CIS 430/530

Database Systems and Processing (3-0-3)

Course Content	
	• Class Announcement and Post • Class Syllabus • Lab Assignments • Class Lecture Notes

- **Class Announcement and POST**

15. May 22, 2018:
Please follow the link in this webpage to get to the Imagine WebStore site.
If you accessed the site from the MS Imagine My School's WebStore site to register for downloading, MAKE SURE TO CHOOSE : Cleveland State University - Computer Information Science !
Do not Select Cleveland State University - ENGINEERING ! Your Account is approved under Computer Information Science ! NOT under ENGINEERING.

14. May 22, 2018:
If you still need help with downloading and insatlling the SQL Server, See the New General Installation Guides in the Lab Section !
From this semester, Any MS SQL Server Package Doesnot Have the Client Software - SQL Server Management Studio. Download it seperately from the MS Download site and install it after Installing a SQL Server. See the new instruction !

13. May 22, 2018:
See the Updated General Installation Guides in the Lab Section !

12. May 22, 2018:
If you didn't get an email (to your email address that you provided during the MS Imagine account registeration) from Jackie, search your Clutter or Spam folder !

11. May 22, 2018:
For the installation guides of SQL Server in detail, see the Lab Section !
Read the Installation Guides FIRST before starting downloading ! See the Lab section for More details !

10. May 22, 2018:
If you still have a trouble to register at MS Imagine Site to download Visual Studio and SQL Server,
it is probably because your ID and email were not in my CampusNet class list since you registered this class late.
Send an email to Dr. Jackie Woldering below (j.woldering@csuohio.edu) with your ID, Name, and CSU Email to ask to approve your MS Imagine Account ASAP !
If you are getting the error saying your account has been expired, send hime email to explain the problem with your info then he will update your account.

9. May 22, 2018:
For Mac, Install VM(Virtual Machine) and Window on Mac and then SQL Server on the Window VM:
1. Install Mac OS X Host from
Oracle VM
Oracle VM Download OR VM Fusion
2. Install Window OS on the VM on your Mac then
3. Install SQL Server on Window VM.

8. May 22, 2018:

The Output of each lab is your report in Doc file that shows your screen captures of your SQL Server Management Studio showing that you wrote each SQL/DDL/DML and the server returned the correct results.
Each of your screen capture must show your query and the result returned by the server respond of the query in the SAME window in your System to prove that your lab is done correctly in YOUR Server !!

Lab Submission:
1. Submit your file in .doc file on Blackboard for a timestamp and as a proof.
2. Submit the printout of your lab in Class for grading.
If you don't submit a printout of your lab, the grade won't be returned to you ! Your consequences !

7. May 22, 2018:
If you can't burn CD to install SQL server, install 7-zip from the site below then right click on the downloaded file to unzip !
to install 7-Zip Make sure to download it from this site only not to get Virus !

6. May 22, 2018:
If you still have a trouble to view the class webpage in Internet Explorer and you don't know how to set Compatibility Mode to fix the problem, see the link below.
How to Set Compatibility Mode in Microsoft IE
Or Use Google Chrome to view webpages, it doesn't have the problem. If you still can't find where to set the compatibility mode (it is usually under Tool icon or your IE address bar),
google it to find the compatibility mode setting for the version of your OS with your IE version.

5. May 22, 2018:
When you download SQL Server and Visual Studio from MS Imagine site, follow the instruction to run Secure Download Manager.
Once you download with SDM, you are supposed to burn the downloaded ISO image into CD then install (run Setup) from the CD you burned.
If you don't want to burn your CD, Install 7-Zip to extract the files from ISO into your directory in your hard disk

4. May 22, 2018:

Your Accounts will be approved this week. Go to the MS Imagine site to create your account to download and install SQL Server and Client (MS SQL SERVER Management Studio which is included in the server package).
MS SQL SERVER Standard version or higher !
Read the guides FIRST before starting downloading ! See the Lab section for More details !

