MAT 534 ALGEBRA I FALL 2024
SYLLABUS (Version August, 2024)

This document will be submitted to BRIGHTSPACE in the documents section.
What below is all subject to change.
This document may be updated from time to time (in the documents section of BRIGHTSPACE).
Significant changes are also announced in class.

The following is strictly enforced:
no texting/surfing during class;
e-note takers, computers, ipads, etc. must be in silent mode and stored away;
keep smartphones on the desk upside down in silent mode;
no food or drinks (except water/coffee/tea).

TEXTBOOK
Abstract Algebra, Summit and Foote, 3rd edition.
There are free copies online. Make sure to have the 3rd edition.

CLASS MEETING TIMES
Tu&Th 2-3:20pm, Physics P-128

INSTRUCTOR
Mark de Cataldo mark.decataldo@stonybrook.edu
https://www.math.stonybrook.edu/~mde/
O.H.: Tu-3:30-6:30pm (the link below has the most current office hours, in case of changes).
https://www.math.stonybrook.edu/cards/de-cataldomark-andrea.html

GRADER
Giovanni Passeri; Giovanni.Passeri@stonybrook.edu
O.H.: see https://www.math.stonybrook.edu/cards/passerigiovanni
please direct to him questions about your graded homework

TOPICS TO BE COVERED
Groups:
normal subgroups,
quotient groups,
Lagrange's theorem,
class formula,
finite p-groups and solvable groups,
Sylow's theorems,
finitely generated abelian groups.
Rings and modules:
subrings,
fields,
prime and maximal ideals,
quotient rings,
ID's,
PID's,

UFD's,
polynomial rings,
field of fractions,
the Wedderburn theorem,
Hilbert basis theorem,
finitely generated modules over a PID.
Vector spaces:
basis,
linear maps and matrices,
dual spaces,
determinants,
eigenvalues and vectors,
inner products,
spectral theorem for normal operators.

Chapters covered (pages and sections)
1 (16-46; 30) (1,2,3,4,5,6,7)
2 (46-73; 27) (1,2,3,4,5)
3 (73-112; 39) (1,2,3,4,5)
4 (112-152; 40) (1,2,3,4,5,6)
5 (152-188; 36) (1,2,3,4,5)
11 (408-456; 48) (1,2,3,4,5)
Inner product spaces and spectral theorem for normal operators (reference: Artin, Algebra, 2nd ed.; Ch. 8.5-8.6)
7 (223-270; 47) (1,2,3,4,5,6)
8 (270-295; 25) (1,2,3)
9 (295-336; 41) (1,2,3,4,5,6)
Semisimple Rings Wedderburn (18.2) (854-864; 10)
10 (337-308; 71) (1,2,3,4,5)
12 (456-509; 53) (1,2,3)
(11 chapters, plus few sections from other chapters) (59 sections) (477 pages)

SCHEDULE OF LECTURES, HOMEWORK, EXAMS
The lecture cannot, should not and will not attempt a line-by-line approach to the textbook.
The emphasis will be on the important concepts, some key proofs, examples and discussions.
Students are required to read the relevant parts of the textbook **before** the lectures.
We assign a relatively small number of problems every week.
Such a small number cannot cover all the topics covered:
you are strongly encouraged to try on your own more problems to truly familiarize yourself will all the material.

AUGUST
#1 Tu 27 (Ch 1)
#2 Th 29 (Ch 2) HMK 1 assigned

SEPTEMBER
#3 Tu 3 (Ch 3)
#4 Th 5 (Ch 3) HMK 2 assigned (HMK 1 collected)

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#5 Tu 10 (Ch 4))
#6 Th 12 (Ch 4) HMK 3 assigned (HMK 2 collected)
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#7 Tu (Ch 5) 17
#8 Th (Ch 5) 19 HMK 4 assigned (HMK 3 collected)
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#9 Tu 24 (Ch 11)
#10 Th 26 (spectral) HMK 5 assigned (HMK 4 collected)

