



## COP 4703 Advanced Database Systems for Information Technology

Credit Hours: 3  
 Prerequisites: none  
 Corequisites: COP 4538 (Data Structures and Algorithms for IT)  
 CRN: **14649**  
 Section: 701  
 College of Engineering  
 Computer Science & Engineering

## COURSE SYLLABUS

Instructor Name:	<b>Dr. Sueychyun (Roger) Fang</b>	Semester/Term & Year:	<b>Spring 2019 (Jan 07 ~ May 02)</b>
Office Number:	<b>ENG 016</b>	Primary Instructional Mode:	<b>Online except final exam</b>
Phone Number:	<b>(813) 974-2398</b>	Delivery Method:	<b>Canvas</b>
E-mail:	<b>fang1@usf.edu</b>	Teaching Assistant:	<b>Md Asaduzzaman Noor</b> <b>noor3@mail.usf.edu</b>
Office Hours:	<b>8:00 ~ 11:00 AM Friday</b>		

### I. University Course Description (2018-2019 catalog)

Database management systems are presented, covering relational, CODASYL, network, hierarchical, and object-oriented models. Backups and database server admin are covered. Best practices for information management are covered.

### II. Course Overview

The goal of this course is to make students knowledgeable of database management systems and their tools. It teaches students how to create databases and their stored objects as well as how to use and manage database systems productively. Because this course is designed to be a learn-by-doing kind of class, major effort will be devoted to hands-on work with sample databases using Microsoft SQL Server.

### III. Course Objectives

Upon successful completion of the course, students should be able to

- 1) Install and configure a database management system such as SQL Server or MySQL.
- 2) Work with tools provided by a database management system.
- 3) Write DDL and DML SQL commands to design, implement, and access databases.
- 4) Develop database objects like views, stored procedures, functions, triggers, etc.
- 5) Secure a DBMS and its databases by managing authentication and authorization.

#### IV. Required Texts and Software

- **Murach's SQL Server 2016 for Developer**, Bryan Syverson and Joel Murach, 2016 ed, ISBN: 978-1-890774-96-7, eBook or print copy.
- **SQL Server 2016 Documentation**  
<https://docs.microsoft.com/en-us/sql/sql-server/sql-server-technical-documentation?view=sql-server-2016>
- **Microsoft SQL Server 2016 Service Pack 2 Express** in your own computer with **Windows 8, 8.1, or 10**  
<https://www.microsoft.com/en-us/download/details.aspx?id=56840>

\*Although you may also use **SQL Server 2017 Express** for all works in this course, the above version is more recommended. 2017 version can be downloaded at

- <https://www.microsoft.com/en-us/download/details.aspx?id=55994>

\*If your PC is still running **older Windows** and cannot install SQL Server 2016 Express, you may use either one of the following:

- Microsoft® SQL Server® **2012** Service Pack 3 (SP3) Express (for Windows 7 or newer)  
<https://www.microsoft.com/en-us/download/details.aspx?id=50003>  
select SQLEXPRT\_x64\_ENU.exe (if your Windows is 64-bit) or SQLEXPRT\_x86\_ENU.exe (if your Windows is 32-bit)
- Microsoft® SQL Server® **2014** Service Pack 2 (SP2) Express (for Windows 7 SP1 or 8.1 or newer)  
<https://www.microsoft.com/en-us/download/details.aspx?id=53167>

\*For **Mac users**, there are two options to install Microsoft® SQL Server® 2017 (only this version is applicable)

- with VirtualBox (a virtual machine)  
<https://database.guide/how-to-install-sql-server-on-a-mac-with-virtualbox/>
- without VirtualBox (a virtual machine)  
<https://database.guide/how-to-install-sql-server-on-a-mac/>

\*For **Linux users**, please use the following guide to install Microsoft® SQL Server® 2017 (only this version is applicable)

<https://docs.microsoft.com/en-us/sql/linux/sql-server-linux-setup?view=sql-server-2017>

#### V. Methods of Instruction

Textbook study, hands-on exercises, online discussions with the instructor, voice over PowerPoint slide lectures, and web research. This instructional approach requires the student to take a self-motivated and active approach to learning. In order to be successful, the student must develop study habits vital to learning in a mixed technology environment, including:

