management and information management system implementation. More specifically, it introduces relational and non-relational data models; entity relationship modeling, the Structured Query Language (SQL), JavaScript Object Notation (JSON), data normalization, and data architecture. Using MySQL as relational vehicle, and MongoDB as non-relational example,

this course provides hands-on experience in database design and implementation through assignments and lab exercises.

### Learning Objectives

Students learn about database design and programming, with a major focus on the relational model and SQL (Structured Query Language). With that in mind, the outcomes of this course are to:

1. Describe fundamental data and database concepts
2. Compare and contrast the relational database model with other database models
3. Explain and use the database development lifecycle
4. Design databases using data modeling and data normalization techniques
5. Create databases using popular database management system products
6. Solve problems by constructing database queries using the Structured Query Language
7. Develop insights into future data management tool and technique trends
8. Recommend and justify strategies for managing data security, privacy, audit/control, fraud detection, backup and recovery
9. Critique the effectiveness of Database Management Systems in computer information systems

### Course Format and Attendance Requirement

While this is an online course, it is not a MOOC; to ensure that students continually engage with the technology, small pieces of work are due almost each weekday (but may be completed ahead of time). Each Sunday evening, a communication from the instructor on Blackboard outlines the goals and tasks for the week. The approximate work rhythm is below (all assignments are due before 11:59 pm CST):

- **Monday:** Do all assigned readings and watch all assigned videos. Review the assignments for the week.

- **Tuesday:** Post your answer to the weekly Discussion Prompt.
- **Wednesday:** Review all answers to the weekly Discussion Prompt and complete the first homework assignment for the week.
- **Thursday:** Respond to TWO of your peers' Discussion posts, taking into account the Response prompt.
- **Friday:** Review the responses to your Discussion post and complete the second homework assignment for the week.

The instructor is available in person and through Skype and Google Chat during the office hours posted above. Use the opportunity to interact with the instructor directly to get your homework questions answered! If you would like an in-person appointment at alternate times, please send an email first.

### Textbooks & Materials

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Books (free):

- MySQL for Professionals: <https://books.goalkicker.com/MySQLBook/>
- SQL for Professionals: <https://books.goalkicker.com/SQLBook/>
- The Little MongoDB Book: <https://www.openmymind.net/2011/3/28/The-Little-MongoDB-Book/>
- MongoDB for Professionals: <https://books.goalkicker.com/MongoDBBook/>

Database and Other Software (free):

- Cloud 9: <https://c9.io/login> -- Create a user account with your @valpo.edu email address
- Then follow the instructions for setting up a MySQL database in <https://docs.c9.io/docs/setup-a-database>. This is also explained in an instructor video. We will set up the mongoDB database later in the course.
- Screen-cast-o-matic for the course final: [http://screencast-o-matic.com/screen\\_recorder](http://screencast-o-matic.com/screen_recorder)

Recommended (not free):

- Oppel, Andy (2011). *Databases Demystified*. **2<sup>nd</sup>** edition. ISBN 978-0-07-174799-8. The eBook (Kindle version) is available on [amazon.com](https://www.amazon.com) for \$10.99; used copies go for as little as \$5 on eBay.
- A computer (Windows, Mac, or Linux) **WITH WEBCAM!**

### Workload

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This 3-credit course requires significant research and teamwork. You will be completing the following:

1. **Weekly Discussion and Responses (6\*(5 points for post; 5 points for 2 responses) =60 points):** Every Tuesday, you will answer the discussion question for the week; this will help you prepare for the first homework on Wednesdays. Every Thursday, you will respond to TWO of your peers; this will help you prepare for the second weekly homework on Fridays. Due to their timebound nature, discussion posts and responses CANNOT BE MADE UP.
2. **Homework Assignments (10\*10 points each=100 points):** During the first 5 weeks, you will complete TWO homework assignments each week. One is due on Wednesday; the other one on Friday. During week 6, you may complete an optional extra credit homework assignment.

3. **Final Exam (40 points):** The final exam will be an individual set of tasks performed on a new database you will receive on the Monday of week 6. On the last Friday of this course, you will have 2 hours to do the following:
- Solve the database tasks you are given and practice typing the commands
  - In a max. 15-minute screencast, record your solution path with screen-cast-o-matic (and webcam, in which you explain what you are doing and typing and why) and post your video to YouTube, then paste the YouTube link into the assignment on Blackboard.

You can earn up to 200 points in this course.

