

BCEM 443 Course Profile

The course description and Fall 2018 syllabus of Biochemistry 443, **Metabolism and Basic Nucleic Acid Biochemistry**, can be [found here](#).

Generally offered in: Fall semesters

Prerequisite(s): One of CHEM 353 or 355; and BCEM 341 or 393

Antirequisite(s): None

Interview with Dr. Ian Lewis

How would you summarize what the course content is about?

Biochemistry 443 is about the role metabolism plays in life, the pathways of metabolism and how metabolism enables the many things that we do as living creatures.

What is the main skill or concept you think is important for students to take away from this course?

Students should understand the connections between life and metabolism; essentially, how metabolism supports life. Metabolism is a beautiful subject because it is one of the few cases in biology where almost all life shares the same rules, has the same mechanisms occurring within them. Everything from *E. coli* to humans follow the same rules about how metabolism works. When you understand these rules, you **understand something profound about the foundation of life.**

What do you think students struggle with the most in BCEM 443?

Biochemistry is challenging because it is **chemistry first, biology second**. Grasping biochemistry concepts well requires a firm understanding of organic chemistry and organic mechanisms as well as of some computational subjects. Therefore, the beauty of biochemistry is only accessible to individuals who invest enough time in understanding the shared chemical principles of life. Those investments are worthwhile because they provide direct and meaningful insight into the way life works.

What types of notes do you provide?

The class is evolving, I taught it for the first time this year and it will likely evolve more as we go. I provide PowerPoints with the majority of the information on them and I try to follow along with material that is covered in the textbook. I also provide some study guides and some sample test banks to help students with their exams preparation. Since the course is evolving, I am not sure what will happen as we move forward. I am experimenting with some integrated science teaching concepts, we will see how those play and how it works moving forward.

There does not seem to be a required textbook for this class, is that correct? To what extent would you recommend students to use the recommended textbook?

That is correct. There is no required textbook, although the material comes directly from the textbook required for Biochemistry 393 which is also needed for this class, simply **no additional textbook is required.**

It is incredibly important to read the textbook. **Lecture is a supplement to reading;** instructors help guide through material and point to things that are important, but as a student it is your responsibility to learn those things thoroughly. The concepts are expertly delivered in the textbook for each subject. **If you master the textbook then you master the subject.**

What can students do to be successful in this course?

Attending lectures is very important because I cover some material that is not in the text at all and is only accessible by coming to lecture. We work through some in-class exercises and I provide some homework assignments and some practice problems that supplement the material and is very important to do. **Repetition is required to improve problem solving abilities in biochemistry.** Investing time into repetition allows students to solve problems more quickly.

Are there sets of practice questions provided on a certain basis?

From the beginning of the term, **I post a test bank on D2L** that gives students an idea of what to prepare for. The test bank has questions on everything that we cover, it gives students an idea of the range of questions I might ask. It is not exhaustive, I will ask questions that are not in the test bank but it gives students a specific idea of how to prepare for exams.

What resources should students focus on when preparing for examinations?

In my class, every material source is equally weighted (lectures, tutorials, laboratories, assigned readings...) there is no way to specialize. My contract with students is **I will not cover unimportant things and they will not study unimportant those things.** All the content in the course is included because I believe it is important for one reason or another, so all the course components cover material relevant for the learning objectives.

Could you comment on the workload students can expect from the laboratory part of the course?

There are only one or two laboratories in the course now, so **laboratories are a small portion of the course, but we also have weekly tutorials.** We have largely replaced the labs with the tutorials and these tutorials play a really important role in the overall class education experience. The tutorials are critical because they cover material that will be in the quizzes that same week.

What do the tutorials entail?

The tutorials are an independent series of lectures delivered by graduate students that are meant to help students be prepared for class. For example, I expect students to already know the material from

Biochemistry 393 before they come to class. Part of how I ensure that is by **giving students students refreshers in tutorials a quiz at the start of class**. I expect them to do well on the quiz before we start to talk about the Biochemistry 443 material. Therefore, there is an expectation that students understand and master the Biochemistry 393 material before we dive into this course's material.

Tutorial sessions are very important for students to engage with because they help ensure that everyone is on the same page. The quiz ensures that they both take the tutorial and class material seriously. **Biochemistry is a cumulative topic** so staying on top of the material and not getting behind is important.

What part of the course are you most looking forward to teach?

I like them all, I love biochemistry so I can't choose a favourite subject. *This* is my favourite subject, there is no one sub-part of it that I don't love. To me **biochemistry is a profound subject**, it tells you about the way life works, the more you invest in it, the more you understand about the foundation of life. I love it all and since I can craft the course into what I think is important, it covers all the things I love the most in biochemistry.

Are there any changes to the course you're looking forward to implementing?

I am actively experimenting with the course organization. Before I came here, I taught at Princeton University and the course that I taught there was in their integrative science program, it's a much more interactive way of teaching. It works well in small format circumstances, I'm trying to adapt to the larger format of our classes. I'm trying to figure out how we'll get it to work and how well it fits with University of Calgary students. I am actively interested in engaging with developing that concept.

Are there any courses you would recommend students to take afterwards if they greatly enjoyed BCEM 443?

There are great courses that can come after taking Biochemistry 443. This course is a strong foundation for going into the signalling courses like Biochemistry 547, protein biochemistry courses like Biochemistry 431 or lipid membrane subjects.

Any last comments or advice for upcoming students?

Biochemistry 443 is a classically hard course that deals with challenging material involving a lot of chemistry and mathematics. Some of these materials can be challenging for certain students, but it is worth investing in this material; students that do invest in it come away with a more profound understanding of the foundation of life. **You will definitely get an appreciation for both how similar life is and how the universe works**. Those are two major epiphanies that come out of this class that are not accessible in most other courses, invest in this and you'll invest in understanding the world.

This interview transcript was edited for clarity and brevity.