- Organization skills
- Autonomous learning
- Complete tasks ahead of time
- Understand, follow, and apply written instructions
- Written Communication skills
- Commitment to necessary study time
- Learn novel techniques and technologies
- Reading skills

**VI. Assessment of Student Learning Outcomes**

Assessment	Percent of Final Grade
Discussion & Posts	10%
Quizzes	10%
Assignments & Projects	30%
Exam 1 (online)	15%
Exam 2 (online)	15%
Exam 3 (on-campus)	20%
	100%

Grade	Point Value	Score	Grade	Point Value	Score	Grade	Point Value	Score
A+	4.00	100+ -97	A	4.00	96.99-93	A-	3.67	92.99-90
B+	3.33	89.99-87	B	3.00	86.99-83	B-	2.67	82.99-80
C+	2.33	79.99-77	C	2.00	76.99-73	C-	1.67	72.99-70
D+	1.33	69.99-67	D	1.00	66.99-63	D-	.67	62.99-60
F	0	59-	FF	Any Cheating				

**VII. Instructor Feedback Policy & Grade Dissemination**

Unless otherwise posted, instructor or TA will provide feedback on assignments within one week of the posted deadline.

Graded tests and materials in this course will be returned individually via Canvas, or, for printed materials, can be picked up in TA's office. You can access your scores at any time using "Grades" in Canvas.

**VIII. Course Policies: Grades****Late Work Policy:**

All posted work for grades, including chapter reading, quiz, and homework assignment are due in one week on Sunday at 11:59pm before next new module is posted. For example, if reading, quiz, and homework assignment of Chapter 1 are posted on Monday, Jan 7<sup>th</sup>, they are due in one week at 11:59pm, Sunday, Jan 13<sup>th</sup>.

Assignments and discussion posts received after the due date will be penalized at the rate of 20% for each day or portion of a day that they are late. Correct answers of quizzes will be released and posted right after their due dates. Therefore, late submitted quizzes will not be accepted and will obtain only zero points.

**Make-up/Missed Work Policy:**

The instructor will accommodate students who have to miss assignments or exams due to medical emergencies in the immediate family or job-related situations. These are the only conditions under which

accommodation will be considered during the semester. Should such a situation arise, the student should notify the instructor and provide necessary documentation before the missed assignment or test can be rescheduled.

**Grades of "Incomplete":**

The current university policy concerning incomplete grades will be followed in this course. For USF Tampa undergraduate courses, an "I" grade may be awarded to a student only when a small portion of the student's work is incomplete and only when the student is otherwise earning a passing grade. The time limit for removing the "I" is to be set by the instructor of the course. For undergraduate students, this time limit may not exceed two academic semesters, whether or not the student is in residence, and/or graduation, whichever comes first. For graduate students, this time limit may not exceed one academic semester. "I" grades not removed by the end of the time limit will be changed to "IF" or "IU," whichever is appropriate.

**Final Examinations General Policy:**

<http://regulationspolicies.usf.edu/policies-and-procedures/pdfs/policy-10-005.pdf>

According to the College of Engineering, the final exam of this course has been scheduled at **12:30~2:30 PM on Sunday April 28, 2019**. The final exam will be comprehensive and held on-campus on the above date and time. Room location will be announced possibly in April once the University arrangement is ready. Please note that you will need to bring with you a computer with SQL Server to do the final exam. Power cord extension may also be needed for your computer battery.

If you cannot participate the scheduled final exam, you are responsible to contact USF Testing Services at least two weeks before the exam week to request your final exam to be proctored on a different date and/or different location. Once approved and arranged, it's very important that you also notify the instructor to submit the exam material to meet your approved date, time, and location.

**IX. Course Policies: Technology and Media****Canvas**

This course will be offered via USF's learning management system (LMS), Canvas. If you need help learning how to perform various tasks related to this course or other courses being offered in Canvas, please consult the Canvas Student Guide <https://guides.instructure.com/m/4212>. You may also contact USF's IT department for help at (813) 974-1222 or [help@usf.edu](mailto:help@usf.edu).

**"Raise Your Hand"**

Each module of the course in Canvas comes with a special discussion titled "Raise Your Hand". If you have questions for instructor that could also be shared with others regarding contents of each weekly module of the course, you can post them directly in "Raise Your Hand" during the specific week of the module and receive an answer from the instructor (or TA, in some cases).

