Information Sciences and Technology
Department

AIT 524: Database Management Essentials

Course Syllabus

Spring 2019

Detailed information on all AIT 524 sections offered in the Spring 2019 semester including the day, time, location, instructors’ names and their contact information is available through the Schedule of Classes posted on PatriotWeb.

For each section, a customized syllabus with information specific to that section will be made available to registered students via the Blackboard Learning System.

Course Description

AIT 524 Database Management Essentials

Recommended Prerequisite:
Academic or industry experience with database systems.

Catalog Description:
Relational database management systems. Covers logical and physical database design; query languages and database programming; and examines commercial systems.

From http://catalog.gmu.edu/

Rationale

This course is designed to provide an understanding and importance of the modern relational database systems. The course will help students fully understand the usage, opportunities, and challenges of relational databases, and their applications in decision-making. Emphasis for the course will be placed on a real-world orientation through the analysis of case studies and hands-on activities that highlight the importance of a comprehensive approach in databases. The course will be in demand by students working in or interested in working with relational databases as well as big data analytical systems, which is one of the fastest growing specializations within IT. As part of this specialization, students need to learn not just how relational databases can be effectively applied in modern information systems but what role they play today in the big data analytical eco-system helping to transform the IT industry.
Objectives
On successful completion of this course, students will be able to:

- Understand the importance of relational databases in decision-making
- Be familiar with different types of databases including relational, NoSQL and Big Data systems
- Be familiar with the techniques of data organization and access in the Oracle 12c database environment
- Be able to understand and work with the relational database model and ERD
- Create database objects, including tables, constraints, indexes, sequences, synonyms, and users, and manipulating data
- Effectively apply data query techniques, such as row filtering, joins, single-row functions, aggregate functions, sub-queries, and views
- Be proficient with advanced SQL topics
- Be familiar in the art of data analysis techniques for government and industrial data systems

Topics
- Design and implementation of modern database systems
- The relational model
- Entity-relational model
- The theory of database design
- Normalization
- Basic data query techniques using SQL
- Advanced SQL including ROLLUP, CUBE, and TOP-N analysis
- SQL optimization
- Role of the relational databases in the Big data eco-system today

References

Textbooks and Reference Materials
In this course students will have access to a large variety of recommended open-source on-line materials to study, including textbooks, videos, audio materials, web-sites, blogs, discussions, etc., provided through the Blackboard Learning Management system.

In addition to the materials provided by the instructor, students will need to purchase the following two books:
Faculty and Staff

AIT 524, Course Coordinator and Instructor for Section 001:

Ioulia Rytikova, Ph.D.
Email: irytikov@gmu.edu

Instructor for Section 002:

Reza T. Hemayati, Ph.D.
Email: rhemayat@gmu.edu

Instructor for Sections DL1 and DL2:

Zehasham Rasheed, Ph.D.
Email: zrasheed@gmu.edu

GTA

TBA

Administrative Support

Fairfax campus

Julija Edwards
Engineering Building, 5400
Phone: 703-993-3565
Grading

Grades will be awarded in accordance with the Mason Grading System for graduate students. See the university catalog for policies: http://catalog.gmu.edu for more information.

The grading scale for this course is:

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>97 – 100%</td>
<td>A+</td>
<td>Passing</td>
</tr>
<tr>
<td>93 – 96%</td>
<td>A</td>
<td>Passing</td>
</tr>
<tr>
<td>90 – 92%</td>
<td>A-</td>
<td>Passing</td>
</tr>
<tr>
<td>87 – 89%</td>
<td>B+</td>
<td>Passing</td>
</tr>
<tr>
<td>83 – 86%</td>
<td>B</td>
<td>Passing</td>
</tr>
<tr>
<td>77 – 82%</td>
<td>B-</td>
<td>Passing</td>
</tr>
<tr>
<td>70 – 76%</td>
<td>C</td>
<td>Passing</td>
</tr>
<tr>
<td>0 – 69%</td>
<td>F</td>
<td>Failing</td>
</tr>
</tbody>
</table>

Raw scores may be adjusted by the Instructor to calculate final grades.

Students are responsible for checking the currency of their grade books. Grade discrepancies must be brought to instructor’s attention within one week of assignment submission and 48 hours of exam submission.

Final grades will be determined based on the following components:

- Homework Assignments: 20%
- Quizzes: 10%
- Practice Problems: 10%
- Discussion Boards: 5%
- Midterm 1: 25%
- Final Exam: 30%

These components are outlined in the following sections.

Discussion Boards, Quizzes, Practice Problems, and Homework Assignments

Discussion Boards, Quizzes, Practice Problems, and Homework Assignments will be assigned every week during the semester. Each assignment is to be prepared and submitted as specified by the Instructor. Late assignments may not be accepted – if accepted, a penalty may be applied. Acceptance of late assignments and/or application of penalties will be at the sole discretion of the Instructor.

