THE UNIVERSITY of NEW MEXICO

APPLICATION *for* GRADUATE ADMISSION

Please note: this information has been generated from the online application you submitted to UNM.

UNM Student ID (if known): _____

Application & Program Information

Term: Fall Year: 2017 Department: Mathematics and Statistics

Major: Mathematics Degree: MS Mathematics

Degree Interest: Applied Mathematics

Have you previously applied to a UNM graduate program? No Attended: _____

Applicant Information

Last: Grainger First: Colton

Middle: Crosman Suffix: _____

Previous name(s): _____

Current Address: 1127 Hammock St

City: Houston State/Province: Texas

Zip/Postal Code: 77009 Country: UNITED STATES OF AMERICA

Email Address: coltoncgrainger@gmail.com

Phone Number(s): 2085857373 7133399015 ext. 1080

Birth Date: 10/24/1994 Gender: Male

Citizenship Status: US Citizen Permanent Resident Number: _____

Country of Citizenship: _____

Do you consider yourself to be Hispanic/Latino(a)? N

Voluntary Federal Race Selection: White

Are you active-duty Military/National Guard/Reserves? N Are you a veteran? N

Are you a spouse/dependent of an active-duty member of the military? N

Please note: this information has been generated from the online application you submitted to UNM.

Academic History:

Most Recent College or University: ALBERTSON COL OF ID

City: CALDWELL State: ID Institution Code: 001617

Attended From / To: 09/2012 / 05/2016 Credit: 139 Degree: BS

Additional College or University: _____

City: _____ State: _____ Institution Code: _____

Attended From / To: _____ / _____ Credit: _____ Degree: _____

Additional College or University: _____

City: _____ State: _____ Institution Code: _____

Attended From / To: _____ / _____ Credit: _____ Degree: _____

Additional College or University: _____

City: _____ State: _____ Institution Code: _____

Attended From / To: _____ / _____ Credit: Degree: _____

Additional College or University: _____

City: _____ State: _____ Institution Code: _____

Attended From / To: _____ / _____ Credit: Degree: _____

Additional College or University: _____

City: _____ State: _____ Institution Code: _____

Attended From / To: _____ / _____ Credit: _____ Degree: _____

Additional College or University: _____

City: _____ State: _____ Institution Code: _____

Attended From / To: _____ / _____ Credit: Degree: _____

Additional College or University: _____

City: _____ State: _____ Institution Code: _____

Please note: this information has been generated from the online application you submitted to UNM.

Residency for Tuition Classification: A New Mexico (NM) resident is a person who has, or a dependent person whose parent or legal guardian has, established and maintained legal residency in New Mexico for at least the past twelve consecutive months. NOTE: if you are under the age of 23, complete the Parent/Guardian information below.

Do you regard NM as your permanent residence? Student: N Parent: N

Have you lived in NM for the past 12 consecutive months? Student: N Parent: N

Explanation if applicable: _____

_____

Are you currently registered to vote in NM? Student: N Parent: N

Are you currently registered to vote in another state? Student: Y Parent: Y

Do you have a current NM driver's license? Student: N Parent: N

Do you have a driver's license in another state? Student: Y Parent: Y

Do you have a vehicle currently registered in NM? Student: N Parent: N

Do you have a vehicle currently registered in another state? Student: Y Parent: Y

Permanent Address

Permanent Address: 1734 W Sugar Crest St

City: Eagle State/Province: Idaho

Zip/Postal Code: 83616 Country: UNITED STATES OF AMERICA

Birth City: Boise Birth State: Idaho Birth Country: _____

Additional Information

Have you ever been convicted of, pled guilty to, or charged with a felony offense in any court? N

Have you ever been suspended from any college or university (including UNM) for any reason? N

Institution: _____ From: _____ To: _____ Type: _____

Test Score Information

Please indicate your GRE/GMAT scores below:

GRE Verbal Reasoning: _____ GRE Quantitative Reasoning: _____ GRE Analytical Writing: _____