**Email:**

If you have personal questions for instructor or TA about the course at any time, you should use 'Inbox' in Canvas to email them directly for prompt reply. If necessary, you may use your official USF e-mail account that ends with "mail.usf.edu." In this case, you should begin your subject line with course number "4703". If you don't, your email may not be responded promptly.

### **Proctored Examinations:**

Exam 1 and 2 will be proctored using the university online proctoring tool **Proctorio**. All students must review the syllabus and the requirements including the online terms and video testing requirements to determine if they wish to remain in the course. Enrollment in the course is an agreement to abide by and accept all terms. Any student may elect to drop or withdraw from this course before the end of the drop/add period.

Online exams within this course require online proctoring. Therefore, students will be required to have a webcam (USB or internal) with a microphone when taking an exam or quiz. Students understand that this remote recording device is purchased and controlled by the student and that recordings from any private residence must be done with the permission of any person residing in the residence. To avoid any concerns in this regard, students should select private spaces for the testing. The University library and other academic sites at the University offer secure private settings for recordings and students with concerns may discuss location of an appropriate space for the recordings with their instructor or advisor. Students must ensure that any recordings do not invade any third party privacy rights and accept all responsibility and liability for violations of any third party privacy concerns. Setup information will be provided prior to taking the proctored exam. For additional information about online proctoring you can visit the online proctoring student FAQ at

**<http://www.usf.edu/innovative-education/resources/student-services/online-proctoring.aspx>.**

The first two exams in this course will be online proctored, time-limited exams. Each will be accessible for 48 hours on the two exam days and each will be 2 hours long. You will be required to take these exams using Canvas with **Proctorio** and other software required by the syllabus.

The following will result in receiving zero points to any of these exams and thus potentially fail the course.

1. Inability to take the exam due to lack of proper equipment; e.g. it is your responsibility to ensure that you own a PC with required tools and software allowing you to perform all required exams tasks.
2. Communicating in any way during the exam with anyone besides the proctor.

The instructor reserves the right to update the process outline above to reflect changes required to meet the specific needs of the course, department and university policy and procedures as required.

## **X. Course Policies: Student Expectations**

### **Course Attendance at First Class Meeting:**

Students are required to attend the first class meeting of courses for which they registered prior to the first day of the term. Names of students who register prior to the first day of the term are printed on the first class roll for each course section. The first class roll is used by professors to drop students who do not attend the first day of class. For this online class, you are required to **complete the first discussion**

post on Canvas by end of Friday, 11:59pm on Jan 11<sup>th</sup> 2019 to meet this requirement and therefore avoid to be dropped from the class.

Students having extenuating circumstances beyond their control and who are unable to attend the first class meeting must notify the instructor or the department prior to the first class meeting to request waiver of the first class attendance requirement.

Students who add courses or late-register during the first week of classes will not be on the first class roll and, therefore, will not be dropped for non-attendance by the instructor. Students are responsible for dropping undesired courses in these categories by the 5th day of classes to avoid fee liability and academic penalty.

### **General Attendance/Participation Policy:**

This course is not self-paced and is taught entirely online module by module. A new module of course content will be published in Canvas no later than Monday of each week during the semester. Regular logins and participation in class work are mandatory and tracked by Canvas. Material not covered in the textbook could also be discussed in the lecture slides or posted notes. Students should plan on logging in regularly throughout the week to review and respond to course materials, readings, discussion posts, and announcements. Infrequent logins or failure to participate in required activities are treated as absence. It will adversely affect the course grade and may result in the student being administratively dropped from the course.

### **Submission Guidelines:**

The following are general points to be observed in all deliverables:

- Submission of files must be typed (or word-processed).
- Student name, course number, and deliverable identification or title (e.g., assignment number, etc.) must be clearly stated in all submissions and any email correspondence.
- If it is a SQL script text file, the file name extension must be .sql and SQL coding guidelines (see Chapter 1) should be applied to the script writing.
- Please retain all deliverables until you verify that scores have been correctly posted in Canvas.
- All deliverables, unless otherwise noted, must be submitted through the designated links in Canvas.
- Citation for references of all external sources, regardless of the format, regardless of the location, must be properly denoted to give credit to the originator.
- All submissions must be original work of the student. Cheating will result in up to an "FF" grade for the course.
- The instructor may post a question or query or concept in Canvas, and you are to expand and research the topic further. You may also be required to post, answer, or comment on one or more classmates for each topic.
- All posts and discussions must be held in a professional manner, no foul or unprofessional language, no threats, or other intimidating comments will be allowed.

