**MA 2071: Matrices and Linear Algebra I (D-Term 2019)**

Instructor: Dr. Qingshuo Song (Department of Mathematical Sciences)

E-mail: qsong@wpi.edu

Office: Stratton Hall 202A

Office Phone: 508-831-6273

Office Hours: M T 10AM-10:50AM, or by appointment

Website: <https://songqsh.github.io>

Coordinator: Julie Browne

Email: jlbrowne@wpi.edu

Office hours: 12-2 on Tuesday in SH204

Lecture: M T R F 2:00 PM – 2:50PM, OH107

**Conferences:**

D07 W 2:00 – 2:50 PM, SH304 (TA: Andrea Bayas, acbayas@wpi.edu)

D08 W 10:00 – 10:50 AM, SH308 (TA: Yi Yu, yyu5@wpi.edu)

D09 W 1:00 – 1:50 PM, SH308 (TA: Yi Yu, yyu5@wpi.edu)

D10 W 12:00 – 12:50, SH304 (TA: Andrea Bayas, acbayas@wpi.edu)

**Course Description**

MA 2071 provides a study of computational techniques of matrix algebra and an introduction to vector spaces.

Topics covered include: matrix algebra, systems of linear equations, eigenvalues and eigenvectors, least squares,

vector spaces, inner products, introduction to numerical techniques, and applications of linear algebra. Essentially this material will be in chapters 1-6 of the textbook. There is no recommended background for this course.

**Textbook**

Linear Algebra and Its Applications – 5th edition (2016) by D. C. Lay, S. R. Lay, and J. J. McDonald

ISBN-10: 0-321-98238-X. ISBN-13: 978-0-321-98238-4.

**Attendance**

Attending class is vital to your success, so you are expected to be present for all lectures and conferences.

Class will be held Monday, March 11 – Tuesday, April 30, with the exception of the following date:

APRIL 15 PATRIOTS’ DAY HOLIDAY

APRIL 19 PROJECT PRES. DAY

Attendance itself will not count explicitly towards your course grade. Not attending class serves as its own

penalty, since the material takes much longer to learn independently.

**Conferences**

Weekly conferences (held on Wednesdays) lead by the course TA / PLAs will be utilized as problem sessions

with the aim of providing students an opportunity to review, ask questions, and work through problems relating to

the course material covered in the preceding lectures

**Attendance/bonus**

There will not be weekly quizzes, but we want to encourage attendance at conference.  To this purpose there will be three pop-up quizzes, distributed randomly throughout the term, each worth 2 BONUS points on the final grade.

This means that students can earn up to 6 bonus points on their final grade.  We're hoping this will serve as an incentive to attend conference and stay on-top of the material. No make-up quizzes will be allowed.

**Course Grade**

Grades for this course will be determined based on online homework assignments (WeBWorK via Canvas), in-class conference quizzes, and two in-class exams (a midterm and a final), with each item weighted as follows:

Webwork Homework: 30%

Exams: 70% (2 exams, each weighted 35%)

Letter grades will be assigned based on the following scale:

A: 90.00 – 100.00% B: 80.00 – 89.99% C: 70.00 – 79.99% NR: 0.00 – 69.99%

Adjustments may be made at the discretion of the instructor. NR grades will not be given upon request.

**Homework (WeBWorK via Canvas)**

Homework for this course will consist of online problem sets using WeBWorK via Canvas, an internet-based homework service that is free to students. The link to the WeBWorK page for our class will be available on Canvas/Assignment. To get your WeBWork score successfully transferred to Canvas grade system, one MUST access WeBWork page by clicking the link provided by Canvas.

Here you can log in with your WPI ID and password to see the class assignments and your scores, as well as links

to additional resources. All registered students will automatically gain access to our WeBWorK page after the first click on the WeBWork link.

Problems will be announced through Canvas every Monday, and the due dates will be usually 10 days after on Wednesday evening. You are expected to check WeBWorK regularly for the due dates, which may change depending on class progress and the amount of material covered.

It is strongly encouraged by the instructor that all work done in completing the WeBWorK problem sets is written

down and kept in a notebook from which you can study for tests and the final exam, although this work will not

be handed in.

Collaboration on homework problems is encouraged, but any work submitted under your name must be your own.

If you have any questions about this, consult the university's academic integrity policy or ask the instructor.

WeBWorK E-mail Policy: If you have a question to ask via e-mail regarding a specific WeBWorK problem, you

must use the “Email Instructor” button at the bottom of the problem page. Clicking this button will allow you to

send a link to your specific problem to the instructor and teaching assistants. Please send e-mails with homework

questions far enough in advance of the due date to allow adequate time for a response.

**Additional Practice Problems**

The instructor will provide a list of recommended problems from each section of the textbook. These optional problems will not be handed in for credit but should serve as additional practice.

