EAST TEXAS A&M

BSC 517, Stem Cell Biology (CRN: 50417)
Summer II, 2025

Instructor:	**Dr. Venu Cheriyath**
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Office Hours:	Tue and Thu 12 –1 PM **Office hours will be held on Zoom upon request.** To schedule a meeting, please send an email with 'BSC 517 Stem Cell Biology' in the subject line.

Course overview:

This course will provide graduate students with an in-depth account of stem cell biology, various forms of stem cells and their application to regenerative medicine. Special reference will be made to molecular, epigenetic, and genetic control of stem cell differentiation and specializations. Existing and potential clinical use of stem cells, its derivatives, and induced pluripotent stem cells also will be discussed. Since this is rapidly developing field with sweeping social implications, strong emphasis will be placed on understanding the current controversies surrounding stem cell research.

Student Learning Outcomes (SLO):
At the completion of this course students will be able to:
1. Describe the difference between embryonic, adult and induced pluripotent stem cells and how they differ from fully differentiated cells.
2. Describe the properties and use of stem cells.
3. Gain a knowledge of the intrinsic and extrinsic factors important for stem cell renewal and differentiation.
4. Understand the clinical significance of stem cell research and the possible problems that need to be overcome.
5. **Could discuss the ethical and religious issues associated with embryonic stem cells and stem cell therapy with a global bioethics perspective.**

Textbook: You are not required to buy text book for this course. I will post PDF versions of the materials covered in the course in D2L. You could also download the electronic version of the following books from internet.

1.   **Essentials of Stem Cell Biology**, Second Edition, 2009, Edited by Robert Lanza, M.D., ISBN: 978-0-12-374729-7, Elsevier Inc.

2.   **StemBook**. Open-access collection of original, peer-reviewed chapters covering topics related to stem cell biology. Chapters required for class will be specified in the course

schedule. StemBook can be accessed @ http://www.stembook.org

3. **NIH Stem Cell Information Home Page**. In Stem Cell Information [World Wide Web site]. Bethesda, MD: National Institutes of Health, U.S. Department of Health and Human Services. Available @ https://stemcells.nih.gov/

INSTRUCTION METHOD
This syllabus serves as a recommended framework. It outlines the essential content that we will address throughout this course. The dates provided are tentative and may be altered. Should there be any significant modifications to the syllabus, they will be announced on D2L, and the syllabus will be revised accordingly. It is your responsibility to stay informed about any updates made to the syllabus. Additional subjects and resources may be introduced during lectures or as discussions necessitate.

Quizzes and exams may feature questions based on the material outlined in the syllabus, available on your class page, and covered in lectures. Given that this is a summer course, we will aim to cover at least two chapters each week.

Web-Based Course: The design of this course is based on student reading. Given the vast amount of information in the Stem Cell Biology field, it is not feasible to cover every aspect in a single course. As this is an online graduate-level course, a significant amount of self-directed learning will be necessary, with at least two chapters of reading and related assignments required each week. This implies that you will need to dedicate a substantial amount of time to assimilating the materials presented in this course. I have chosen these chapters to ensure a comprehensive understanding of Stem Cell Biology. PowerPoint presentations, supplementary reading materials, and various activities will be provided to facilitate your learning. Your progress in this course will be assessed through weekly quizzes and two exams. You can track your progress in the D2L Gradebook.

How to Succeed in the Class: For successful course completion, your active and timely participation is essential. As an online class on Stem Cell Biology, I expect that you have a back ground in cell and molecular biology. You must read chapters prescribed for each week and go through additional lecture materials, assignments and activities. From my prior experience, discussing topics via e-mails and online discussions are poor strategies of learning. Therefore, I encourage to clear any questions that you may have during electronic office hours via the "Zoom" feature available in D2L-Brightspace.

