RIT - GCCIS — COURSE SYLLABUS
ISTE.432.01 — DATABASE APPLICATION DEVELOPMENT

FALL 2021 (TERM 2211) — DRAFT OF AUGUST 25, 2021

DETAILS

Important note: The information presented in this syllabus is subject to expansion, contraction, change, or stasis during the semester. In case of conflict between versions, the copy on myCourses takes precedence.

Course Number. 15057

Prerequisites.

- ISTE330 Database Connectivity and Access
- competency in at least one application programming language

Time. MWF 1220–1310

Place. Golisano Hall GOL-3690

Dates. 23 AUG 2021–6 DEC 2201

Final Exam. Fri, 10 Dec 2021 1045–1315, online

Instructor. Mick McQuaid

Email. mjmics@rit.edu

Office. 70-2675

Office Hours. WF 1000–1200 or by appointment https://rit.zoom.us/j/5303555034

DESCRIPTION

Database applications face issues specific to designing and developing larger-scale systems. In this course students will explore topics such as concurrent processing, scalability, perfor-

mance, and security within the context of developing larger-scale database-oriented systems. Programming projects are required.

MATERIALS

Each student will need at least a 32GB USB3 drive to bring to class every day. The student may substitute a larger drive or a laptop running VMWare, which is available free of charge to RIT students. This drive is needed to hold a virtual machine image used in class. The image is too large to quickly download each class period, necessitating the drive. Note that the virtual machine may be installed in the lab, which would obviate the need for a drive or laptop.

The course materials include readings on myCourses and the open Web and open source software required to complete exercises and the project. Students with experience using equivalent proprietary or other open source software may use it at the discretion of the instructor and with the understanding that the student bears the burden to make optional software work. The failure of optional software to perform as the student expects may lead to a failing grade for the student. The student may not simply blame the software nor may the student expect the instructor to troubleshoot the software.

Textbook. We will use two textbooks in this course. One is called *Web Development with Node and Express, Second Edition* by Ethan Brown, published by O'Reilly in 2019. The other is the course study guide, which is available on MyCourses > Content > lecture notes / study guide > book.pdf.

Technology. Five kinds of software will be used in this course. All are free, open source software (FOSS). The first is a database management system or dbms. The second is a scripting language. The third is an application language. The

fourth is a set of common shell utilities. Fifth is a text editor.

The student will use at least three dbms products during the course, including MySQL, PostgreSQL, and Sqlite3, as well as some open source application software. Students may additionally use other dbms packages at the discretion of the instructor.

The student will need to program in one scripting language, JavaScript. Other scripting languages may be substituted based on student expertise and at the discretion of the instructor but JavaScript will be the only scripting language demonstrated.

The student will need to program in one application language such as Java. No application language will be taught in this course and other full-featured languages may be substituted. Proprietary features of full-featured languages that allow shortcuts only to proprietary dbms products, however, will strictly not be allowed. For at least one project milestone a score of zero will result from using proprietary features adapted strictly for a single dbms.

The student will need to manipulate certain shell utilities, including GNU coreutils. These will be demonstrated in class.

The student will need to use a text editor. Any text editor will be acceptable for most assignments and the project, but the open source text editor Vim will be demonstrated and used for at least one exercise and no text editor without comparable features may be substituted for that exercise.

SCHEDULE

The estimated course schedule follows. All dates, lecture topics, and assignments are subject to reasonable change at the discretion of your instructor. Any changes will be announced in class. Numbering refers to semester week numbers.

1. Introduction / Baseline Setting
2. Data Input / Improvised ETL
3. Multi-user issues
4. Data Integrity
5. Locking
6. Design Patterns
7. Layered Applications
8. Exception Handling
9. Authentication and Authorization
10. Performance and Refactoring
11. Testing
12. User Help
13. Packaging / Deployment
14. Architecture / Regulations
15. Future Directions / Summary
16. Presentations

GRADING

The grading scale used along with the grade components follow.

- A >= 90.0%
- B >= 80.0% & < 90%
- C >= 70.0% & < 80.0%
- D >= 60.0% & < 70.0%
- F < 60.0%

Numbering refers to semester week numbers.

