Appendix I
Physics Syllabi 2011-2012 Academic Year

PHYS 1101 - Introduction to Space Science Laboratory
Fall 2011
Web Instructional Method

Instructor: William Murry

Phone: Department 870-972-3086
Office 870-972- 3138

Office: LSE 116

E-mail: wmurry@astate.edu

Office Hours: W 10:00 am – 12:00pm
TR 3:30 pm – 5:00pm, Or by appointment

Course Co-Requisite: PHYS 1103 Introduction to Space Science Lecture

Description: Laboratory Supplement to PHYS 1103 Introduction to Space Science

Goals: This course uses online and hands-on activities to demonstrate basic science principles that are taught in the lecture class PHYS 1103.

General Education Objective: Using Science to Accomplish Common Goals – Students will be able to

- Understand Concepts of Science as they apply to contemporary issues

Resources: http://blackboard.astate.edu/webapps/login/
http://www.stellarium.org/

Class website: Blackboard will be used in this class. Notes, assignments, announcements, and grades will be posted. You are responsible for getting this information. If you are having a problem with the website please contact me before a lab report is due so the problem can be fixed.

Lab Reports: Labs are to be submitted through blackboard before midnight on the due date. As this is an on-line class you will be responsible for checking the web site for any changes to the listed due dates. Because of the electronic nature of the labs, late labs will not be accepted.

Lab Due Dates:

Lab Assignment	Due Date

Intro to Stellarium Write-up	Tuesday, August 30, 2011
Lab 1: The Sky	Tuesday, September 06, 2011
Lab 2: The Ecliptic and Precession	Tuesday, September 13, 2011
Lab 3: The Sky & the Earth – I	Tuesday, September 20, 2011
Lab 4: The Sky & the Earth – II	Tuesday, September 27, 2011
Lab 5: The Solar Eclipse Cycle	Tuesday, October 04, 2011
Lab 6: The Clockwork of the Moon and Planets	Tuesday, October 11, 2011
Lab 7: Exoplanets	Tuesday, October 18, 2011
Lab 8: The Sun	Tuesday, October 25, 2011
Lab 9: Galileo and the Moons of Jupiter	Tuesday, November 01, 2011
Lab 10: Newton's Laws and the Masses of The Planets	Tuesday, November 08, 2011

Course Grades: Your lowest lab score will be dropped from the final average. The grades will use a standard scale such that:

90+: A; 80+: B; 70+: C; 60+: D; less than 60: F.

E-mail: All E-mail sent to me should be from your official student account (john.doe@smail.astate.edu) and include your student ID number. E-mail will be checked during office hours, and responses will be given in the order they are received.

Academic Integrity: Arkansas State University enthusiastically promotes academic integrity and professional ethics among all members of the ASU academic community. Violations of this policy, including plagiarism and other forms of cheating, are considered serious misconduct and may result in disciplinary action and severe penalties. Please see the Academic Integrity section in the student handbook for a more thorough explanation of the schools policy.

American Disabilities Act: Students who require academic adjustments in the classroom due to a disability should register with and provide documentation to the ASU Disability Services. They will provide you with a letter indicating what academic accommodations you need. Please get this to me within the first week of class. For more information about what services are available to ASU students with disabilities, contact the ASU Disability Services. They can be reached in Suite 2181 of the Student Union, by calling (870) 972-3964, or on the web at http://disability.astate.edu/.

Syllabus Change Policy: This syllabus is a guide for the course and is subject to change. You will be notified of any changes to the policies outlined in this syllabus

PHYS 1103 - Introduction to Space Science
Fall 2011
Web Instructional Method

Instructor: William Murry

Phone: Department 870-972-3086
Office 870-972-3138

Office: LSE 116

E-mail: wmurry@astate.edu

Office Hours: W 10:00 am – 12:00pm
TR 3:30 pm – 5:00pm, Or by appointment

Course Prerequisites: MATH 0013 - INTERMEDIATE ALGEBRA or ACT Math score of 16

Text: *Astronomy – A Beginner's Guide to the Universe, Sixth Edition,*
Chaisson and McMillan

Pearson (2010)

ISBN-10: 0-321-59876-8
ISBN-13: 978-0-321-59876-9

Description: A survey of the basic principles of science, with emphasis on physics, through their application to the study about our place in the cosmos.

Goals: Students will obtain:

- A basic understanding of the historical and current practice of Astronomy.
- A basic understating of the structure and mechanisms governing our solar system and the wider universe.

General Education Objective: Using Science to Accomplish Common Goals – Students will be able to

- Understand Concepts of Science as they apply to contemporary issues

Resources: http://blackboard.astate.edu/webapps/login/
http://www.masteringastronomy.com/

Corse ID: MURRY1103

Class website: All class notes, assignments, announcements, and grades will be posted on the class website. You are responsible for getting this information and turning the assignments in on time. If you are having a problem with the website please contact me before an assignment is due so the problem can be fixed.

Homework: Homework will be assigned after each chapter, and will be submitted electronically through the mastering astronomy site. If an access code was not included with your text book the mastering astronomy site will require a subscription fee (~$40). Because of the electronic nature of the assignments, late assignments will not be accepted.

Tests: As this is an on-line class all tests will be given through the class website. Since the tests can be taken from any internet ready computer there will be no makeup exams. If you know beforehand that you will not have access to a computer on the day of the test, please contact me and we can schedule a time for you to take the exam early.

Schedule for Exams:

Exam	PHYS 1103-001	Covering
1	Thursday, September 08, 2011	**Part 1**
2	Tuesday, October 04, 2011	**Part 2**
3	Thursday, October 27, 2011	**Part 3**
4	Tuesday, November 29, 2011	**Part 4**
Final	Wednesday, December 07, 2011	**Comprehensive**

Course Grades: The lowest Section Exam and Homework score will be dropped.

To calculate your final score apply the following weights to the average exam and homework scores.

Four Section Exams	45%
Comprehensive Final Exam	25%
Homework and activities	30%

The grades will use a standard scale such that:

90+: A; 80+: B; 70+: C; 60+: D; less than 60: F.

Academic Integrity: Arkansas State University enthusiastically promotes academic integrity and professional ethics among all members of the ASU academic community. Violations of this policy, including plagiarism and other forms of cheating, are considered serious misconduct and may result in disciplinary action and severe penalties. Please see the Academic Integrity section in the student handbook for a more thorough explanation of the schools policy.

American Disabilities Act: Students who require academic adjustments in the classroom due to a disability should register with and provide documentation to the ASU Disability Services. They will provide you with a letter indicating what academic accommodations you need. Please get this to me within the first week of class. For more information about what services are available to ASU students with disabilities, contact the ASU Disability Services. They can be reached in Suite 2181 of the Student Union, by calling (870) 972-3964, or on the web at http://disability.astate.edu/.

Withdrawal Policy: The withdrawal policy as stated in the Arkansas State University Undergraduate Handbook will be followed. For this semester, the last day to withdraw without academic penalty is listed on the Registrar's website. Make certain to follow all procedures if you decide to withdraw; failure to do so will result in your being assigned a grade of "F" for the course.

E-mail: All E-mail sent to me should be from your official student account (john.doe@smail.astate.edu) and include your student ID number. E-mail will be checked during office hours, and responses will be given in the order they are received.

Syllabus Change Policy: This syllabus is a guide for the course and is subject to change. You will be notified of any changes to the policies outlined in this syllabus

PHYS 2034-002 – University Physics 1

Fall 2011

Instructor: Dr. Carroll

Office: LSE 116
Phone: (870) 680-4335
Office Hours: MW 2:00 PM – 4:00 PM & **T** 10:00 AM – 11:00 AM

Email: bcarroll@astate.edu

Meeting time: **TR** 12:30 PM – 3:15 PM in LSE Room 307

Co-requisite: Calculus 1 – MATH 2204

Required Text: *Physics for Scientists and Engineers* by Serway and Jewett, 8th Edition

Grades:		
	Homework	35%
	Exams	30%
	Quizzes/Attendance	10%
	Labs	25%

Grading Scale: 100% ≥ A ≥ 88% > B ≥ 76% > C ≥ 65% > D ≥ 55% > F

Learning Outcomes:

- Understand concepts of science (introductory Physics in particular) as they apply to contemporary issues
- Describe observed and modeled phenomena using fundamental physical principles and calculus-based mathematics.
- Investigate physical properties of mechanical and fluid systems with available laboratory equipment and effectively communicate the methods and results of experimentation.
- Demonstrate the development of standards expected of professional scientists.

Topics to be covered:

Intro to Physics, Mathematics, and Measurement
Translational Motion in 1, 2, & 3 Dimensions
Newton's Theory of Motion
Energy & Work
Momentum, Collisions, & Torque
Rotational Motion & Angular Momentum
Universal Gravitation
Fluid Mechanics
Oscillations & Waves
Introductory Thermodynamics

Attendance: You are allowed up to **four** absences for the semester. All missed work with valid excuse must be made up on your own time; talk with me about possible make-up exams and quizzes. Do note that a valid excuse consists only of official excuses sanctioned by the University.

Lectures: Lectures will be fairly interactive. They utilize PowerPoint slides as well as "Clicker Questions." They will include general discussion on the relevant topics, example problems, demonstrations, and break-out sessions for group-based problem solving. Participation in discussions and problem solving sessions will be graded.

PowerPoint lecture notes will be available on Blackboard Learn and narrated lecture notes will be available via Tegrity.

Homework/Quizzes: I will assign weekly homework sets covering each week's material (typically covering one to two chapters from the textbook). Expectations will be clearly given in class and on Blackboard. In addition, there will be weekly quizzes. N.B.: I do reserve the right to give a quiz whenever I deem necessary.

Exams: There will be four exams this semester, including the final. All exams will be announced several weeks in advance. Except for the final, specific dates will vary depending on our progress.

Final Exam: Thursday, December 8 from 2:45 PM to 4:45 PM

Laboratory: Labs will be done on a weekly basis. Assignments will consist of pre-lab quizzes administered at the beginning of the lab session and group lab reports due one week following their respective lab.

Laboratory Safety: Safety in the Lab is **critical**. Any actions not in accordance with the lab safety rules will have serious consequences, including but not limited to: points off your lab grade, assignment to a different group, and dismissal from class. Although our labs are not as physically dangerous as those in Chemistry, for instance, you are expected to take safety in the Physics lab seriously.

Blackboard: Assignments, lectures, and any relevant information for this class will be posted on Blackboard. I encourage you all to take full advantage of Blackboard's many features (Discussion boards, Collaboration/Chat, etc.) Note that I will be using Blackboard 8, not the new Blackboard Learn. This can be found at http://blackboard.astate.edu or through the MyCampus portal.

Open Door Policy: Although I have regular office hours that I encourage you all to take advantage of, I am always here to help you. Assuming I have no prior engagements, my door will be open (perhaps not literally) if you have questions or need to talk.

Classroom Decorum: *Please* turn off or silence your cellphone and other noise making devices in class. Disruptive behavior will not be appreciated.

Note on my own attendance: Due to the nature of my research, I may on occasion have to spend a week or so elsewhere (typically Tennessee, Canada, or the UK). In the event that I do have such a research trip during the semester, there will certainly be a substitute instructor and the class will proceed as usual. My expectations of you all will not diminish with my absence.

Students requiring accommodations in the classroom due to disability must first register with ASU Disability Services. After registration, please contact me as soon as possible so we can arrange a course of action. Equal access for all students is of the utmost importance and should be taken care of at your earliest convenience.

UNIVERSITY PHYSICS II-60734-2044

Text: Physics for scientists and engineers, 7th Edition
Chapters 23-33, 16-18, 34-38, Raymond A. Serway & John W. Jewett, Jr.
Thomson, Brooks/Cole 2008

Course Objective: Provide the student with fundamental knowledge of Electricity, Magnetism, Wave Motion, Optics and Basic Instrumentation.

Corequisite: MATH 2214 Calculus II

Instructor: Dr. Liangmin Zhang
Office: LSE 105
Phone: 972-3175
Email: lzhang@astate.edu
Office Hours: M-F, 4:00pm-5:00pm (or by appointment)

Grades:

Two in-class exams and the final		60%
(All equal weight and the lowest one dropped)		
Homework **(drop one)**	20%	
Lab **(drop one)**	20%	
		100%

Scores: 90-100%: A; 80-89%: B; 70-79%: C; 60-69%: D; less than 60%: F.

Exams: **Tentative Schedule for Exams:**
Exam 1, Monday, September 26, Chapters 23-28
Exam 2, Wednesday, October 26, Chapters 29-33
Final, Friday, December 9, 8:00 am-10:00 am, Chapters 16-18, 34-38

Homework: Students will pick up and turn in homework assignments from **http://classwk.net/**. As you turn in a problem, the computer will indicate if your solution is correct. Missed problems can be re-attempted for reduced credit. Solutions to the homework will be available via WWW after the due date.

Miscellaneous: If you miss an exam or a lab due to official university business (official university excuse required) or due to the sickness of the student herself/himself (letter from the doctor required), special make-up arrangement can be made.

Students enrolled in this class agree to use Texas Teaching Tools provided by the University of Texas at Austin, including electronic grading and password-protected access to a student's grades by the instructor and the student herself/himself.