GMAT Verbal: _____ GMAT Quantitative: _____ GMAT Total: _____

THE COLLEGE OF IDAHO

UNOFFICIAL

Date: 20 Jan 2017
ID..: 0540157
Name: Grainger, Colton Crosman
SSN.: XXX-XX-0519

Mr Colton C. Grainger
1734 W Sugar Crest St
Eagle ID 83616

Course	Course Title	Grd	R	Crd Att	Crd Cmpt	Grade Points
* Placement, Transfer and Non-Course work, if applicable, listed first						
Other Test				16.00		
	Term GPA: 0.000 Totals:			16.00	16.00	0.000
	Cum GPA: 0.000 Totals:			16.00	16.00	0.000
	FALL SEMESTER 2012 (09/06/2012 to 12/17/2012)					
FYS101	First-Year Seminar	B		3.00	3.00	9.000
HIS110	Western Civilization to	C-		3.00	3.00	5.100
MUS126	Chorale	B+		1.00	1.00	3.300
MAT152	Calculus II	B-		4.00	4.00	10.800
SPE199	Debate I	P		1.00	1.00	0.000
MFL223	German Language& Culture	B		3.00	3.00	9.000
IND305.1	Winter Wilderness Experi	A		2.00	2.00	8.000
	Term GPA: 2.825 Totals:			17.00	17.00	45.200
	Cum GPA: 2.825 Totals:			33.00	33.00	45.200
	WINTER TERM 2013 (01/07/2013 to 02/01/2013)					
IND305.2	Winter Wilderness Experi	A		4.00	4.00	16.000
	Term GPA: 4.000 Totals:			4.00	4.00	16.000
	Cum GPA: 3.060 Totals:			37.00	37.00	61.200
	SPRING SEMESTER 2013 (02/11/2013 to 05/17/2013)					
MUS126	Chorale	A		1.00	1.00	4.000
MFL224	German Language& Culture	A-		3.00	3.00	11.100
ENG299T.9	Visions of Environment	A		3.00	3.00	12.000
POE250	Introduction to Politica	A		3.00	3.00	12.000
MAT252	Discrete Mathematics	A		3.00	3.00	12.000
	Term GPA: 3.931 Totals:			13.00	13.00	51.100
	Cum GPA: 3.403 Totals:			50.00	50.00	112.30
Dean's List						
	FALL SEMESTER 2013 (09/05/2013 to 12/16/2013)					
PHY199	Math & Physics Colloquiu	P		0.50	0.50	0.000
MAT251	Calculus III	A		4.00	4.00	16.000
PHY271	Analytical Physics I	A-		4.00	4.00	14.800
PHY271L	Analytical Physics I Lab	A		1.00	1.00	4.000
ENG280	Theory& Method in Study	A		3.00	3.00	12.000
HIS334	19 C Europe:Ind Natn&Dis	A		3.00	3.00	12.000
	Term GPA: 3.920 Totals:			15.50	15.50	58.800
	Cum GPA: 3.565 Totals:			65.50	65.50	171.10
Dean's List						