### **Academic Integrity of Students:**

<http://regulationspolicies.usf.edu/regulations/pdfs/regulation-usf3.027.pdf>

### **Disruption to Academic Process:**

<http://regulationspolicies.usf.edu/regulations/pdfs/regulation-usf3.025.pdf>

**Student Academic Grievance Procedures:**

<http://regulationspolicies.usf.edu/policies-and-procedures/pdfs/policy-10-002.pdf>

**Disability Access:**

<http://regulationspolicies.usf.edu/policies-and-procedures/pdfs/policy-0-108.pdf>

**Sexual Misconduct/Sexual Harassment Reporting:** <http://regulationspolicies.usf.edu/policies-and-procedures/pdfs/policy-0-004.pdf>

**Religious Observances:**

Students who anticipate the necessity of being absent from class due to the observation of a major religious observance must provide notice of the date(s) to the instructor, in writing, by end of the first week of class.

**End of Semester Student Evaluations:**

All classes at USF make use of an online system for students to provide feedback to the University regarding the course. These surveys will be made available at the end of the semester, and the University will notify you by email when the response window opens. Your participation is highly encouraged and valued.

**Campus Emergencies:**

In the event of an emergency, it may be necessary for USF to suspend normal operations. During this time, USF may opt to continue delivery of instruction through methods that include but are not limited to: Canvas, Elluminate, Skype, and email messaging and/or an alternate schedule. It's the responsibility of the student to monitor the Canvas site for course specific communication, and the main USF, college, and department websites, emails, and MoBull messages for important general information.

**XI. Instructor-Specific Course Policies****Instructor's Right to Modify the Course Syllabus:**

As the instructor of this course, I reserve the right to modify the course syllabus at any time during the course to address changes needed in content, course resources, assignments, exams, etc. Changes will be made so as not to impact negatively students' grades.

**Miscellaneous:**

1. The main mode of communication between the instructor and students during off-class hours will be the Canvas Announcement portal and your official USF email. You are responsible to regularly check both for any announcements.
2. Students do not have permission to sell lectures notes or provide the assignments and tests to others.

**XII. Important date/time about this course to remember**

- **First day class attendance:** Friday, Jan 11<sup>th</sup> 2019 (completing a post by midnight)

- Drop/Add ends: Friday, Jan 11<sup>th</sup> 2019
- **Martin Luther King, Jr. Holiday:** Monday, Jan 21<sup>st</sup>, 2019
- **Exam 1 (online proctored):** Two hours between Feb 20<sup>th</sup> and 21<sup>st</sup>, 2019
- Withdrawal (with "W") Deadline: Saturday, Mar 23<sup>rd</sup> 2019
- **Exam 2 (online proctored):** Two hours between Mar 27<sup>th</sup> and 28<sup>th</sup>, 2019
- **Spring Break:** Monday ~ Sunday, Mar 11<sup>th</sup> ~ 17<sup>th</sup>, 2019
- Reading days: Thursday ~ Friday, Apr 25<sup>th</sup> ~ 26<sup>th</sup>, 2019
- **Final Exam (on-campus):** 12:30 ~ 2:30 PM, Sunday, Apr 28<sup>th</sup>, 2019. Room will be announced once determined.