Students who require academic adjustments in the classroom due to a disability must first register with ASU Disability Services. Following registration and within the first two weeks of class, please contact me to discuss appropriate academic accommodations. Appropriate arrangements can be made to ensure equal access to this course.

Tentative Schedule:

Monday	Wednesday	Friday
Aug. 22, Ch. 23	Aug. 24, Ch. 23	Aug. 26, Chs. 23-24
Aug. 29, Ch. 24	Aug.31, Ch. 24	Sept. 2, Ch. 25
Sept. 5, Holiday	Sept. 7, Ch. 25	Sept. 9, Ch. 27
Sept. 12, Ch. 28	Sept. 14, Ch. 28	Sept. 16, Lab 03
Sept. 19, Lab 04	Sept. 21, Lab 06	Sept. 23, Lab 07
Sept. 26, Exam 1	Sept. 28. Ch. 29	Sept. 30, Ch. 29
Oct. 3, Ch. 30	Oct. 5, Ch. 30	Oct. 7, Ch. 31
Oct. 10, Ch. 31	Oct. 12, Ch. 32	Oct. 14, Ch. 32
Oct. 17, Ch. 33	Oct. 19, Lab 09	Oct. 21, Lab 10
Oct. 24, Lab 12	Oct. 26, Exam 2	Oct. 28, Ch. 16
Oct. 31, Ch. 17	Nov. 2, Ch. 18	Nov. 4, Ch. 34
Nov. 7, Ch 35	Nov. 9, Ch. 36	Nov. 11, Ch. 36
Nov. 14, Ch. 37	Nov. 16, Chs. 37- 38	Nov. 18, 38
Nov. 21, Fall Break	**Nov. 23, Fall Break**	**Nov. 25, Fall Break**
Nov. 28, Lab 02	Nov. 30, 1, Lab 13	Dec. 2. Lab 14
Dec.6, Lab 15	Study day	Dec. 9, Final Exam

PHYS 2054 - General Physics I
Fall 2011

Room and Time

Lecture
AG 203, MWF 1:00-1:50 p.m.
Lab
LSE 307

- PHYS 2054-001: M 2:00-3:50 p.m.
- PHYS 2054-002: W 2:00-3:50 p.m.
- PHYS 2054-003: F 11:00 a.m.-12:50 p.m.

Instructions for individual labs may be found on Blackboard.

Prerequisites

MATH 1033 or higher

Textbook

College Physics, Serway Faughn & Vuille, 9th edition; ISBN 978-0-8400-6206-2

Student Learning Outcomes/Objectives

Using Science to Accomplish Common Goals:

Students will be able to understand concepts of science as they apply to contemporary issues.

Using Physics to describe Physical Phenomena:

Describe observed and modeled phenomena using fundamental physical principles.

Using Mathematics:

Students should be able to interpret and analyze quantitative/mathematical information (such as formulas, graphs, and tables) and apply mathematical methods to solve problems.

Goals

The student will learn the essentials of mechanics, thermodynamics, and oscillatory motion in a lecture and laboratory format.

Instructor

Dr. Michael Guenther
Office: LSE 108
Phone: (870) 972-3265
Email: mguenther@astate.edu
Office Hours: 12-1 p.m. MW, 11a.m.-12 p.m. TR, 10-11 a.m. F, or by appointment

Grading and Evaluation

Tests	40%
Final	20%
Homework	5%
Quizzes	10%
Lab	25%
	100%

≥ 88%	A
76-88%	B
64-76%	C
52-64%	D
< 52%	F

Your grade will comprise four components: quizzes, homework, tests (including the final), and lab. You will work together on the quizzes in lab in groups no larger than four people. If you have an excused absence for a quiz or a lab I will prorate your score rather than have you make up that work, for a limited number of absences. Homework will be assigned for each chapter. I strongly encourage you to work together on the homework. Homework grades will be based on the number of problems attempted rather than the correctness of the student's solutions. The student must make a good-faith effort to complete each problem to receive full credit. There will be four tests, each covering only new material not previously tested. The final may be comprehensive. Tests are closed book, though you may bring a single letter-sized page of notes (front and back) and a calculator. If you have an excused absence for a test you will be given a make-up test upon your return (please contact me to arrange a time). *You must be prepared to take any make-up test the day you return to classes.* There is no extra credit offered, though I reserve the right to curve class scores upward. Grades, announcements, and other course materials will be posted on Blackboard. The last day to drop this course or withdraw from the university is Wednesday, November 16. The final is scheduled for Wednesday, December 7 from 2:45-4:45 p.m.

Course Calendar – *Subject to Change*

Week 1: 8/22-8/26	Chapter 1-2
Week 2: 8/29-9/2	Chapter 2-3
Week 3: 9/6-9/9 Labor Day 9/5	Chapter 3, Test over chapters 1-3 Fri 9/9
Week 4: 9/12-9/16	Chapter 4
Week 5: 9/19-9/23	Chapter 4-5
Week 6: 9/26-9/30	Chapter 5, Test over chapters 4-5 Fri 9/30
Week 7: 10/3-10/7	Chapter 6
Week 8: 10/10-10/14	Chapter 7
Week 9: 10/17-10/21	Chapter 8, Test over chapters 6-8 Fri 10/21
Week 10: 10/24-10/28	Chapter 9
Week 11: 10/31-11/4	Chapter 13, Test over ch 9,13 Fri 11/4
Week 12: 11/7-11/11	Chapter 10
Week 13: 11/14-11/18 Last day to drop, Wednesday, 11/16	Chapter 11
Fall Break	
Week 14: 11/28-12/2	Chapter 12
Week 15: 12/5	Chapter 12, review

General Physics II

PHYS 2064

Dr. Bruce Johnson

office: 972-3086
home: 931-7062
bjohnson@astate.edu

prepared: August 29, 2011

TEXT: *College Physics* by Serway and Vuille

READING: For best results read the chapters before they are discussed in class, and bring questions to class. You are responsible for all material in the following chapters.
15 Electric Forces and Fields
16 Electrical Energy and Capacitance
17 Current and Resistance
18 Direct-Current Circuits
19 Magnetism
20 Induced Voltages and Inductance
21 Alternating-Current Circuits and Electromagnetic Waves
22 Reflection and Refraction of Light
23 Mirrors and Lenses
24 Wave Optics
25 Optical Instruments
26 Relativity
27 Quantum Physics
28 Atomic Physics
29 Nuclear Physics

PREREQUISITE:
MATH 1023 College Algebra, MATH 1033 Plane Trigonometry, PHYS 2054 General Physics I

OFFICE HOURS:
Times will be announced in class.

STUDYING TOGETHER: Strongly encouraged - Working on homework together is a great way to learn. I strongly recommend attempting problems on your own first, then working together on unsolved problems. Please see me if finding a study group or partner is difficult to arrange.

MAKEUP POLICY: No makeup exams will be given. If fewer than two hour exams have been completed, the final may count (with prior approval from me) toward a missing exam grade.

GRADING:

homework:	20%
(3) hour exams:	40%
(2 hour exams count)	
labs:	20%
final:	20%

SCORES:

90 - 100%	A
80 - 90%	B
70 - 80%	C
60 - 70%	D
0 - 60%	F

HOMEWORK: A problem set covering the material in each chapter will be due on the day indicated on the calendar for this course. Homework is retrieved over the internet from https://classwk.net as per instructions in class.

HOUR EXAMS: Three tests will be given. (The top two exams will count.)

FINAL: Comprehensive. The final exam score may not be dropped.

DISABILITIES: Students who require academic adjustments in the classroom due to a disability must first register with ASU Disability Services. Following registration, please contact me to discuss appropriate academic accommodations. Appropriate arrangements can be made to ensure equal access to this course.

LEARNING OUTCOMES:
Describe observed and modeled phenomena using fundamental physical principles.

Calendar

Tuesday	*Thursday*
Aug 23 Ch 15	25 Ch 15
30 Ch 16 HW:1(15)	**Sept** 1 Ch 16
6 Ch 16 nt HW:2(16)	8 Ch 17 nt
13 Ch 18 HW:3(16,17)	15 Ch 18 nt
20 Ch 19 HW:4(18)	22 Ch 19 nt
27 Ch 20 HW:5(19)	29 Ch 20 nt
Oct 4 Ch 21 HW:6(20)	6 Ch 21 **Exam 1 (15 - 20)**
11Ch 22 HW:7(21)	13 Ch 22 nt
18 Ch 23 HW:8(22)	20 Ch 23 nt
25 Ch 24 HW:9(23)	27 Ch 24
Nov 1Ch 25 HW:10(24)	3 Ch 25,26 **Exam 2 (21 - 24)**
8 Ch 26 HW:11(25,26)	10 Ch 27
15 Ch 27, 28 HW:12(26,27)	17 Ch 28
22 Thanksgiving	24 Thanksgiving
29 Ch 29 HW:13(27,28)	**Dec** 1 Ch 29 **Exam 3 (25 - 28)**
6 Study Day HW:14(29) (no class)	8 **Final**

Final: Thursday, Dec 8, 2005, 12:30 – 2:30 p.m.

Homework for chapters 27 - 29 (Serway & Vuille 8th edition)

Ch 27: 1, 7, 11, 17, 25, 30, 33, 35, 41, 45
Ch 28: 7, 15, 23, 25, 31, 33, 38, 39, 41
Ch 29: 1, 5, 11, 15, 20, 22, 23, 37, 46, 54

PHYS 2133 Survey of Physics for the Health Professions

Objectives: The learning objective of this course is to understand concepts of science as they apply to contemporary issues. The content objectives are:
To understand and apply basic laws of mechanics
To analyze wave phenomena
To determine consequences of electricity and magnetism
To solve problems related to basic optics and modern physics

Lecture: **TR** 9:30 a.m. – 10:45 a.m. LSW 334

Text: Conceptual Physics, Eleventh Edition
Paul G. Hewitt
Addison-Wesley, 2010

Instructor: Dr. Bin Zhang
Office: LSE 103
Phone: 972-2996
E-mail: bzhang@astate.edu
Office Hours: W 3:00 p.m. – 5:00 p.m.

Grades: We will have 3 exams (including the non-comprehensive final). They will be equally weighted at 20%. Homework will be worth the remaining 40%.

Course Grades: 90+: A; 80+: B; 70+: C; 60+: D; less than 60: F.

Final: Monday, December 12, 8:00 a.m. – 10:00 a.m.

Students who require academic adjustments in the classroom due to a disability must first register with ASU Disability Services. Following registration and within the first two weeks of class, please contact me to discuss appropriate academic accommodations. Appropriate arrangements can be made to ensure equal access to this course.

ATMOSPHERIC DYNAMICS (PHYS 3043)

Spring 2012

Instructors: **Dr. Tillman Kennon** (*jkennon@astate.edu*) and **Dr. Hashim Ali** (*hali@astate.edu*)
Text: Essentials of Meteorology, 5th Edition by C Donald Ahrens
Class: MW 3.30-4.45 LSE Room 306
Office hours: Dr. Kennon, LSE 312, MW: 1-3 pm; F: 12-1 pm
Dr. Ali, LSE 513 TR: 9-11 am

- **BSE General Science: Chemistry & Physics Learning Outcome:** Demonstrate an understanding of the history, philosophy, and practice of science.

Atmospheric Dynamics is an introduction to fluid dynamics taught through the study of the atmosphere. The concepts of fluid flow, energy, rotating reference frames, thermodynamics, turbulence, circulation, weather systems, global warming, and atmosphere/ocean interactions will be explored. Subject matter content will be reinforced through hands-on involvement in creating and flying atmospheric detection equipment on high and low altitude balloon systems. Students taking this course must have passed Physics I (PHYS 2034 or 2054).

Learning is an active process. While attendance is expected at all class meetings, merely being present is no guarantee of a strong performance in the class. In-class discussion will play an integral role in the learning process, i.e. come prepared for class by reading the book and reviewing your notes and chapter objectives and take part in the discussion. While grades are not assigned for participating in discussions, experience has shown that students that take an active role in class and come prepared for class learn the material much better. Remember, students are responsible for all materials and announcements made in class.

You should be taking this course because you are interested in learning more about the world around you and how it operates. If you fully participate in this class, you will achieve this goal. Remember, your instructor is here to help you in this endeavor. **If you are having trouble, come see us or call us as soon as the trouble starts**. Do not wait until later in the semester when things might have gotten worse for you.

The use of simple calculators is allowed in all laboratories and examinations. All examinations are closed book. No "memory sheets" or note cards are allowed. Visitors (friends, children, etc.) are strictly prohibited from the laboratory periods.

Course evaluation:

- 2 short quizzes 10%
- Midterm exams 20%
- Research paper/presentation/lab activities 50%
- Final Exam 20%

Grading:

A = 90-100

B = 80-89

C = 70-79

D = 60-69

F = Below 60

Attendance is required for all tests and quiz times. There are no make-up quizzes or tests. Any grade for a missed examination or quiz will be replaced with the grade for the final exam **with a valid excuse (illness, death, etc.) for the absence**.

Participation in laboratory activities involves an inherent risk of injury. In the event of injury, the student should immediately inform the instructor, who will contact the Campus Public Safety Officer. The Officer will file an accident report and administer first aid or contact appropriate medical help.

