FACULTY ANNUAL REVIEW

LAMAR UNIVERSITY

Submitted by: James L. Drachenberg

College: Arts and Sciences

Department: Physics

Rank: Assistant Professor

Status:
☐ Non-Tenure Track
X Tenure Track
☐ Tenured

Reporting Period, Calendar Year 2016

Performance Scores:	Numeric score	Merit Reward Level
Exemplary Performance	(level 5)	Highest merit
High Performance	(level 4)	High merit
Adequate Performance	(level 3)	Merit
Marginal Performance	(level 2)	No merit
Unsatisfactory Performance	(level 1)	No raise

Chair: _______________________________ (Signature) **Date:______________**

Evaluation/Merit Score: _____4.3_____ (from Section IV, page 5)

Performance was satisfactory X
Performance was unsatisfactory ☐

[Note: An unsatisfactory rating on Section I mandates an unsatisfactory overall performance evaluation for any faculty member.]

Faculty Acknowledgment

_____________________________________ (Signature) **Date:______________**

☐ Faculty disputes the evaluation [Attach documentation of appeal, give to chair for transmittal to dean]

College of Arts and Sciences

Dean: ________________________________ (Signature) **Date:______________**

Performance was satisfactory ☐
Performance was unsatisfactory ☐

Comments (not required):

I. TEACHING AND INSTRUCTIONAL ACTIVITIES (For examples, see Appendix IV to Form F2.08, "Instructions and Comments.")

Goals for 2016:

1. Continue development of active-learning methods for PHYS 1402. Streamline lecture presentations to allow for more "homework-style" example problems.
2. Expand the role of error and data-analysis in 1402 labs using spreadsheets, e.g. Excel.
3. Develop a course on data reduction and error analysis for physics majors.

Accomplishments for the 2016:

Teaching Proficiency/Teaching Effectiveness.

1. I teach PHYS 1402 in a traditional, lecture style with weekly homework assignments administered through MasteringPhysics, weekly in-class quizzes, weekly web-based quizzes administered through MasteringPhysics, three monthly in-class examinations, and a comprehensive final exam. I post PowerPoint lecture slides on Blackboard for students to view prior to coming to class and for facilitating in-class note-taking. I utilize multiple-choice questions for facilitating in-class discussion of lecture material in the manner of so-called active-learning methods.

2. Building from the curriculum I developed in Fall 2015, I streamlined certain areas of PHYS 1402 lectures to include additional concept-based discussion questions and "free-response-style" example problems. This was initially launched for the Spring 2016 semester and continued into the Fall 2016 semester.

   I have appreciated the chance to teach 1402 for several semesters, now, allowing me to gauge student performance over a range of time. Students continue to be very engaged during in-class discussions. Over the course of the semester, I also see some improvement in exam and quiz performance on longer, free-response "homework-style" problems involving mathematical calculation. However, there is still a general unfamiliarity with how to study for physics, favoring rote memorization of equations rather than guidance by intuition of physical laws. Additionally, there continues to be wide-spread inadequate preparation in algebra and trigonometry. Streamlining lectures to allow more example problems has helped with preparing students for my expectations concerning their own mathematical abilities. I continue to look for ways to help students learn how to apply not just rote memorization of equations, but to leverage conceptual understanding in approaching problems.

   For the Spring 2017 semester and beyond, I have begun to develop a set of pre-lecture recordings in PowerPoint. These short (15-20 minute) recordings will take the introductory material from lecture slides and allow students to view them prior to coming to class. They will be posted on Blackboard, where students can watch them as many times as desired and at their own pace. This will then free up additional lecture time for concept questions, example problems, and demonstrations, which will help expand the visual learning component of my course.

3. For the Spring 2016 semester, I have expanded the role of data-analysis in 1402 Labs, utilizing spreadsheets and the "data analysis" package available in Excel. This was an effort to build from the initial trials conducted in Fall 2015. The Excel analysis was expanded to 8 of the 11 laboratory exercises.