Mid-term exam

Midterm exam will be conducted during the scheduled class session 7 and will be based on topics addressed in Classes 1-6. Midterm exam will be “closed book, closed notes” – no reference materials other than those provided with the exam paper will be permitted.
Final exam

The final exam will be held during the scheduled final exam session (see http://registrar.gmu.edu) and will be based on topics addressed throughout the entire course. The final exam will be “closed book, closed notes” – no reference materials other than those provided with the exam paper will be permitted. Final exams will be retained by the Department of Information Sciences and Technology and will not be returned to students.

NET Session: The midterm exam and the final exam will NOT be online. Exams will be held during the scheduled exam sessions. It would be taken in person in class. Proof of ID is required. The location and time of the exams would be announced during the semester. If the student cannot attend an exam due to schedule conflicts, he must contact the instructor in advance to schedule an alternative date and time for the exam.

No make-up for any activity including exams, unless arranged in advance. Only in special cases, such as medical problems and family emergency, make-ups and late assignments may be allowed with verifiable proof. Arrive promptly to exams. Late students may not be admitted.

Final grades will be posted to PatriotWeb, which is the only vehicle for students to obtain those grades. A student with a "hold" on his/her PatriotWeb account will be unable to access final grades until the hold has been removed by the Registrar.

Schedule

A detailed schedule will be published on Blackboard. As many factors may affect the development and progress of a class, the instructor reserves the right to alter the schedule as may be required to assure attainment of course objectives. The schedule is subject to revision before and throughout the course.

Registered students should see the Blackboard Learning System for the latest class schedule.

Important Dates

Dates for dropping, adding the course etc. are available via http://registrar.gmu.edu/calendars/

Religious Holidays

A list of religious holidays is available on the University Life Calendar page. Any student whose religious observance conflicts with a scheduled course activity must contact the Instructor at least 2 weeks in advance of the conflict date in order to make alternative arrangements.
Attendance Policy

Students in in-class sections are expected to attend each class, to complete any required preparatory work and to participate actively in lectures, discussions and exercises. As members of the academic community, all students are expected to contribute regardless of their proficiency with the subject matter.

Students are expected to make prior arrangements with Instructor if they know in advance that they will miss any class and to consult with the Instructor as soon as possible if they miss any class without prior notice. Any student who expects to miss more than one class session is strongly advised to drop the course and take it in a later semester when he/she can attend every class.

Departmental policy requires students to take exams at the scheduled time and place, unless there are truly compelling circumstances supported by appropriate documentation. Except in such circumstances, failure to attend a scheduled exam will result in a score of zero (0) for that exam, in accordance with Mason policy on final exams. Students should not make travel plans or other discretionary arrangements that conflict with scheduled classes and/or exams. If the University is closed due to weather or other unforeseen conditions, final exams may be rescheduled – students are strongly advised not to make plans that would prevent them from attending exams that may be rescheduled during the entire exam period.

NET Version attendance: During each week the students must perform all the requirements published for that week. A detailed week-by-week schedule of classes will be published on the net version of the course.

Expectations for the Active Learning Technology Classroom (Section 001):

This semester, Section 001 is scheduled in an innovative Active Learning Technology (ALT) classroom, designed to support interactive, collaborative and technology-enhanced learning environment. Research indicates that active learning improves student interest, motivation, and attendance, increases mastery and retention of the course material, and promotes deeper learning.

When active learning is used in the classroom, typical lecture methods of instruction are replaced with a new approach where students work collaboratively during class time and focus primarily on understanding and applying the material using cutting-edge classroom technology. You will spend most of class time working with guidance and feedback rather than just listening. You will receive a lot of help and continual feedback on your work this way, but you will also be required to take responsibility for your learning. Check out the ALT video to learn more about student experiences in ALT.

Taking AIT 524 in ALT will help students become active participants in the learning process. It will support them in building competencies (problem-solving, critical thinking, communication) as well as content knowledge in an engaging and creative environment. It will assist students in developing higher order thinking skills (e.g., analysis, synthesis, evaluation) through intentionally designed activities.
We will spend a lot of time exploring database ideas in groups through a variety of highly-interactive activities including discussions, team projects, peer review, presentations, etc. This is not a traditional class and will be a new experience for many students. To succeed, it is very important to come prepared for class each day, and think carefully about how to make this class a great place to work and learn.