Important dates:

- Monday February 6th 2012 — First Quiz
- Monday March 12th 2012 — Midterm Exam
- Monday April 16th 2012 — Second Quiz
- Wednesday April 18th 2012 — Last day to drop without academic accountability
- Monday May 7th 2012 — Final Exam

Academic Honesty: Every ASU student is expected to follow the regulations regarding academic integrity as stated in the Arkansas State University Undergraduate Handbook. **Plagiarism and cheating of any kind will not be tolerated**. A first infraction will result in a zero for the assignment. Further infractions will result in a failing grade for the course and a recommendation for sanctions to be imposed on the student by the University.

Withdrawal Policy: The withdrawal policy as stated in the Arkansas State University Undergraduate Handbook will be followed. For this semester, the last day to withdraw without academic penalty is **April 18th, 2012**. Make certain to follow all procedures if you decide to withdraw; failure to do so will result in your being assigned a grade of "F" for the course.

Disability: Students with a documented disability and wish to receive academic accommodations need to meet with the instructor as soon as possible to discuss special needs. Students who require academic adjustments in the classroom due to disability must also register with ASU Disability Services (room 410 Chickasaw Building).

If, for some unusual reason, changes need to be made to this syllabus at a later date, announcements will be made in class, and changes made to the copy found on the class website. For comments and questions, send messages to jkennon@astate.edu or hali@astate.edu.

Course Outline:

1. **Review of basic physics** — *Appendices A, B*
   1.1 Review of the governing equations

1.2 Coordinate systems
1.2 Scale analysis

2. **Atmospheric Composition and Structure** (5^{th} Edition, chapter 1)
   2.1 Chemical analysis
   2.2 Vertical structure
   2.3 Weather and climate

3. **Atmospheric warming** (5^{th} Edition Chapter 2)
   3.1 Heat transfer
   3.2 Adiabatic heating and latent heat
   3.3 Solar radiation

4. **Humidity, Condensation, and Clouds** (5^{th} edition chapter 4)
   4.1 Water circulation
   4.2 Ocean/atmosphere interaction
   4.3 Relative humidity and dew point

5. **Atmospheric circulation** (5^{th} edition, chapter 7)
   5.1 Air pressure and wind
   5.2 Internal gravity waves
   5.3 Inertia gravity waves
   5.4 Geotropic adjustment
   5.5 Rossby waves

6. **Global Climate Change** (5^{th} edition, chapter 14)
   6.1 Paleo climates
   6.2 Changes in structure and composition
   6.3 The future

(Final Exam—May 7-2012)

Lab Outline

- Soldering Practice—construct a practice kit. *Week 2*
- Construct CricketSAT transmitter and receiver *Week 3*
- Launch CricketSAT *Week 4*
- Basic BalloonSAT design *Week 5*
- Basic BalloonSAT design. *Week 6*
- Participate in scheduled BalloonSAT launch, (*Tentatively—January 21 or 28)*

  (Payload construction/flights/presentations are scheduled for March and April)
- Construction of BalloonSAT payload boxes designed for selected instruments.
- Student built payloads will be launched on scheduled flights in February, March & April.
- Collection of data from launches.
- Report on findings (possibly at the Arkansas Academy of Science spring meeting and/or the Arkansas Space Grant Symposium, both in April)

PHYS 3153-001 – Mechanics

Fall 2011

Instructor: Dr. Carroll

Office: LSE 116
Phone: (870) 680-4335
Office Hours: MW 2:00 – 4:00 PM & **T** 10:00 – 11:00 AM
Email: bcarroll@astate.edu

Meeting Time: MWF 12:00-12:50 PM in Lab Science East Room 508

Prerequisites: at least MATH 2214 (Calculus II) & PHYS 2044 (University Physics II)

Required Text: *Classical Mechanics* by John R. Taylor
(Although not required, a handbook of mathematics will be very useful)

Grades:	Homework/Quizzes	40%
	Exams	40%
	Project	20%

Grading Scale: 100% ≥ A ≥ 88% > B ≥ 76% > C ≥ 65% > D ≥ 55% > F

Learning Outcomes:

- Describe observed and modeled phenomena using fundamental physical principles and calculus-based mathematics.
- Develop an aptitude for literature reviews of historic scientific works and peer-reviewed papers in reputable scientific journals (online and in print).
- Effectively communicate, both oral and written, to various audiences (layperson and professional) using appropriate terminology.
- Demonstrate the development of standards expected of professional scientists.

Topics to be covered:
Introductory Differential Equations
Newton's Theory of Motion
Motion of Projectiles & Charged Particles
Momentum (Translational & Angular)
Energy
Oscillations
Calculus of Variations
Lagrangian Dynamics
Two-Body Central-Force Problems
Motion in Noninertial Reference Frames
Rigid Body Rotations
Coupled Oscillators & Normal Modes

Time permitting: Special Topics of your choice (e.g. Chaos, Relativity, Rocket Propulsion)

Attendance: You are allowed up to **four** absences for the semester. All missed work with valid excuse must be made up on your own time; talk with me about possible make-up exams and quizzes. Do note that a valid excuse consists only of official excuses sanctioned by the University.

Lectures: PowerPoint presentations of lecture materials will be posted on Blackboard. Your textbook and the PowerPoint lectures will be the primary source of content delivery for this class. Class time will consist of a review of the material, discussions, and problem solving exercises. It is imperative that you study the textbook & PowerPoint notes, as well as, actively participate in the discussion and problem solving sessions.

Homework/Quizzes: I will assign homework problems weekly. Expectations will be clearly given on the homework set. I will give the occasional quiz with at least one class period of notice.

Exams: There will be four exams this semester, including the final.
Final Exam: Friday, December 9 from 12:30 PM – 2:30 PM

Term Project: You will construct and present an independent project over an advanced topic in Classical Mechanics (Theory and/or Experimentation). This may be primarily a literature review, computational work, experimental work (assuming resources are available), or a combination of these. You will turn in a paper (perhaps with a multimedia aspect) and give a brief presentation of your work. I expect you to put a great deal of effort into these projects; I hope they serve as useful learning experiences and help further develop the skills necessary for success in your future profession. I have set strict deadlines on the essential aspects of these projects and expect you to develop this project over the course of the semester. See the attachment for details on deadlines and guidelines.

Blackboard/Web Resources: Lecture notes, announcements, and any relevant information for this class will be posted on Blackboard. I encourage you all to make use of appropriate Software/Web resources during this learning experience. There are many video & audio lectures available online from reputable sources that can serve as an excellent complement to this course.

Open Door Policy: Although I have regular office hours that I encourage you all to take advantage of, I am always here to help you. Assuming I have no prior engagements, my door will be open (perhaps no literally) if you have questions or need to talk.

Classroom Decorum: Please turn off or silence your cellphone and other noise making devices in class. Disruptive behavior will not be appreciated.

Note on my own attendance: Due to the nature of my research, I may on occasion have to spend a week or so elsewhere (typically Tennessee, Canada, or the UK). In the event that I do have such a research trip during the semester, there will certainly be a substitute instructor and the class will proceed as usual. My expectations of you all will not diminish with my absence.

Students requiring accommodations in the classroom due to disability must first register with ASU Disability Services. After registration, please contact me as soon as possible so we can arrange a course of action. Equal access for all students is of the utmost importance and should be taken care of at your earliest convenience.

ELECTROMAGNETIC THEORY - PHYS 3203 001

Semester: Spring 2012 (Jan. 12 – May 08, 2012)
Lectures: 11:30 am - 12:45 pm, TR, Room: LSE307

Course Description:

Physics 3203 is an introduction to electrodynamics to provide students with basic understanding of electromagnetic phenomena. It is expected that the students have already taken University Physics I & II, Calculus and Differential Equations courses.

Textbook:

The text book for the course is "Introduction to Electrodynamics" (Third Edition), by David J. Griffiths.

Instructor: Dr. Liangmin Zhang, Office: LSE 105
Phone: 972-3175, E-mail: lzhang@astate.edu
Office Hours: M-F: 4:00 -5:00pm (or other time by appointment)

Grade Policy:	Two in-class exams and the final	70%
	(All equal weight and the lowest one dropped)	
	Homework **(drop one)**	30%
		100%

85-100%: A; 70-84%: B; 55 - 69%: C; 40 – 54% D; less than 40%: F.

Exams: **Tentative Schedule for Exams:**

Exam 1, Thursday, March 1, Chapters 1 - 2.
Exam 2, Thursday, April 3, Chapters 3 - 4
Final, Thursday, May 3, Chapters 5 -7.

Excuses: If you miss an exam or homework due to official university business (official university excuse Is required) or due to the sickness of the student herself/himself (letter from the doctor is required), special makeup arrangement can be made.

Tentative Schedule

Chapters	Tuesday	Thursday
Chapter 1	Jan. 24	Jan. 26
	Jan. 31	Feb. 2
Chapter 2	Feb. 7	Feb. 9
	Feb. 14	Feb. 16
Chapter 3	Feb. 21	Feb. 23
	Feb. 28	
March 1: 1st Exam		
Chapter 4	March 6	March 8
	March 13	March 15
Chapter 5	March 27	March 29
	April 5	April 10
April 3: 2nd exam		
Chapter 6		April 12
	April 17	April 19
	April 24	
Chapter 7	April 26	
Final	May 3, 2:45 pm – 4:45 pm or 12: 30 – 2: 30 pm	

OPTICS

PHYS 3253

Dr. Bruce Johnson

office: 972-2955
home: 931-7062
bjohnson@astate.edu

prepared: January 18, 2011

TEXT: *Optics* by Eugene Hecht 4th edition.

READING: For best results read the chapters before they are discussed in class, and bring questions to class. You are responsible for all material in the chapters covered in this course.

PREREQUISITES:
MATH 2214, and {PHYS 2064 or PHYS 2044}

OFFICE HOURS:
To be announced in class.

STUDYING TOGETHER: Strongly encouraged - Working on homework together is a great way to learn. I strongly recommend attempting problems on your own first, then working together on unsolved problems. Please see me if finding a study group or partner is difficult to arrange.

MAKEUP POLICY: No makeup exams will be given. If less than 2 hour exams have been completed, the final may count (with prior approval from me) toward a missing exam grade.

PRESENTATION: Each student will make a short presentation on the material in one or more chapters from the text for the course that are not covered in the lectures.

GRADING:

homework:	20%
exams: (2 count)	40%
final:	20%
paper:	10%
presentation:	10%

SCORES:

90 - 100%	A
80 - 90%	B
70 - 80%	C
60 - 70%	D
0 - 60%	F

HOMEWORK: Problem sets will be due on the day indicated on the calendar for this course.

EXAMS: Three tests will be given with problems similar to the assigned homework. All exams will be open book. (The top two exams will count.)

FINAL: Comprehensive, open book. The final exam score may not be dropped.

LEARNING OUTCOMES:

- Describe observed and modeled phenomena using fundamental physical principles and calculus-based mathematics.
- Effectively communicate, both oral and written, to various audiences (layperson and professional) using appropriate terminology.
- Use commercially available databases to search the primary scientific literature.

Calendar

Monday	***Wednesday***	***Friday***
Jan 16 Martin Luther King Day	18 Ch 2	20 Ch 2
23 Ch 2,3 HW:1	25 Ch 3	27 Ch 3
30 Ch 3,4 HW:2	**Feb** 1 Ch 4	3 Ch 4
6 Ch 4 HW:3	8 Ch 4	10 Ch 5
13 Ch 5 HW:4	15 Ch 5	17 Ch 5,6
20 Ch 6 HW:5	22 **Exam 1**	24 Ch 7
27 Ch 7 HW:6	29 Ch 7	**Mar** 2 Ch 7
5 Ch8 HW:7	7 Ch 8	9 Ch 8
12 Ch 8 HW:8	14 Ch 9	16 Ch 9
19 Spring Break	21 Spring Break	23 Spring Break
26 Ch 9 HW:9	28 Ch 9	30 Ch 9
Apr 2 Ch 10 HW:10	4 **Exam 2**	6 Ch 10
9 Ch 10 HW:11	11 Ch 10	13 Ch 10
16 Ch 11 HW:12	18 Ch 11	20 Ch 11
23 Ch 11 HW:13	25 Ch 12	27 **Exam 3**
30 HW:14 presentations	**May** 2 **Final exam 12:30 – 2:30 p.m.**	4
7		

Homework assignments from Hecht

Assignment #	**Assignment**
1	2.16, 2.18, 2.23, 2.26, 2.27, 2.30, 2.31, 2.37, 2.38, 2.39, 2.42
2	3.21, 3.22, 3.26, 3.29, 3.30
3	3.32, 3.48, 3.53, 3.55, 4.41, 4.51, 4.59, 4.63
4	4.64, 4.71, 4.72, 4.75, 4.76, 4.77, 4.78, 4.80, 4.81, 4.82