   I believe the lab course was improved in 2016 over the initial implementation in 2015. For 2017, I will continue to implement the data analysis elements to lab with a few changes:
   - I will streamline the lab report section to clarify my expectations for students
   - Each lab group (3-4 students) will turn in a single electronic spreadsheet of data, but ***each individual student*** will complete a short, quantitative discussion and interpretation of collected data
   - I will begin the semester with a focused introduction to data analysis with a hand-out packet summarizing the quantitative tools we will use during the semester

4. For the Spring 2016 semester, I developed a new three-hour, special-topics course in Data Reduction and Error Analysis. I built this course, starting from material used in a similar one-hour course I taught as a visiting assistant professor at Valparaiso University, prior to my time at Lamar. The course was delivered in the traditional, in-person, lecture-style setting with weekly homework assignments and three examinations during the semester. I developed the curriculum and instructional materials, including homework assignments, examinations, and a set of PowerPoint lecture slides that I posted on Blackboard for students to access prior to lecture.

   A new element original to the Lamar course is the use of in-class experiments with real-time data analysis. For each unit, I selected a brief in-class experiment for the students to perform. Each student was provided a laptop for use during the in-class experiment. Together we set up the experiment, and the students would collect the data with my supervision. After collecting the data, each student built a spreadsheet on their laptop, while I demonstrated an example with my own using the overhead projector. Then, together, we analyzed the data, discussing the logical steps and building on material discussed during lecture. The students were then assigned either a similar analysis to perform as "homework" or given an opportunity to write-up the results discussed in class. We also took the opportunity to discuss analysis of data collected by Lamar physics faculty in their personal research. For example, Dr. Irwin provided us with atomic spectroscopy data, which we analyzed in class. He attended class for the discussion and provided some unique insight into the collection of this data. I see this as an expandable element in future offerings.

   I was very pleased with the success of this course. Students were enthusiastic, engaged, and performed very well in assigned material. Going forward, I hope to make the course a regular majors elective course, rather than a special topic. The course fits quite naturally into the curriculum of the recently proposed master's program in computational physics and data science. This course could also provide a natural opportunity to advance the student research opportunities in the physics department. I will work with my colleagues to collect data samples from their personal research to use as examples in Data Reduction and a natural advertisement and preparation for student research opportunities.

5. For the Fall 2016 semester, I developed a new curriculum and set of instructional materials for our majors' course in Quantum Mechanics. The course was delivered in the traditional, in-person, lecture-style format, including weekly homework assignments, two in-class examinations, and a comprehensive final exam. Following the similar philosophy from my College Physics course, I attempted to utilize technology to facilitate instruction and emphasize the role of conceptual understanding of the course material. I developed a set of PowerPoint lecture slides that I attempted to post prior to lecture for student use. I admit that I was not always successful in posting ***prior*** to lecture, but they were always made available to students, as soon as possible. I also posted to Blackboard electronic copies of all written solutions to weekly homework assignments and the two exams, after administration.

   Quantum mechanics is a challenging course mathematically, even for our majors; and it is easy for students to become overwhelmed in the mathematics, losing sight of the bigger conceptual picture. To try to avoid this trap, I began each section with a "qualitative" approach. For example, before solving the allowed energies for a particle under a harmonic-oscillator potential—a task requiring a thorough grasp of differential equations and linear algebra—we performed a "back-of-the-envelope" calculation from the Heisenberg Uncertainty Principle to obtain a qualitative estimate of the ground-state energy. This requires substantially less mathematical rigor, but instead requires a conceptual understanding of the problem. Similar pedagogical techniques were utilized for other units throughout the semester. I also made a change from the standard undergraduate quantum text to one that offers much more in the way of background and explanation.

   The conceptual element by no means sufficient for this course. I tried to ensure the course material covered all subjects required for top Ph.D. programs in the country. I dedicated significant portions of the semester to familiarizing students with the Dirac notation and the linear-algebra formalism, which is imperative, e.g. for the GRE Physics test. I also held weekly, hour-long, problem-solving help sessions for students, outside of class. Students responded very well to this and attendance was near 100%. I believe this speaks very well of the dedication of our students.

