

Syllabus

Advanced Database Systems Design


Course No.	CS 632
Section	001 CRN 92048
Title	Advanced Database Systems Design
Time & Place	Monday from 10:00 to 12:50 In Kupfrian Hall, Room 118
Instructor	James Geller Home Page: https://web.njit.edu/~geller/
Course Home Page	Course Material will be partially on Google Docs and partially on Canvas
Prerequisite(s)	CS 631 AND Good knowledge of programming in any modern high-level procedural programming language such as Python, Java or C++.
Instructor	James Geller · Office Room No.: 2103 GITC Building. · Office Phone: 973 596-3383 (I am more likely to reply quickly to email messages than to phone messages !!!!)

	<ul style="list-style-type: none"> Email : james.geller@njit.edu
Office Hours	<p>Always email me before you come. Even during office hours.</p> <p>Sometimes I have to leave on short notice.</p> <p>MONDAY 10:45 to 12:10.</p> <p>TUESDAY 12:15 to 1:40</p> <p>Hours in the evening or on other days by appointment.</p>
Instructor Response Schedule	<p>Email: Normally I will respond to a student email by the end of the next workday or sooner. If I am traveling or offline for another reason I will announce that fact by email to all students and/or by setting up a vacation responder on NJIT Gmail. In those cases response times will be longer (up to three days). If there is a difficult issue I will acknowledge that I received the message and give an estimate by when it can be resolved.</p> <p>Homeworks: Students will always have at least two full weeks to do each of the four programming homeworks.</p> <p>Grading will normally also take about two weeks.</p> <p>Exams: Exams will be graded in one to two weeks.</p>
Description	<p>This course has these parts.</p> <ol style="list-style-type: none"> 1) Review your SQL and learn more of it. 2) Learn PL/SQL. 3) Practical ETL (Extract-Transform-Load) of data. 4) Study of a few advanced topics on databases, such as XML, OODBs, DB security, Indexing, and Buffer tuning. 5) Study JSON and No-SQL databases, especially MongoDB. 6) Regular expressions in Oracle SQL 7) Study the graph database Neo4j <p>The purpose of the course is to get better in programming in an Oracle environment, especially in PL/SQL and to learn about different models of data, such as objects, XML, JSON, and graphs.</p>
Course Topics	<p>At the end of the course, students will have a working knowledge of the following subjects and techniques:</p>

	<ul style="list-style-type: none"> • PL/SQL as "normal" language • PL/SQL accessing tables • Using Oracle SQL Developer for Oracle programming • Extract-Transform-Load • Object-Oriented Modeling • Inserting etc. in PL/SQL • Object-Oriented DBs • Triggers in PL/SQL • Object-Relational DBs • Regular expressions in Oracle SQL • Objects in Oracle SQL • HTML (brief) • Intro to XML • Intro to JSON • Database Security • XML data insertion in Oracle SQL • Querying XML in Oracle SQL • JSON in Oracle SQL • No-SQL databases, esp. MongoDB • Intro to MongoDB use • Neo4j • Indexing in Oracle and MongoDB • Buffer Tuning, Exceptions, Transactions (brief) <p>Topics are subject to change or omission, depending on time.</p>
Course Materials and Text Book(s)	<p>There will be no text book.</p> <p>All material will be on Canvas, or on Google Docs, or on the Web, or handed out in class.</p>
Exams	<p>There will be</p> <ul style="list-style-type: none"> • One initial Quiz, • one Midterm exam and • one Final exam. <p>The Quiz and Midterm will be during class time. Dates are in the Calendar File that goes with this Syllabus.</p> <p>The Final Exam will be scheduled by the Registrar later in the semester.</p>