5	5.8, 5.35, 5.37, 5.71, 5.72, 5.73, 5.74, 5.88
6	6.17, 6.19, 6.20, 6.21, 6.22, 6.24, 6.28
7	7.19, 7.23, 7.24, 7.25, 7.30, 7.32, 7.33, 7.35, 7.36, 7.38, 7.39, 7.42
8	8.1, 8.3, 8.4, 8.8, 8.12, 8.13, 8.17, 8.22, 8.28, 8.30, 8.40, 8.41, 8.42
9	8.51, 8.52, 8.53, 8.54, 8.64, 8.66, 8.67, 9.6, 9.7, 9.25, 9.32, 9.34, 9.35, 9.36, 9.37
10	9.39, 9.40, 9.41, 9.44, 9.45, 9.46
11	10.2, 10.9, 10.11, 10.13, 10.14, 10.15, 10.16, 10.18, 10.25, 10.26, 10.27
12	10.29, 10.32, 10.38, 10.40, 10.42, 10.43, 10.44, 10.45
13	11.9, 11.10, 11.11, 11.12, 11.13, 11.14, 11.15
14	11.18, 11.19, 11.21, 11.22, 11.23, 11.27, 11.30 (& any problems from chapters 12 & 13 assigned in class)

Homework when teaching from Saleh & Teich

Assignment #	**Assignment**
1.1	Exercises 1.2-4, 1.2-6, 1.3-2 Problems 1.2-1, 1.2-2, 1.2-3, 1.3-1
1.2	Exercises 1.4-3, 1.4-4, 1.4-6 Problems 1.4-1, 1.4-2, 1.4-3
2.1	Exercises 2.2-2, 2.4-2, 2.4-4, 2.4-6 Problems 2.2-3, 2.4-3, 2.4-4
2.2	Exercises 2.5-1, 2.5-3 Problems 2.5-2, Worksheet
3	Exercises 3.1-1, 3.2-1 Problems 3.1-1, 3.1-3, 3.2-1
4.1	Problems 4.1-1, 4.1-2, 4.1-3, 4.2-1, 4.2-2, 4.2-3
4.2	Problems 4.3-1, 4.4-1, 4.4-3, 4.4-6, 4.4-7, 4.5-1
5	Problems 5.2-1, 5.5-1, 5.5-2, 5.6-1, 5.6-2 (bonus - may be best to try on Mathematica), 5.6-3
6.1	Exercises 6.1-4, Ask me to a part of this problem Problems 6.1-3, 6.1-4, 6.1-5, 6.1-6, 6.2-1, 6.2-2
6.2	Exercises 6.4-1 Problems 6.2-3, 6.3-1, 6.3-2, 6.3-4, 6.6-2
7	Exercises 7.2-2 Problems 7.1-2, 7.2-1, 7.2-2, 7.2-3, 7.2-5, 7.3-1, 7.4-1

PHYS 3303 Modern Physics

Objectives: The learning objective of this course is to describe observed and modeled phenomena using fundamental physical principles and calculus-based mathematics. The content objectives are:

To determine consequences of special relativity

To analyze important quantum phenomena

To understand the atomic nature of matter and nuclear structure of the atom

To solve simple quantum mechanical problems

Lecture: MWF 11:00 a.m. – 11:50 a.m.LSE 508

Text: Modern Physics, Third Edition
Serway/Moses/Moyer
Thomson Brooks/Cole, 2005

Instructor: Dr. Bin Zhang
Office: LSE 103
Phone: 972-2996
E-mail: bzhang@astate.edu
Office Hours: W 3:00 p.m. – 5:00 p.m.

Grades: We will have 2 exams (including the non-comprehensive final). They will be equally weighted at 20%. Homework will be worth the remaining 60%.

Course Grades: 90+: A; 80+: B; 70+: C; 60+: D; less than 60: F.

Final: Wednesday, December 7, 12:30 p.m. – 2:30 p.m.

Students who require academic adjustments in the classroom due to a disability must first register with ASU Disability Services. Following registration and within the first two weeks of class, please contact me to discuss appropriate academic accommodations. Appropriate arrangements can be made to ensure equal access to this course.

PHYS 4553 - Principles of Quantum Mechanics

Spring 2012

Room and Time

LSE 307, Scheduled for TR, 2:00-3:30 p.m.

Prerequisites

20 hours of physics.

Textbook

J. S. Townsend, *A Modern Approach to Quantum Mechanics*.

Suggested References

Quantum mechanics has an embarrassment of riches when it comes to texts. Most everything you can find is quite good, going back all the way to the beginnings of the subject (though of course the early texts are dated). Don't be afraid to browse the library or pick up an older text that is out from Dover books; it's hard to go wrong in this subject. I can personally recommend the following texts.

- D. McIntyre, C. Manogue, and J. Tate, *Paradigms in Physics: Quantum Mechanics*. This is preparing to be published but is presently online for free at http://physics.oregonstate.edu/portfolioswiki/texts:quantumbook:start. I have not read through the text completely, but what I have seen looks outstanding.
- D. J. Griffiths, *Introduction to Quantum Mechanics.* A standard text in the field. He's well known for explaining things very clearly. Highly recommended. He uses a wave mechanics approach.
- R. L. Liboff, *Introductory Quantum Mechanics*. A previous text for the course. He uses a wave mechanics approach.
- R. Shankar, *Principles of Quantum Mechanics*. This should be considered an advanced undergraduate/introductory graduate level text. Chapters 3 and 4 are an extremely good discussion of the limits of classical mechanics and the postulates of quantum mechanics.
- J. J. Sakurai and J. J. Napolitano, *Modern Quantum Mechanics*. I'm only familiar with the first edition. This text inspired the author of our textbook in his approach. Outstanding modern presentation of quantum mechanics at a graduate level. The first chapter on the mathematics needed may prove valuable in itself. Sakurai assumes you know wave mechanics and are familiar with the hydrogen atom, which makes it unsuitable as a first text.
- L.I. Schiff, *Quantum Mechanics*. Find the third edition. This is a graduate level text. It is excellent and surprisingly comprehensive, developing both the wave mechanics and the more abstract modern approach.

I have not had a chance to read the following texts but have heard high praise for all of them.

Undergraduate Level

- R. P. Feynman, *QED: The Strange Theory of Light and Matter*. For the layman, but can be read profitably by anyone.
- R. P. Feynman, R. B. Leighton and M. Sands, *The Feynman Lectures on Physics,* vol. 3, (Addison-Wesley, Reading, 1965). Introductory level, but Feynman is always brilliant at explaining things.
- D. Park, *Introduction to the Quantum Theory*

Graduate Level

- C. Cohen-Tannoudji, B. Diu, and F. Laloë, *Quantum Mechanics*, vol. 1
- L.D. Landau and E.M. Lifshitz, *Quantum Mechanics*. These two wrote a series of textbooks covering a vast range of physics.
- A. Messiah, *Quantum Mechanics*
- E. Merzbacher, *Quantum Mechanics*

Student Learning Outcomes/Objectives

Using Physics to describe Physical Phenomena:

Describe observed and modeled phenomena using fundamental physical principles and calculus-based mathematics.

Effective Communication of Physics:

Effectively communicate, both oral and written, to various audiences (layperson and professional) using appropriate terminology.

Using Mathematics:

Students should be able to interpret and analyze quantitative/mathematical information (such as formulas, graphs, and tables) and apply mathematical methods to solve problems.

Goals

The student will learn the essentials of quantum mechanics, solutions of the Schrodinger equation, including the harmonic oscillator, the hydrogen atom, and perturbation theory, and associated topics.

Instructor

Dr. Michael Guenther

Office: LSE 108

Phone: (870) 972-3265

Email: mguenther@astate.edu

Office Hours: 11-12 MTWRF, or by appointment

Grading and Evaluation

Tests	40%
Final	20%
Homework	40%
	100%

≥ 88%	A
76-88%	B
64-76%	C
52-64%	D
< 52%	F

Homework, tests, and the final will compose your grade. Homework will be assigned for each chapter. I strongly encourage you to work together on the homework. There will be three tests (not including the final), each covering only new material not previously tested. The final may be comprehensive or semi-comprehensive. Tests are take-home and you may not work with anyone else on them. There is no extra credit offered, though I reserve the right to curve class scores upward. Grades, announcements, and other course materials will be posted on Blackboard. The last day to drop this course or withdraw from the university is Wednesday, April 18. The final is scheduled for Monday, May 7 from 12:30-2:30 p.m.

Course Calendar – *Subject to Change*

Week 1: 1/16-1/20 MLK holiday 1/16	Chapter 1
Week 2: 1/23-1/27	Chapter 2
Week 3: 1/30-2/3	Chapter 2 & 4, Test over chapters 1-2
Week 4: 2/6-2/10	Chapter 4
Week 5: 2/13-2/17	Chapter 3
Week 6: 2/20-2/24	Chapter 3
Week 7: 2/27-3/2	Selections from chapter 5, Test over chapters 3-5
Week 8: 3/5-3/9	Chapter 6
Week 9: 3/12-3/16	Chapter 6 & 7
Spring Break	
Week 10: 3/26-3/30	Chapter 7 & 9
Week 11: 4/2-4/6	Chapter 9, Test over chapters 6-7 & 9
Week 12: 4/9-4/13	Chapter 10
Week 13: 4/16-4/20 Last day to drop, Wednesday, 4/18	Chapter 10 &11
Week 14: 4/23-4/27	Chapter 11

PHYS 459V(1-3) Research in Physics Agreement

This form must be completed by the student and faculty research advisor. It must be signed by the student and advisor, and submitted to the Chair of the Department of Chemistry & Physics by 5:00 PM of the third day of the term in which the student has registered for PHYS 459V.

Student Name:					
Student ID:					
Research Advisor:					
Year:					
Term:					
# Credit Hours:					
Days Working:	M	T	W	Th	F
Hours Working:					
Research Title:					
Research Description:					
CRN: (entered by office personnel)					

Students registering for PHYS 459V must complete a minimum of 3 hours of research per week per registered credit hour. The student will provide a summary report of the completed research. This report will be a minimum of one page per registered credit hour (typed, single spaced, 12 point font, one inch margins) in length, and tables, figures, equations, formatting (i.e. section headings/titles) and references will not constitute any portion of the required length. The report must be approved by the advisor, and submitted to the Chair of the Department of Chemistry & Physics at least three days prior to end of the term in which the student has registered for PHYS 459V. The summary report must be submitted to the Department Chairman before course credit will be awarded.
By signing this document the student agrees to perform the research described above according to terms of this document. Moreover, the student realizes failure to satisfy these terms may result in a failing grade for this section of PHYS 459V.

Student signature	**Instructor signature**	**Chair signature**
Date	**Date**	**Date**

PHYS 4693 Research in Physics-Capstone Agreement

This form must be completed by the student and faculty research advisor. It must be signed by the student and advisor, and submitted to the Chair of the Department of Chemistry & Physics by 5:00 PM of the third day of the term in which the student has registered for PHYS 4693.

Student Name:					
Student ID:					
Research Advisor:					
Year:					
Term:					
Days Working:	M	T	W	Th	F
Hours Working:					
Research Title:					
Research Description:					
CRN: (entered by office personnel)					

Students registering for PHYS 4693 must complete a minimum of 9 hours of research per week, in addition to writing a report and giving an oral presentation describing the completed research, and completing an exit exam/interview. The report will be a minimum of three pages (typed, single spaced, 12 point font, one inch margins) in length, and tables, figures, equations, formatting (i.e. section headings/titles) and references will not constitute any portion of the required length. The report must be approved by the advisor, and submitted to the Chair of the Department of Chemistry & Physics at least three days prior to end of the term in which the student has registered for PHYS 4693. The summary report must be submitted to the Department Chairman before course credit will be awarded. By signing this document the student agrees to perform the research described above according to terms of this document. Moreover, the student realizes failure to satisfy these terms may result in a failing grade for this section of PHYS 4693.

Student signature	**Instructor signature**	**Chair signature**
Date	**Date**	**Date**

Appendix II
Physics Faculty Curriculum Vitae

Department of Chemistry and Physics, P. O. Box 419
Arkansas State University, State University, AR 72467
E-mail: kbiswas@astate.edu; biswas.koushik@gmail.com Phone: (573) 673-1988

KOUSHIK BISWAS

Current Position

August 2012, Assistant Professor of Physics
Department of Chemistry and Physics
Arkansas State University

Previous Positions

July 2010 – July 2012, Postdoctoral Research Associate
Oak Ridge National Laboratory
Oak Ridge, TN 37831

August 2007 – June 2010, Postdoctoral Researcher
National Renewable Energy Laboratory
Golden, CO 80401

Education

2004 – August 2007 Ph.D.(Physics)
Department of Physics
Texas Tech University

PhD Dissertation
Theoretical investigation of type-II clathrate materials
Advisor: Prof. Charles W. Myles

2001 - 2003 MS(Physics)
Department of Physics
Texas Tech University

1997 - 1999 MSc.(Physics)
Jadavpur University, India

Awards

- Bucy Scholarship in Applied Physics (Texas Tech), January 2001.
- David Howe Fellowship in Physics (Texas Tech), April 2006.
- Texas Section APS Travel Award, October 2006.
- Texas Tech University Graduate School Travel Award, March 2007.
- Bucy Scholarship in Physics (Texas Tech), May 2007.
- Outstanding Teaching Assistant Award, American Association of Physics Teachers (AAPT), May 2007.
- Selected to participate in Pan American Advanced Studies Institute Workshop, Santiago, Chile, January, 2012 (PASI 2012-CMS4E).