While I have plenty of ideas for improving the course, moving forward, I was pleased with the outcome of the course. Students were challenged, but they responded very well. As a pleasant surprise, we covered a bit more material than I initially anticipated. Because of this, at the end of the semester I focused on some elements specific to Lamar research activities, e.g. in nuclear and solid-state physics. Going forward, it will be important for me to finesse the pace of the development of the mathematical formalism. Our students found this element of the course very challenging. Having taught this course, now, I will be better prepared for how best to prepare them.

6. I have reviewed my course evaluations. At the request of our department chair, I do not post the evaluations, here, but I include a discussion of the scores and comments in the appendix.

7. Served as a graduate/professional school reference for five students from PHYS 1402 and 4320.

8. Facilitated an opportunity for four PHYS 1402 students to shadow my wife, Annie Drachenberg, M.D., at her family medicine clinic in Lumberton, TX. Two students, Rachel Bently and Katelyn Coombs, utilized the experience for internship credit toward their degrees.

<u>Faculty Schedule</u>. [Note: Faculty member's teaching schedule for all semesters (provided on-line by LU Faculty Web Pages) or a summary that includes at a minimum course identification and numbers enrolled. Other information may be included — e.g., off campus, web-based, interactive video, etc.]

Spring 2016

PHYS 1402-01 College Physics II	MW	1:50 PM-3:10 PM	23
PHYS 1402-02 College Physics II	TR	3:50 PM-5:10 PM	11
PHYS 1402-11 College Physics II Lab	M	8:00 AM-10:00 AM	12
PHYS 1402-12 College Physics II Lab	M	11:30 AM-1:30 PM	11
PHYS 4301-01 Data Reduction	TR	2:20 PM-3:40 PM	5

Fall 2016

PHYS 1402-01 College Physics II	TR	9:35 AM-10:55 AM	16
PHYS 1402-11 College Physics II Lab	T	11:10 AM-1:10 PM	8
PHYS 1402-12 College Physics II Lab	T	1:20 PM-3:20 PM	8
PHYS 4320-01 Introduction to Quantum Mechanics	MWF	8:00 AM-8:55 AM	7

<u>Chair Review:</u> Evaluation Score: ___4.5___
(NOTE: A score of 1 on this section **<u>mandates</u>** an overall unsatisfactory rating by Chair.)

Comments:
Dr. Drachenberg continues to improve his teaching style and is becoming an effective communicator in the classroom thanks to his hard work including pre-lecture recordings and the use of Excel spreadsheets and lab reports. As his teaching style develops, students are expected to be more and more attracted to his course offerings.

II. RESEARCH, PUBLICATION, SCHOLARSHIP, AND/OR CREATIVE ACTIVITIES (For examples, see Appendix IV to Form F2.08, "Instructions and Comments.")

Goals (See Appendix IV, Item #1):

1. Publication of the Collins effect paper, currently in internal review
2. Complete two-year term as co-convener of STAR Spin PWG
3. Utilize the published Collins data to examine spin-averaged hadronization in the same high-energy proton-proton collisions. Complete a "preliminary" analysis to be shown publicly at an external conference.

Accomplishments for the evaluation year:

[Note: Indicate refereed items with an asterisk (*) and invited items with a pound sign (#).]

Research Projects

Spin Physics Research at STAR

1. Continued as an active member of the STAR Collaboration. STAR (an acronym for "Solenoidal Tracker at RHIC") is an international collaboration of several hundred scientists located at Brookhaven National Laboratory's Relativistic Heavy Ion Collider (RHIC). STAR investigates high-energy nuclear interactions, as well as proton structure and the nature of the strong nuclear force, in particular, as it relates to the phenomena of "spin" (intrinsic angular momentum).

2. Received from the STAR Council (the collaboration's governing body) official acceptance for Lamar University as an "Associate Member Institution." This formally allows Lamar to be a collaborating institution of STAR and listed as my affiliation on publications.

