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FDST 880P: Food Proteins - A Peer Review of Teaching Project, Benchmark Portfolio

Kaustav Majumder

University of Nebraska - Lincoln, kaustav.majumder@unl.edu

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FDST 880P: Food Proteins - A Peer Review of Teaching Project, Benchmark Portfolio

Kaustav Majumder

Spring 2020

Kaustav Majumder,

Assistant Professor

Food Proteins and Bioactive peptides

Department of Food Science & Technology,

University of Nebraska-Lincoln

Rm 256 | 1901 North 21st Street | Food Innovation Center

Nebraska Innovation Campus, NE 68588-6205

Email: kaustav.majumder@unl.edu

Phone: 402 472 3510

Abstract

FDST 880P: Food Proteins, is a course designed only for the graduate students for the department of food science and technology. The course work provides the opportunity to dwell deep into the fundamental chemistry, protein structures and functions to understand the physiochemical and biochemical factors that govern the functionality and biological activity of the food proteins and proteins-derived peptides. For each of the course objectives, I describe how and why I organize the course, as well as how my pedagogical choices encourage the student learning and engagement. Collect and analyze the data on students' performance and progress during the semester and presented samples of students' self-assessment to demonstrate the effectiveness of the teaching methods. Finally, it summarizes the accomplishments and enduring challenges in the course and highlights the plans for future changes.

Keywords: Food proteins, Graduate students, Teaching presentation, Research paper synopsis, peer review

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MEMO 1: Introduction and Objectives of Peer Review Course Portfolio

I enrolled in the Peer-Review-of-Teaching-Project in Fall-2019 with the primary goal of reflecting on my pedagogical goals, teaching methods, and learning from the experience of other faculty members from various disciplines across the University of Nebraska-Lincoln campus. Developing the benchmark portfolio will allow me to examine how my teaching methods align with my course objectives and document the students' experience and the overall impact of the course. I anticipate that this exercise will help me to identify more informed instructional adoptions for the future to enhance the students' learning outcomes.

The course I selected for this benchmark portfolio is FDST-880P, Food proteins. FDST 880P is an advanced level graduate course offered by the Department of Food Science and Technology every even spring semester, and I am the primary instructor of the course. This report serves as documentation of attempts to define and refine the course goals, assignments, and assessment activities. As food protein is a vast subject, along with the graduate students of food science, students from other departments such as Nutrition and Health Sciences, and Animal Science often took this course. Thus, through this portfolio, I hope to design more effective strategies to disseminate the knowledge that is impactful for the students. The components of student learning that I plan to document and enhance in the future are, 1) how to effectively teach the technical and applied science parts of the course; 2) how to develop critical thinking ability among the students. I choose this course as I taught this course for the first time in 2018 and taught it again in spring 2020. After my first experience teaching this course, I plan to make some substantial changes to facilitate critical thinking among the students. The wide range of students with expertise in their respective areas enrolling in the course has been challenging for me in shaping achievable goals for all. Therefore, through this portfolio, I aim to address and document how the students i) remain engaged throughout the semester, ii) develop technical and applied knowledge, iii) become a critical thinker, and iv) further developed their scientific communication skills.

MEMO 1: Description of the Course

Course Goal and Content:

The overall goal of the FDST 880P course is to do an in-depth discussion about food proteins and peptides, their composition, chemical, and physical properties, structure-function relationships, and the current research-development,. The course work provide the opportunity to dwell deep into the fundamental chemistry, protein structure-function to understand the physiochemical and biochemical factors that govern the functionality and biological activity of the food proteins and proteins-derived peptides. The course also provide an overview of the physiological fate of the food proteins, the dietary role, digestion, absorption, and metabolism.

Course Learning Outcomes:

It is anticipated that as a result of taking this course students will,

Understand:

- How proteins are synthesized in plant and animal tissues
- The importance of structure to proteins functionality

Learn:

- The standard methods used to characterize food proteins
- The composition of proteins in major food commodities
- The processing-induced modifications of food proteins

Develop Knowledge:

- On the novel sources of food proteins
- On the physiological fate of food proteins and biological activity of food proteins and peptides
- On high-value and novel uses of underutilized proteins from food and agricultural waste

Enrollment/demographics

There is a prerequisite for this class - each student must have completed FDST 430/830 (Food chemistry) or similar level class in any other institution or need to obtain special permission from the instructor. In spring 2020, 7 students were enrolled in the course,

and all of them are the graduate students of the Department of Food Science & Technology.

Explanations of how this course fits with others in the department and the University

FDST 880P is a 2-credit graduate class, and primarily, this course is designed for graduate students in the department of food science and technology. However, historically students from other departments (animal science and nutrition) often take this course. As the course provides a comprehensive resource of food proteins, and the interdisciplinary content is useful for the students working in biochemistry, biotechnology, food science and technology, animal science, and nutrition. However, for the Spring 2020 term, all the students are from the department of food science and technology, and 80% of the students work in the food protein area for their graduate thesis project.

MEMO 2: Teaching Methods, Course Materials, and Course Activities

Teaching methods:

The primary teaching methods for the course are traditional lecture-based instructions, self and peer-based learning, and critical evaluation of the research articles. Effective and efficient course design is crucial. Thus the lecture-based instructions were divided into four separate modules those are 1) Module 1: Introduction to Protein Biochemistry, 2) Module 2: Methods of Protein Characterization, Proteomics, 3) Module 3: Food Protein and Functionality and Bioactivity, 4) Module 4: Overview of Major Food Protein System.

In-Class Teaching methods: The first half of the semester primarily focuses on lecture-based instructions. Since the time is limited for the lecture, it is 1.5 hours for a week in two 50-minute lectures. A variety of methods are employed, including giving lectures, in-class discussion, module-wise assignments, and problem sets.

Every lecture starts with a slide titled "Thought of the day," the purpose of this slide is to summarize the lecture plan and describe the learning objectives. I prefer to explain the study material more visually than just words and text; thus, I adapted this method. The aim of this slide is also to stimulate critical thinking among the student. As this is a class of high-level graduate students, critical thinking is crucial for their learning outcome. Few examples of the "Thought of the day" slides are presented in [Appendix 2](#). In the following lectures, I combine the "Thought of the day" slide with a brief review of the previous lecture materials and articulate how the new content is connected to or builds upon the knowledge of the last lecture.

Additionally, at the beginning of each new module, I give a short class quiz/discussion on real-world applications of the previous module in the food industry or food science research. In the transition lectures, I encourage students to do some further independent research on the connections between the previously covered topics and their graduate research projects. To facilitate the problem-solving capacity, I also provided them with a small research problem and asked them to solve the Problem with proper scientific justification with the methods described in the class so far. Later on, I bring the same question during the discussion and demonstrate how a problem can be potentially solved through multiple possible ways.

The ultimate goal of my lecture is to make it as participative and interactive as possible. I facilitate the interactive learning environment by asking frequent questions to students without pressing them into getting the right answer. These questions are generally a mix of fundamental scientific conceptual questions or real-world application-based questions. The primary aim of these questions is to make the students realize the importance of the lecture's topic. I often noticed that the wrong answers always stimulate fruitful discussions, eventually leading to a better conceptual understanding of the study

material. The goal of the interactive lecture sessions is to create a comfortable atmosphere for the students. Practicing the specific style of delivering the lectures, I noticed that the students who were silent at the beginning of the class become much more responsive in the latter half of the semester. However, this could have flourished more during the teaching and research topic presentation and peer-evaluation process, but due to the transition of the class from face-to-face class to online class for COVID-19 pandemic, I think it would not reach the level I initially plan to achieve.