Research

- July 2010 – July 2012
  Oak Ridge National Laboratory, Oak Ridge, TN
  Computational/Theoretical research on the prediction and design of new materials for detecting radiation. Specifically, materials that can be used in small, efficient, room-temperature radiation detector devices.

- August 2007 – June 2010
  National Renewable Energy Laboratory, Golden, CO
  Computational/Theoretical research on the design and properties of new semiconductor materials for "water splitting" and hydrogen production, Photovoltaic materials and transparent conducting oxides (TCOs).

- Jan 2005 – July 2007
  Texas Tech University, Lubbock, TX
  Computational/Theoretical research on Si and Ge semiconductor clathrates for potential opto-electronic and thermoelectric applications.
  Predicting the electronic, vibrational and thermodynamic properties of the clathrate materials, using first principles computational methods.

- Sept 2003 – May 2004
  IBM Almaden Research Center, San Jose, CA
  Experimental research on low-k nanoporous thin film preparation and characterization.
  Use of the above films for device applications such as liquid and solid core waveguides.
  Using nanoporous thin films for potential anti-reflection coating.

- Jan 2003 – Aug 2003
  Jack Maddox Lab, Texas Tech University, Lubbock, TX
  Synthesis and characterization techniques of low-k dielectric thin films for semiconductor device applications.

- Jan 2001 – Dec 2002
  Texas Tech University, Lubbock, TX
  High Energy Physics research (CDF experiment) at the **Fermi National Accelerator Laboratory, Batavia, IL.**

Hands on Experience

Computational techniques using **Density Functional Theory** (LDA/GGA, GGA+U, Hybrid functionals, and GW method) and semi-empirical techniques (**Empirical Pseudopotential, Valence Force-Field**) for computational Materials Physics research. First-principles calculations of the electronic, vibrational, and defect properties of semiconductors as well as other techniques such as Empirical pseudopotential and Valence force field with the goal of predicting and designing new materials for diverse applications.

Experience in electronic structure calculations of semiconductors and insulators using DFT and beyond-DFT techniques as implemented within VASP, Quantum Espresso.

Teaching Experience

Currently teaching undergraduate courses for Physics majors and non-majors.

Department of Physics, Texas Tech University
Instructor in undergraduate Physics Laboratory courses.

Department of Mathematics, University of Missouri-Columbia
Lecture course on undergraduate math.

List of Publications

1. **K. Biswas**, M.-H. Du, and D. J. Singh "Electronic structure and defect properties of Tl6SeI4: Density functional calculations" *Physical Review B* **86**, 144108 (2012).
2. **K. Biswas** and M.-H. Du, "Energy transport and scintillation of Cerium doped elpasolite Cs_2LiYCl_6: hybrid density functional calculations" *Physical Review B* **86**, 014102 (2012).
3. **K. Biswas** and M.-H. Du, "Causes of high resistivity in CdTe" *New Journal of Physics* **14**, 063020 (2012).
4. **K. Biswas**, M.-H. Du, J. T-Thienprasert, S. Limpijumnong, and D. J. Singh, Comment on "Uncovering the complex behavior of hydrogen in Cu_2O" *Physical Review Letters* **108**, 219703 (2012).
5. G. Trimarchi, H. Peng, J. Im, A. J. Freeman, V. Cloet, A. Raw, K. R. Poeppelmeier, **K. Biswas**, S. Lany, and A. Zunger, "Using design principles to systematically plan the synthesis of hole-conducting transparent oxides: Cu_3VO_4 and Ag_3VO_4 as a case study", *Physical Review B* **84**, 165116 (2011).
6. M.-H. Du and **K. Biswas**, "Anionic and hidden hydrogen in ZnO", *Physical Review Letters* **106**, 115502 (2011).
7. **K. Biswas** and M.-H. Du, "AX centers in II-VI semiconductors: Hybrid Functional Calculations", *Applied Physics Letters* **98**, 181913 (2011).
8. **K. Biswas** and M.-H. Du, "First principles study of native defects in InI", *Journal of Applied Physics* **109**, 113518 (2011).

9. **K. Biswas**, S. Lany, and A. Zunger, "The electronic consequences of multivalent elements in inorganic solar absorbers: Multivalency of Sn in Cu_2ZnSnS_4", *Applied Physics Letters* **96**, 201902 (2010).
10. M. Beekman, E. N. Nenghabi, **K. Biswas**, C. W. Myles, M. Baitinger, Y. Grin, and G. S. Nolas, "Framework Contraction in Na-Stuffed Si(cF 136)", *Inorganic Chemistry* **49**, 5338 (2010).
11. **K. Biswas** and S. Lany, "Energetics of quaternary III-V alloys described by incorporation and clustering of impurities", *Physical Review B* **80**, 115206 (2009).
12. **K. Biswas**, A. Franceschetti, and S. Lany, "Generalized valence-force-field model of (Ga,In)(N,P) ternary alloys", *Physical Review B* **78**, 085212 (2008).
13. **K. Biswas**, C. W. Myles, M. Sanati, and G. S. Nolas "Thermal properties of guest-free Si_{136} and Ge_{136} clathrates: A first-principles study", *Journal of Applied Physics* **104**, 033535 (2008).
14. **K. Biswas** and C. W. Myles, "Electronic and vibrational properties of framework-substituted type-II Si clathrates", *Physical Review B* **75**, 245205 (2007).
15. **K. Biswas** and C. W. Myles, "Density-functional investigation of $Na_{16}A_8Ge_{136}$(A=Rb,Cs)clathrates", *Journal of Physics: Condensed Matter* **19**, 466206 (2007).
16. **K. Biswas** and C. W. Myles, "Electronic properties of the $Na_{16}Rb_8Si_{136}$and $K_{16}Rb_8Si_{136}$clathrates", *Physical Review B* **74**, 115113 (2006).
17. **K. Biswas**, S. Gangopadhyay, H. C. Kim, and R. D. Miller, "Nanoporous organosilicate films as antireflection coatings", *Thin Solid Films* **514**, 350 (2006).
18. C. W. Myles, **K. Biswas**, and E. Nenghabi, "Rattling guest impurities in Si and Ge clathrate semiconductors", *Physica B* **401**, 695 (2007).

Submitted/Under preparation

K. Biswas and M.-H. Du, "Electronic structure engineering of elpasolites" (submitted).

List of Presentations

1. **K. Biswas** (*invited*)
   "Materials for application in photovoltaics and optoelectronics"
   Seminar, Applied Materials Science Division, Saha Institute of Nuclear Physics, Calcutta, India, May, 2012.
2. **K. Biswas** et al.
   (i) "Using design principles to plan the synthesis of p-type transparent conducting oxides"
   (ii) "Compensation mechanism in highly resistive CdTe for application in radiation detectors"
   MRS Spring Meeting, San Francisco, CA, April 9-13, 2012.
3. **K. Biswas**
   Seminar, "Materials for application in photovoltaics and optoelectronics", Department of Chemistry and Physics, Arkansas State University, March, 2012.

4. **K. Biswas** and Mao-Hua Du
   "AX centers in II-VI semiconductors: Hybrid functional calculations"
   2012 March meeting of the American Physical Society, Boston, MA, Feb 27-Mar 2, 2012.
5. **K. Biswas** (*invited*)
   "Materials for application in photovoltaics and optoelectronics"
   Graduate Seminar, Materials Science and Engineering Department, University of Tennessee, Knoxville, February, 2012.
6. **K. Biswas**, D. J. Singh, and M.-H. Du
   "First principles study of defects and compensation in CdTe for room temperature radiation detection"
   2011 II-VI Workshop, October 4-6, 2011, Chicago, IL.
7. **K. Biswas** and M.-H. Du
   "Study of defects in TlBr, InI as potential semiconductor radiation detectors"
   2011 March meeting of the American Physical Society, Dallas, TX, March 21-25, 2011.
8. M.-H. Du, **K. Biswas**, and D. J. Singh
   "Effective Dielectric Screening and Defect Properties in Halide-based Semiconductor Radiation Detectors"
   2011 MRS Spring Meeting, Symposium U, April 27, 2011.
9. S. Lany, **K. Biswas**, J. Vidal, and A. Zunger
   "Theory of Bandstructure and Defect Properties in Compound Semiconductors for Energy Applications"
   2011 MRS Spring Meeting, Symposium D, April 26, 2011.
10. S. Lany, **K. Biswas**, and A. Zunger
    "The Electronic Consequences of Multivalent Elements in Inorganic Solar Absorbers: Multivalency of Sn in Cu_2ZnSnS_4"
    2011 MRS Spring Meeting, Symposium D, April 27, 2011.
11. **K. Biswas**, S. Lany, and A. Zunger
    "Multivalency of Sn and its implication in Cu_2ZnSnS_4"
    Gordon Research Conference on Defects in Semiconductors, New London, NH, August 8-13, 2010.
12. **K. Biswas**, S. Lany, and A. Zunger
    "Multivalency of Sn in Cu_2ZnSnS_4"
    2010 March meeting of the American Physical Society, Portland, OR, March 15-19, 2010.
13. **K. Biswas**, A. Franceschetti, and S. Lany
    "Quaternary (Ga,In)(P,N) alloys described by clustering of In and N in GaP"
    2009 March meeting of the American Physical Society, Pittsburgh, PA, March 16-20, 2009.
14. **K. Biswas**, A. Franceschetti, and S. Lany
    "First principles and valence force field study of III-V quaternary alloys"
    2008 March meeting of the American Physical Society, New Orleans, LA, March 10-14, 2008.
15. C. W. Myles, **K. Biswas**, and E. Nenghabi
    "Rattling guest impurities in Si and Ge clathrate semiconductors"
    Poster presented at the 24th International Conference on Defects in Semiconductors, Albuquerque, NM, July 22-27, 2007.

16. **K. Biswas** and C. W. Myles
"Electronic and vibrational properties of the Na16Rb8Si136and K16Rb8Si136 clathrates"
2007 March meeting of the American Physical Society, Denver, CO, March 5-9, 2007.
17. **K. Biswas** and C. W. Myles
"Electronic properties of the Na16Rb8Si136and K16Rb8Si136clathrates"
TSF06 meeting of the American Physical Society, University of Texas at Arlington, Arlington, TX, Oct 5-7, 2006.
18. J. A. Lubguban, B. Lahlouh, G. Sivaraman, **K. Biswas**, M. R. Ali, T. Rajagopalan, J. Sun, D. H. Huang, N. Biswas, S. L. Simon, R. Gale, L. Menon, and S. Gangopadhyaya, Paper presented at the Second International Surface Cleaning Workshop, Boston, MA, Nov 9-12, 2003.

Membership in professional organizations

- Member of the American Physical Society (APS)
- Member of the Materials Research Society (MRS)

Other academic contribution

Reviewer
APS Journals: *Physical Review Letters, Physical Review B*
AIP Journals: *Applied Physics Letters, Journal of Applied Physics*
IOP Journals: *Journal of Physics: Condensed Matter*
Scientific evaluation of research grant proposal: *American Chemical Society (ACS) Petroleum Research Fund.*

Grants

Startup award (allocation year 2013) for computer time at the National Energy Research Scientific Computing Center (NERSC).

Brent Ross Carroll, Ph.D.