#### Letter Grade Conversion:

>93%: A	90-93%: A-	87-90%: B+	83-87%: B	80-83%: B-	77-80%: C+
73-77%: C	70-73%: C-	<70%: F			

#### Assignment Submission, Late Work, and Academic Honesty

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- **Assignment Submission:** All assignments must be submitted on Blackboard by 11:59 pm CST on the day they are due. **No emailed assignments will be accepted.**
- **Late Work:** Work is considered late if not posted to Blackboard by 11:59 pm CST of the day on which it is due. **Late work will lose 50% of the grade.** All outstanding late work is due on the last day of class.
- **Academic Honesty:** **All work you submit for this course must be your own.** You may NOT use anyone else's words (from blogs, webpages, purchased solutions, etc.) without giving a clear source citation. If you are unsure, consult <http://www.plagiarism.org/> or the Writing Center. In addition, you must write and sign with your name the following statement on all course work:

**I have neither given nor received, nor have I tolerated others' use of unauthorized aid.**

For more information about Valparaiso University's Academic Honor Code, case review cycles, and potential penalties, please refer to <http://www.valpo.edu/student/honorcouncil/index.php>

**Any work found in noncompliance with the Valparaiso University Honor Code will receive 0 points and be referred to the Graduate School. This causes much paperwork and headache.**

## Diversity and Inclusion

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Valparaiso University aspires to create and maintain a welcoming environment built on participation, mutual respect, freedom, faith, competency, positive regard, and inclusion. This course will not tolerate language or behavior that demeans members of our learning community based on age, ethnicity, race, color, religion, sexual orientation, gender identity, biological sex, disabilities (visible and invisible), socio-economic status, or national origin. The success of this class relies on all students' contribution to an anti-discriminatory environment where everyone feels safe, welcome, and encouraged to engage, to explore, and ultimately, "to embark on a rewarding personal and professional journey" (Pres. Heckler).

## Title IX

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Valparaiso University strives to provide an environment free of discrimination, harassment, and sexual misconduct (sexual harassment, sexual violence, dating violence, domestic violence, and stalking). If you have been the victim of sexual misconduct, we encourage you to report the incident. If you report the incident to a University faculty member or instructor, she or he must notify the University's Title IX Coordinator about the basic facts of the incident. Disclosures to University faculty or instructors of sexual misconduct incidents are not confidential under Title IX. Confidential support services available on campus include: Sexual Assault Awareness & Facilitative Education Office "SAAFE" (219-464-6789), Counseling Center (219-464-5002), University Pastors (219-464-5093), and Student Health Center (219-464-5060). For more information, visit <http://www.valpo.edu/titleix/>.

## Access and Accommodation Services

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The Access & Accommodations Resource Center (AARC) is the campus office that works with students to provide access and accommodations in cases of diagnosed mental or emotional health issues, attentional or learning disabilities, vision or hearing limitations, chronic diseases, or allergies. You can contact the office at [aarc@valpo.edu](mailto:aarc@valpo.edu) or 219.464.5206. Students who need, or think they may need, accommodations due to a diagnosis, or who think they have a diagnosis, are invited to contact AARC to arrange a confidential discussion with the AARC office. Further, students who are registered with AARC are required to contact their professor(s) if they wish to exercise the accommodations outlined in their letter from the AARC.

## Academic Support

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To get help, use the [Academic Success Center \(ASC\) online directory](http://valpo.edu/academicsuccess) (valpo.edu/academicsuccess) or contact the ASC ([academic.success@valpo.edu](mailto:academic.success@valpo.edu)) to help point you in the right direction for academic support resources for this course. Valpo's learning centers offer a variety of programs and services that provide group and individual learning assistance for many subject areas. These learning centers include:

- [Graduate Tutoring Lab](#): Serves the academic needs of Graduate students – tutors offer suggestions on organization of papers, assist in research and citations, and help in understanding difficult assignments. Additional one on one tutoring is also available.
- [Writing Center](#): Primarily serves the needs of undergraduate students, but is also available for Graduate students. Writing Consultants provide proofreading and editing assistance for papers and assignments.

### **Library Services**

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The librarian best able to help you navigate information resources for independent research or additional reading is listed on the library research guide for our department. Click the link to Library Guides within the Blackboard table of contents for this course.

### **Class Cancellations**

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Notifications of class cancellations will be made through Blackboard with as much advance notice as possible. It will be both posted on Blackboard and sent to your Valpo e-mail address. If you don't check your Valpo e-mail account regularly or have it set-up to be forwarded to your preferred e-mail account, you may not get the message. Please check Blackboard and your Valpo e-mail (or the e-mail address it forwards to) before coming to class.