How to Succeed in the Class: As an online class on stem cell biology, I expect that you have a back ground in cell and molecular biology. You must read chapters prescribed for each week and go through additional Powerpoint and videos. Watch recordings of the lectures to enhance your understandings or clear any doubts that you may have. **Based on my previous experience, engaging in online discussions and exchanging emails are ineffective methods for online learning. Consequently, if you have any inquiries, I recommend addressing them through a Zoom meeting.**

Since a lot of materials are covered in 5 weeks, you need to spend a considerable amount of time in studying and integrating the materials on your own.

Class Policies:
In an online class students are required to be self learners and self-directed. The fact that you

might be taking several online classes and working full time may put additional pressure on you, but would not be considered as a reason for diluting the rigor of this course. **This class will keep the rigor, time line, and standards of a face-to-face class.**

E-mail and Communication: If you are e-mailing me please use your university e-mail account and put BSC 517, Stem Cell Biology in subject line. If you use an e-mail account without .edu extension, it may end up in my spam folder. During work days, I will respond to e-mails that I receive within 24–48 hrs. Since I check e-mails occasionally on weekends, e-mails received on weekends will be responded on the next working day. Most of the correspondence will be announced on the course homepage, therefore check course homepage as-often-as possible.

Electronic Office Hours: You may access office hours on Tue and Thu 12–1 pm via Zoom. To schedule Zoom meeting, please send an email with 'BSC 517 Stem Cell Biology' in the subject line.

Lecture Materials:
The PowerPoint slides I utilize for my lectures can be found on D2L. However, **I want to emphasize that these slides are intended for my lecture delivery and should not be considered as lecture notes. You may refer to them as a guide while reading the book, but they should not be used as primary study material. Relying solely on the PowerPoint slides for studying may hinder your performance on tests.**

Overview of Assignments:
1) Weekly Quizzes (20% of Total):
After covering each unit, there will be a quiz which needs to be taken online in D2L. Quizzes are due @11.59 PM on every Monday. Each quiz will contain 10 questions and worth of 20 points. **If you miss a quiz or perform poorly, there won't be any makeup quiz.**

Exams and Grades:
There will be two exams, each accounting for 40% of the total grade, including the final. The exam will be divided into two sections: multiple choice and essays/short answers. The questions will assess critical thinking, analytical skills, and comprehension of the subject matter. Thus, grasping the concepts is crucial for success in this course. Make-up exams are not permitted unless you miss an exam due to university-approved emergencies. If a make-up exam is necessary, it will not include any multiple choice questions.

Grading Policy:

Weekly Quizzes	= 100 points (20%)
Exam I	= 50 points (40%)
Final Exam	= 50 points (40%)
Total	**= 200 points**

Grading Scale:
A = ≥90%
B = ≥80%
C = ≥70%

D = ≥58%
F = ≤58%

To calculate where you stand:

Your up to date scores and percentage will be available in the grade book of D2L. Add your 3 exam scores, scores in assignments, and your final score of lab and assignment plus any extra credit points that you have, which will be your total score in 1000. Calculate the percentage. This will be your grade.

Course Calendar and Exam Schedule:

Date	Topics
Week 1	
Unit 1, (July 7–11)	**Introduction to Stem Cells** NIH Stem Cell Primer: https://stemcells.nih.gov/info/basics Definitions, Criteria, and Standards.
Unit 2, (July 7–11)	Embryonic Stem Cells A) PowerPoint presentation & Notes B) Early Development, - Stem Cells Scientific Progress and Future Research Direction.
Week 2	
Unit 3, (July 14–18)	Pluripotency A) StemBook: Cellular and nuclear reprogramming Ch. 1 B) A New Path: Induced Pluripotent Stem Cells- Essentials of Stem Cell Biology
Unit 4, (July 14–18)	Molecular Bases of Pluripotency "Chapter 6: Molecular Basis of Pluripotency" - Essentials of Stem Cell Biology
Week 3	
Unit 5, Week 3 (July 21–25)	Epigenetics and Stem Cells StemBook: Epigenetics Ch. 2 and 3
Unit 6, Week 3 (July 21–25)	Adult Stem Cells and Stem Cell Niches A) StemBook: Renewal Ch. 3 B) Chapter 7: Stem Cell Niches - Essentials of Stem Cell Biology.
Exam I	
Week 4	
Unit 7, (Jul 28–Aug 1)	Hematopoietic Stem Cells A) Chapter 5: Hematopoietic Stem Cells - Stem Cells: Scientific Progress and Future Research Directions.
Unit 8, (July 28–Aug 1)	Stem Cells and Diabetes A) Chapter 7: Stem Cells and Diabetes - Stem Cells:

	Scientific Progress and Future Research Directions. Chapter 35 and 57 from Essential Stem Cell Biology.
Week 5	
Unit 9, Week 5 (Aug 1– Aug 6)	Stem Cells and Tissue Engineering StemBook: Tissue engineering Ch. 1, 2 and 4
Unit 10, Week 5 (Aug 1–Aug 6)	Stem Cells and cancer
Additional Reading	
Unit 11, Throughout the semester	The Stem Cell Debate: Politics, Religion and Ethics A) The Pew Forum on Religion & Public Life Issues: Bioethics. http://pewforum.org/bioethics B) Chapter 67: Stem Cell Research, Religious Consideration. Essential Stem Cell Biology. PDF article in Doc Sharing.
Final Exam	

ALL DATES AND ASSIGNMENTS ARE TENTATIVE AND MAY SUBJECT TO CHANGE

<u>**Sample Study Week:**</u>

Step 1–Download lecture slides and supporting materials from D2L.

Step 2–**Critically** read chapters and supporting materials, make notes (*simply going through the materials are not going to be enough, focus on concepts, molecular mechanisms etc..*)

Step 3–Complete assignments and upload into D2L by due date.

Step 4–Review materials and your notes and participate in officer hours to clear any questions that you may have.

Step 5–Take online quizzes in D2L when they are due.

Step 6–Review again before the test due date and take online tests.

Academic Integrity: A Texas A&M University-Commerce student does not lie, cheat, steal, and does not tolerate those who do. A violation of the Texas A&M honor code and academic integrity involves any of the following offenses: cheating, fabrication, falsification, multiple submissions, plagiarism, and complicity in any of these offenses. The first instance of cheating will results in "ZERO" on the exam and/or on the assignment. The second instance of cheating will results in "ZERO" on the course. Cheating involves copying information from another student, non-allowable materials or source and plagiarism. Once again, violations of academic integrity will not be tolerated. This class will be conducted in strict observance of the Honor Code. Refer to your Student Handbook for details.

Conduct Policy: All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. (See Student's

Guide Handbook, Policies and Procedures, Conduct).

Behavior: *All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment." (See Student's Guide Handbook, Policies and Procedures, Conduct).*
http://www.tamuc.edu/academics/universityCollege/successCoaches/default.aspx

Plagiarism: Plagiarism is a criminal activity. You must cite all sources of information. Unreferenced and non-paraphrased copying of material, whether parts of sentences, whole sentences, paragraphs, or entire articles can result in a score of zero for your assignment and may result in further disciplinary action.

Piracy: *Materials provided in this course including lecture slides are copy righted and must not share them without obtaining permission.*

Students with Disabilities/Reasonable Accommodation: *The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact: Office of Student Disability Resources and Services, Texas A&M University-Commerce*
Gee Library, Room 132
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
StudentDisabilityServices@tamuc.edu

If you have not taken a course in e-College before, please use the tutorial provided for students in D2L. It will save you a lot of time and frustration and a lot faster than trial and error.

ACCESS AND NAVIGATION

D2L Brightspace Access and Log in Information

This course will be facilitated using D2L Brightspace, the learning management system used by Texas A&M University-Commerce. To get started with the course, go to myLeo and from App window select MyLeoOnline (D2L Brightspace) App. From home menu choose your course.

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu.

Note: It is strongly recommended you perform a "Browser Test" prior to the start of your course.

TECHNOLOGY REQUIREMENTS

Browser support

D2L is committed to performing key application testing when new browser versions are released. New and updated functionality is also tested against the latest version of supported browsers. However, due to the frequency of some browser releases, D2L cannot guarantee that each browser version will perform as expected. If you encounter any issues with any of the browser versions listed in the tables below, contact D2L Support, who will determine the best course of action for resolution. Reported issues are prioritized by supported browsers and then maintenance browsers.