For more guides on installation of SQL Server, see the Lab Section !

3. May 22, 2018:
If you don't want to wait, Go to the Oracle site below to download and install Oracle database server 11g Standard.

http://www.oracle.com/technetwork/database/enterprise-edition/downloads/index.html

Refer Online Oracle documents Oracle9i/Database Installation Guide

2. May 22, 2018:

Lab Assignment 0 : Prep for Lab Assignments

1) Go to Microsoft Academic Alliance Program: Microsoft Imagine site below to register
2) Download and Install a SQL SERVER package
2014 or 2016 SQL Server Standard (Developers/Enterprise) Version with Service Packs recommended
Make Sure to install a matching Version of Visual Studio first before installing SQL Server (Please see installation Guide in the Lab section for the detail)

Read the installation Guides FIRST before Starting to download !
3) After everything is set up correctly, Run SQL Server Management Studio - a Client for your SQL Server (It is Under All Programs of your start menu of your Window) to Play with your SQL Server
4) If your SQL Server is not running (You don't see the green arrow on your server name on the top left of your SQL Server Management Studio), start the server manually in your SERVICE list. (Read the general installation guides for this in the Lab Section !)

Registration Instructions - Microsoft Academic Alliance Program :

New Procedure from Jan 2017:

1) Go to the Microsoft Imagine Site (Previously known as DreamSpark page) below to Register:
Microsoft Imagine for CSU

Please follow the link in this webpage to get to Imagine WebStore site.
If you accessed the site from the MS Imagine My School's WebStore site to register for downloading, MAKE SURE TO CHOOSE : Cleveland State University - Computer Information Science !
Do not Select Cleveland State University - ENGINEERING ! Your Account is approved under Computer Information Science

If already registered, just enter Username and Password and click the Sign-In button.

If not registered yet, do the following steps:

1) Click the Register button.
2) Enter the 7-digit CSU ID Number as the Username.
3) Click the Continue button to go to the next screen.
4) Enter First Name.
5) Enter Last Name.
6) Username should already be shown, don't change it!
7) Enter Email Address of an account that you check regularly.
8) Choose a new password for the Microsoft Imagine site.
9) Re-enter the new password same as the previous step.
10)Type the 'Captcha' text to prove that you're not a robot!
11)Click the Register button.
You will be taken back to the initial Sign-In or Register webpage.

12) Enter your Username and Password and click the Sign-In button.

If you didn't get an email from Jackie for this procedure, search it in your Clutter or Spam folder to find it.
For more detailed information or if you have difficulties, contact Dr. Jackie Woldering j.woldering@csuohio.edu

If you already created your account from another classes, and you are getting the message saying that your account has been expired,
please recreate your account with your CSUID or Campusnet email to access the products.
If you still have a problem, you HAVE to send email(and CC to me) to Dr. Jackie Woldering j.woldering@csuohio.edu to update your account.

Old Prodedure Before Jan 2017

1)=> Go to DreamSpark site for CSU (now, Microsoft Imagine) Webpage below:
Microsoft Imagine for CSU
To register. Hit the "Signin" button at the top right.
2) => On the "SIGN IN" page and hit the "REGISTER"button.
3) => In the box labeled "USERNAME " input your CSU ID number (if not, CampusNet Email Address).
4) => The next page is self explanatory.
NOTE- Your CSU ID that you entered on this page (or CampusNet email) becomes your Username after registration.

1. May 22, 2018:
The class webpage can be reached from blackboard as well:
Class Webpage
If you have a trouble to display the webpage correctly with MS Internet Explorer, open it with Google Chrome

Final Exam schedule for Summer:
on the Last Class July 12 !

University's Official Academic Calendar for the Semester and the Final Exam Schedules

- **Class Syllabus**
- **ABET Class Syllabus**

- **Lab Assignments**

- **Installation Guides for SQL Server:**

Read all the instruction Guides below FIRST !
If you already created your Microsoft Imagine (DreamSpark) account from another classes, and you are getting the message saying that your account was expired, please recreate your account with your Campusnet email to access the products.