3. Continued my term as co-convener of the STAR Spin Physics Working Group (PWG). This is a (typically two-year) leadership position within the collaboration, tasked with organizing and overseeing research that could be considered "spin physics." Responsibilities include chairing weekly teleconference meetings of the PWG; soliciting, reviewing, editing, and approving all conference abstracts, presentations, and proceedings; organizing and chairing parallel sessions for biannual STAR Collaboration Meetings; and serving on committees for STAR internal review of journal articles on research conducted under the auspices of the Spin PWG.

4. Continued to navigate the review process for my paper describing the first observation of the "Collins effect" in spin-polarized proton-proton collisions. The Collins effect is a non-perturbative mechanism that correlates quark transverse spin-polarization with the orientation of particles produced when the quark "hadronizes," i.e. converts into observable particles. This mechanism has been previously observed in the scattering of leptons from spin-polarized proton targets. However, it has never been seen in collisions between two protons. Such an observation may have intriguing implications for the nature of the strong force. The paper is nearing the end of STAR internal review.

5. Traveled to Brookhaven National Laboratory (BNL) to lead a week-long data-taking shift at STAR (May 23-June 1, 2016).

6. Served on the writing committee for STAR's 2017 Beam Use Request, submitted to BNL management in 2016.

7. Served on the organizing committee for the STAR Collaboration Meeting held at the Ohio State University, Columbus, OH, in August 2016.

8. Served on the “godparent committee” (GPC) for drafting a journal article entitled “Measurement of the cross section and longitudinal double-spin asymmetry for di-jet production in polarized pp collisions at $\sqrt{s} = 200$ GeV.” This paper has been submitted to the journal and is in the reviewer response stage. It is likely be published as a Physical Review D Rapid Communication in 2017.

9. Published a conference proceedings for a presentation given at the 2015 International Workshop on Deep-inelastic Scattering, held at Southern Methodist University. Reference: Proceedings of Science, DIS2015 193. *Published January 29, 2016.*

Presentations (Abstracts Published)

10. (#) Gave an invited presentation entitled, “Recent Developments in Transverse Spin Physics at RHIC,” at the Joint Spring 2016 Meeting of the Texas Sections of the APS, AAPT and Zone 13 of the SPS in Beaumont, TX. Abstracts are published in the Bulletin of the American Physical Society.

11. (#) Gave an invited presentation entitled, “Illuminating QCD and Nucleon Structure Through the Study of Hadrons Within Jets and Dihadron Correlations at RHIC,” at the 22nd International Spin Symposium in Urbana-Champaign, IL. This meeting is a biennial international conference series and the highest-profile meeting for spin physics research.

Publications

As an active member of STAR, I am coauthor to all journal publications of the STAR Collaboration. In 2016, my name appeared on 12 journal articles as a result of my work with RHIC experiments. It goes without saying that my contributions to most of these papers is quite minimal. Here, I list only those papers to which I made a contribution in terms of either data analysis, peer-review, or an intellectual contribution.

12. (*) L. Adamczyk et al. (STAR Collaboration), “Measurement of the Transverse Single-Spin Asymmetry in $p^{\uparrow} + p \rightarrow W^{\pm}/Z^0$ at RHIC,” Physical Review Letters 116, 132301 (4/1/2016). ***Contribution:*** *Served as Spin Physics Working Group co-convener during the discussions and publication of this article.*

Grants

13. Received notice of the rejection of my NSF grant proposal, “RUI: Probing the Nature of QCD Through Transverse Spin Physics at RHIC,” submitted in fall 2015. I will submit a new proposal in 2017.

Conferences Attended

14. The Joint Spring 2016 Meeting of the Texas Sections of the APS, AAPT and Zone 13 of the SPS in Beaumont, TX, March 31-April 2, 2016.