Outside-Class Teaching methods: After the completion of each module, there is a problem set. This encourages students to study regularly and stay up to date with the lecture materials. Students are encouraged to discuss with each other and look for all available options to solve the Problem. After the submission of each Problem set, there is a session in the class where we review the problems and discuss what the major points they missed are and what are the points they responded correctly. Simultaneously, I also encourage the students to bring their own problems or a problem they might encounter in their graduate thesis or research project.

In order to promote critical thinking and independent research paper reading skills, which is an essential part for the next half of the class, students are once in a while required some designated sections of research articles on their own. The research article often has a direct relation with the study materials covered in the class. After the reading session, at the lecture, I devoted some time to clarify any doubts and ask questions to understand how the students integrate research techniques with the study materials.

The major part of the out-side class learning activities happens during the teaching and research seminar presentation. However, the research seminar was later converted into two-term paper submissions, but during the teaching presentation, the students work in a group of two to answer the study-specific questions assigned to their group.

Course materials:

There is no dedicated textbook for this class as I plan to cover recent developments and research updates on food proteins. Class-lectures utilizes several resources, including textbook materials, peer-reviewed research papers, and web reports. The lectures were regularly posted on Canvas.

For the teaching presentation, I selected a handful of topics and asked the students to choose their top three choices. Once they submit their choices, I assigned them a topic on a first-come-first-serve basis. Once the topics are assigned, I meet with the student individually and provide them with study materials, texts, research papers. Along with that, I work closely with each student to develop the content of the teaching lecture. It is

a different experience for all of the students to develop teaching materials, and I provide them with feedback and suggestions.

Course activities:

The two major class activities are teaching and research topics presentation and the peer-evaluation.

Teaching presentation- One student took the lead each day, and the remaining students were divided into small groups (two students per group with a total of three groups) by the instructors. The teaching presentation was approximately 30 min in length, followed by classroom discussion for 15-20 mins. The leading student needs to provide a list of 10 study questions, one week in advance of the presentation date. Each team then work together to answer the study questions and participate in the class discussion on the presentation day. However, we can able to conduct the teaching presentations in the classroom format only for two presentations before we transition into the online class. During the period of the online class, I have asked presenting students to record the presentation using zoom and upload them in a dedicated box folder. The presenter was given the liberty to answer one of the 10 study questions as per their choice, and then the presenter needs to assign three questions for each group randomly. The respective groups then need to coordinate among themselves via Email, Canvas discussion, or any other means to answer the assigned questions, and each group was given 3 days to answer the questions after the posting of the presentation. A complete schedule was prepared beforehand that clearly articulates the expected deadlines. All the deadlines were fixed after consultation with the students. For the teaching presentation, the instructor evaluation values 70%, and the rest 30% is the average of the peer assessment by the participating teams. The scoring rubric was posted in Canvas at the beginning of the semester. The example rubric is presented in [Appendix 3](#).

Research presentation- The initial plan for the research presentation was, one student will take the lead each day, and the remaining students will be organized into small teams by the instructors. The leading student needs to select the research article and provide a 1-page summary (single space, 1" margin, Arial 12) of the article (one week in advance to the presentation date) and present the article in the class (approximately 20 min). Each team needs to work together before the presentation (outside class time) to do a critical evaluation of the article and need to answer specific questions provided by the instructor. However, due to the transition to the remote teaching mode because of the COVID-19 pandemic the research presentation was modified with research paper assignments.

Research paper assignments- In the middle half of the semester, students selected their research paper that they plan to present in the presentation. But under the remote learning environment, the research presentation requirement was removed, and two

different small research paper assignments replaced it. The two assignments are 1) Research Paper Assignment 1 (Synopsis or summary of the selected research paper), and 2) Research Paper Assignment 2 (Key highlights of the assigned research paper). For assignment 1, the students were asked to prepare a 3-page synopsis or summary for the research paper they selected earlier. For assignment 2, the students were asked to write 5-6 major key highlights of another research article. I assigned the 2nd research article from the pool of articles to each student, and this 2nd article is substantially different from their selected research article 1. Thus, it was helpful to create a matrix; all the articles for the 2nd assignment are the primary article for another student in the class. I created this matrix as it will be helpful to do the peer-evaluation. Thus, I asked the students to evaluate their classmates.

The instructions for each assignment are as follows;

Research Paper Assignment 1 (Synopsis or Summary of the Selected Research Paper)

- No more than 3-Pages (Single spaced) excluding tables, figures, and bibliography, no less than 12 font-size with minimum 1" of margin
- There are no requirements for a specific format. However, structured writing covering the background, hypothesis, objectives, experimental design, analysis of the results, and limitation or future work of the study is highly desirable.
- Be sure to cite all literature that you use in your writing, including in-text citations and a bibliography at the end of the synopsis. The bibliography does not count towards your page limit.
- For the bibliography, please use the style for the journal 'Science'. Here's an example of their format:
 1. R. Harvey, S. Nedergaard, Sodium-independent active transport of potassium in the isolated midgut of the *Cecropia* silkworm. *Proc. Natl. Acad. Sci. U.S.A.* **51**, 731-735 (1964).

Research Paper Assignment 2 (Key highlights of the assigned Research Paper)

- Need to write 5-6 major key highlights of the article.
- No more than 1-Page (Single spaced) 12 font-size with minimum 1" of margin, No tables, figures, and bibliography.
- Highlights should answer the **Three primary questions** - a) What is the major objective of the study, b) What are the key experiments the authors conducted to achieve the objective, and c) What are the major conclusions of the study.

Both of these assignments were evaluated as teaching presentations. The instructor evaluation values 70%, and the rest 30% is from the peer-evaluation.

Along with the teaching presentation and research paper assignments, another critical course activity was self-assessment. The self-assessment sheet is provided in [Appendix 4](#). The primary goal of the self-assessment sheet is to encourage the students to document their own learning and participation in different activities throughout the semester. Along with the assessment, I also asked the student to complete an end of a term survey questionnaire to evaluate their overall learning experience during the course.

MEMO 3: Analysis of Student Learning

Evidence of students meeting learning goals:

Foundational knowledge and abilities- At the beginning of the semester, the first two assignments (Problem set 1 and 2) primarily aimed to evaluate the foundational understanding of the students and their abilities to understand the basic concepts of protein biochemistry. The primary purpose of these evaluations was to understand the knowledge of the students on how proteins are synthesized in plant and animal tissues and the importance of protein structure. Figure 1 describes the overall performance of the students, and for Problem set 1 and 2, the class median was 98%, indicating that the students have adequate knowledge, and they are well prepared to develop the concepts of food protein functionality, bioactivity, and characterization.

Conceptual understanding- The next half of the semester aims to test the theoretical understanding of the subject and reading materials. The knowledge development was tested through three different assignments (Problem set 3 & 4, and teaching presentation). Unfortunately, when it comes to conceptual understanding of the theoretical substructures of the subject and acquired knowledge, many students did not meet the expected learning goals, and the median was dropped to 83% in the Problem set 3 and the teaching presentation (Figure 1). The teaching presentation was also an assessment of their communication skill, and it was observed that communication skills are not adequate for a few students in the class.