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Course	Course Title	Grd	R	Crd Att	Crd Cmpt	Grade Points
	WINTER TERM 2014 (01/06/2014 to 01/31/2014)					
POE350.1	Topics/Politicl Phi:Niet	A		3.00	3.00	12.000
	Term GPA: 4.000 Totals:			3.00	3.00	12.000
	Cum GPA: 3.590 Totals:			68.50	68.50	183.100
	SPRING SEMESTER 2014 (02/10/2014 to 05/16/2014)					
MAT199	Math & Physics Colloquiu	P		0.50	0.50	0.000
PHY272	Analytical Physics II	C		4.00	4.00	8.000
PHY272L	Analytical Physics II La	C		1.00	1.00	2.000
ENG333	Hemingway & Faulkner	C		3.00	3.00	6.000
MAT352	Differential Equations	C+		3.00	3.00	6.900
MAT361	Linear Algebra	C		3.00	3.00	6.000
	Term GPA: 2.064 Totals:			14.50	14.50	28.900
	Cum GPA: 3.262 Totals:			83.00	83.00	212.000
	FALL SEMESTER 2014 (09/04/2014 to 12/16/2014)					
CSC150	Computer Science I	A		4.00	4.00	16.000
ENG294	Russian Lit. Mortality	C		1.00	1.00	2.000
PHY301	Theoretical Mechanics	B+		3.00	3.00	9.900
HIS325	Ancient Greek Language&	B		3.00	3.00	9.000
MAT461	Algebraic Structures	B+		3.00	3.00	9.900
MAT498	Upper Division Seminar	A		1.00	1.00	4.000
	Term GPA: 3.387 Totals:			15.00	15.00	50.800
	Cum GPA: 3.285 Totals:			98.00	98.00	262.800
	WINTER TERM 2015 (01/05/2015 to 01/30/2015)					
MAT282	Intro to Proof:Sets& Fun	A		1.00	1.00	4.000
MAT372	History of Mathematics	B		3.00	3.00	9.000
	Term GPA: 3.250 Totals:			4.00	4.00	13.000
	Cum GPA: 3.283 Totals:			102.00	102.00	275.800
	SPRING SEMESTER 2015 (02/09/2015 to 05/15/2015)					
PHY199	Math & Physics Colloquiu	WA		0.50	0.00	0.000
HIS349	Mod European Intellectua	WA		3.00	0.00	0.000
PHY400	Quantum Physics	WA		2.00	0.00	0.000
MAT431	Complex Variables	WA		3.00	0.00	0.000
	Term GPA: 0.000 Totals:			8.50	0.00	0.000
	Cum GPA: 3.283 Totals:			110.50	102.00	275.800

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THE COLLEGE OF IDAHO

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Date: 20 Jan 2017
ID..: 0540157
Name: Grainger, Colton Crosman
SSN.: XXX-XX-0519

Mr Colton C. Grainger
1734 W Sugar Crest St
Eagle ID 83616

Course	Course Title	Grd	R	Crd Att	Crd Cmpt	Grade Points
	FALL SEMESTER 2015 (09/02/2015 to 12/15/2015)					
MUS126	Chorale	A		1.00	1.00	4.000
ENG310	English Renaissance Lite	A		3.00	3.00	12.000
PHY313	Thermal Physics	A		3.00	3.00	12.000
HIS359	Pre-Modern Japan	A		3.00	3.00	12.000
MAT451	Real Analysis	A-		3.00	3.00	11.100
MAT498	Upper Division Seminar	A		1.00	1.00	4.000
	Term GPA: 3.936 Totals:			14.00	14.00	55.100
	Cum GPA: 3.377 Totals:			124.50	116.00	330.90
Dean's List						
	WINTER TERM 2016 (01/05/2016 to 01/27/2016)					
MAT370	Geometry	A		3.00	3.00	12.000
	Term GPA: 4.000 Totals:			3.00	3.00	12.000
	Cum GPA: 3.395 Totals:			127.50	119.00	342.90
	SPRING SEMESTER 2016 (02/03/2016 to 05/17/2016)					
ENG308	Rival Playwrights	A		3.00	3.00	12.000
PHY330	Electricity & Magnetism	A		3.00	3.00	12.000
HIS347	18 C Europe:Fall of Old	A		3.00	3.00	12.000
ENV389	Scotland Abroad Prep	A		1.00	1.00	4.000
MAT441	Topology	A		3.00	3.00	12.000
HIS470	History Portfolio	P		1.00	1.00	0.000
MAT494	Galois Theory for Diff E	A		2.00	2.00	8.000
	Term GPA: 4.000 Totals:			16.00	16.00	60.000
	Cum GPA: 3.473 Totals:			143.50	135.00	402.90
Dean's List						

Degree Received: Bachelor of Science
Date Conferred.: 05/17/2016
Majors.....: Mathematics-Physics
Minors:.....: German Foundations
History
Literature in English

	2016 SUMMER TERM (05/31/2016 to 07/29/2016)					
ENV390	Scotland/Lake District A	A		4.00	4.00	16.000
	Term GPA: 4.000 Totals:			4.00	4.00	16.000
	Cum GPA: 3.491 Totals:			147.50	139.00	418.90

End of official record.