1. Install Visual Studio 2016 or higher first before installing 2016 SQL Server.
Install Visual Studio 2013 or higher first before installing 2014 SQL Server.
Note that any old versions of Visual Studio (2010 or 2012 VS) won't work with 2014 SQL Server. Visual Studio (2013 or 2015 VS) won't work with 2016 SQL Server.

2. 2014 SQL Server won't work that well on Window 8 OS. Recommend it on Window 7 or Window 10.

3. 2016 SQL Server can be installed only on Window 8 or Window 10. It can NOT be installed on Window 7 OS or any lower version.

4. For Those who want to install Enterprise Edition
Follow the steps to install MS SQL Server Enterprise Edition and Choose Window Authentification Mode and then Add Current User (add you as administrator in your system) in Server Configuration and Database Engine Configuration steps.

5. From this semester, Any MS SQL Server Package Doesnot Have the Client Software - SQL Server Management Studio. Download it seperately from the MS Download site and install it after Installing a SQL Server. See the new instruction !
Download and Install the Client: SQL Server Management Studio (SSMS) Download SSMS

General Installation Guides:

Guides for Downloading and installing 2017 Visual Studio and 2016 SQL Server
Guides for Installing MS SQL Server and Creating Your First Database

Installation Guides for 2016 SQL Server: NEW POST !

Installation Guides for 2016 SQL Server
Guide to Install 2016 MS SQL Server Enterprise Edition
First Guides to Install MS SQL Server

How to Use the Client SSMS to Connect to Your SQL Server: How to Use SSMS NEW POST !
How To use a Client new SSMS 2017

Installation Guides for 2014 SQL Server:

Updated Installation Guides for 2014 SQL Server on Window 8
Guide to Install MS SQL Server Enterprise Edition
Trouble shooting Tip for installing SQL Server2014 on Window 10 (This issue may not seen anymore)Shared by Nick White

How to Install SQL Server on Mac:
1. Install Mac OS X Host VM(Virtual Machine) from
Oracle VM
Oracle VM Download OR VM Fusion
2. Install Window OS on the VM on your Mac then
3. Install SQL Server on Window VM .

If you want to install SQL Server on Linux, download and install PostgreSQL.
PostgreSQL to download

Creating a Database Using AZURE Cloud:
Quick Tutorial: Getting Started : How to Set Up and Create a Database on Azure Cloud
Quick Tutorial: How to Create a SQL Database on Azure Cloud

If you have any questions or help on the insatllation and set up, please send email to TA !

Lab1 :
- **Lab Assignment 1 on Creating and Populating Tables**

Notes for Lab1:
1. Make Sure to Insert All 4 Departments in Department table.
2. Make Sure to Show Your Table Contents with Select * From your_table_name; (with the screen Capture of the Select Query Results) in your report right after Inserting all the data.

- **Example of Lab Output Note that this is NOT a Full Output of Lab1 !**
- **Guides for Installing MS SQL Server and Creating Your First Database**

SQL Server Data Types:
- **Data Types in MS SQL Server**
- **Numeric Data Types in MS SQL Server**
- **DateTime Data Types in MS SQL Server**

Basic DDL and DML Examples:
- **Example SQL: Create Database, Delete/Drop TableNew Post !**
- **Example SQL: Handling NULL values New Post !**
- **Lab Assignment 1_2 on Creating Company Database Schema**

Lab2 :
- **Lab Assignment 2_1 E-R Modeling : Identifying Realtionships and Creating an E-R Diagram**

Note that You have to identify all the attributes for each Entity
and Identify Key attributes, Multi-Valued Attributes, Composite Attributes, and Derived Attributes as well in your E-R Diagram.