A few suggestions that might help you in this class are:

Before class:
- Complete all the assigned reading
- Complete all required assignments
- Bring all necessary materials to class, as instructed
- Ask for help if needed

In class:
- Make thoughtful contributions to the group discussions and activities
- Encourage a positive group atmosphere where all participant views are valued equally
- Ensure all group members have an opportunity to voice their views
- Stay on task (no cell phones, texting or off topic conversations)
- Be on time and staying engaged for the entire class

Please make sure to bring your laptop to each class. In addition, you will need to bring dry erase markers and a white board eraser to each class (an old clean, white sock would work great too!).

**Classroom conduct**

Students are expected to conduct themselves in a manner that is conducive to learning, as directed by the Instructor. Any student who negatively impacts the opportunity for other students to learn will be warned – if disruptive behavior continues, the student will be asked to leave the classroom.

Electronic devices are potential distractions in the classroom environment. Cell phones, pagers and other handheld devices must be turned off or set to "silent" mode and not used while class is in session. Laptop computers and similar devices may be used only if such use is directly related to the classroom activity in progress – for some activities the Instructor may require that such devices not be used in order to maximize student engagement.

**Communications**

Registered students will be given access to a section of the Blackboard Learning System for this course. Blackboard will be used as the primary mechanism (outside of lectures) to disseminate course information, including announcements, lecture slides, homework and other assignments, and scores for homework and exams.
Communication with the Instructor on issues relating to the individual student should be conducted using Mason email, via telephone, or in person - not in the public forums on Blackboard. Mason Mail is the preferred method – for urgent messages, you should also attempt to contact the Instructor via telephone. Federal privacy law and Mason policy require that any communication with a student related in any way to a student's status be conducted using secure Mason systems – if you use email to communicate with the Instructor you MUST send messages from your Mason email account.

When sending an e-mail to the instructor, please include the following:

- Course number
- Section number
- Your full name

Privacy

Instructors respect and protect the privacy of information related to individual students.

As described above, issues relating to an individual student will discussed via email, telephone or in person. Instructors will not discuss issues relating to an individual student with other students (or anyone without a need to know) without prior permission of the student.

Assessable work other than final exams will be returned to individual students directly by the Instructor (or by a faculty or staff member or a Teaching Assistant designated by the Instructor, or via another secure method). Under no circumstances will a student's graded work be returned to another student.

Faculty and staff will take care to protect the privacy of each student's scores and grades.

Disability Accommodations

The Office of Disability Services (ODS) works with disabled students to arrange for appropriate accommodations to ensure equal access to university services. Any student with a disability of any kind is strongly encouraged to register with ODS as soon as possible and take advantage of the services offered.

Accommodations for disabled students must be made in advance – ODS cannot assist students retroactively, and at least one week's notice is required for special accommodations related to exams. Any student who needs accommodation should contact the Instructor during the first week of the semester so the sufficient time is allowed to make arrangements.

Honor Code

All members of the Mason community are expected to uphold the principles of scholarly ethics. Similarly, graduating students are bound by the ethical requirements of the professional communities they join. The ethics requirements for some of the communities relevant to IST graduates are available via the following links:
– ACM Code of Ethics and Professional Conduct
– IEEE Code of Ethics
– EC-Council Code of Ethics

On admission to George Mason University, students agree to comply with the requirements of the Mason Honor System and Code. The Honor Code will be strictly enforced in this course. Honor Code cases are heard by a panel consisting of students – students who meet the requirements are encouraged to nominate themselves to serve on the Honor Committee.

Any use of the words or ideas of another person(s), without explicit attribution that clearly identifies the material used and its source in an appropriate manner, is plagiarism and will not be tolerated. The Instructor reserves the right to use manual and/or automated means (including such services as SafeAssign.com) to detect plagiarism in any work submitted by students for this course, and to direct Teaching Assistants and/or other faculty and/or staff members to do likewise in support of this course.

For this course, the following requirements are specified:

- All assessable work is to be prepared by the individual student, unless the Instructor explicitly directs otherwise.

- All work must be newly created by the individual student for this course for this semester. Any usage of work developed for another course, or for this course in a prior semester, is strictly prohibited without prior approval from the instructor.

Students may seek assistance with assigned work (and are encouraged to do so if they feel the need), provided:

- The directions for the assigned work do not prohibit such assistance.

- Such assistance is acknowledged in the submitted work, clearly identifying the person(s) giving assistance and the nature of the assistance given.

- Any work to be submitted is prepared entirely and exclusively by the student submitting it. Students are expressly prohibited from sharing any assessable work for this course in any manner with other students (except students assigned as Teaching Assistants to this course and the student's section), unless all students involved have had their work graded and returned by the Instructor, or the Instructor has explicitly approved such sharing.

**NET Sections only:**

For the net section you will need to have the following additional resources:

- Computer with fast internet connection

- Microphone and web camera (optional)