## Schedule

Week	Week Starting	Topic	Readings and Videos (read and watch before Monday)	Due by 11:59 pm CST T = Tuesday W = Wednesday R = Thursday F = Friday
1	07/01	What is a Database?  The relational database model  (OPTIONAL: Installing MySQL)	Instructor Slides and Video(s)  MySql for Professionals Ch. 1-2  Oppel Ch. 1-2  Lynda.com course: Sections 1-3  Browse the user documentation for Cloud9: <a href="https://docs.c9.io/docs/getting-started">https://docs.c9.io/docs/getting-started</a>  OPTIONAL:  Install MySQL Community Edition on your local computer	T: Discussion  W: HW01: Create an account on c9.io with your valpo.edu email address, then email the instructor that you have completed the task; once you have been added to the Valpo Cloud9 team, install the course database based on the instructions  R: 2 Responses  F: HW02: Install your assigned database and use draw.io to build an ERD based on its structure
2	07/07	Structured Query Language and its WHERE filter  Aggregating Data	Instructor Slides and Video(s)  SQL for Professionals Ch. 6-9, 13, 42  Oppel Ch. 4  Lynda.com course: Section 4	T: Discussion  W: HW03: Build two queries using the WHERE operator  R: 2 Responses  F: HW04: Build two queries that aggregate data and perform

				mathematical operations on data
3	07/14	Changing data and table structures  Joining data between tables	Instructor Slides and Video(s)  SQL for Professionals Ch. 18, 19, 21, 25, 26, 29  Oppel Ch. 4  Lynda.com course: Section 5-6	T: Discussion  W: HW05: Add columns to a table and insert/ update data  R: 2 Responses  F: HW06: Build select statements that combine data from different tables
4	07/21	Automating Functionality with Views, Triggers, and Stored Procedures	Instructor Slides and Video(s)  MySql for Professionals Ch. 8, 24  SQL for Professionals Ch. 47, 54, 55  Oppel Ch. 4	T: Discussion  W: HW07: Build two views that combine data from different tables  R: 2 Responses  F: HW08: Build a set of a trigger and a stored procedure to automate a task
5	07/28	Database Security: Creating Users and granting and revoking privileges  Setting Row-level Security	Instructor Slides and Video(s)  MySql for Professionals Ch. 63, 64  SQL for Professionals Ch. 34	T: Discussion  W: HW09: Build two users with varying permission levels  R: 2 Responses  F: HW10: Setting row-level security

			<p>Oppel Ch. 10</p> <p>SQL injection tutorial at <a href="https://sqlzoo.net/hack/">https://sqlzoo.net/hack/</a></p>	such that users have limited access to the database
6	08/04	Designing Databases: From conceptual to relational—and to NoSQL	<p>Instructor Slides and Video(s)</p> <p>The Little MongoDB Book, Ch. 4, 6</p> <p>Oppel Ch. 6-8</p>	<p>T: Discussion</p> <p>W: EXTRACREDIT (optional): Install MongoDB on Cloud9, upload a database, and navigate around this database</p> <p>R: 2 Responses</p> <p>F: Course Final</p>

**APPENDIX****Student Learning Objectives—Graduate School**

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1. Students will understand and practice methods of inquiry and strategies of interpretation within the student's field of study.
2. Students will master the knowledge and skills pertinent to the student's field of study.
3. Students will effectively articulate the ideas, concepts, and methods through written and oral presentation.
4. Students will understand the connection between their knowledge and skills on the one hand and their professional identity, responsibilities, and demands on the other.
5. Students will integrate knowledge and methods of their study with cognates and other disciplines.
6. Students will study, reflect upon, and practice ethical behavior and cultural sensitivity as they relate to professional and personal responsibility.

**Student Learning Objectives—Information Technology Program**

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1. To understand and practice methods of inquiry and strategies of interpretation within the student's field of study.
  - 1A. Students will master several programming environments.
  - 1B. Students will learn to identify and isolate problems.
2. To master the knowledge and skills pertinent to the student's field of study.
  - 2A. Students will acquire an extensive technology related vocabulary.
  - 2B. Students will become comfortable using a wide range of technology environments.
3. To effectively articulate the ideas, concepts, and methods through written and oral presentation.
  - 3A. Students will be taught how to make formal, oral presentations and be required to give 6 such presentations during their program.
  - 3B. Students will write numerous, thorough papers requiring extensive research. They will be required to use the services on the writing center.
4. To understand the connection between their knowledge and skills on one hand and their professional identity, responsibilities, and demands on the other.
  - 4A. Students will understand the implications of legal and professional regulations as they relate to information technology.
  - 4B. Students will study how technology can be made available to people that are traditionally less advantaged.
5. To integrate knowledge and methods of their study with cognates and other disciplines.
  - 5A. Students will learn techniques of modeling data from other disciplines.
  - 5B. Students will study human factors in IT.
6. To practice ethical and cultural sensitivity as it relates to professional and personal responsibility.
  - 6A. Students will examine a wide range of ethical issues related to technology and the potential effects on people and the environment.
  - 6B. Students will explore the relationship between IT and ethnic and cultural diversity.