- **Lab Assignment 2_2 Creating a Database from E-R Model**
- **Tips For Creating Database Schema and Initial Loading**
- **Tips with Examples For Creating Database Schema and Initial LoadingNEW POST !**
- **Data Types in MS SQL Server**
- **Delete Table and Drop Table**
- **Example Test of Database Integrity Constraints**

Lab2 Good Solution (Script) for Creating Company Database

Lab3:
- **Lab Assignment 3**
- **Example SQLs to run and see on Self Join**
- **Example SQLs to run and see on Set Operators NEW POST**
- **Example SQLs to run and see on Different Join on Composite Keys NEW POST**
- **Example SQLs to run and see on IN/NOT In, EXISTS/NOT EXISTS with Correlated Subquery NEW POST**
- **Lab3 Solution**

Lab4:
- **Lab Assignment 4**
- **Example LOJ with Group By and Aggregate Fns**
- **Lab4 Solution**

Lab5:
- **Lab Assignment 5 on View, Stored Procedure, and Cursor**
- **Solution of Lab Assignment 5 on View, Stored Procedure, and Cursor**

Lab6:
- **Lab Assignment 6**
- **Trigger in MS SQL Server Specific Syntax**
- **Lab6 Output Example**
- **FAQ for the Trigger Lab**
- **Solution for Lab Assignment 6**

Extra Labs:
- **Extra Credit Lab Assignment 6_1 Required For CIS530/Honor/Contract Course Students**
- **Extra Credit Lab Assignment 8 Required For Honor/Contract Course Students**

Data Source:
Zip file for JASON files -- with the valid Json format

Yelp Challenge Data Set

Semi-structured Database with MongoDB:
Create Semi-Structured Database for the 100 Business Yelp data in JSON with MongoDB
See MongDB and Node JS Guide below for Extra Credit Lab8 !
- **Extra Credit Lab Assignment 6_2 Required For CIS530/Honor/Contract Course Students**
- **Extra Credit Lab Assignment 6_3: Do research on How Relational Database Server Achieves Data Base Privacy/Security and Write a Summary Report on it. (in Minimum 4 Pages)Required For CIS530/Honor Contract Course**

Lab7 : LAB7 Section is For Those Who Are Doing for Extra Credt.
- **Optional Lab Assignment 7 Extra Credit for CIS430/CIS530**
- **Trouble Shooting WAMP Server SetUp for Lab7**
- **For Most Recent Updated Document, See Project 5 Section of Lab Section of CIS 408 Internet Comuting Site !**

MySql Tutorial
- **How to Create a database and select the database to create a table in MySQL**
- **Example Script to Create a database and select the database to create a table in MySQL**

LAMP Server Set Up:
- **LAMP Server Set Up Guide**

- **PHP Guide: My First PHP Page**
- **PHP Guides with Database/ODBC API**
- **Example PHP Codes with Bootstrap for Lab7 Solution**
- **Lab7 Guide with Example**

Note that the sample codes here have deprecated and replaced with new methods in the new version of PHP (because of the web security, it changes very fast almost every six months), make sure to replace them with the updated methods in php.net site above !
- **index.php**
- **search_musicapp.php**
- **search_musicapp1.php**

	NOSQL Database: Object Relational Mapping for Semi Structured Database **MongoDB:** **Lecture Notes on Mongo DB** **Introduction to Mongo DB** **Mongo DB: Databases/Collections** **Mongo DB: Document Format** **Mongo DB: CRUD Operations** **Mongo DB: Aggregations** **Mongo DB Query Examples Comparison with SQL** **Mongo DB Join Operator: lookup with unwind for array** **Mongo DB Setup:** **MongoDB Download** **Class Note_22_3: MongoDB Getting Started** **Class Note_22_3: MongoDB Shell options to start** **MongoDB Site: How to Import Data Set** **Class Note_22_3: MongoDB Resources** **Mongo DB Documentation** **Set up Guide for MEAN Stack: Also See Project 3 Section For Node JS Set up Guide or CIS 408 Class Lectures: Scroll down to Node JS: MEAN Stack Section** **Node JS with Mongo DB Setup Guide** **Node JS Setup Guide** **Node JS with Mongo DB Setup Guide** **Angular JS with Node JS with Setup Guide** **Node JS API for MongoDB:** **NodeJS: Integrating to MongoDB** **Mongoose: Node JS API for MongoDB: For connecting/querying to MongoDB:** **Mongoose To Set Up** **Mongoose Guide** **Application Examples Built with Node JS** **Sample Web Application Using Node JS with Mongo DB** **Sample Web Application with Angular JS and MS SQL Server**