It was observed that most of the students understand two individual concepts separately but often failed to connect the ideas to solve a problem. It is also noted that the students somehow were unable to connect with the real-world situation in the Problem set 1 and 2 where I asked more direct questions they performed much better. Still, similar sort of questions when it is framed for a lab-based application or food -industry application, the students often failed to understand the actual Problem. Thus, we spent a substantial amount of time in the class to dissect each Problem into small pieces and solve one piece at a time. I observed that breaking the questions into small sections was helpful for them to grasp the essence of the Problem, and in the class, they responded much better than what they have written earlier in the assignment.

During the teaching presentation, along with the conceptual understanding, I also evaluate their presentation skills; their peers also evaluated the presentation skills. Overall it was observed that most of the students are just narrating the reading materials but not describing the concept behind the narration. As a part of the teaching presentation, I worked individually with every student and helped them to develop 10 study questions for their teaching topics. During this exercise, it was noted that except for a few of the students, most of them formulated a straightforward question and did

not involve much conceptual understanding. However, it was observed the students who presented in the latter half of the semester get the concept of formulating critical questions better than the students who presented in the first half of the semester. It is most likely that time and examples help them rethink their approach and eventually improve their performance.

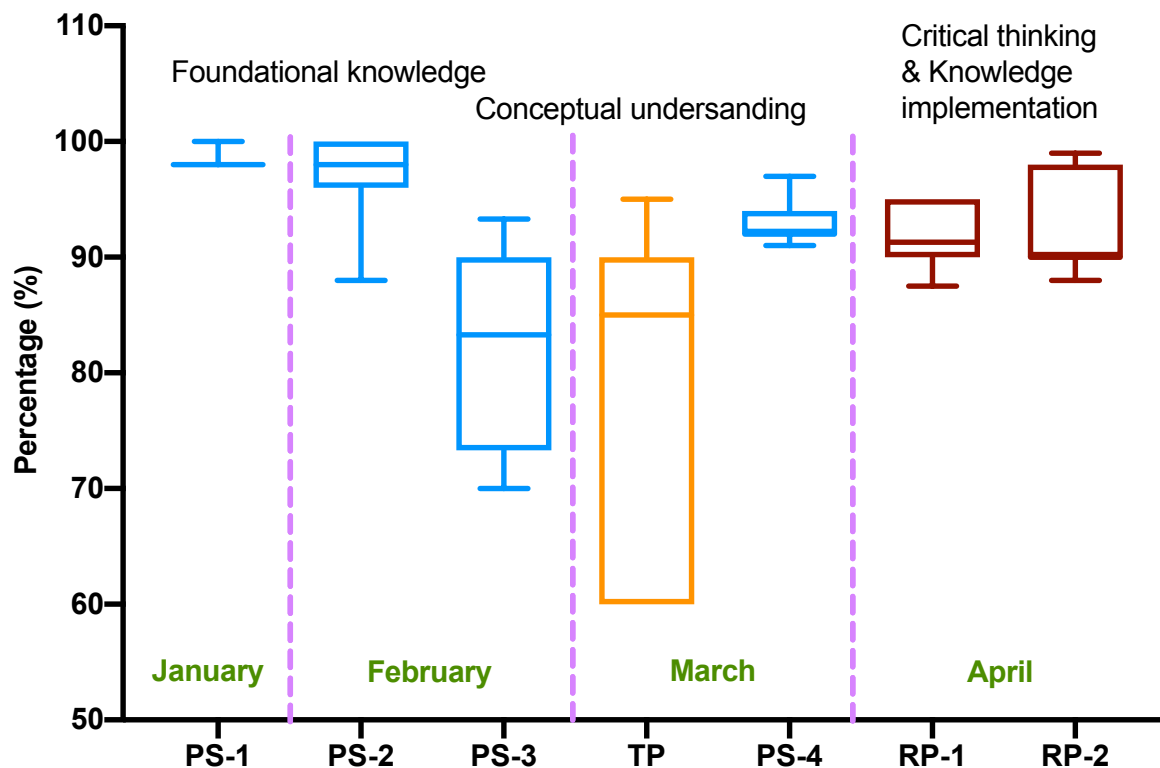


Figure 1: The course implemented 4 Problem Sets (PS), 1 Teaching Presentation (TP), and 2 Research Paper (RP) assignments. The workload was evenly distributed in different phases of the semester and typically each month the students need to submit 2-assignments, with the only exception in the month of January. The first two assignments (PS-1 and PS-2) primarily focuses on evaluating the foundational knowledge, whereas the PS-3, PS-4, PS-4, and TP primarily evaluate the conceptual understanding. At the end of the semester, RP-1 and RP-2 evaluated the critical thinking and knowledge implementation ability of the students.

The improvement of their conceptual understanding was reflected as well in the Problem set 4; this was by far the toughest problems and required both fundamental and conceptual knowledge. It was observed that the students significantly improved and gained knowledge, and the median score for the Problem set 4 was 92% (Figure 1). Given the difficulties associated with this Problem set, this performance was truly commendable.

Implementation- In the final half of the semester, the students were evaluated for their skills to test the students' ability to do critical thinking and implement the knowledge.

The two research paper assignments primarily evaluated these skill sets. It was observed that over time, the students develop critical thinking ability and can implement their acquired knowledge in reading the research paper and writing the synopsis for those research articles. The research assignment 2 was assigned in a way that the students really need to go out of their comfort zone and need to understand a research article. It was also observed that the students did an outstanding job in those assignments. The median score for the research assignment was 90%.

Self-assessment- During the semester, the students need to complete three self-assessments. The three main criteria for the self-assessment logs are 1) Participation during the lecture or in the class discussion, 2) Participation in small group activities, and finally 3) Self-assessment, reflection, and improvement. It was observed that at the beginning of the semester, most of them except one did not start the logging regularly. It was also noted that student's self-reflection points are meager at the beginning of the semester. However, when it was explained in the class, the student starts logging their self-reflections. The qualitative analysis revealed that for most of the students, the reflections were not a critical analysis of their performance. It is mostly re-iterating the participation, having said that it was also noticed that one out of seven students did all the logging as per the requirement over the period of the semester. The analysis also suggested that the students are keen to learn. They all accepted that they have learned some key points during the semester and developed their conceptual understanding. A few examples of the student's self-assessments are presented in the [appendix](#) section.

End of term course survey and feedback- At the end of the semester, I organized an end-of-term survey and feedback, where I asked the students 14 questions. The questionnaire is divided into two parts; part I consists of 8 questions primarily designed to assess students' overall experience. In contrast, the 2nd part was designed to determine student perceptions of group classroom discussion.

The first three questions of the 1st part of the questionnaire asked three basic questions,

1. Overall the course meets my expectation.
2. The Course materials and assignments fulfill the course objectives, and
3. The relevancy of the lecture materials and assignments

All the 7 students participated in the survey; for questions 1 and 2, they indicated that the course meets their expectations, and the materials and assignments fulfill the course objectives. The third question was a multiple-choice question, and they need to choose how relevant the course materials were. They all indicated that the course materials and assignments were appropriate (Figure 2).