The College of Idaho
2112 Cleveland Blvd, Caldwell, Idaho 83605
(208) 459-5011

Name of Institution:
The College of Idaho:
October 2007 to the present.
Albertson College of Idaho:
November 1991 to October 2007.
The College of Idaho:
October 1891 to November 1991.

Accreditation:
The College of Idaho has been accredited by the Northwest Commission on Colleges and Universities continuously since 1922.

Units of Credit: Semester credits.

Calendar:
September 2010 to present:
The college follows a 4-1-4 academic calendar, with a full semester from September to December, an intensive January term, and a full semester from February to May.

1968-2010:
The school year was divided into two semesters. The first was a 13-week semester from September to December. The second semester was 19 weeks from January to June. This semester included a 6-week winter session in January through February.

Course Numbering System:

Lower Division	100-299
Upper Division	300-499
199T/299T/399T/499T	Special Topics
294/494	Independent Studies
397/497	Internships
500-699	Graduate Level

In accordance with the Family Educational Rights and Privacy Act of 1974, as amended, this record is released on the condition that it will not be made available to any other party without the written consent of the student.

Grading System:
Grades used in calculation of GPA:

A	Excellent	4.00
A-		3.70
B+	Good	3.30
B		3.00
B-		2.70
C+	Satisfactory	2.30
C		2.00
C-	Poor	1.70
D+		1.30
D		1.00
D-		0.70
F		0.00
WF		0.00
IA, IB	Incomplete work completed and graded	

Grades *NOT* used in the calculation of GPA:

AU	Audit
I	Incomplete
L	Work in progress not expected to be completed in one term.
P	Passing with credit given.
W	Withdraw. No credit given.
WA	Administrative Withdraw. No credit given.

Repeat of a course:
If a course is repeated, both grades appear on the transcript, but only the most recent grade is used in GPA calculation.

Graduation with Honors:

Summa Cum Laude	3.85-4.00
Magna Cum Laude	3.75-3.84
Cum Laude	3.50-3.74

Colton Grainger
5019090

February 15, 2017

Department of Mathematics and Statistics
University of New Mexico

Committee Member,

I aim to enroll at University of New Mexico to become quantitatively literate. J. Lorenz's work in fluid mechanics and A. Korotkevich's simulation of dynamic gas flow motivates this application. At UNM, I would design and implement numerical methods to model ground water and aquifers. I intend to defend these methods in a master's thesis. Upon attainment of an M.S., I plan to complete a Ph.D. and enter industry.

Here are two rough descriptions of my research interest.

Sediment Transport In Idaho's Treasure Valley, farmers use a network of reservoirs and canals to suspend and divert the Boise river. To understand how this irrigation regime sweeps up and transports material, I would model water's energy in flood irrigated fields. Constrained by agricultural machinery and topography, I would search for furrow patterns that minimize water's turbidity. As a related project, I would consider canal geometries that interrupt high-velocity flows.

Ground Water Contamination The Army's vacillation over the Dakota Access Pipeline pushes me to research contaminant diffusion. Were I to contribute to an environmental impact statement, I would (i) model geomorphic stress on the pipeline and (ii) consider the effects of a leak in regions of stress. I imagine the first item, characterizing tension in surrounding media, to be accessible as an inverse problem. I would approach the second, modeling diffusion, with a modified finite element method.

I share two examples of my relevant research experience.

Galois Theory & Fuchsian Equations Following Michio Kuga's analysis of Fuchsian-type differential equations, I parameterized the solution space of the hypergeometric equation. For interesting cases, I found the monodromy representation at singular points. I presented my method, its history and a potential application to fluid flow at The College of Idaho's 2016 student research conference.

Igneous Dikes in Scotland Relying on N. L. Bowen's *The Evolution of the Igneous Rocks*, I modeled the cooling of plagioclase feldspar magma. I proposed that my geology abroad group in Scotland visit Glen Sligachan, a significant site for Bowen's field observations. On June 4th, noticing rough shards of buoyantly exposed olivine lodged within dense clusters of plagioclase crystals, we validated Bowen's hypothesis that molten plagioclase carried partially solidified mafic minerals into the crust.