P.O. Box 419
State University, AR 72467
Phone: (870) 680-4335
E-mail: bcarroll@astate.edu

Areas of Expertise

Semiconductor Defect Spectroscopy, Optoelectronic Materials Deposition & Characterization

Current Appointment

Arkansas State University, Jonesboro, Arkansas

- **Assistant Professor of Physics—**Department of Chemistry & Physics ***2011-Present***

  *Assistant Campus Lead—V*ertically-Integrated Center for Transformative Energy Research (*VICTER*), NSF EPSCoR funded ASSET II Initiative: http://victer.uark.edu

Education

Texas Tech University, Lubbock, Texas

- **Ph.D., Physics**—Experimental Condensed Matter Physics ***Aug. 2010***
  Dissertation: "Muonium in Silicon Germanium Alloys"
- **M.S., Applied Physics**—Microelectronics Fabrication & Materials Physics ***May 2009***
- **B.S., Physics in Honors Studies**, Minor in English ***May 2006***
  Senior thesis: "Local structure and motional dynamics of μ^+ in *p*-type GaP"

Prior Academic Experience

Arkansas State University

- **Visiting Assistant Professor**—Department of Chemistry & Physics ***2010-2011***

Texas Tech University

- **Graduate Research/Teaching Assistant**—Department of Physics ***2006-2010***
- **Undergraduate Research Fellow** – Honors College / Department of Physics ***2004-2006***
- **Academic Tutor** – Athletics Academic Services ***2003-2004***

Courses Taught

Arkansas State University

- *University Physics I & Laboratory*
- *Introduction to Space Science & Laboratory (Web Instructional)*
- *Principles of Quantum Mechanics*
- *Electromagnetic Theory I*
- *Classical Mechanics*
- *Physical Instrumentation I*
- *Environmental Sciences Seminar: Solar Cell Materials*

Texas Tech University

- *General Physics I Laboratory*
- *University Physics II Laboratory*
- *Modern Physics Laboratory*
- *Advanced Undergraduate Laboratory*

External Support

Principal Investigator, NASA / Arkansas Space Grant Consortium Research Infrastructure Grant #ASU21139, "*Titania Nanostructures for Lunar Applications*," Total award $2,383

ASU Assistant Campus Lead, Vertically Integrated Center for Transformative Energy Research, "*Advancing and Supporting Science, Engineering, and Technology II*," NSF EPSCoR award #1003970

(*Pending*) Principal Investigator, unsolicited NSF Electronic & Photonic Materials proposal, "*Deep defects in kesterite thin films*" with Dr. Koushik Biswas (ASU), Total request $252,870. Submitted Oct 2012

Professional Development

- Arkansas State University's Institute for Research Development (Grant Writing Course), Spring 2012
- Attended 20th AAPT New Physics & Astronomy Faculty Workshop, College Park, MD, July 2012

Professional Service

- Reviewer: Proceedings of the 24th International Conference on Defects in Semiconductors and the Arkansas Academy of Sciences
- Physics Search Committee member
- Faculty Co-Advisor – Arkansas State University Society of Physics Students
- Department & College Assessment Committees

Mentoring/Advising

- One M.S. Environmental Sciences Student (Env. Materials Science Track)
- Four B.S. Physics Research Assistants supported by various sources: McNair, Arkansas Louis Stokes Alliance for Minority Participation (ARK-LSAMP), NASA Arkansas Space Grant Consortium Minority STEM Major award
- Hosted an ARK-LSAMP Summer Research Assistant from University of Arkansas – Montecello
- Instrumentation training for local high school research interns in the Optoelectronic Materials Research Lab at ASU

Honors

Outstanding Ph.D. Student in Physics – Texas Tech Dept. of Physics **2010**

Peer-reviewed Publications

BR Carroll, RL Lichti, PJC King, YG Celebi, I Yonenaga, and KH Chow, "Muonium defect levels in Czochralski-grown Silicon Germanium alloys," *Phys. Rev. B* **82** (2010) 205205.

I Fan, KH Chow, B Hitti, R Scheuermann, AI Mansour, WA MacFarlane, BE Schultz, M Egilmez, J Jung, YG Celebi, HN Bani-Salameh, BR Carroll, JE Vernon and RL Lichti, "Influence of photoexcitation on the diamagnetic muonium states in Ge studied via their precession signatures," *Phys. Rev. B* **78** (2008) 153203.

RL Lichti, HN Bani-Salameh, BR Carroll, KH Chow, B Hitti and SR Kreitzman, "Donor and acceptor energies for muonium in GaAs," *Phys. Rev. B* **76** (2007) 045221.

Refereed Conference Proceedings

HN Bani-Salameh, AG Meyer, BR Carroll, RL Lichti, YG Celebi, KH Chow, PJC King and SFJ Cox, "Charge-state transitions of muonium in 6H silicon carbide," *Physica B* **401** (2007) 631.

PJC King, RL Lichti, BR Carroll, YG Celebi, KH Chow and I Yonenaga, "Muonium defect states and ionization energies in SiGe alloys," *Physica B* **401** (2007) 617.

RL Lichti, JE Vernon, BR Carroll, YG Celebi, PJC King and SFJ Cox, "Diffusion and trapping of positively charged muonium in InAs," *Physica B* **401** (2007) 627.

I Fan, KH Chow, M Egilmex, B Hitti, BR Carroll, JE Vernon, AI Mansour, R Scheuermann, BE Schultz, WA MacFarlane, J Jung and RL Lichti, "Muonium dynamics in doped Si probed by photoexcited TF-μSR measurements," *Physica B* **404** (2009) 849.

YG Celebi, RL Lichti, HN Bani-Salameh, AG Meyer, BR Carroll, JE Vernon, PJC King and SFJ Cox, "Muonium transitions in 4H silicon carbide," *Physica B* **404** (2009) 845.

RL Lichti, BR Carroll, JE Vernon, HN Bani-Salameh, KH Chow, I Fan, M Egilmez, RC Vilao, JM Gil, HV Alberto, JP Duarte, N Ayres de Campos, SP Cottrell and SJF Cox, "Possible donor and acceptor energies for Mu in ZnSe," *Physica B* **404** (2009) 827.

JE Vernon, BR Carroll, HN Bani-Salameh, RL Lichti, YG Celebi, I Fan, AI Mansour and KH Chow, "Dynamics of T-site muonium in gallium phosphide," *Physica B* **404** (2009) 820.

BR Carroll, RL Lichti, PJC King, YG Celebi, I Yonenaga and KH Chow, "Muonium acceptor states in high-Ge $Si_{1-x}Ge_x$ alloys," *Physica B* **404** (2009) 812.

YG Celebi, RL Lichti, BR Carroll, PJC King and SFJ Cox, "Muonium in 4H silicon carbide," *Physica B* **404** (2009) 5117.

BR Carroll, RL Lichti, YG Celebi, KH Chow, PJC King and I Yonenaga, "Evidence for a shallow muonium acceptor state in Ge-rich Cz-$Si_{1-x}Ge_x$," *Physica B* **404** (2009) 5113.

MJ Newell, R Engelken, J Hall, MA Mughal, F Felizco, J Vangilder, S Thapa, D McNew, Z Hill, and BR Carroll, "Elemental sulfur-based electrodeposition of indium sulfide films" *in proceedings: 37th IEEE Photovoltaics Specialists Conference* (2011) 1322.

PW Mengyan, YG Celebi, RL Lichti, BR Carroll, BB Baker, HN Bani-Salameh, and I Yonenaga, "Longitudinal Muon Spin Depolariztion in Ge-Rich SiGe Alloys," *Physics Procedia* **30** (2012) 214.

BB Baker, YG Celebi, RL Lichti, HN Bani-Salameh, PW Mengyan, and BR Carroll, "Initial Study of Positively Charged Muonium Motion in ZnO, CdO, TiO_2, and SnO_2," *Physics Proceedia* **30** (2012) 101.

PW Mengyan, RL Lichti, YG Celebi, BR Carroll, BB Baker, HN Bani-Salameh, and I Yonenaga, "Muonium transitions in Ge-rich SiGe alloys," *Physica B* **407** (2012) 2829.

Working Manuscripts

BR Carroll, RL Lichti, YG Celebi, PW Mengyan, BB Baker, HN Bani-Salameh, "Spectroscopic evidence of Shallow Muonium Acceptors in $Si_{0.09}Ge_{0.91}$ via Muon Spin Resonance," *Physical Review Letters* to be submitted Spring 2013.

BR Carroll, MJ Newell, RD Engelken, "Electrochemical deposition of chalcogenide thin films by *in-situ* quasi-rest potential optimization."

Conferences

Texas Section APS Spring Meeting – San Angelo, TX (2006)
Poster: "Local structure and motional properties of positively charged muonium in gallium phosphide"

Gordon Research Conference on Defects in Semiconductors – New London, NH (2006)
Poster: "Local structure and motional properties of muonium in p-type GaP"

24th International Conference on Defects in Semiconductors, Albuquerque, NM (2007)

Texas Section APS Fall Meeting – Abilene, TX (2007)
Oral Presentation: "Muonium in Silicon Germanium Alloys"

Gordon Research Conference on Defects in Semiconductors – New London, NH (2008)
Poster: "Muonium in Silicon Germanium Alloys"

11th International Conference on Muon Spin Rotation, Relaxation and Resonance, Tsukuba, Japan
Poster: "Muonium acceptor states in high-Ge $Si_{1-x}Ge_x$ alloys" (2009)

25th International Conference on Defects in Semiconductors, St. Petersburg, Russia (2009)
Poster: "Evidence for a Shallow Muonium Acceptor State in Ge-rich $Si_{1-x}Ge_x$"

Texas Section APS Spring Meeting – Stephenville, TX (2009)
Oral Presentation: "Characterization of the Muonium Defect in Cz-$Si_{0.09}Ge_{0.91}$"

19th Annual Arkansas Space Grant Consortium Symposium, Winthrop Rockefeller Institute, Petit Jean, AR:
Oral Presentation "Semiconductor film/nanomaterial research at Arkansas State University" (2011)

2011 Tennessee Valley Solar Solutions Conference, Nashville, TN

20th Annual Arkansas Space Grant Consortium Symposium, Winthrop Rockefeller Institute, Petit Jean, AR:
Oral Presentation "Thin-film photovoltaics research at Arkansas State University" (2012)

2012 Common Core Standards Conference, Arkansas State University, Jonesboro, AR
Oral Presentation: "The Hippocratic Oath for Teaching Science" co-presented with Dean JM Pratte

Curriculum Vitae: J. Bruce Johnson, Ph. D.

Arkansas State University
Dept. of Chemistry and Physics
State University AR 72467

EDUCATION:

Ph.D. *Physics* University of Illinois--Urbana-Champaign, 1991. (Specialty: Biophysics, Advisor: Hans Frauenfelder, Thesis: Motions in Myoglobin).
M.S. *Physics* University of Illinois--Urbana-Champaign, 1986.
B.S. *Physics* Brigham Young University, 1985.

EXPERIENCE:

Associate Professor of Physics, Arkansas State University, 1999 - present
Assistant Professor of Physics, Arkansas State University, 1994 - 1999
Research Associate, Dept. of Physics and Astronomy, Vanderbilt University, 1991-1994
Research Assistant, Physics Department, University of Illinois, 1986 - 1991

GRANTS:

- Arkansas ASSET Initiative II: VICTER, NSF EPSCoR, Co-PIs at ASU: Robert Engelken (lead), J. Bruce Johnson, Zariff Chudhury, October 1, 2010 to October 1, 2015, Funding for ASU: $1.225M
- *Development of Novel Optical Materials for Standoff Explosive Detection (NOMSED),* U.S. Army Night Vision and Electronic Sensors Directorate, Susan D. Allen, William Burns, J. Bruce Johnson, Scott Reeve, FAMU, and UH; FY08 $3.2M
- *Standoff Sensors for Radionuclide Identification (SSRID),* U.S. Army Space and Missile Defense Command, Susan D. Allen, J. Bruce Johnson, Sergey I. Kudryashov, Scott Reeve, William Burns, FAMU, and UH; FY05 $11M; FY06 $4.8M; FY07 $1.7M
- *Standoff Sensors for Radionuclide Identification (SSRID),* U. S. Army Space and Strategic Missile Defense Command through the University of Hawaii at Manoa $143,092 PI: Bruce Johnson, co-PIs: Susan Allen, Scott Reeve, William Burns, Sergey Kudryashov
- *The Creation of In2S3/SnS Heterojunction Solar Cells, Arkansas Space Grant Consortium, March 2003 – February 2004, $4,200.*
- *Vacuum evaporation of SnS thin films,* Arkansas Space Grant Consortium, March 1998 - February 1999, $11,643.
- *Investigation of tin sulfide for Photovoltaic Applications,* SILO Undergraduate Research Fellowship, December 1997 - October 1998, $3,900.
- *The Characterization of Photovoltaic Materials,* Arkansas Space Grant Consortium, January - December 1997 $8,327.
- *Investigation of tin sulfide for Photovoltaic Applications,* SILO Undergraduate Research Fellowship, December 1996 - October 1997, $3,457.
- *Development of Tin Sulfide Thin-Film Photoconductors,* Arkansas Science and Technology Authority Basic Research Grant, Fall 1995 - Summer 1996, $57,240. This Grant was applied for together with Robert Engelken, Professor of Electrical Engineering, Arkansas State University.

- *Development of Tin Sulfide Thin-film Photoconductors*, SILO Undergraduate Research Fellowship, December 1995 - October 1996, $2,837.
- *Optimization of Tin Sulfide Photoconductors*, Arkansas State University Faculty Research Fund, Summer 1995 - Summer 1996, $6,571.