Attempts: 7 out of 7

Overall, the course meets my expectation

Yes	7 respondents	100 %	<div style="width: 100%;"></div> ✓
No		0 %	<div style="width: 0%;"></div>

Attempts: 7 out of 7

The course materials and assignments fulfill the course objectives

Yes	7 respondents	100 %	<div style="width: 100%;"></div> ✓
No		0 %	<div style="width: 0%;"></div>

Attempts: 7 out of 7

The lecture materials and assignments were-

Relevant	7 respondents	100 %	<div style="width: 100%;"></div> ✓
Somewhat Relevant		0 %	<div style="width: 0%;"></div>
Not Relevant		0 %	<div style="width: 0%;"></div>

Figure 2: The survey results part I

The survey next enquired about the quality of the teaching materials, and it was noted that out of 7, 4 students thought it was sufficient, and 2 of them indicated it was more than enough. However, 1 of them stated that it was not enough. As a reflection of the course, my plan is to improve the study materials and provide the students with some more extra information/guidance to solve the problem sets (Figure 3).

The next survey questions asked the students to list 3 major learnings from the course, and it was observed that the students learned and acquired knowledge on food proteins and also gained experiences in peer-evaluation, how to construct teaching presentation, how to self-studying help the gradual learning process. In the following section, I highlighted a few of those points students mentioned during the survey. This is a cumulative overview, and examples of the survey not portraying each comment. These comments are truly helpful for me to make necessary and required changes for the future.

In the middle of the term, we had issues with COVID-19, and all the face-to-face class was transferred to the online delivery. Thus, I plan to ask a question on the student experience about the transition. I am glad to know that 4 students out of 7 responded it was seamless (Figure 3).

Attempts: 7 out of 7

Do the lecture and study materials help in solving the problem sets?

More than sufficient	2 respondents	29%	✓
Sufficient	4 respondents	57%	
Not sufficient	1 respondents	14%	

Attempts: 7 out of 7

Three major things I have learned in this class are -

Ungraded answers	7 respondents	100%	✓
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Attempts: 7 out of 7

How would you rate the transition to the online class due to the COVID-19 situation?

Seamless	4 respondents	57%	✓
Challenging	3 respondents	43%	
Required lot of effort		0%	

Figure 3: The survey results part II

The list of the thing's students indicated they have learned in this course:

1. How to construct a teaching presentation around the study questions. My past experiences for classes have this the other way around and it allowed for a different thinking perspective and to be able to present the material in a more constructive way.
2. How to build on fundamental knowledge to connect to critical questions. For example, starting from amino acid structure, then discussing amino acid detection methods and ending on deciding which methods to use based on the research hypothesis/question.
3. How to critically read a research article. Starting out research articles have been read in a perspective of a finished piece of work. However, one objective of the research assignment is to comment on the limitations of the techniques and what future work needs to be done. This demonstrated that published work is part of the flow of scientific data, not pure fact.
4. Gaining the ability to highlight key points from different resources (i.e. research papers) to support my study.

5. Familiarizing with the high application of new and robust technology into research
6. Learning from peers with high skills in research experiences
7. The effect of gradual learning, searching, and self-studying
8. The importance of collaboration in the learning process
9. Analytical and critical thinking and creating motivator question
10. The first major thing I have learned is protein denaturation and the different ways this can happen by man or in nature.
11. The second is on isolates and concentrates, especially by the guest lecturer, on the differences between them along with the functionality changes.
12. The last major thing I learned was on the different ways of separating and identifying proteins, including by Mass Spectrometry, SDS-PAGE, column chromatography, and the general techniques. This helped round out my view of food proteins.

The next part of the survey asked about the experience and value of the research paper assignments (Figure 4). It should be noted that research paper assignments are characterized in the implementation category, and this is a vital component of the course. As a graduate student, it was expected from the students to read a research paper and do a critical evaluation and learn from those papers to do future studies. The course was an

Attempts: 7 out of 7

Do the research paper assignments help you to understand and apply the knowledge you gained in class?

Yes	5 respondents	71%	<div style="width: 71%;"></div>	✓
No	2 respondents	29%	<div style="width: 29%;"></div>	

Attempts: 7 out of 7

Do the research paper assignments help you to diversify your knowledge about food proteins?

Yes	7 respondents	100%	<div style="width: 100%;"></div>	✓
No		0%	<div style="width: 0%;"></div>	

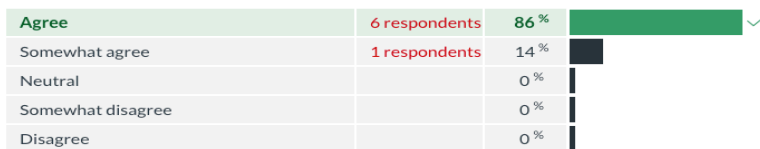
Figure 4: The survey results part III

attempt to provide the students with a glimpse of the research paper reading and writing. The two basic questions asked for this category were: 1) Do the research paper assignments help you to understand and apply the knowledge you gained in class? and 2) Do the research paper assignments help you to diversify your knowledge about food proteins? It was noted that 2 students indicated that the research paper assignments did not help them to understand the knowledge they gained in the class. It was a surprise to see why two of the students thought that the research was not helpful. In the future, I plan to explain more in the class how to use the class knowledge to read a research article.

The next half of the questionnaire primarily focused on group activities (Figure 5), and it was observed that overall, students understand the value of group presentation and group assignments. I also noticed that for most of the students, they did some group activities, but probably none of them are so intense or required a coherent combination between the team members.

Attempts: 7 out of 7

Participation in group discussions improved my overall ability to answer the study questions.



Attempts: 7 out of 7

Participation in group discussions helped improved my understanding about structure and function of Food proteins



Attempts: 7 out of 7

Participation in group discussions was a valuable way to interact with my peers.

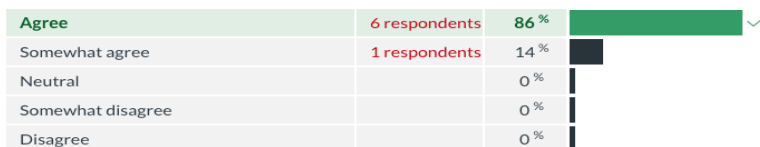


Figure 5: The survey results part IV

The final half of the survey specifically asked to answer the following three questions,

- 1) What are the other benefits of group discussion?
- 2) What are the major drawbacks of group discussion?
- 3) Would you recommend group discussion activity for future classes?

For the above three questions, the students overall gave a positive response and indicated that they benefited from the group discussion, and they recommend the discussion for the future class. The only major drawback they identified was the switching the online class was difficult for them to discuss with their group members, and the group of three students might be a better option. I do notice the differences between in-person discussions and online discussions. However, this year it was inevitable. The group of 3 students is an option, and that can be implemented if I have more than 10 students enrolled for the class.

Overall performance and grade distribution-

The majority of the students developed a satisfactory working knowledge of basic concepts and tools in food proteins and the applications of food proteins and were able to use them to solve problems, especially those involving routine characterization techniques. This is demonstrated by the reasonably high scores obtained in the research paper assignments. Thus, the median score for the research paper assignments were 90% (Figure 6).