15. The 22nd International Spin Symposium in Urbana-Champaign, IL, September 2016.

Chair Review: Evaluation Score: ___4.0____

Comments:
Dr. Drachenberg continues his collaboration efforts with the solenoidal tracker at RHIC (STAR) group. As he develops his individual research platform I expect that he involves students in a more significant manner, start presenting at national conferences, and submit research proposals on a biannual basis. I recommend the development of a medium to long term research plan that would include these activities. The Department, and the College will certainly offer reasonable support of these pursuits.

III. PROFESSIONAL SERVICE TO THE DISCIPLINE, UNIVERSITY, AND/OR COMMUNITY (For examples, see Appendix IV to Form F2.08, "Instructions and Comments.")

Goals (See Appendix IV, Item #1):

1. Complete SACS assessments for physics department.
2. Complete the department-chair search process.
3. Complete service as a member of the Texas APS organizing committee. Present a talk on my research at STAR to open the nuclear physics break-out session.

Accomplishments for the evaluation year:

Professional Affiliations

1. Member of the American Physical Society (APS).

Service to Department

2. Physics SACS Liaison. Compiled the results of courses evaluated for SACS, composed the report, updated target measures and goals, and submitted the report on Weave in summer 2016. Filed the report plan for the next year in the fall of 2016.

3. Physics Department Chair Search Committee. Evaluated candidates and participated in Skype interviews, phone reference checks, and on-sight interviews for three candidates. The search continues, as does my participation with the committee.

4. Served as a member of the organizing committee for the APS Texas Section/AAPT meeting hosted by the physics department in spring 2016. Served sorting abstracts, hanging directional fliers, procuring technical equipment for presentations, and chaired one of the break-out sessions during the conference.

5. On April 7, 2016, I represented the physics department at the Hargrave High School (Huffman, TX) College and Career Fair, speaking with junior high and high school students about college and career opportunities. Together with Dr. Cristian Bahrim, we transported and performed demos for the students and distributed literature for recruiting purposes.

Service to College

6. College Curriculum Committee Member

Chair Review: Evaluation Score: ___4.0____

Comments:
Dr. Drachenberg is to be commended for his work as SACS liaison and for the co-organization of the regional APS meeting in Beaumont. As the tenure clock moves forward, I recommend he seeks more College and University level service contributions.

IV. EVALUATION/ RECOMMENDATION BY CHAIR

Workload Distribution for this Evaluation Year:

(40 to 60%)	(20 to 40%)	(10 to 30%)
% Teaching = 60	% Research/Scholarship = 30	%Service = 10

The Chair will calculate a Composite Score for each faculty member, according to departmental workload policies.

[(Teaching score) • (% workload)] + [(Research/Scholarship score) • (% workload)] + [(Service score) • (% workload)]

= __4.3___ **CHAIR'S COMPOSITE SCORE**

[Note: Chair's Composite Score should be recorded also on Evaluation/Merit Score line on page 1 of this form.]

Chair's Overall Comments:

Dr. Drachenberg's first full year at Lamar was dedicated to developing teaching methods and style that will likely make him a very sought after instructor in the future. He also continued the development of his research activities and established service activities to help the department.

*** END OF FORM F2.08. SEE APPENDICES FOR SUPPLEMENTARY FORMS AND INSTRUCTIONS. ***

LAMAR UNIVERSITY
APPENDIX I FOR FORM F2.08
FACULTY and CHAIR PLANNING PAGE
Academic Year 2017

Faculty **James L. Drachenberg** **Department** Physics

This page is a **department level planning document** intended to enhance communication between each faculty member and the department chair/library coordinator. It should be completed during the annual performance evaluation conference between chair/coordinator and faculty member, and no later than April 10. For units which have elected to establish performance measures for each Merit Reward Level and have had them approved by the faculty, chair, dean, and provost, the goal-setting portion of this form may be omitted. These performance measures must be established and/or modified no later than December 31 preceding the year in which they will be in force.