PUBLICATIONS:

- Chakree Tanjaroon, Scott W. Reeve, Alan Ford, Dean W. Murry, Kevin Lyon, Bret Yount, Dan Britton, William A. Burns, Susan D. Allen, and J. Bruce Johnson, "Picosecond rotationally resolved stimulated emission pumping spectroscopy of nitric oxide," Chemical Physics **393**, 80-85 (2012).
- J. Bruce Johnson, Michael J. Johnson, and Kevin Lyon, "Limitations and guidelines for measuring the spectral width of a single pulse of light with a Fabry–Perot interferometer," Appl. Opt. **50**, 347-355 (2011).
- Johnson, J. Bruce; Reeve, S. W.; Burns, W. A.; and Allen, Susan D. "Optical detection of special nuclear materials: an alternative approach for standoff and remote sensing," *Proc. of SPIE* **7665**, 76651L/1-76651L/7 (2010).
- J. Bruce Johnson, Susan D. Allen, Jim L. Hicks, and Joey Burdin, "STIRAP on sodium gas as a function of argon buffer gas pressure," *Proc. of SPIE* **7665**: 766512/1-766512/10 (2010).
- J. Bruce Johnson, Susan Allen, Daniel R. Britton, Joey Burdin, Jim L. Hicks, Kevin Lyon, and W. Dean Murry, "Picosecond multiphoton STIRAP detection of gas phase species: a test with sodium," *Proc. of SPIE*, **7304**: 73040U/1-73040U/9 (2009).
- J. Bruce Johnson, Kevin Lyon, William D. Murry, Daniel R. Britton, and Michael J. Johnson, "Picosecond standoff multiphoton detection of gas phase species: initial results," *Proc. of SPIE*, **6975**: 69750S/1-69750S/9 (2008).
- J. B. Johnson, R. D. Engelken, C. Barber, H. Jones, B. Latham, J. Parker, "Optimization of photoconductivity in vacuum-evaporated tin sulfide thin films," *Semiconductor Science and Technology*, **14**: 501-7 (1999).
- J. Bruce Johnson, "Hydrostatic optical cell for temperatures below 350 K and pressures to 400 MPa," *Review of Scientific Instruments*, **70**: 1349-51 (1999).
- J. Bruce Johnson, Don C. Lamb, Hans Frauenfelder, Joachim D. Müller, Ben McMahon, G. Ulrich Nienhaus, and Robert D. Young, "Ligand Binding to Heme Proteins; VI. Interconversion of Taxonomic Substates in Carbonmonoxymyoglobin", *Biophysical Journal*, **71**:1563-73(1996).
- J. Bruce Johnson, Klaus Becker, and Glenn Edwards, "Pressure Corrections for $CoCl_2$ as a Thermometer in an Analytic Ultracentrifuge", *Analytical Biochemistry*, **227**: 385-387 (1995).
- Glenn Edwards et. al. "Ablation of Soft Tissue by Free-Electron Lasers Tuned to the Amide II Band", *Nature*, **371**: 416 - 419 (1994).
- Klaus Becker, J. Bruce Johnson, and Glenn Edwards, "A Broad Band Pockels Cell and Driver for a Mark III Type Free-Electron Laser", *Review of Scientific Instruments*, **65**: 1496-1501 (1994).
- J. Bruce Johnson, Glenn Edwards, and Marcus Mendenhall, "Low-cost, High-performance Array Detector for Spectroscopy Based on a CCPD", *Rev. Sci. Instr.*, **65**:1782-83 (1994).

- R. Mu, D. O. Henderson, J. B. Johnson, and Glenn Edwards, "Pulsed IR-FEL applications for the characterization of infrared optical materials", Invited paper presented at the OE/LASE (Los Angeles, January, 1994).
- Glenn Edwards, Jerri Tribble, and J. Bruce Johnson, "Partitioning-of-energy model for laser ablation of tissue", Invited paper presented at the OE/LASE (Los Angeles, 1994)
- Glenn Edwards, Regan Logan, Michael Copeland, Lou Reinisch, Jeffrey Davidson, Bruce Johnson, Robert Maciunas, Marcus Mendenhall, Robert Ossoff, Jerri Tribble, Jay Werkhaven, and Denis O'Day, "Two years of free-electron laser applications research in biological physics", Invited paper presented at the OE/LASE (Los Angeles, January, 1994).
- D. O. Henderson, R. Mu, E. Silberman, J. B. Johnson, and G. S. Edwards, "FEL Investigations of Energy Transfer in Condensed Phase Systems", *SPIE Proceedings*, **1854**: 105 (1993).
- Glenn Edwards, Bruce Johnson, John Kozub, Jerri Tribble, and Katrina Wagner, "Biomedical Applications of Free-Electron Lasers", *Optical Engineering*, **32**: 314-319 (1993).
- Glenn Edwards, Bruce Johnson, John Kozub, Jerri Tribble, and Katrina Wagner, "Applications of free-electron lasers to measurement of energy transfer in biopolymers and materials", *SPIE*, **1646**: 13-23 (1992).
- P.J. Steinbach, K. Chu, H. Frauenfelder, J.B. Johnson, D.C. Lamb, and G.U. Nienhaus, "Determination of Rate Distributions from Kinetic Experiments", *Biophys. J.*, **61**: 235-245 (1992).
- Robert D. Young, Hans Frauenfelder, J. Bruce Johnson, Don C. Lamb, G. Ulrich Nienhaus, Robert Philipp, and Reinhard Scholl, "Time- and temperature dependence of large-scale conformational transitions in myoglobin", *J. Chem. Phys.*, **158**: 315-327 (1991).
- H. Frauenfelder, G.U. Nienhaus, and J.B. Johnson, "Rate Processes in Proteins", *Ber. Bunsenges. Phys. Chem.*, **95**: 272-278 (1991).
- P.J. Steinbach, A. Ansari, J. Berendzen, D. Braunstein, K. Chu, B.R. Cowen, D. Ehrenstein, H. Frauenfelder, J.B. Johnson, D.C. Lamb, S. Luck, J.R. Mourant, G.U. Nienhaus, P. Ormos, R. Philipp, R. Scholl, A. Xie, and R.D. Young, "Ligand Binding to Heme Proteins: the Connection Between Dynamics and Function", *Biochemistry*, **30**: 3988-4001 (1991).
- H. Frauenfelder, N.A. Alberding, A. Ansari, D. Braunstein, B.R. Cowen, M.K. Hong, I.E.T. Iben, J.B. Johnson, S. Luck, M.C. Marden, J.R. Mourant, P. Ormos, L. Reinish, R. Scholl, A. Schulte, E. Shyamsunder, L.B. Sorenson, P.J. Steinbach, A. Xie, R.D. Young, and K.T. Yue, "Proteins and Pressure", *J. Phys. Chem.*, **94**: 1024-1037 (1990).
- I.E.T. Iben, D. Braunstein, W. Doster, H. Frauenfelder, M.K. Hong, J.B. Johnson, S. Luck, P. Ormos, A. Schulte, P.J. Steinbach, A.H. Xie, and R.D. Young,"Glassy Behavior of a Protein", *Phys. Rev. Lett.*, **62**: 1916-1919 (1989).
- Ansari, J. Berendzen, D. Braunstein, B.R. Cowen, H. Frauenfelder, M.K. Hong, I.E.T. Iben, J.B. Johnson, P. Ormos, T.B. Sauke, R. Scholl, A. Schulte, P.J. Steinbach, J. Vittitow, and R.D. Young, "Rebinding and Relaxation in the Myoglobin Pocket", *Biophys. Chem.*, **26**: 337-355 (1987).

PRESENTATIONS:

- Wavelength dependence of the production of NO from photodissociated $C_6H_5NO_2$. Christopher Lue, Chakree Tanjaroon, Scott Reeve, Bruce Johnson, Susan Allen, SCIX (FACSS Analytical Science and Innovation), Kansas City, October 2012.
- Tunable picosecond spectroscopy for detection of NO. Chakree Tangaroon, Christopher Lue, Scott Reeve, Bruce Johnson, Susan Allen, SCIX (FACSS Analytical Science and Innovation), Kansas City, October 2012.
- Fluorescence emission and excitation spectra of photo-fragmented nitrobenzene. Christopher J. Lue, Chakree Tanjaroon, J. Bruce Johnson, Susan D. Allen, Scott W. Reeve, International Symposium on Molecular Spectroscopy, 67th Meeting, Ohio State University, June 18 – 22, 2012.
- Optical heterodyne analysis of picosecond laser pulses. Steven Hoke, Jeffrey Johnson, American Physical Society, DAMOP meeting, Anaheim, CA, June 2012.
- Computational Analysis of population transfer via STIRAP in sodium vapor. Matt Tilley, J. Bruce Johnson, Chakree Tanjaroon, Susan Allen, DAMOP meeting, Anaheim, CA, June 2012.
- STIRAP on sodium vapor with picosecond pulses: calculations and experiment. J. Bruce Johnson, Chakree Tanjaroon, Jim L. Hicks, and Susan D. Allen, American Physical Society, DAMOP meeting, Atlanta, GA, June 2011
- FT spectroscopy of sodium vapor: Confirmation of a pressure related signal enhancement. Tiffani Johnson, James Hicks, Chakree Tanjaroon, J. B. Johnson, and Scott W. Reeve, Joint 66th Southwest and 62nd Southeast Regional Meeting of the American Chemical Society, New Orleans, LA, December 1-4 2010
- Picosecond STIRAP on sodium vapor in a noble gas buffer. Jim L. Hicks, Chakree Tanjaroon, Susan D. Allen, Joey Burdin, Steven Hoke, and J. Bruce Johnson, American Physical Society DAMOP meeting, Houston, TX, May 2010
- Optical detection of special nuclear materials: an alternative approach for standoff and remote sensing. Johnson, J. Bruce; Reeve, S. W.; Burns, W. A.; Allen, Susan D., SPIE Defense, Security, and Sensing, Orlando, FL, April 2010
- STIRAP on sodium gas as a function of argon buffer gas pressure. J. Bruce Johnson, Susan D. Allen, Jim L. Hicks, and Joey Burdin, SPIE Defense, Security, and Sensing, Orlando, FL, April 2010
- Efficiency of STIRAP as a function of buffer gas pressure: sodium in argon. Jim L. Hicks, Susan D. Allen, Joey Burdin, William D. Murry, and J. Bruce Johnson, American Physical Society DAMOP meeting, Charlottesville, VA, May 2009
- Determining the spectral width of an ultrashort light pulse with a diffraction grating-based spectrometer. J. Bruce Johnson, American Physical Society DAMOP meeting, Charlottesville, VA, May 2009
- Picosecond multiphoton STIRAP detection of gas phase species: a test with sodium. J. Bruce Johnson, Susan Allen, Daniel R. Britton, Joey Burdin, Jim L. Hicks, Kevin Lyon, and W. Dean Murry, SPIE Defense, Security, and Sensing, Orlando, FL, April 2009

- STIRAP in a sodium gas using picosecond lasers. Kevin Lyon, Susan D. Allen, Michael J. Johnson, William D. Murry, Daniel R. Britton, Tomasz Kutner, J. Bruce Johnson, American Physical Society DAMOP meeting, State College, PA, May 2008
- Analysis of a single pulse of light using a Fabry-Pérot interferometer. Kevin Lyon, Susan D. Allen, Michael J. Johnson, William D. Murry, Daniel R. Britton, Tomasz Kutner, J. Bruce Johnson, American Physical Society DAMOP meeting, State College, PA, May 2008
- Picosecond standoff multiphoton detection of gas phase species: initial results. J. Bruce Johnson, Kevin Lyon, William D. Murry, Daniel R. Britton, and Michael J. Johnson, SPIE Defense and Security, Orlando, FL, March 2008
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- STIRAP and its Potential in IED Detection. J. Bruce Johnson, Joint Improvised Explosives Devices Defeat Organization (JIEDDO), Washington DC, October 3, 2006
- STIRAP and its Potential in IED Detection. J. Bruce Johnson, U.S. Army NVESD headquarters, Washington DC, October 3, 2006
- STIRAP and its Potential in IED Detection. J. Bruce Johnson, given to the head of research at the Edgewood Chemical Biological Center, Washington DC, October 4, 2006
- STIRAP and its Potential in IED Detection. J. Bruce Johnson, University of Hawaii at Manoa at a meeting to explore collaborative research opportunities between researchers at the University of Hawaii, Florida A & M University, and Arkansas State University, Manoa, Hawaii, July 19, 2006
- STIRAP Multicolor Spectroscopy, J. Bruce Johnson, Office of Naval Research, Washington, DC, April 28, 2006
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- Fractional Quantum Hall Effect Arkansas State University chapter of the Society of Physics Students, October 21, 1998, Arkansas State University.
- Optimization of Photoconductivity in Vacuum-Evaporated Tin Sulfide Thin Films 6th Annual Arkansas Space Grant Consortium Symposium, April 24, 1998, UAMS, Little Rock Arkansas.
- Modulated Photocurrent Measurements in SnS Thin Films 6th Annual Arkansas Space Grant Consortium Symposium, April 24, 1998, UAMS, Little Rock Arkansas.
- Determination of the Ambipolar Diffusion Length in SnS Through Analysis of Steady State Photocarrier Grating Measurements 6th Annual Arkansas Space Grant Consortium Symposium, April 24, 1998, UAMS, Little Rock Arkansas.

- Determination of Bandgap States in SnS Through Thermally Stimulated Current Measurements: Data Analysis 6th Annual Arkansas Space Grant Consortium Symposium, April 24, 1998, UAMS, Little Rock Arkansas.
- Determination of Bandgap States in SnS Through Thermally Stimulated Current Measurements: Experimental 6th Annual Arkansas Space Grant Consortium Symposium, April 24, 1998, UAMS, Little Rock Arkansas.
- An Investigation of Band-Gap States in Tin Sulfide: II 5th Annual Arkansas Undergraduate Research Conference, April 17 - 18, 1998, Henderson State University, Arkadelphia, AR.
- An Investigation of Band-Gap States in Tin Sulfide: I 5th Annual Arkansas Undergraduate Research Conference, April 17 - 18, 1998, Henderson State University, Arkadelphia, AR.
- Modulated Photocurrent Measurements on SnS 4th Annual Arkansas Undergraduate Research Conference, April 11, 1997, Henderson State University, Arkadelphia, AR.
- Photoconductance and Optical Absorption in In2 82nd Annual Meeting of the Arkansas Academy of Science, April 3-4, 1998, UAMS, Little Rock Arkansas.
- Diffusion Length in Tin Sulfide Thin Films 4th Annual Arkansas Undergraduate Research Conference, April 11, 1997, Henderson State University, Arkadelphia, AR.
- Development of Tin Sulfide Thin-Film Photoconductors Undergraduate Research Conference, October 1996, Henderson State University, Arkadelphia, AR.
- Preparation, Doping, and Photoconductive Properties of acuum Evaporated Tin(II) Sulfide Powders 80th Annual Meeting of the Arkansas Academy of Science, April 12, 1996, Fort Smith, AR.
- Ligand Motions Following Flash Photolysis in Myoglobin Biophysical Society Meeting, February 17-21, 1996, Baltimore, Maryland.
- Motions in Myoglobin. Arkansas State University chapter of the Sigma Xi Research Society, November 2, 1994, Arkansas State University.
- Photoconductive and Other Properties of Vacuum Evaporated Tin (II) Sulfide Films Texas Section of the American Physical Society, October 13 - 15, 1994, University of Texas at Austin.