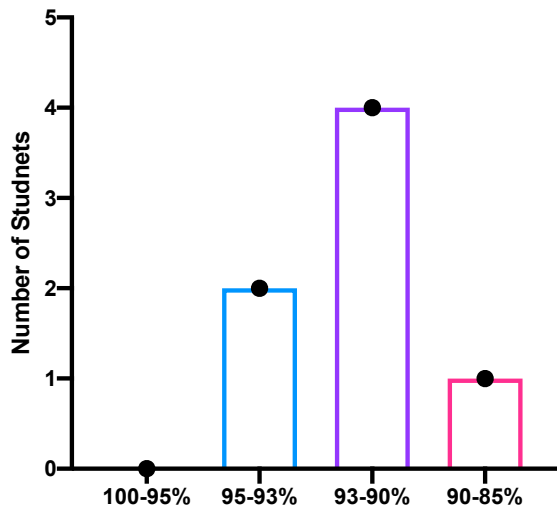


Figure 6: The Grade distribution, overall the median score was 91%

SUMMARY: Reflections on the Course

In view of the challenges that few students had to face to fulfill some of the learning goals regarding the conceptual understanding of the usage of food-proteins and the importance of structure-function relationship, I plan to either redesign the learning methods specific to achieving those goals or set use different other methods. In the future, I plan to explain more in the class how to use the class knowledge to read a research article.

I also plan to give the students interesting open-ended projects in which they need to apply some knowledge of protein structure and characterization. Projects involving the role of evaluating different analytical techniques would also be helpful.

Appendix

Below are the items included in the Appendix

1. [Course Syllabus](#)
2. [Thought of the Day-Slides](#)
3. [Teaching Presentation Rubric](#)
4. [Self-assessment log examples.](#)

Course Syllabus

FDST 880P: Food Proteins

Spring 2020

Lecture: Tuesday, Thursday, 12:00 -12:50PM, 275 Food Innovation Center

Instructor

Dr. Kaustav Majumder

256, Food Innovation Center

Email: kaustav.majumder@unl.edu

Phone: 402-472-3510

Office hours: The instructor has an open-door policy during regular office hours, however appointment via Email is highly recommended.

Course Description and Outline

The overall goal of the course is to do an in-depth discussion about food proteins and peptides, their composition, chemical, and physical properties, structure-function relationships, and the current research development and commercial trends related food proteins and peptides. The course work will provide the opportunity to dwell deep into the fundamental chemistry, protein structures, and functions to understand the physiochemical and biochemical factors that govern the functionality and biological activity of food proteins and peptides beyond their known nutritional values. The course will also provide an overview of the physiological fate of the food proteins, the dietary role, digestion, absorption, and metabolism. It is anticipated that as a result of taking this course students will:

Understand:

- How proteins are synthesized in plant and animal tissues
- The importance of primary structure to proteins functionality

Learn:

- The common methods used to characterize food proteins
- The composition of proteins in major food commodities
- The processing-induced modifications of food proteins

Develop awareness:

- About the novel sources of food proteins
- On the physiological fate of food proteins and biological activity of food proteins and peptides
- On high-value and novel uses of underutilized food proteins

Textbook: Class-lectures will utilize several resources including textbook materials, research papers, and web reports. The lectures will regularly be posted on Canvas, no requirement for any particular textbook.

In addition to the lectures, this course will be using literature articles. The articles will be provided on Canvas or the reference for the article will be given in the class.

Lecture format: This class will meet on Tuesdays and Thursdays from noon till 12:50 in room 275 FIC. The course will be composed of lectures and student-led class discussion of selected topics, each composing about one half of the course.

Class Discussion format: Each student will be responsible for presenting food protein topics and lead the class discussion, twice during the term (one teaching topic and one research article).

Teaching presentation- One student will take the lead each day and the remaining students will be organized into small teams by the instructors. The presentation should be approximately 30 min in length followed by classroom discussion of 15-20 min, leading student also need to provide a list of 10 study questions, one week in advance of the presentation date. Each team will then work together to answer the study questions and participate in the class discussion on the presentation day. Instructor will provide the teaching topics and students need to notify their first, second and third choices; topics will be assigned on first-come, first-served basis.

Research paper presentation- One student will take the lead each day and the remaining students will be organized into small teams by the instructors. The leading student need to select the research article and provide a 1-page summary (single space, 1" margin, Arial 12) of the article (one week in advance to the presentation date) and present the article in the class (approximately 20 min). Each team needs to work together before the presentation (outside class time) to do critical evaluation of the article and need to answer specific questions provided by the instructor.

Attendance Policy

Students are strongly encouraged to attend all lectures as attendance is a component of the participation grade. It is the responsibility of the student to notify the instructors via email in advance of any absence.

Assessment plan:

The grade is based on participation, presentations, quizzes and take-home problem sets. The mark distribution for each section is as follows:

- Participation	5%
- Class discussion and presentation (Teaching topic)	40%
- Class discussion and presentation (Research paper)	40%
- Quizzes and problems	15%
TOTAL	100%

Participation: Participation in class discussions will be counted as part of your grade. The expectation is that you will read the assigned materials (discussion summary) and be prepared to be an active and engaged participant in class discussions. Peer review on the oral presentations and self-assessment will also be counted as part of your participation grade. *Instructor will schedule individual meeting with the student at the beginning and end of the semester.*

Class discussion: The components of the score are presentation summary, assessment by the participating students listening to the presentation (peer

review), leadership in class discussion, and evaluation by the instructor. The instructor evaluation values 70% and the rest 30% is the average of the peer assessment by the participating team.

Quizzes and Problem sets: The take home quizzes, and problem sets will be given either in class or will be posted on the Canvas. Due dates of these problem sets will be clearly posted and should be submitted electronically. Late work will not be accepted. Collaborative work on these problem sets is encouraged but do not simply copy another student's answers.

Note: All the marking rubrics will be shared with the class.

Late Work

Permission to hand in assignments late must be secured 24 hours before the scheduled due date. Failure to follow this will result in a grade of zero.

Grade Determination

Final grades for the course will be assigned according to the percentage of the total available points throughout the semester earned by the student, as follows:

98-100%	A+	77-79%	C+
94-97%	A	74-76%	C
90-93%	A-	70-73%	C-
87-89%	B+	67-69%	D+
84-86%	B	64-66%	D
80-83%	B-	60-63%	D-
<60%	F		

Academic Dishonesty

According to the [Student Code of Conduct](#), Section 4.2, academic dishonesty includes, but is not limited to, the following:

Cheating: Copying or attempting to copy from an academic test or examination of another student; using or attempting to use unauthorized materials, information, notes, study aids or other devices for an academic test, examination or exercise; engaging or attempting to engage the assistance of another individual in misrepresenting the academic performance of a student; or communicating information in an unauthorized manner to another person for an academic test, examination or exercise.

Fabrication or Falsification: Falsifying or fabricating any information or citation in any academic exercise, work, speech, test or examination. Falsification is the alteration of information, while fabrication is the invention or counterfeiting of information.

Plagiarism: Presenting the work of another as one's own (i.e., without proper acknowledgment of the source) and submitting examinations, theses, reports, speeches, drawings, laboratory notes or other academic work in whole or in part as

one's own when such work has been prepared by another person or copied from another person.

Abuse of Academic Materials Destroying defacing, stealing, or making inaccessible library or other academic resource material.

Complicity in Academic Dishonesty Helping or attempting to help another student to commit an act of academic dishonesty.