- **Class Lecture Notes with Tentative Schedule**

Class	Chapter / Topic / Specific Objectives / Activities
Special Topics	**Special Study Guides for Data Warehouse, Data Analytics, Big Data for CS Senior Projects From Independent Study with Nick White (Now in FaceBook and The First Prize Winner of 2016 Senior Project)** **The First Prize Winner of 2016 Senior Project From CIS430 and CIS408 by Nick White, et al** **Database Career Opportunities**
1	**Modern Enterprise DBMS Architecture:** **Class Note 1_2: First Look on Current RDBMS and Big Data** **Class Note 1_0: Examples of Modern Enterprise Web Application with Database Systems: Client Server Architecture on WWW** **Class Note 1_1: Modern Enterprise Database System: Client Server Architecture on WWW** **Class Note_2: Chapter 1** **Overview of Database Management System and Users**
2-3	**Introduction to RDBMS Architecture:** **Class Note 2: Chapter 2** **Class Note_2_1: Lecture Note on DBMS Archetecture** **Class Note_2_2: Example of System Catalogue/Data Dictionary** **Class Note 3: Chapter 3** **Class Note_16: RDBMS and Basic DDL/DML/SQL** **Class Note 3_1: E-R Database Modeling** **Class Notes_4_2: From Chapter 15: First Normal Form: Normalization** **Class Note_6:More On Data Modeling with the Entity-Relationship Model** **Example SQL: Create Database, Delete/Drop Table** **Example SQL: Handling NULL values**
3-4	**Database Design and E-R Model:** **Class Note_4: Lecture Note on Database Design and ER Model NEW UPDATE ! NOV 2016** **Class Note_4_1:Referential Integrity Constraint** **Class Note_5: Chapter 7 ER Model**
4-5	**Basic SQL, DDL and DML:** **Class Note_7_2: Chapter 4 Basic SQL and DDL, DML, Data Types** **DDL and DML:** • **Tips with Examples For Creating Database Schema and Initial Loading** **SQL:** **2_2. Introduction to Structured Query Language part I** **2_2. Introduction to Structured Query Language Part II** **Summary of SQL -- Quick SQL Tutorial** **Introduction to SQL/DML** **Important SQL Examples:** **Example SQLs to run and see on Self Join** **Example SQLs to run and see on Different Join on Composite Keys NEW POST** **Example SQLs to run and see on Set Operatrs** **Example SQLs to run and see on IN/NOT In, EXISTS/NOT EXISTS with Correlated Subquery** **More Example SQLs for IN/NOT In, EXISTS/NOT EXISTS with Correlated Subquery** **Class Note_9: All Basic SQL Examples to Remember**
6-7	**Advanced SQL:** **Class Note_8: Chapter 5 Complex SQL NEW Updated at Nov 2016**