I am now a medical care intern at a resettlement office in Houston. I work on a small team to support refugees with complex medical conditions. In this work, I help limited English proficiency clients navigate one of the nation's densest health-care bureaucracies, I coordinate health plans to ensure coverage of medical services, and I accompany clients to safety nets (e.g., shelters and food pantries) in emergency situations.

However, my heart's work is empirical, not service-oriented. Keeping in mind that "we can … only augur well for the sciences when the ascent [proceeds] by a true scale and successive steps, without interruption or breach, from particulars,"[1] I am ready to endure the rigors of graduate study. Eventually, I hope to have some serious ecological impact by attacking water use controversies with numerical methods.

I would contribute formidably to your program. Thank you for your consideration.

Respectfully,
Colton Grainger

1. Francis Bacon. *Novum Organum*. Sec. I, para. 104

Curriculum Vitae

Colton Grainger

(208) 585-7373
coltoncgrainger@gmail.com
@ColtonGrainger

OBJECTIVE To complete an M.S. in Mathematics (under Plan I, with applied emphasis) at UNM.

EDUCATION

B.S. in Mathematics-Physics May 2016
The College of Idaho, Caldwell, ID GPA: 3.49

- Senior Study: *Galois Theory for Differential Equations*
- Advised by Dr. Jonny Comes.

RESEARCH INTERESTS

Multiscale Analysis and Computation to approach complex systems (e.g., aquifers).
Numerical Methods to model fluid flow and contaminant diffusion in porous media.

EXPERIENCE

Refugee Medical Care Intern August 2016 – Present
YMCA International Services, Houston, TX

- Managed 60 refugee medical cases in a team of 3 staff.
- Arranged medical appointments with transportation and interpretation.
- Facilitated access to low-income health-care and affordable housing.

Course Grader & Tutor September 2015 – December 2015
The College of Idaho

- Graded weekly assignments for a section of 25 general physics students.
- Tutored 5 calculus students in weekly one-on-one sessions.

Dishwasher & Server Summers 2011 – 2013, Fall 2015
The Griddle, Meridian, ID

- Served food and kept clean a 100 m^2 commercial kitchen.

COMMUNITY INVOLVEMENT

Service Corps Fellow August 2016 – Present
Texas Episcopal Service Corps, Houston, TX

- Lived in an intentional community with 2 other fellows.
- Committed to 1,700 hours of service in 11 months.

WWOOF Ranch-Hand Summer 2016
Sonnwendhof Biofarm, Möckmühl, Deutschland

- Worked on a cooperative ranch with American, German and Italian WWOOFers.
- Pastured two herds of sheep and maintained a sustainable garden.

SKILLS (rated out of 5)

Languages
- **German** (3), English (5)

Computer Algebra
- **SageMath** (3), Mathematica (2)

Programming
- **Python** (3), C++ (2)

Operating
- **GNU** (3), macOS (4), Windows (4)

HONORS

Heritage Scholarship for academic merit 2012 – 2016
Top Putnam Score among College of Idaho students 2013, 2015
Varsity Skier on The College of Idaho Ski Team 2014, 2016

Assistantship Interest

Colton Grainger

(208) 585-7373
coltoncgrainger@gmail.com
@ColtonGrainger

Summary of Teaching Experience

Consider my candidacy for a teaching assistantship. I summarize what has prepared me to teach.

Tutoring & Grading I tutored calculus students one-on-one and graded physics coursework. I guided small groups through problems in elementary electromagnetism. I heard out my peers in introductory topology and posed constructive questions. As a Heritage Scholar at The College of Idaho, I led discussions in colloquium. In seminar, I organized half-hour workshops on the logistic equation and the heat equation. I also delivered an hour presentation on epidemiological modeling.

Time Away from School Over the last year, I volunteered on a ranch outside of Stuttgart and worked at a refugee resettlement office in Houston. These experiences refined my teaching ability. For example, while I learned LaTeX for mathematical exposition, with it, I have created bus guides and applications for indigent health-care. As a second example, while I was exposed to guided problem solving (G. Polya) and inquiry based learning (R. L. Moore) in college, I have applied these pedagogies across language barriers. I plan ahead, relax, and invite questions.