Falsifying Grade Reports Changing or destroying grades, scores or markings on an examination or in an instructor's records.

Misrepresentation to Avoid Academic Work Misrepresentation by fabricating an otherwise justifiable excuse such as illness, injury, accident, etc., in order to avoid or delay timely submission of academic work or to avoid or delay the taking of a test or examination.

Other Academic units and members of the faculty may prescribe and give students prior notice of additional standards of conduct for academic honesty in a particular course, and violation of any such standard of conduct shall constitute misconduct under this Code of Conduct and the University Disciplinary Procedures.

If I suspect someone of committing academic dishonesty, I will discuss the situation with the student. If necessary, disciplinary action such as imposing academic sanctions or assigning a failing grade will be taken.

Course Timeline

Tentative Lecture Schedule

Date	Lecture #	Topics
Jan14	Intro	Introduction and Overview of the course
Module 1: Introduction to Protein Biochemistry		
Jan 16	1	Protein Structure and Diversity
Jan 21	2	Protein Synthesis
Jan 23	3	Protein-Informatics
Module 2: Methods of Protein Characterization, Proteomics		
Jan 28	4	Protein Characterization -1 – Protein assays, protein profiling methods, Chromatographic methods
Jan 30	5	Overview of Proteomics and Mass Spectrometry- (Guest Lecture- Dr. Phil Johnson)
Feb 4	6	Proteomics and Mass Spectrometry techniques in food science (Guest Lecture- Dr. Phil Johnson)
Feb 6	7	Protein Characterization -2 – Immunological and spectroscopy-based methods
Feb 11	8	Protein Characterization -2-Continues
Module 3: Food Protein and Functionality and Bioactivity		
Feb 13	9	Functional Properties of Food Proteins – I

Feb 18	10	Guest lecture- Dr. Nagul (Ingredion)	
Feb 20	11	Functional Properties of Food Proteins – II	
Module 4: Overview of Major Food Protein System			
Feb 25	12	Enzymes in Food System	
Feb 27	13	Interaction of Proteins with Food Matrices	
Mar 3	14	Gastrointestinal digestion and absorption of Food proteins	
Mar 5	15	Food protein system-Animal source- Meat (Guest Lecture Dr. Gary Sullivan)	
Student Lead Discussion Session- Teaching Topics			
Mar 10	S1	Student1	Legumin and vicilin from pea
Mar 12	S2	Student2	Conglycinin and b-conglycinin from soy
Mar 17	S3	Student3	Ovomucin from egg white
Mar 19	S4	Student4	Ovalbumin from egg white
Mar 24	<i>SPRING BREAK</i>		
Mar 26	<i>SPRING BREAK</i>		
Mar 31	S5	Student5	Whey protein
Apr 2	S6	Student6	Collagen from meat and seafood
Apr 7	S7	Student7	Gluten from wheat
Student Lead Discussion Session- Recent Advancements in Food Protein Research			
Apr 9	R1		Peptides from gluten digestion: A comparison between old and modern wheat varieties
Apr 14	R2		Quantitative analysis of species specificity of two anti-parvalbumin antibodies for detecting southern hemisphere fish species demonstrating strong phylogenetic association
Apr 16	R3		Synergistic stabilization of emulsions by blends of dairy and soluble pea proteins: Contribution of the interfacial composition
Apr 21	R4		High-resolution mass spectrometry-based selection of peanut peptide biomarkers considering food processing and market type variation
Apr 23	R5		A Novel Immunoassay Test System for Detection of Modified Allergen Residues Present in Almond-, Cashew-, Coconut-, Hazelnut-, and Soy-Based Nondairy Beverages
Apr 28	<i>NO CLASS</i>		

Apr 30	R6		Effect of high-intensity ultrasound on structure and foaming properties of pea protein isolate
May 5	R7		Heat-induced changes in microstructure of spray-dried plant protein isolates and its implications on in vitro gastric digestion

ADA Statement:

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can discuss options privately. To establish reasonable accommodations, I may request that you register with Services for Students with Disabilities (SSD). If you are eligible for services and register with their office, make arrangements with me as soon as possible to discuss your accommodations so they can be implemented in a timely manner. SSD contact information: 232 Canfield Admin. Bldg.; [402-472-3787](tel:402-472-3787)

Emergency procedures

Consult UNL emergency planning site for current emergency procedures:
<https://emergency.unl.edu/>



[Fire - Pull Alarm, Use Nearest Exit](#)



[Shooting - Run, Hide, Fight](#)



[Severe Weather - When Thunder Roars Get Indoors](#)



[Flooding - Turn Around Don't Drown](#)



[Tornado - When Warning is Issued Take Shelter](#)



[Earthquake](#) – Drop, Cover, and Hold on



[Winter Weather - Be Prepared](#)



[Gas Leak - Report](#)




[Hazardous Material - Report](#)



[Bomb Threat - Report](#)

Thought of the Day-Slides

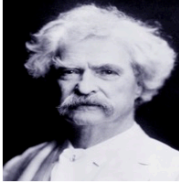
Lecture-1 Introductory day



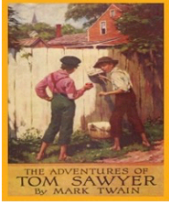
Thought of the Day

“The secret of getting ahead is getting started. The secret of getting started is breaking your complex, overwhelming tasks into small manageable tasks, and then starting on the first one”

Samuel Langhorne Clemens
An American Writer, Publisher, and Lecturer



Pen name: *Mark Twain*



Lecture-2 Protein Diversity

Thought of the Day

“ Food, specifically protein rich foods are one of the earliest invention of mankind”



[Fire the first invention](#)



[Weapons to hunt](#)



[Hunting and cooking Food](#)



Teaching Presentation Rubric

Teaching Presentation Rubrics

Presenter:

Date:

Category	Scoring Criteria	Value	Level of Execution
Scientific Merit (60 points)	<u>Content</u>		
	• Defines the Background	2.75	5 4 3 2 1 0
	• Provide a logical transition between different topics	2.25	5 4 3 2 1 0
	• Provide enough information to answer all the study questions	5.00	5 4 3 2 1 0
	<u>Conclusion</u>		
	• Summarizes the talk with major points	0.75	5 4 3 2 1 0
	• Provides a clear 'take home' message	1.25	5 4 3 2 1 0
Quality of Communication (40 points)	• Speaks clearly and at an understandable pace	4.50	5 4 3 2 1 0
	• Graphs/figures are clear	2.50	5 4 3 2 1 0
	• The text is readable and clear	0.50	5 4 3 2 1 0
	• Complete the talk within the time limit	0.50	5 4 3 2 1 0

What were the most useful thing you learned today from this presentation (list at least three)- Need to provide examples?