Grading Policy	<p>Homework:</p> <p>There will be four programming homework assignments covering all the material that we are studying in the class. Late policies will be announced together with the assignments. Non-programming questions might be added, but most of the work involves SQL, programming in PL/SQL, and No-SQL query languages.</p> <p><i>In general, there will be late penalties.</i></p> <p>As a rule of thumb you can submit a late homework until the beginning of the first class after the due date with a 20% late penalty.</p> <p>Assignments handed in after the beginning of class will receive zero credit unless there is WRITTEN documentation of a SERIOUS health problem. FIVE MINUTES LATE IS LATE.</p> <p>Attendance & Participation</p> <p>There will be Attendance Credit in every class. (Unless I announce otherwise.)</p> <p>Attendance will be taken either by participation using the AHASLIDES App, or by handing in in-class work (PAPER or electronic), or by calling students by name, or by passing a signature list around or by all of the above. <i>Typically attendance will be taken several times during one class.</i></p> <p>If you are not in the room then you don't get attendance credit. Any attempt to fake attendance will be immediately reported to the Dean of Students.</p> <p>Extra Credit</p> <p>There will be NO EXTRA CREDIT for exams. Don't ask.</p> <p>Study from the beginning of the semester.</p> <p>There will be NO EXTRA CREDIT for homeworks. Don't ask.</p> <p>Start early with your homework work and submit it on time.</p> <p>For missed classes (missed attendance credit): In exceptional cases there MIGHT be up to 2 times 5 points extra credit earned by supporting a research study. (Or by preparing an extensive</p>
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	<p>powerpoint presentation on a database topic.) The professor will decide. Do NOT rely on this option. It might not be available.</p> <p>Grading: The assignments will be graded with points from the following maxima:</p> <table> <tr> <td>Midterm Exam:</td><td>100</td></tr> <tr> <td>Initial Quiz:</td><td>60</td></tr> <tr> <td>Final Exam:</td><td>200</td></tr> <tr> <td>Programming Homework 1:</td><td>45</td></tr> <tr> <td>Programming Homework 2:</td><td>45</td></tr> <tr> <td>Programming Homework 3:</td><td>45</td></tr> <tr> <td>Programming Homework 4:</td><td>50</td></tr> <tr> <td>Attendance/Participation:</td><td>55 (= 5 points * 11 weeks)</td></tr> <tr> <td>Total</td><td><hr/>600</td></tr> </table> <p>Letter Grade: At the end of the semester, I will add up your total points and curve the results for the whole class.</p> <p>The department has voted on a stringent curve for all courses. Only the top 25% of the class should expect an A.</p> <p>Furthermore, up to 20% of the class may face a C+, C, or F. In my experience, students getting 550 out of 600 points tend to be in the top 25%, but this is no guarantee for the future.</p> <p>Also note that most students typically get all the points on the Homework assignments. Thus, your position in the curve and your class grade depend almost entirely on the exams. On the other hand, missing a single homework is highly likely to lower your grade at least by one letter grade.</p>	Midterm Exam:	100	Initial Quiz:	60	Final Exam:	200	Programming Homework 1:	45	Programming Homework 2:	45	Programming Homework 3:	45	Programming Homework 4:	50	Attendance/Participation:	55 (= 5 points * 11 weeks)	Total	<hr/> 600
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Make-up Policy:	<p>Exam makeup <i>after</i> missing the exam will be only allowed in extreme cases with written proof, e.g., hospital stay, car accident with police report, and similar.</p> <p>Exam makeup due to travel may or may not be approved ahead of time and never after the trip. As above, trips related to an extreme</p>																		

	<p>emergency, e.g., death in the family, will be allowed with written proof (death announcement in a newspaper or government death certificate with <i>official</i> English translation, if from a foreign country).</p>
Academic Support System	<p>NJIT Academic Calendar:</p> <p>https://www5.njit.edu/registrar/calendars/</p> <p>This contains drop/add and other important dates.</p> <p>Resources for NJIT Online Students</p> <p>IST Service Desk</p> <p>The IST Service Desk is the central hub for computing information and first point of contact for getting help and reporting issues related to computing technology at NJIT.</p> <p>Then click the button on the right that says </p> <p>or call (973) 596-2900 Monday - Friday from 8:00am – 9:00pm</p> <p>Academic Advising Success Center</p> <p>Is for undergraduate students only. Ying Wu College of Computing has its own advising team.</p> <p>Academic Support and Student Affairs</p> <p>“From questions about becoming a student at NJIT – to student engagement – to searching for information on career development, the Division of Academic Support and Student Affairs Staff is here to help.”</p> <p>YWCC has its own Tutoring Service:</p> <p>https://computing.njit.edu/tutoring</p> <p>Additional Tutoring Centers</p> <p>The Writing Center</p> <p>Bookstore</p>

NJIT has a bookstore. Please check its web page how COVID is affecting operations.

[Canvas Help Page](#)

Canvas support for students.