Biographical Sketch

Contact information

Bin Zhang, Associate Professor of Physics, Department of Chemistry and Physics, Arkansas State University, P.O. Box 419, State University, AR 72467-0419

Professional preparation

- 1998-2000, Postdoctoral Researcher in Nuclear Theory, Texas A&M University
- 1998, Ph.D. in Physics, Columbia University
- 1990, B.S. in Physics, Peking University, P.R. China

Appointments

- Aug. 2005 – present, Associate Professor of Physics, Arkansas State University
- Sep. 2000 – Aug. 2005, Assistant Professor of Physics, Arkansas State University
- Jun. 1998 – Sep. 2000, Postdoctoral Research Associate, Cyclotron Institute, Texas A&M University
- Jun. 1994 – May 1998, Graduate Research Assistant, Department of Physics, Columbia University
- Jul. 1997 – Aug. 1997, Summer Visitor, Lawrence Berkeley National Lab
- May 1993 – Aug. 1993, Research Assistant, Deutsches Elektronen-Synchrotron, Germany

Selected recent publications

(Undergraduate co-authors are labeled by *)

1. B. Zhang, Toward parton equilibration with improved parton interaction matrix elements, arXiv:1208.1224 [nucl-th].
2. B. Zhang and W. A. Wortman*, Chemical and kinetic equilibrations via radiative parton transport, J. Phys. Conf. Ser. 312, 012017 (2011) [arXiv:1102.4313 [nucl-th]].
3. B. Zhang and W. A. Wortman*, Parton radiative processes and pressure isotropization in relativistic heavy ion collisions, Phys. Lett. B 693, 24 (2010) [arXiv:1006.0270 [nucl-th]].
4. B. Zhang, Thermalization through parton transport, Nucl. Phys. A 834, 279c (2010) [arXiv:0909.0780 [nucl-th]].
5. B. Zhang, Recent results from parton cascade and microscopic transport, Eur. Phys. J. C 62, 25 (2009) [arXiv:0809.0446 [nucl-th]].

Other significant publications

1. G.-L. Ma and B. Zhang, Effects of final state interactions on charge separation in relativistic heavy ion collisions, Phys. Lett. B 700, 39 (2011) [arXiv:1101.1701 [nucl-th]].
2. B. Zhang, Kinetic equilibration from a radiative transport, Proceedings of the 25th Winter Workshop on Nuclear Dynamics, 1 – 8 Feb 2009, Big Sky, Montana, arXiv:0903.2055 [nucl-th].
3. B. Zhang, L.-W. Chen, and C. M. Ko, Evolution of the bulk properties of the hot dense matter in relativistic heavy ion collisions, J. Phys. G 35, 065103 (2008).
4. N. Armesto, et al., Heavy Ion Collisions at the LHC - Last Call for Predictions, J. Phys. G 35, 054001 (2008) [arXiv:0711.0974 [hep-ph]].
5. B. Zhang, J/ψ production from charm coalescence in relativistic heavy ion collisions, Phys. Lett. B 647, 249 (2007) [nucl-th/0606039].

Synergistic Activities

- Science contributor to Jonesboro Sun and KAIT radio.
- Referee for Physical Review Letters, Physical Review C, Physical Review D, Europhysics Letters, Journal of Physics G, Journal of Physics Conference Series, Canadian Journal of Physics, Sri Lankan Journal of Physics, Journal of Arkansas Academy of Science.
- Physics and astronomy judge for the Northeast Arkansas Regional Science Fair.

Collaborators in the last 48 months

W. A. Wortman (Arkansas State University), G.-L. Ma (Shanghai Institute of Applied Physics)

Ph.D. and Postdoctoral advisors

Ph.D. advisor: M. Gyulassy (Columbia University)

Postdoctoral advisor: C.M. Ko (Texas A&M University)

Liangmin Zhang

Arkansas Center for Laser Applications and Science
Department of Chemistry and Physics
Arkansas State University
P. O. Box 419, State University, AR 72467

Phone: (870)972-3175
Fax: (870)972-3089
E-mail: lzhang@astate.edu

Professional Preparation

SUNY at Buffalo	Nanophotonics, Postdoctoral Research Associate, 1997-2000
Shandong University, China	Experimental Condensed Matter Physics, Ph.D.,1996
Shanxi Normal University, China	Optics, M.S., 1993
Qufu Normal University, China	Physics, B.S., 1987

Employment Experience

Assistant Professor

Department of Chemistry and Physics, Arkansas State University August 2008-Present

- Semiconducting polymers and nanomaterials for solar cells.
- Nonlinear optical properties of carbon nanotubes, Ge and Au nanoparticles, and crystals.

Research Scientist

NanoSonic, Inc., Blacksburg, VA 2005-2008

- Studied nonlinear absorption and optical power limiting effects in polymer-functionalized carbon nanotubes and electrostatically self-assembled gold nanoparticle-dielectric thin films.
- Researched photovoltaic properties of dye-sensitized TiO_2 nanoparticle-polymer thin films.
- Established an optical tweezers setup to investigate whispering-gallery mode lasing properties in dielectric microspheres and biophysical properties of biological cells.

Optical Scientist, Mentor: Prof. Richard O. Claus 2000-2005

Fiber & Electro-Optics Research Center, Department of Electrical and Computer Engineering, Virginia Tech, Blacksburg, VA

- Led linear and nonlinear optical property research in CdSe nanostructured thin films using a femtosecond Ti:Sapphire - optical parametric oscillator laser system.
- Investigated photovoltaic cells of dye-sensitized nanoporous films and bacteriorhodopsin thin films.
- Designed a laser lithography setup to fabricate nanopatterns.

Postdoctoral Research Associate, Mentor: Prof. P. N. Prasad 1997-2000

Photonics Research Laboratory, Department of Chemistry, SUNY at Buffalo, NY

- Researched nonlinear optical properties of CdS nanocrystal and polymer hybrid films using nanosecond- and pico-second pulsed laser systems.
- Devised a time-of-flight setup to measure photovoltaics of organic-inorganic hybrid nanocomposites.
- Established Mach-Zender interferometry and ellipsometric setups to measure electro-optic coefficients of CdS nanocrystal thin films.

Research Assistant, Mentor: Prof. Minhua Jiang 1993-1996

National Laboratory of Crystal Materials, Shandong University, China

- Investigated phase conjugation and photorefractive properties of KNSBN, SBN, and $BaTiO_3$ Crystals.
- Researched properties of diode pumped Nd:YVO_4/KTP compact laser systems.

Appendix III
Course and Instructor Evaluation Instrument

Project Name

Course: Course Title
Instructor: Instructor Name

1- I am classified as a:

- Freshman
- Sophomore
- Junior
- Senior
- Graduate

2- My gender is:

- Female
- Male

3- How old are you?

- less than 17
- 17-20
- 21-24
- 25-28
- 29-32
- more than 32

4- When were you last enrolled in college?

- This is my first semester of college
- Within the last year
- Two years ago
- Three years ago
- Four years ago
- It has been more than five years

5- In what college is your major?

- Agriculture and Technology
- Business
- Communication
- Education
- Engineering
- Fine Arts
- Humanities and Social Sciences
- Nursing and Health Professions
- Sciences and Mathematics

- University College

6- If your answer to question 5 was the College of Sciences and Mathematics, in what department is your major?

- Biology
- Chemistry and Physics
- Computer Science
- Mathematics and Statistics

7- The Instructor:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
clearly defined and described course expectations					
followed these course expectations					
clearly identified learning objectives for each chapter/unit					
maintained control of the classroom (i.e. maintained a classroom environment conducive to learing)					
was approachable and respectful					
explained material clearly					
was receptive to student questions and concerns during class					
was receptive to student questions and concerns outside of class					
provided answers to student questions and concerns at an appropriate level of understanding					

8- How could the instructor alter their teaching style to improve the classroom learning experience?

9- If a friend asked you to describe this instructor's ability to teach, what would you say?

10- Indicate how important each of the following was to achieving your current level of performance in this course:

	not at all	just a little bit	somewhat	a lot	essential
Attending lecture	○	○	○	○	○
Reading the textbook	○	○	○	○	○
Completing assignments	○	○	○	○	○
Talking with other students	○	○	○	○	○
Talking with the instructor outside of class	○	○	○	○	○

11- How often did you:

	never	once a week	several times a week	every day
Attend lecture	○	○	○	○
Read the textbook	○	○	○	○
Complete assignments	○	○	○	○
Talk with other students	○	○	○	○
Talk with the instructor outside of class	○	○	○	○

12- On average, how much time outside of class did you dedicate to studying for this course?

- ○ 0 to 3 hours per week
- ○ 3 to 6 hours per week
- ○ 6 to 9 hours per week
- ○ 9 to 12 hours per week
- ○ more than 12 hours per week

13- Considering the grade you would like to earn in this course and the amount of out of class studying you indicated in question 12, which of the following is most accurate?

- ○ I should have studied less
- ○ I studied the correct amount
- ○ I should have studied more

14- The level of difficulty of this course is:

- ○ very easy
- ○ Easy
- ○ Moderate
- ○ Difficult
- ○ Impossible

15- Do you think the material presented in this course will be useful or necessary in other classes?

- ○ No
- ○ Yes

16- What grade do you feel you **deserve** in this course?

- ○ A
- ○ B
- ○ C

- D
- F

17- Describe any changes that should be made to improve this course.

18- What advice would you give to a friend taking this course next semester?

Appendix IV
Alumni Survey Instrument

Project Name

Course: Course Title
Instructor: Instructor Name

1- **First Name** (optional)

2- **Last Name** (optional)

3- **What is the highest level chemistry or physics degree you earned from ASU?**

- Physics bachelors degree
- Chemistry bachelors degree
- Chemistry masters degree

4- **What year did you earn this degree?**

2012 2011 2010 2009 2008 2007 2006 2005 2004 2003 2002 2001 2000 1999 1998 1997 1996 1995 1994 1993 1992 1991 1990 prior to 1990

5- **Did you earn a higher degree from another institution after leaving ASU?**

- Yes
- No

If you responsed "Yes" to question 5 please answer questions 6-9, otherwise continue with question 10.

6- **Degree earned:**

7- **Field:**

8- **Institution:**

9- **What year did you earn this degree?**

2012 2011 2010 2009 2008 2007 2006 2005 2004 2003 2002 2001 2000 1999 1998 1997 1996 1995 1994 1993 1992 1991 1990

10- **How long have you been in your current position?**

- More than 10 years
- 8-10 years
- 6-8 years
- 4-6 years

- 2-4 years
- 1-2 years
- Less than a year

11- **What best describes your current position?** (select all that apply)

- Teaching
- Health related (inlcuding pharmacy, physician, chiropractor, dentist....)
- Sales
- Industry
- Management
- Research
- College/University
- K-12
- State government
- Federal government

12- **<u>While at ASU</u>, what were your long term plans once graduating from ASU?**

- Seek employment
- Continue employment with current employer
- Apply to graduate school
- Apply to pharmacy school
- Apply to medical school
- Apply to dental school
- Apply to optometry school
- Apply to chiropractic school
- Apply to physician assistant program
- Apply to a program/school other than listed above
- Other

13- **What did you <u>actually do</u> immediately after graduating from ASU?**

- Seek employment
- Continue employment with current employer
- Apply to graduate school
- Apply to pharmacy school
- Apply to medical school
- Apply to dental school
- Apply to optometry school
- Apply to chiropractic school
- Apply to physician assistant program
- Apply to a program/school other than listed above
- Other

14- **How much did your ASU degree(s) contribute to your current state of:**

	1 Not at all	2	3	4	5	6	7 A great amount
Chemistry or physics knowledge							
Oral communication skills							
Written communication skills							
Ethical standards							
Laboratory skills							
Laboratory saftey skills/awareness							
Ability to use common laboratory instruments							
Computer skills							
Problem-solving skills							
Ability to work as a member of a team							

15- **Looking back on the chemistry or physics degree(s) you earned from ASU, what aspects of the degree programs were most beneficial in the development of the skill set you have needed since graduating?**

16- **Looking back on the chemistry or physics degree(s) you earned from ASU, what aspects of the degree programs should have been modified to better equip you with the skill set you have needed since graduating?**

17- **Please provide any additional comments you would like to inlcude.**