Undergraduate Syllabi

While I am a quick study, I want to front up my established strengths. Here I list my undergraduate course-work, declare my grade, cite the textbook and abstract the course's content. My strength in analysis and topology suggests that I would be a excellent assistant for calculus sequence courses. However, perhaps working as an assistant for introductory linear algebra or ordinary differential equations would be a fruitful learning experience for myself and others.

2015–2016

MAT-441 Topology

3 credit(s). Taught by Dave Rosoff, with final grade **A**.

- Dave Rosoff. *Course Notes on Elementary Topology*. Personally distributed, 2016. adapted from notes by Michael Starbird
- An introduction to the techniques and theorems of point-set topology. Approached in a modified Moore method, with emphasis on writing, revising and presenting proofs. Topics included cardinality, separation axioms, compactness, connectedness, continuity, as well as novel proofs for the Heine-Borel theorem and the fundamental theorem of algebra.

MAT-494 Galois Theory for Diff Eqs

2 credit(s). Advised by Jonny Comes, with final grade **A**.

- Michio Kuga. *Galois' Dream: Group Theory and Differential Equations: Group Theory and Differential Equations*. Birkhäuser Boston, 1993

- An independent study. Explored the correspondence between the fundamental group of the plane with n points removed and its covering surface. Used Galois theory to prune the ring of continuous functions (defined out of the covering surface) down to exactly those functions that were solutions to Fuchsian type differential equations.

PHY-330 Electricity & Magnetism

3 credit(s). Taught by James Dull, with final grade **A**.

- David Jeffery Griffiths. *Introduction to Electrodynamics*. Prentice Hall, third edition, 1999
- A survey of classical electro-magnetic theory including electrostatic and magnetostatic fields and potentials, Gauss's flux theorem, Laplace's equation, dielectrics, vector potentials, magnetization and Maxwell's equations. Focused on spoken delivery. Concluded in an oral exam.

MAT-370 Geometry

3 credit(s). Taught by Jonny Comes, with final grade **A**.

- Michael P. Hitchman. *Geometry with an Introduction to Cosmic Topology*. Jones and Bartlett Publishers, 2009
- A preparation for Felix Klein's *Erlangen* program. Developed geometry in terms of a space and a group of transformations of that space. Emphasis on congruence relations. Unpacked the theory of complex functions in relation to hyperbolic geometry.

MAT-451 Real Analysis

3 credit(s). Taught by Jonny Comes, with final grade **A-**.

- Stephen Abbott. *Understanding Analysis*. Undergraduate Texts in Mathematics. Springer New York, 2015
- Proceeded from the Axiom of Completeness to rigorously prove results about the convergence of sequences and series. Defined continuity (Lipschitz and uniform), the derivative and nowhere differentiable functions. Used suprema and infima to define the Riemann integral.

MAT-498 Upper Division Seminar

1 credit(s). Taught by Dave Rosoff, with final grade **A**.

- Douglas R. Shier and K.T. Wallenius. *Applied Mathematical Modeling: A Multidisciplinary Approach*. Discrete Mathematics and Its Applications. CRC Press, 1999
- A student-led seminar concerned with computational methods for mathematical modeling. Emphasized the importance of audience understanding. With the early outbreak of HIV in Houston as a case study, I presented a introduction to epidemiological modeling.

PHY-313 Thermal Physics

3 credit(s). Taught by James Dull, with final grade **A**.

- Daniel V. Schroeder. *An Introduction to Thermal Physics*. Addison Wesley, 2000
- Physical basis and applications of thermodynamics and statistical mechanics including temperature, heat heat engines, entropy and free energy. Included an introduction to Maxwell-Boltzmann, Bose-Einstein, and Fermi-Direct statistics and their application to the solution of thermal, mechanical and electrical problems in fluids and solids.

2014–2015

MAT-431 Complex Variables

0 credit(s). Taught by Dave Rosoff.

- No meaningful text.
- Due to a health concern in late spring, I **administratively withdrew** from all courses.

PHY-400 Quantum Physics

0 credit(s). Taught by Kathrine Devine.

- No meaningful text.
- Due to a health concern in late spring, I **administratively withdrew** from all courses.