Self-Assessment log

FDST 880P Spring 2020 Self-Assessment Log

Name: Student 2

<i>I. Participation during lecture or large class discussion.</i>	
Note that this type of participation refers to making comments heard by the entire class. Students should log approximately 10 specific examples and ensure that they are spread out over the course of the semester.	
Date	<i>What did you contribute to lecture or large class discussion? Report what you shared specifically and your perception of how, if at all, your contribution aided the flow of the lecture or discussion, as well as the comment's relevance to the lecture or large class discussion.</i>
1/16/2020	Started discussion with the belief that high protein foods were invented by humans because of the advent of high protein ingredients (such as soy protein isolate).
1/21/2020	Answered what I thought a super-secondary structure was – motifs of repeating alpha and beta structures (specific example would be an alpha hairpin).
1/23/2020	Discussed accession numbers for proteins – specifically a soy protein (B-conglycinin) replaced by two accession numbers.
2/6/2020	Asked about the composition of C18 columns, that lead to the question of the composition and application of C4 and C8 columns.
2/3/2020	I asked Dr. Johnson about the limitations of MS as a routine method for allergen detection. This question was important because while MS is an invaluable research tool, it still requires some technological improvements in order to become a routine method. These limitations include sample preparation time and data analysis. This aided in the flow of discussion on how MS as a method fits both into the research field but also how it is applied currently in the food industry.
2/18/2020	I contributed to the discussion of the identification of reducing sugars from non-reducing sugars. This was a group discussion and several reducing sugars were identified. This aided in the flow of discussion since different people had differing opinions on what was the correct answer.
3/3/2020	I answered a question about the digestion of proteins in the GI tract. This aided to the flow of discussion because there is a common misconception that proteins are digested completely in the GI tract. This is not entirely true because proteins can stay intact within the digestion process, partly explaining why there are sensitivities to certain food proteins. Food allergens are commonly robust proteins that resist proteolysis and maintain native structure even in harsh pH environments.

3/5/2020	I asked Dr. Sullivan questions about the potential interactions between meat proteins and other functional ingredients in meat products. This would aid the flow of conversation on the types of proteins present in final meat products (depending on the efficiency of extraction during processing) and how they interact with other constituents. For example, the sodium nitrite (the ingredient that gives products a pink color) does not interact with the protein and only aids in color and antibacterial properties.
II. Participation in small group activities.	
Log at least 10 specific examples and ensure that they are spread out over the course of the semester.	
Date	What did you contribute to the small group activity? Summarize how you participated, and your perception of how, if at all, your participation aided the interaction.
3/12/2020	In the discussion of soy food allergens during Tengfei's presentation, I contributed as to why 2S albumins are not major allergens. This may be because they are lower abundant proteins and the heat sensitivity that may contribute to lower allergenicity. This aided in the interaction because of the debate of whether or not this reflects the population prevalence.
III. Self-assessment, reflection, and improvement. Log four self-assessments of your performance as a participant in the class, focusing on your strengths and how you can improve. Reflect on participation expectations outlined in the syllabus, as well as the quality and quantity of your participation in class. Each self-assessment should be at least five sentences in length. See due dates on syllabus.	
Date	Reflection
3/5/2020	I asked several questions during the presentation, some of which were topics that were not discussed. This aided to the quality of the presentation because it related to topics that were not necessarily covered but were further explained by the instructor per the questions. My major strength is discussing new points that can further generate more questions. However, I do not necessarily bring up new topics in the form of new information. In other words, I ask questions, but I can improve by bringing in my own background knowledge on protein and aid in discussion that way.

3/12/2020	I contributed to the study questions at the end of the presentation. One of my major strengths was contributing to one of the questions that I did not necessarily know the answer to. This question about lower abundant proteins and why they were not considered major allergens. I was able to use my background in food allergens to draw from background information that was not necessarily presented in the presentation. However, I think I can improve on my critical thinking skills because I could not completely answer the question.
4/01/2020	The transition of the class from in-person to online needed some adjustments. One of my strengths in class was maintaining discussions with peer evaluators. In-person discussions could no longer take place but zoom meetings were planned to maintain some level of face-to-face interaction. Shared google documents also allowed for real-time editing so the group could work collectively on the grading rubrics. These tools maintained valuable discussion time for the teaching topics.
4/09/2020	Teaching presentations had to be critically evaluated through online zoom recordings. My strength was these recordings could be more effectively evaluated because of the ability to revisit sections of the material. My area of improvement is to be able to draw connections of the basic material presented and apply that to the data shown in the slides. For example, in the gluten in wheat presentation the viscoelasticity of the different wheat varieties affects the end-application, depending on desired organoleptic properties was understood. However, the G and G' graphs were not immediately correlated with this information as showing the variety differences.
4/17/2020	Quiz 4 was an assignment that applied critical thinking of topics covered in class. Although the general knowledge of the subjects was demonstrated, critical thinking skills can be improved on. My major strength is knowing the fundamental knowledge and also drawing from data in the literature. I have background knowledge in soy protein and allergen detection/quantification methods. My major area of improvement is to be able to connect and apply these basic ideas to a greater picture.
4/30/2020	The research paper synopsis was an assignment that required a critical synopsis of a published scientific article. My major strength was to be able to use my basic knowledge of mass spectrometry to justify the importance of the paper and the scope of the results. An area of improvement is the knowledge of the techniques used for sample preparation. There are a multitude of available techniques that can be used for MS samples depending upon the hypothesis, equipment, and data analysis.

FDST 880P Spring 2020
Self-Assessment Log

Name: Student7

<i>I. Participation during lecture or large class discussion.</i>	
Note that this type of participation refers to making comments heard by the entire class. Students should log approximately 10 specific examples and ensure that they are spread out over the course of the semester.	
Date	<i>What did you contribute to lecture or large class discussion? Report what you shared specifically and your perception of how, if at all, your contribution aided the flow of the lecture or discussion, as well as the comment's relevance to the lecture or large class discussion.</i>
1.16.2020	I disagreed with the "Thought of the Day." I felt that agriculture was one of the earliest inventions of mankind due to humans being foragers and having to grow their own food. It followed the start of class to flow as a discussion by suggesting two opposing views, both of which are debated on in current history. This set up the lecture to be more open, with more opposing views hopefully shared without the fear of being wrong. Looking at the thought of the day helps get people involved in the class.
1.30.2020	I asked Dr. Phil Johnson what future applications or advancements Mass Spectrometry could have, which would be beneficial to the user. This was then answered by saying that more discussion would be talked about the following lecture however, the actual data processing software is really what needs to catch up with the equipment. This aided the flow of discussion by leading into the next lecture topic and providing us a glimpse with some of the potential pitfalls of current mass spec work.
2.13.2020	I disagreed with a few students in the class on whether or not a native protein would be soluble or insoluble based on its charge, hydrophobicity, and hydrophilicity. Two students in the class mentioned that the protein of interest would be insoluble because of the presence of the hydrophobic groups. However, I disagreed due to the hydrophilic and charged groups being on the outside of the structure while the hydrophobic portions were on the inside of the structure, allowing the protein to bind to water and be soluble. In addition, I mentioned how the denatured protein would be insoluble, because more of the hydrophobic groups are exposed preventing solubility. This aided the flow of discussion by offering a different view to the previously discussed answer of the protein being insoluble. The larger discussion then went broader to see how different structures may or may not be soluble. By keeping my comment in mind, how the position of hydrophilic and hydrophobic groups determine whether or not the protein would be soluble or insoluble, we were then able to make correct group decisions on the solubility of different proteins for the rest of lecture.