Workload Distribution for the next Planning Calendar Year:

% Teaching = 45 % Research-Scholarship = 55 %Service = 10

I. TEACHING AND INSTRUCTIONAL ACTIVITIES
Goals 2017:

1. Continue development of active-learning methods for PHYS 1402.
2. Develop a set of recorded lecture intros for 1402 students to view before class meetings.
3. Use 1402 labs developed recently to compile a new formal laboratory manual.
4. Develop an introductory packet for data analysis techniques for 1402 students.

II. RESEARCH, PUBLICATION, SCHOLARSHIP, AND/OR CREATIVE ACTIVITIES
Goals for 2017:

1. Publication of the Collins effect paper, currently in internal review
2. Complete term as co-convener of STAR Spin PWG
3. Utilize the published Collins data to examine spin-averaged hadronization in the same high-energy proton-proton collisions. Complete a “preliminary” analysis to be shown publicly at an external conference.
4. Leverage my STAR research to establish an undergraduate research experience for Lamar physics students

III. PROFESSIONAL SERVICE TO THE DISCIPLINE, UNIVERSITY, AND/OR COMMUNITY
Goals for 2017:

1. Complete SACS assessments for physics department.
2. Complete the department-chair search process.

COMMENTS:

Faculty Member Signature & Date: ______________________________

Chair/Coordinator Signature & Date: ______________________________

LAMAR UNIVERSITY
APPENDIX V FOR FORM 2.08
STUDENT EVALUATIONS

Summary of Student Evaluations

Below are two plots summarizing my student evaluations. Figure 1, shows semester-by-semester averages to evaluation questions, combining all courses within the semester. I fit the averages across the semesters with a linear function, displaying the trend line results on the right-hand side of the figure. Each question shows improvement across the three semesters, with an average improvement of 0.257 ± 0.033 points per semester. The lowest rate of improvement appeared in Question 4: "Syllabus was accurate," where the trend is steady at ≈ 4.5, above the department, division, and school averages. The highest rate of improvement appears in Question 7: "Instructor stimulated interest," where the trend suggests a rate of nearly one half of a point per semester. This is likely strongly influenced by the opportunity to teach senior level physics courses in each of the last two semesters.

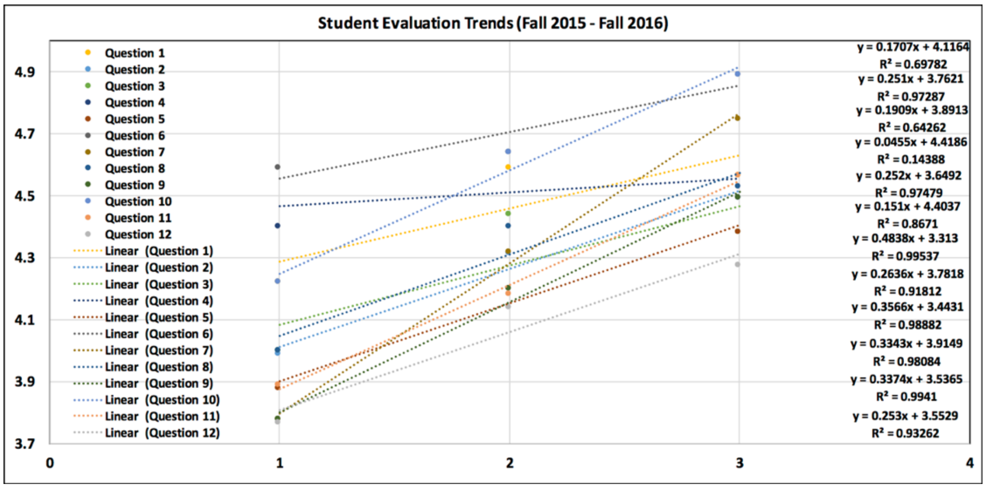

Figure 1: Average scores for student evaluation questions for Fall 2015 - Fall 2016 semesters. For each question, the averages for Fall 2015-Fall 2016 are fit with linear trend lines. The results of the linear fits are displayed on the right in order of question.