MAT-372 History of Mathematics

3 credit(s). Taught by Dave Rosoff, with final grade **B**.

- Carl B. Boyer and Uta C. Merzbach. *A History of Mathematics*. Wiley, 2011
- A historical survey of the ideas, tools, and symbols of mathematics and the people who developed them. Contextualized sexigesimal computations, Diophantine equations and medieval number theory. Emphasis on notation and legible proofs.

MAT-461 Algebraic Structures

3 credit(s). Taught by Robin Cruz, with final grade **B+**.

- David M. Clark. Theory of groups. *Journal of Inquiry Based Learning in Mathematics*, (No. 3), April 2007
- An inquiry based course in abstract algebra focused primarily on groups. Addressed basic properties of groups, cyclic groups, LaGrange's Theorem, homomorphisms, isomorphisms, representation theorems, normal subgroups and quotient groups. Rich with examples.

MAT-498 Upper Division Seminar

1 credit(s). Taught by Dave Rosoff, with final grade **A**.

- Stanley J. Farlow. *Partial Differential Equations for Scientists and Engineers*. Dover books on advanced mathematics. Dover Publications, 1993
- A student-led seminar addressing partial differential equations in mathematical modeling. A prep for the COMAP contest. I presented the Fourier series solution to the heat equation.

PHY-301 Theoretical Mechanics

3 credit(s). Taught by Kathrine Devine, with final grade **B+**.

- John Robert Taylor. *Classical Mechanics*. University Science Books, 2005
- A survey of classical and modern topics in dynamics. Topics included orbital mechanics, non-inertial reference frames, rigid-body motion, Lagrangian and Hamiltonian methods, and elements of nonlinear mechanics and chaos. An introduction to Mathematica.

2013–2014

MAT-352 Differential Equations

3 credit(s). Taught by Dave Rosoff, with final grade **C+**.

- William E. Boyce and Richard C. DiPrima. *Elementary Differential Equations and Boundary Value Problems*. Wiley, ninth edition, 2008
- A study of the solution and applications of ordinary differential equations including systems of equations using matrix algebra. An introduction to SageMath.

MAT-361 Linear Algebra

3 credit(s). Taught by Robin Cruz, with final grade **C**.

- Robert A. Beezer. *A First Course in Linear Algebra*. Published Online, 2012
- A study of general vector spaces, linear transformations, eigenvalues and eigenvectors.

References

[1] Dave Rosoff. *Course Notes on Elementary Topology*. Personally distributed, 2016. adapted from notes by Michael Starbird.

[2] Michio Kuga. *Galois' Dream: Group Theory and Differential Equations: Group Theory and Differential Equations*. Birkhäuser Boston, 1993.

[3] David Jeffery Griffiths. *Introduction to Electrodynamics*. Prentice Hall, third edition, 1999.

[4] Michael P. Hitchman. *Geometry with an Introduction to Cosmic Topology*. Jones and Bartlett Publishers, 2009.

[5] Stephen Abbott. *Understanding Analysis*. Undergraduate Texts in Mathematics. Springer New York, 2015.

[6] Douglas R. Shier and K.T. Wallenius. *Applied Mathematical Modeling: A Multidisciplinary Approach*. Discrete Mathematics and Its Applications. CRC Press, 1999.

[7] Daniel V. Schroeder. *An Introduction to Thermal Physics*. Addison Wesley, 2000.

[8] Carl B. Boyer and Uta C. Merzbach. *A History of Mathematics*. Wiley, 2011.

[9] David M. Clark. Theory of groups. *Journal of Inquiry Based Learning in Mathematics*, (No. 3), April 2007.

[10] Stanley J. Farlow. *Partial Differential Equations for Scientists and Engineers*. Dover books on advanced mathematics. Dover Publications, 1993.

[11] John Robert Taylor. *Classical Mechanics*. University Science Books, 2005.

[12] William E. Boyce and Richard C. DiPrima. *Elementary Differential Equations and Boundary Value Problems*. Wiley, ninth edition, 2008.

[13] Robert A. Beezer. *A First Course in Linear Algebra*. Published Online, 2012.