1. Week 01 No graded work due
2. Week 02 Exercise 1, 05% (sqlite3 database)
3. Week 03 Milestone 1, 05% (requirements)
4. Week 04 Exercise 2, 05% (improvised etl)

5. Week 05 Exam 1, 05% (locking)
6. Week 06 Milestone 2, 05% (design / design patterns)
7. Week 07 Milestone 3, 05% (layering)
8. Week 08 Exercise 3, 05% (stand up rdbms with server)
9. Week 09 Milestone 4, 05% (exception handling)
10. Week 10 Exam 2, 10% (access control)
11. Week 11 Milestone 5, 05% (refactoring)
12. Week 12 Exercise 4, 05% (password hashing)
13. Week 13 Milestone 6, 05% (testing)
14. Week 14 Milestone 7, 05% (packaging)
15. Week 15 Exercise 5, 05% (oral presentation)
    Week 15 Finalized project code, 10%
16. Final Exam Period Exam 3, 15% (material after access control)

Adding the points from the above list shows that the course grade is composed of

- 45% project milestones
- 30% exams
- 25% in-class exercises

POLICIES

Your familiarity with the following policies, dates, and and parameters will be assumed in this course.

Last day to add/drop. 30 Aug 2021

Last day to withdraw with W. 5 Nov 2021

MyCourses. All project assignments, lecture notes, and other distributable course materials will be available via MyCourses. All student project assignments will be submitted via MyCourses dropboxes. Where the assignment is a website, the URL will be submitted to a myCourses dropbox. Every

student will submit every assignment to myCourses, regardless of whether it is a group assignment. Please do not submit any Microsoft Office files in this course ever. If you must use Microsoft Office to complete your assignment, please convert it to pdf or one of the formats listed under the *Completing exercises* section of the study guide (starts around page 162).

Grade Challenges. School of Information policy states that a student has one semester to challenge any grade. After that, grades cannot be challenged.

Late Work. Any work not submitted by the final due date receives a grade of zero, unless arrangements are made previous to the initial due date.

Extra Credit. No extra credit is available in this course.

Accommodations. If you have a "Notice of Accommodation", you must provide your instructor with a copy of it within 1 week of starting this course. You must follow all the rules of the relevant office.

Academic Dishonesty. The policy on dishonesty is simple: Anyone caught cheating receives an "F" as a course grade, is removed from the section and a letter detailing the incident is placed into his or her folder. Any student accused of cheating should realize that the evidence has already been verified by other faculty members and will withstand an appeal. Additionally, please review the institute policy at https://www.rit.edu/studentlife/student-conduct/conduct-process

Acceptable Use. We are bound by the following Acceptable Computer Use policy at https://www.rit.edu/academicaffairs/policiesmanual/c082-code-conduct-computer-use

Student Responsibilities. Please review the general student responsibilities as outlined at https://www.rit.edu/

academicaffairs/policiesmanual/policies/student

Policy on Reporting Incidents of Discrimination and Harassment. RIT is committed to providing a safe learning environment, free of harassment and discrimination as articulated in our university policies located on our governance website. RIT's policies ***require faculty to share information*** about incidents of gender based discrimination and harassment with RIT's Title IX coordinator or deputy coordinators, regardless whether the incidents are stated to them in person or shared by students as part of their coursework. RIT Governance website: https://www.rit.edu/academicaffairs/policiesmanual/policies/governance

If you have a concern related to gender-based discrimination and/or harassment and prefer to have a ***confidential*** discussion, assistance is available from one of RIT's confidential resources on campus:

1. The Center for Women & Gender: Campus Center Room 1760; 585-475-7464; CARES (available 24 hours/7 days a week) Call or text 585-295-3533.
2. RIT Student Health Center – August Health Center/1st floor; 585-475-2255.
3. RIT Counseling Center - August Health Center /2nd floor - 2100; 585-475-2261.
4. The Ombuds Office – Student Auxiliary Union/Room 1114; 585-475-7200 or 585-475-2876.
5. The Center for Religious Life – Schmitt Interfaith Center / Rm 1400; 585-475-2137.
6. NTID Counseling & Academic Advising Services – 2nd Floor Lyndon B. Johnson; 585-475-6468 (v), 585-286-4070 (vp).

RIT Resilience. Success in this course depends heavily on your personal health and wellbeing. Recognize that stress is

an expected part of the college experience, and it often can be compounded by unexpected setbacks or life changes outside the classroom. Moreover, those with marginalized identities may be faced with additional social stressors. Your other instructors and I strongly encourage you to reframe challenges as an unavoidable pathway to success. Reflect on your role in taking care of yourself throughout the term, before the demands of exams and projects reach their peak. Please feel free to reach out to me about any difficulty you may be having that may impact your performance in this course as soon as it occurs and before it becomes unmanageable. In addition to your academic advisor, I strongly encourage you to contact the many other support services on campus that stand ready to assist you.