OCTOBER
#11 Tu 1 (Ch 11) (@OXFORD) ZOOM LECTURE
#12 Th 3 (spectral) (@OXFORD) ZOOM LECTURE HMK 6 assigned (HMK 5 collected)
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#13 Tu 8 (spectral) (@OXFORD) ZOOM LECTURE
Th 10 (@OXFORD) IN CLASS MIDTERM
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TU 15 NO CLASS FALL BREAK
#14 Th 17 (Ch 7) HMK 7 assigned (HMK 6 collected)
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#15 Tu 22 (Ch 7)
#16 Th 24 (Ch 7) HMK 8 assigned (HMK 7 collected)
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#17 Tu 29 (Ch 8)
#18 Th 31 (Ch 8) HMK 9 assigned (HMK 8 collected)

NOVEMBER
#19 Tu 5 (Ch 9)
#20 Th 7 (Ch 9) HMK 10 assigned (HMK 9 collected)
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#21 Tu 12 (Wedderburn)
#22 Th 14 (Wedderburn) HMK 11 assigned (HMK 10 collected)
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#23 Tu 19 (Ch 10)
#24 Th 21 (Ch 10) HMK 12 assigned (HMK 11 collected)
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#25 Tu 26 (Ch 12)
NO CLASS THKSGIVING Th 28

DECEMBER
#26 Tu 3 (Ch 12)
#27 Th 5 (Ch 12) HMK 13 assigned (not collected, not graded) (HMK 12 collected)

FINAL: TU DECEMBER 17, 2:15—5pm

Homework
Homework is assigned via Brighspace weekly, and due on Tuesdays in class. Homework is returned by the grader via a dedicated box/envelope in front of the grader's office. Homework MUST be stapled, or it will not be collected. No late

homework will be accepted; there are no exceptions to this rule.

Email
Best way to contact your instructor: in class and during office hours.
Use email only for true emergencies; example: you are sick, you inform the instructor you are not coming to the test,
and you will bring an official letter from the doctor (including phone number and address of medical practice to reach said doctor).
Please refrain from using email to ask: for exceptions to the various rules (e.g. late hmk), math questions (our typing abilities are limited),
questions about grades on the final, or to fix an appointment (please do so in person, unless it is not possible).
Questions about the grading of homework should be directed to the grader.

Academic Integrity and homework: there are online sources for the homework. If it is determined that the student used, even in part, these resources to hand in the homework,
a grade of zero will be given for the first occurrence; for the second occurrence, this will be reported to the appropriate offices.

Textbook: Dummit and Foote, Abstract Algebra, 3rd Edition.

Grades/scores:
Homework: 20% (200 points out of 1000) (each homework counts 20points max; only 10 best homeworks are counted)
Midterm: 30% (300 points out of 1000)
Final: 50% (500 pts out of 1000)
We will assign the letter grade in the course by curving the numerical scores (out of 1000 total maximum points).

Student Accessibility Support Center Statement (SASC)
If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, Stony Brook Union Suite 107, (631) 632-6748, or at sasc@stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and the Student Accessibility Support Center. For procedures and information go to the following website: https://ehs.stonybrook.edu/programs/fire-safety/emergency-evacuation/evacuation-guide-disabilities and search Fire Safety and Evacuation and Disabilities. Academic Integrity Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/ index.html. Critical Incident Management Stony Brook University expects students to respect the rights, privileges, and

property of other people. Faculty are required to report to the Office of Student Conduct and Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

Student Accessibility Support Center Statement

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Student Accessibility Support Center, ECC (Educational Communications Center) Building, Room 128, (631)632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential. https://www.stonybrook.edu/commcms/studentaffairs/sasc/facstaff/syllabus.php

[In addition, this statement on emergency evacuation is often included, but not required:

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Student Accessibility Support Center. For procedures and information go to the following website: https://ehs.stonybrook.edu/programs/fire-safety/emergency-evacuation/evacuation-guide-people-physical-disabilities

Academic Integrity Statement

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at: http://www.stonybrook.edu/commcms/academic_integrity/index.html

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