### XIII. Course Outline/Schedule

Week	Topics	Assignments
<b>Unit 1 – Overview &amp; Tooling</b>		
(1) 01/07	<ul style="list-style-type: none"> <li>♦ Introduction to the course</li> <li>♦ Database System Overview</li> <li>♦ Relational Data Models &amp; RDBMS</li> <li>♦ SQL</li> <li>♦ Database Administration (DBA)</li> </ul>	<ul style="list-style-type: none"> <li>♦ Reading and quiz: Chapter 1</li> <li>♦ Download and install Microsoft SQL Server 2016 Express</li> </ul>
(2) 01/14	<ul style="list-style-type: none"> <li>♦ DBMS Tools</li> <li>♦ SQL Server Management Studio (SSMS)</li> <li>♦ Managing a database and its files</li> <li>♦ Online help &amp; references: Books Online</li> </ul>	<ul style="list-style-type: none"> <li>♦ Reading and quiz: Chapter 2</li> <li>♦ Download and install textbook databases (See Appendix)</li> </ul>
<b>Unit 2 – SQL Querying (SQL/DML)</b>		
(3) 01/21	<ul style="list-style-type: none"> <li>♦ Retrieve single table data               <ul style="list-style-type: none"> <li>– SQL/DML</li> <li>– Column and row selection</li> <li>– Sorting</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>♦ Reading and quiz: Chapter 3</li> </ul>
(4) 01/28	<ul style="list-style-type: none"> <li>♦ Retrieve multi-table data               <ul style="list-style-type: none"> <li>– Inner &amp; outer joins</li> <li>– Set operators</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>♦ Reading and quiz: Chapter 4</li> </ul>
(5) 02/04	<ul style="list-style-type: none"> <li>♦ Summary Queries</li> <li>♦ Data aggregation &amp; grouping</li> </ul>	<ul style="list-style-type: none"> <li>♦ Reading and quiz: Chapter 5</li> </ul>
(6) 02/11	<ul style="list-style-type: none"> <li>♦ Complex database queries               <ul style="list-style-type: none"> <li>– Subqueries</li> <li>– Common table expression (CTE)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>♦ Reading and quiz: Chapter 6</li> </ul>
<b>Unit 3 – SQL Querying (SQL/DML) with Data Modification, DBMS Data Types &amp; Functions</b>		
(7) 02/18	<ul style="list-style-type: none"> <li>♦ <b>EXAM 1 (two hours, online proctored)</b> <ul style="list-style-type: none"> <li>– 02/20 ~ 21 (due at 11:59pm)</li> </ul> </li> <li>♦ Data modification and action Queries</li> </ul>	<ul style="list-style-type: none"> <li>♦ <b>Chapters 1 ~ 6</b></li> <li>♦ Reading and quiz: Chapter 7</li> </ul>
(8) 02/25	<ul style="list-style-type: none"> <li>♦ SQL data types &amp; data conversion</li> <li>♦ DBMS built-in functions</li> </ul>	<ul style="list-style-type: none"> <li>♦ Reading and quiz: Chapter 8</li> <li>♦ Reading and quiz: Chapter 9</li> </ul>



Unit 4 – SQL Data Definition (SQL/DDDL) and Database Design		
(9) 03/04	♦ Database design & normalization	♦ Reading and quiz: Chapter 10
(10) 03/11	♦ <b>Spring Break (no class)</b>	♦ No assignments
(11) 03/18	♦ Database implementation ♦ SQL/DDDL	♦ Reading and quiz: Chapter 11
Unit 5 – Database Scripting for Procedures, Functions, and Triggers		
(12) 03/25	♦ <b>EXAM 2 (two hours, online proctored)</b> – 03/27 ~ 28 (due at 11:59pm) ♦ Database scripting	♦ <b>Chapters 7 ~ 11</b> ♦ Reading and quiz: Chapter 14
(13) 04/01	♦ Stored procedures ♦ User-defined functions	♦ Reading and quiz: Chapter 15 (p.450-475) ♦ Reading and quiz: Chapter 15 (p.476-485)
(14) 04/08	♦ Triggers	♦ Reading and quiz: Chapter 15 (p.486-498)
Unit 6 – Database Security (SQL/DCL)		
(15) 04/15	♦ Authentication & Authorization – Logins – SQL/DCL – Permissions – Roles	♦ Reading and quiz: Chapter 17
(16) 04/22	♦ Database threats and security ♦ SQL injection, Privilege Escalation Attacks ♦ Using Stored Procedures/Triggers to Secure a Database ♦ Review for Final Exam ♦ <b>04/25~26 Reading Days</b>	♦ Handout materials
(17) 04/29	<b>FINAL EXAM</b> ♦ 12:30 ~ 2:30 PM, Sunday, 04/28 ♦ on-campus, room TBA	♦ <b>All materials</b>

\* Note: The Schedule is subject to revision and minor changes might be made in CANVAS as needed.

### Revisions

01-07-2019      Office hours and TA updated.