In Fig. 2, I show the average student response to evaluation questions, combining all courses from Fall 2015-Fall 2016. My averages are at or above those of the department, division, and university in all questions, save Question 12: "Grade reflects performance," where my average of 4.1 is on par with the division, but slightly below the department and university average of 4.2. My two highest scores appear in Question 6: "The instructor is available" and Question 10: "Overall the instructor is a good teacher." For these questions, my scores are 4.7 and 4.6, respectively, compared to the department/division/school averages of 4.3/4.3/4.3 and 4.2/4.3/4.3, respectively.

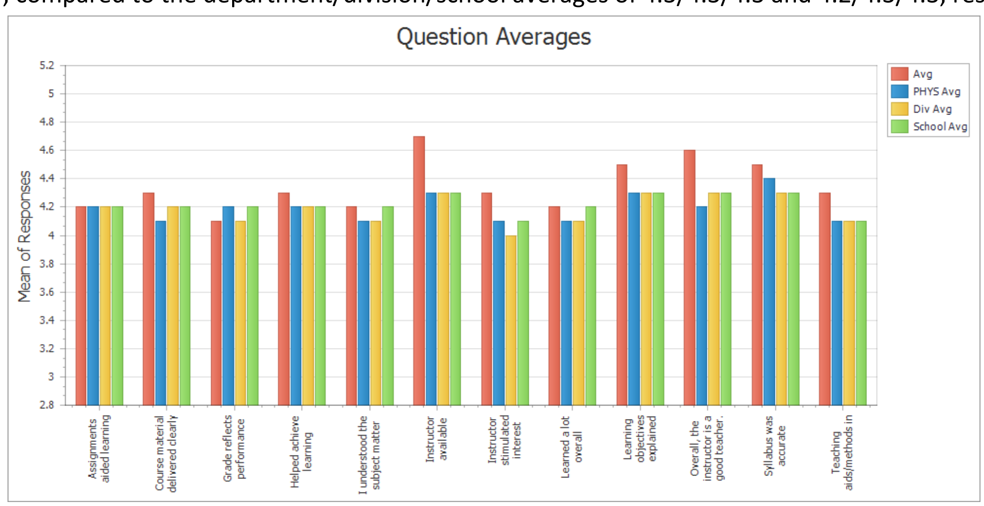

Figure 2: Student evaluation question responses, averaging over the Fall 2015-Fall 2016 semesters. The means are shown in comparison to those of the Physics Department, Division, and Lamar University.

Summary of Student Critique

Semester	Complaint Category	Student Comment
Fall 2015	"Pace of Material Delivery"	Since it's his first year, he doesn't really know what works best. Crams in lecture material, speeds through lecture, everyone is literally lost. Even the brightest students in our class were still lost and didn't completely understand the material given. The homework were generally due the same day we learned most of the material for that homework even though he gives us about a week to complete.
Spring 2016	"Pace of Material Delivery"	worked really fast very quick and sometimes confusing transitions while lecturing
Spring 2016	"Pace of Material Delivery"	Slow down!!! You go too fast through the examples and slides while lecturing. Also (for my side of the room anyway) whenever you got done writing on the board you would stand in front of the board so I couldn't see what you had written. Finally, I know the homework helps, but I feel as though you either don't go through enough or put in the appropriate homework style problems during the lecture for us to fully understand how to solve them on our own.
Spring 2016	"HW/Exam Issues"	In-class lecture and material did not seem to prepare students for the online homework most of the time - the online homework did not seem to follow what we learned in class, some of the time (not for every assignment).
Spring 2016	"HW/Exam Issues"	The online Pearson homework does more harm than good in my opinion. The assignments are so lengthy, the program can be very fickle, leaving the student so frustrated that no learning is taking place. It becomes something you are just trying to "get done" (mostly with the help of chegg in my case) and the concepts are not sinking in.
Spring 2016	"HW/Exam Issues"	I think the concepts would be better absorbed if the homework was condensed to a few questions per concept and NOT done through Pearson. That way this gives students more time to let the concept sink in and practice said concepts.
Fall 2016	"HW/Exam Issues"	working problems that would best help with those on the test. I felt that the mastering physic program did not help with learning how to work the problems that where given on the test. I can not know or understand how to work a problem if i have never seen that problem or situation.
Fall 2015	"Expectation of Students"	HIS TESTS. They're so hard. Normally, our class average is an F...
Spring 2016	"Expectation of Students"	Expects a little too much of students learning a tough subject for the first time. There just isn't enough time to do all of the homework assignments/online quizzes/in class quizzes for the amount of material we are trying to learn and comprehend. Doesn't allow students to bring their own formula sheet, which I think would be helpful.
Spring 2016	"Expectation of Students"	He is too smart to break this subject down for people that aren't quite at his level.
Spring 2016	Material Clarity	Sometimes the lab instructions and procedures were not clear.