**Exams**

Two in-class exams (a midterm and a final) will be given during the term and are scheduled as follows:

Midterm: Thursday, April 4th,

Final: Tuesday, April, 30th (last day of class)

Each exam will cumulatively assess material covered in all lectures and homework problems up to that point.

Exams will be closed book, closed notes, and use of calculators will not be permitted.

Prior to the start of each exam, you must place all of your belongings (e.g., cell phone, study materials, etc.) in

your backpack and under your desk, so that no items are visible during the exam. You will be required to show

your WPI ID when turning in your exam to verify your identity. You must also sign a roster sheet on your

way out of the exam, confirming that your exam was turned in.

**Make-up Exam Policy**:

If you know that you will be missing class on the date of an exam for any reason, you must provide a valid excuse and arrange with the instructor to take a make-up exam. Please give notification (via e-mail) to the course instructor no later than 24 hours after the scheduled exam time. A make-up exam will not be given for unexcused absences on exam days.

**Grading Corrections Policy**:

If you feel that an error has been made in grading your exam, you must notify the course instructor within two (2) days of receiving your exam back. Grade changes will not occur outside of this time frame. If the original work on the exam is altered, no additional credit will be given.

**Canvas**

Material for this course will be made available on Canvas (https://canvas.wpi.edu/). Course information

(including a copy of the syllabus), supplementary material and worksheets, recommended problems from the text,

and useful links will be posted at this site. Grades will also be posted on Canvas.

**WPI E-mail Account**

Make sure to check your WPI e-mail account daily for any course announcements that the instructor may send.

**Additional Help**

Tutoring is available for free on a first-come, first-served basis at the Mathematics Tutoring Center (MTC)

located in Stratton Hall 002A. The tutoring center is open Monday – Thursday, 10:00 AM – 7:00 PM, and

Friday, 10:00 AM – 3:00 PM. No appointment is necessary, so you may drop in at any time. The schedule of

tutors is posted online on the Department of Mathematical Sciences resources page

(<https://www.wpi.edu/academics/departments/mathematical-sciences/resources>).

The Academic Resources Center (ARC) provides additional academic assistance and support for WPI undergraduate students.  The ARC offers Math & Science Help (MASH) which is large group tutoring (collaborative learning with peers) and no appointment is needed; schedules are available on the Academic Resources Center Canvas site.  To make the most of the MASH experience, it is recommended to bring 2-3 specific questions, along with your notes and textbook, and be ready to collaborate and review material.  In addition, the ARC offers individually scheduled one-on-one appointments through [https://tutortrac.wpi.edu](https://tutortrac.wpi.edu/). If a student is not able to find an available time slot, or need additional assistance, please contact [arc@wpi.edu](mailto:arc@wpi.edu) or fill out an inquiry form with availability at bit.ly//ARCinquiry.

**Classroom Courtesy**

As a courtesy to those around you, cell phones and all other electronic devices (laptops, tablets, etc.) should be

turned off (or silenced) and put away during lecture. Out of respect for the instructor and your fellow classmates,

side discussions should be kept to a minimum.

**Calculators**

The use of calculators will not be permitted on in-class exams, unless otherwise instructed.

**Academic Integrity**

All students are expected to be familiar with and adhere to WPI’s policy on academic integrity (i.e., no cheating,

fabrication, facilitation, or plagiarism). Please refer to the WPI Academic Honesty Policy within the Student

Code of Conduct (https://www.wpi.edu/about/policies/academic-integrity). Academic integrity violations will be

prosecuted according to the university’s policy. For more details as to what constitutes academic dishonesty,

please see https://www.wpi.edu/about/policies/academic-integrity/dishonesty.

**Disability Services**

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of

available accommodations, students must register with the Office of Disability Services

(https://www.wpi.edu/offices/office-disability-services) located in Daniels Hall 124. The ODS can be contacted

by phone at 508-831-4908 and by e-mail at disabilityservices@wpi.edu. Students granted extended testing time

should arrange to take their exams at the ODS. For more information on available resources, please visit

https://www.wpi.edu/student-experience/resources/disability-services.

**WPI Policies**

Students are responsible for reviewing WPI’s policies at https://www.wpi.edu/about/policies, pertaining to their

rights and responsibilities.

**Tentative Course Schedule**

\*\*Subject to Change\*\*

Sections Topics

1.1 – 1.7 Linear systems and matrices

(1.8 – 1.9) (Linear transformations – time-permitting)

2.1 – 2.3 Matrix operations

2.8 – 2.9 Subspaces, dimension and rank

3.1 – 3.2 Determinants

MIDTERM

4.1 Vector spaces and subspaces

5.1 Eigenvalues and eigenvectors

(5.2 – 5.3) (Characteristic equation, diagonalization – time-permitting)

6.1 – 6.5 Orthogonality, least squares

(6.6 – 6.8) (Inner product spaces, applications – time-permitting)

FINAL