2/18/20	During the guest lecturer through zoom, I questioned their statement which said "no allergens" existed in the protein isolates/concentrates. I did not agree with this statement and I think this aided the flow of discussion by discussing allergens, a major food safety topic in industry which was glossed over. The comment's relevance to the lecture was then interesting, as he really didn't answer the question, but instead mentioned that these were not "major allergens" which was very different from his initial statement. This further brings the importance of allergens into people's minds.
2/25/20	We were discussing the distribution of research groups and I mentioned that we should stay in groups of two for the ability to have more classroom discussion. This aided the flow of discussion with further agreement by other students on this group distribution. This was very relevant to the discussion as it was a question we all needed to decide upon for the remainder of the semester.
3/5/20	During the guest lecturer on meat, I asked how the characteristics of ground beef are taken into account regarding the impossible burger. This flowed into discussion as he continually talked about intact beef, so ground beef was a topic that was less focused on but still relevant to the overall discussion. In addition, the impossible burger, looking to take on the characteristics of ground beef, is also relevant to the larger discussion as plant proteins continue to shine throughout the industry.
3/10/20	In the group discussion on peas, I emphasized why I thought pea should be included as an allergen, due to its high prevalence and potential cross-reactivity to soy. My participation aided in the interaction by suggesting to the speaker, Jenna, that I agreed that pea was important to consider and was able to re-emphasize her point that pea was important in terms of future food safety. The larger class discussion surrounded pea protein and its function, and with more use in the industry, allergenic potential may need to be considered more and more.
4/14/2020	During the online zoom lecture, I gave my opinion on what I would have liked to have seen additionally for the zoom teaching presentations. The question of additional tips for future online teaching presentations was asked and I spoke up on what I would have liked to see; a group discussion afterwards. This comment aided the group discussion as it gave people the opportunity to then agree with me, saying that the group discussion after the presentation would have been nice to have to further strengthen understanding of each presentation.
<p><i>II. Participation in small group activities.</i></p> <p>Log at least 10 specific examples and ensure that they are spread out over the course of the semester.</p>	
Date	<i>What did you contribute to the small group activity? Summarize how you participated, and your perception of how, if at all, your participation aided the interaction.</i>

3/10/20	I met with xxx to pre-discuss the questions brought forth by yyy. This was important to discuss as both she and I had some ideas on what some of her questions were really asking. After discussing with xxxx, I felt more prepared for the classroom discussion which led us to answer the study questions with more clarity.
3/12/20	I met with Grace to pre-discuss the questions brought forth by xxxx. I made sure each of us understood the questions being asked and any pre-perceptions we had on the topic. This was important to the future discussion as I understood the type of comments she had on the study questions, since we had discussed them previously.
4/1/20	I spoke with xxxx, over email, to discuss the questions we had. After having a few different answers for Alisha's questions, we decided to combine our answers to get the most detailed answers we could determine. My ability to communicate, just as well over email as in person, helped us collaborate on the questions just as well as we would have during class.
4/2/20	I met with xxxx to discuss Willow's questions and evaluation. I had mentioned that she didn't have a concluding slide to summarize her thoughts. xxxxxx agreed and after thinking about it, we were able to accurately grade her presentation, taking into account the overall presentation. Had we not discussed the individual aspects of what her presentation did and didn't have, we may not have graded her as accurately.
4/6/2020	For discussing over email, xxx and I were able to work together to answer the questions we were assigned for the teaching presentation. We were struggling with one of our questions and as I re-watched the lecture, I was able to find the answer. I then emailed xxxx, and together we talked though how that answer fit with our thoughts and if it made sense. My re-watching of the video allowed us to have more of a discussion for that answer, which aided our interpretation of the presentation.
4/7/2020	For discussing over email, I spoke with xxxx on the various questions we were to discuss for the teaching presentation. She didn't have too many different comments than mine, so to facilitate more discussion, I instead suggested that we should discuss three different things each of us learned from the presentation. This got us conversing on the topic and instead of quickly emailing our response to the questions, we had a useful discussion for the peer evaluation.
4/14/2020	Together, with xxxx and yyyy, I was able to help come up with a paper which was useful for answering one of the questions on Problem set 4. I decided to look up some papers on my own to help with the analysis and I ended up finding a paper which helped to give a new perspective to the question being asked. This helped get each of us to look to the literature to answer the questions, thus strengthening the answers that we discussed.

III. Self-assessment, reflection, and improvement. Log four self-assessments of your performance as a participant in the class, focusing on your strengths and how you can improve. Reflect on participation expectations outlined in the syllabus, as well as the quality and quantity of your participation in class. Each self-assessment should be at least five sentences in length. See due dates on syllabus.

Date	Reflection
2.13.2020	<p>As a participant in the class, I tend to be a good listener yet also a good communicator. I pay attention with notes as needed while still trying to comprehend some of the more basic aspects of protein chemistry. Overall, this was my way of staying active and engaged in class, as part of the participation expectations. My strength of communicating an answer when I am confident in my thought process is something I do well. However, I do think I can go outside of my comfort zone and suggest answers even when I am less confident. Failure leads to further success and the same goes for saying a thought out loud. I think by going outside of my comfort zone to answer questions I am less sure of, I can benefit more in my learning. Based on the participation expectations, I am trying to go over material after the lecture to further understand the concepts, but I think I can go over the material or lectures posted before class as well, being able to better discuss topics we will learn. In addition, I have made sure to really understand the outside problem set assignments and find those helpful in reinforcing basic concepts from lectures. Because I value the quality of my answers over the quantity, I tend to speak up less. I will strive to do a better balance of both, speaking up to improve the quantity of how many times I express my thoughts, yet also ensuring that the quality of my answers make sense. This will especially become relevant over the rest of the semester during research and teaching presentations.</p>
3/12/20	<p>Up to now, we have had mostly guest lecturers and two student presentations. As a participant in the class, I have tried to focus on answering more questions, even if I am less sure of the answer. In addition, my strength of allergens has shown through in a variety of the discussion points I have brought up, from a comment during the guest lecturer discussion to a comment in Jenna's presentation. This strength, allergens, helps offer a new perspective to the group and adds to the overall quantity of my class participation. My overall quality of my participation in class has stayed pretty high, as I continue to answer questions which I am most confident in. My area of improvement can be to ask more questions, as sometimes I rely too much on is the speaker having all the answers. I should be questioning statements and logic to further improve my understanding of the topic.</p>

4/6/20	<p>Now that we have had two presentations online, and will continue to have more, I realize that I need to change my participation style. In conversing people online, I need to be more aware of the lack of emotion connected to each point. I can't read the person's mind so asking questions in my small group discussions is essential for me to improve and fully understand what someone is asking and continue with quality participation. I need to still improve on my questioning, and this is something I was already trying to do in the in-person class situation. The overall quantity of my participation online has been reliable, in discussing questions with multiple emails over Canvas and the like. My strength during this online conversation is timeliness, in that I connect with people over email just as easily as a conversation in person. This will help me contribute in class to fully discuss the task at hand in the designated time frame.</p>
4/27/2020	<p>As the semester ends, my overall participation in the class was consistent and engaging. I was able to actively speak up in group discussions, and even by email, contribute to a small group discussion. My ability to foster discussions is brought by some of my curiosity as a student, but also in my interest to apply my skills to my future career. I always tried to speak up when I thought it was necessary, further pushing for a question or answer to what I was thinking about. My overall quantity of responses was average, in that I still can work on answering questions when I am slightly unsure of my answer. However, this led me to continually think on my questions even after class. For my future career, I hope to employ these questioning techniques to better myself and the company, taking care to discuss concepts thoroughly with a variety of people with a variety of backgrounds.</p>