	Class Note_8_1: Union Queries and Aggregation with Group By NEW POST ! **SQL Examples:** **Group By with Aggregation Query Examples:** Examples of LOJ with Group By and COUNt behavior Examples of LOJ with Group By and Aggregate Functions Example OUTPUT of LOJ with Group By and Aggregate Fns Variations of Group By on LOJ with Aggregate Fns -- COUNT **Other Advanced SQLs:** **Class Note_8_2: MS SQL Server: Identity Column and Index Creation NEW POST !** **Class Note_8_3: Database Security: Grant and Revoke NEW POST !** **Class Note_8_4: Database Transaction: COMMIT and ROLL Back NEW POST !**
8	**Relational Algebra:** **Class Note_10: Lecture Note on DBMS Archetecture** Class Note_11: Chapter 6 Relational Algebra Class Note_12: Lecture Notes On Relational Algebra **Class Note_13: Chapter 6 Relational Calculus with SQL** **Class Note_2_1: Example of Query Execution Plan Generated by Optimizer**
9-12	**View, Trigger, Transaction:** Class Note_14: SQL Extension: View, Trigger, Transaction **NEW UPDATE !** **Class Note_14_1: Lecture Notes More on Trigger NEW UPDATE !** Class Note_14_3: How DB Sever Update a Row in a Table **NEW UPDATE !** **Trigger in MS SQL Server Specific Syntax** **Class Note_15_4: Example of Instead of Triggerin SQL Server** Class Note_4_1:Referential Integrity Constraint **Transaction:** Class Note_14_2: Example of Transaction **NEW UPDATE !** **Embedded/Dynamic SQL, Stored Procedure, Table Function, User Defined Type:** Class Note_15: Database Programming: Embedded SQL/Dynamic SQL, Cursor, Stored Procedure, Table Function, UDF **NEW UPDATE !** Class Note_15_1: Example of Stored Procedure **NEW UPDATE !** **Class Note_8_2: MS SQL Server: Identity Column and Index Creation** **Class Note_15_2: Introdction To Object Relational DBMS using UDF and UDT** **Database Security:** **Class Note_15_4: Database Security NEW POST !** **Class Note_8_3: Database Security: Grant and Revoke Example NEW POST !**
13-14	**Web Application with JDBC/ODBC:** **Class Note_16: Building Web Applications with RDBMS and Java & JDBC** Class Note_16_1: MySQL Applications Using Java & JDBC **Class Note_17: Lecture Notes On Embedded SQL Using Java & JDBC** **Class Note_16_1: Example of MS SQL Server Applications Using C# & ODBC in ASP.NET** **PHP:** **Class Note_20: Chapter 15:Database Programming Using PHP** **Class Note on Database Programming with Introduction of PHP/ODBC** **Class Note_18_1: PHP Tutorial** **Class Note_19: Database Programming: PHP**
15-16	**Database File System and Index:** Class Note_21: Chapter 17:Disks-FileStructure-Hashing Class Note_22: Chapter 18:Indexing for File Structure
17	**Class Note_23: Chapter 12:XML** **Class Note_24:Introduction to Semi-Structured Database and XML**

==> Completion of Homeworks/Labs is required for obtaining a passing grade.

This is a tentative scale and it could be changed

Letter Grade	Quality Points	
A	> 93%	**A**: Outstanding (student's performance is genuinely excellent)
A-	90% - 93%	
B+	87% - 90%	
B	82% - 87%	**B**: Very Good (student's performance is clearly commendable but not necessarily outstanding)
B-	80% - 82%	
C	75% - 80%	**C**: Good (student's performance meets every course requirement and is acceptable; not distinguished)
D	65%-75%	**D**: Below Average (student's performance fails to meet course objectives and standards)
F	<65%	**F**: Failure (student's performance is unacceptable)

ADA Adherence. If you need course adaptations or accommodations because of a disability, if you have emergency medical information to share with me, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible. My office location and hours are listed on top of this syllabus. If you need further information, please contact the ACCESS office, phone number 687-5106.

Programming standards

- Every program must include your name, CSU ID number, Class, Section Number, Hours, the words 'Homework # ...', and a short description of the assignment. For example:

```
 ' Name: Mark Zuckerberg
' ID: 1234567
' Homework #1
' Description: Computing the average life of a light bulb
```

- Every variable should have a meaningful name (this includes function/procedure/subprogram names).
- Every portion of the program should be as cohesive (single purposed) as possible. This leads to a large number of small functions.
- Every function (including the main function) should be preceded by a comment indicating its arguments and a description of the transformation it performs.
- Non-obvious code within a function should be explained.
- Code should not be over commented.