[Center for Counseling and Psychological Services](#)

“The NJIT Center for Counseling and Psychological Services (C-CAPS) is committed to assisting students in the achievement of their academic goals as well as benefiting from their personal experience on campus. College life can be personally challenging and stressful at times. We believe that the educational process is an important component of the development of the individual as a whole person. Our goal is to optimize the college experience and improve the quality of the lives of our students by promoting their mental health and facilitating students’ personal, academic and professional growth.”

[The Learning Center](#)

“Our mission is to assist students both in the classroom and beyond by providing tutorial services, academic coaching, academic and personal enrichment workshops and staff and peer support so students can meet the demands of their coursework and are prepared for life after graduation.”

[Robert W. Van Houten Library](#)

“The Van Houten Library offers electronic and print resources essential to the mission of New Jersey's science and technology university, including a core collection of academic books, databases, and journals, as well as research and consultation services.”

[Student Disability Services](#)

“The Disability Support Services office works in partnership with administrators, faculty and staff to provide reasonable accommodations and support services for students with disabilities

	<p>that have provided our office with documentation to receive services.”</p> <p>Student Financial Aid Services</p> <p>“Student Financial Aid Services (SFAS) at NJIT is committed to providing you with every opportunity to obtain funding to support your undergraduate educational costs at NJIT.”</p>
Computer Use	<p>You have to have a laptop and bring it to class, charged and working.</p> <p>You have to have a cell phone, charged and working. (Who doesn't??? 😊) We will use it in class.</p> <p>You have to have pens, pencil, erasers for worksheets in class.</p> <p>Canvas/Google Docs:</p> <p>Class material will be posted on Canvas or Google Docs.</p> <p>Oracle and SQL Developer:</p> <p>You will use the Oracle database system and PL/SQL.</p> <p>PL/SQL is part of the normal Oracle distribution.</p> <p>Instructions about SQL Developer are in the class materials web page and I will talk about them in the lecture.</p> <p>MongoDB:</p> <p>We will use MongoDB. It is available at NJIT.</p> <p>Studio3T:</p> <p>We will use the Studio3T development environment as a frontend to MongoDB. The company is making it available for free to NJIT students. Find the information here:</p> <p>https://studio3t.com/discount/education</p> <p>Neo4j</p> <p>https://neo4j.com/graphacademy/university-program/</p> <p>NJIT Passwords:</p>

	<p>If there is an NJIT password problem, try this: http://myucid.njit.edu</p> <p>This is the UCID password reset.</p> <p>You need a DIFFERENT password for Oracle.</p> <p>How do you get that different password?</p> <p>Go to: https://ist.njit.edu/database-password-assistant/</p> <p>In order to work from home on Oracle you need to install VPN. See Here: https://ist.njit.edu/vpn</p> <p>The computer we are using with Oracle is called prophet.njit.edu The connection identifier that you will be asked for is course.</p> <p>Furthermore, you can get extensive explanations of the ORACLE setup by going to: http://ist.njit.edu/support/db/oracle.php (Links to an external site.)</p>
Generative AI	<p>The use of Generative AI tools such as ChatGPT will be permitted in most cases, UNLESS the Instructor expressly prohibits it for a specific problem or assignment.</p> <p>In some cases the use of Generative AI <i>will be required</i>.</p> <p>The final responsibility for anything handed in by a student is carried by the student. If ChatGPT produces a wrong result and the student hands in the wrong result, the student will get a bad grade, not ChatGPT.</p>
Cheating	<p><i>“Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:</i></p>

Academic Integrity

"New Jersey Institute of Technology is an institution dedicated to the pursuit of knowledge through teaching and research. The university expects that its graduates will assume positions of leadership within their professions and communities. Within this context, the university strives to develop and maintain a high level of ethics and honesty among all members of its community. Imperative to this goal is the commitment to truth and academic integrity. This commitment is confirmed in this NJIT University Code on Academic Integrity."

*Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. **Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.** If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu"*

You may "talk" about Homework assignments with each other. Where does talking end and cheating start? You may NOT copy lines of code from anybody. You may NOT use code in your program where you don't understand WHY it works, even if it works, and even if you wrote it yourself.

A few years ago I caught a student who offered my homework on a commercial (bidding) Web site. In other words, he paid money to have somebody else do my assignments for him. I will be checking for this, and I will have no mercy if I catch you. The student in question was failed out of the course. Who knows, the person bidding to do your homework might be me.

In addition, I will give questions out of the homework assignments on the midterm and final exam. If your answers on the exams are substantially wrong, even though you did the homework correctly I might question you about the homework and reduce your homework credit to zero, from whatever it was before.