Table 1: Summary of Student Critiques from 1402. Comments are sorted by category of complaint and listed in order of semester.

The comments section of my evaluations is overwhelmingly positive. All comments for 4301 Data Reduction were positive. In 4320 Quantum Mechanics, I received two comments that were not explicitly positive Under "weaknesses":

Experience. With time, he will be an amazing educator

and

Try making the slides more self-contained for a day's worth of lecture, or add a review slide if a problem has to stretch days so that we can remember what all of the symbols and equations mean. Other than that, one of the best teachers I've had.

For 1402 College Physics II, I have listed all negative comments in Table 1, sorting by the category of complaint and listing in order of semester. I found comments to fall within one of three general categories: "Pace of Material Delivery," "Homework or Exam Issues," and "Instructor's Expectation of Students." A single comment also referenced clarity of laboratory instructions, which is something I continuously work to improve. Some comments are factually incorrect, e.g. claims of homework being due the same day material is presented or claims that the average exam score is normally an F. However, other comments have proven useful; and I summarize my responses, below. I note that I received a lone negative comment in the Fall 2016 semester, indicating a measure of success in my efforts to alleviate student concerns.

The pace of 1402 is admittedly fast, however, this is somewhat unavoidable, given the mandatory amount of material to cover. I would be remiss to cut much more material than I have, given the number of students preparing for professional entrance exams, e.g. the MCAT. However, I have attempted to streamline lectures; and I note that the Fall 2016 class did not mention pace as a complaint.

Most negative comments relate to homework and exam issues. Some relate to my use of MasteringPhysics, which some students simply do not enjoy. To be fair, I have my own issues with MasteringPhysics; but, overall, I believe the tool is beneficial. Furthermore, most students never state a complaint. The rest of the comments tend to deal with preparation for assigned problems and exams. I appreciate these comments, as they reveal a mindset to which I am attempting to be more attuned. There is a mindset with certain students that, if material is properly presented, students should never struggle to understand material. This is simply not a realistic expectation for Physics II, which covers, in some cases, challenging material and requires copious amounts of outside study and problem-solving. I am trying proactively to address this notion, so that students will not be discouraged if they require more effort than usual to grasp the material. Finally, I believe the following comment is revealing:

I cannot know or understand how to work a problem if I have never seen that problem or situation.

Of course, one of the primary goals of physics is to teach students how to approach problems they have never seen! So, this defeatist mindset is something I constantly work to challenge in 1402. One of the examples I use is that of a patient experiencing symptoms of an illness. No two patients with the same illness present symptoms in the exact same way, and most likely none of them present in a way exactly as described in a medical text. The health professional must apply problem-solving skills to identify tests that will rule out possible illnesses until the primary cause of the symptoms is found. While the context is different, the approach and thought process is the same as what we do in college physics. This is a primary goal of my course.

Finally, the remainder of student comments deal with my expectations of the students. It is fair to say that, at first, the course was more challenging than the students expected. As my reputation has spread, however, students seem better prepared for what to expect in my course. I readily admit that I have high expectations for these students. My goal has been to challenge them with the appropriate amount of rigor for a course such as this. However, I wish to do so in an atmosphere where questions and discussion are encouraged and assessment is fair. I believe most student comments indicate this goal has been modestly achieved; and I work to improve even more, going forward.