Supported browsers are the latest or most recent browser versions that are tested against new versions of D2L products. Customers can report problems and receive support for issues. For an optimal experience, D2L recommends using supported browsers with D2L products.

Maintenance browsers are older browser versions that are not tested extensively against new versions of D2L products. Customers can still report problems and receive support for critical issues; however, D2L does not guarantee all issues will be addressed. A maintenance browser becomes officially unsupported after one year.

Note the following:

Ensure that your browser has JavaScript and Cookies enabled.
For desktop systems, you must have Adobe Flash Player 10.1 or greater.
The Brightspace Support features are now optimized for production environments when using the Google Chrome browser, Apple Safari browser, Microsoft Edge browser, Microsoft Internet Explorer browser, and Mozilla Firefox browsers.

Desktop Support

Browser	Supported Browser Version(s)	Maintenance Browser Version(s)
Microsoft® Edge	Latest	N/A
Microsoft® Internet Explorer®	N/A	11
Mozilla® Firefox®	Latest, ESR	N/A
Google® Chrome™	Latest	N/A
Apple® Safari®	Latest	N/A

Tablet and Mobile Support

Device	Operating System	Browser	Supported Browser Version(s)
Android™	Android 4.4+	Chrome	Latest
Apple	iOS®	Safari, Chrome	The current major version of iOS (the latest minor or **point** release of that major version) and the previous major version of iOS (the latest minor or **point** release of that major version). For example, as of June 7, 2017, D2Lsupports iOS 10.3.2 and iOS 9.3.5, but not iOS 10.2.1, 9.0.2, or any other version. Chrome: Latest version for the iOS browser.
Windows	Windows 10	Edge, Chrome, Firefox	Latest of all browsers, and Firefox ESR.

- You will need regular access to a computer with a broadband Internet connection. The minimum computer requirements are:
    - 512 MB of RAM, 1 GB or more preferred
    - Broadband connection required courses are heavily video intensive
    - Video display capable of high-color 16-bit display 1024 x 768 or higher resolution

- You must have a:
    - Sound card, which is usually integrated into your desktop or laptop computer
    - Speakers or headphones.
    - *For courses utilizing video-conferencing tools and/or an online proctoring solution, a webcam and microphone are required.

- Both versions of Java (32 bit and 64 bit) must be installed and up to date on your machine. At a minimum Java 7, update 51, is required to support the learning management system. The most current version of Java can be downloaded at: JAVA web site http://www.java.com/en/download/manual.jsp

- Current anti-virus software must be installed and kept up to date.

Running the browser check will ensure your internet browser is supported.
    Pop-ups are allowed.
    JavaScript is enabled.

Cookies are enabled.

- You will need some additional free software (plug-ins) for enhanced web browsing. Ensure that you download the free versions of the following software:
  - Adobe Reader https://get.adobe.com/reader/
  - Adobe Flash Player *(version 17 or later)* https://get.adobe.com/flashplayer/
  - Adobe Shockwave Player https://get.adobe.com/shockwave/
  - Apple Quick Time http://www.apple.com/quicktime/download/

- At a minimum, you must have Microsoft Office 2013, 2010, 2007 or Open Office. Microsoft Office is the standard office productivity software utilized by faculty, students, and staff. Microsoft Word is the standard word processing software, Microsoft Excel is the standard spreadsheet software, and Microsoft PowerPoint is the standard presentation software. Copying and pasting, along with attaching/uploading documents for assignment submission, will also be required. If you do not have Microsoft Office, you can check with the bookstore to see if they have any student copies.

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu**.**

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

Brightspace Support

Need Help?

Student Support

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778 or click on the **Live Chat** or click on the words "click here" to submit an issue via email.

System Maintenance

Please note that on the 4th Sunday of each month there will be System Maintenance which means the system will not be available 12 pm-6 am CST.

COMMUNICATION AND SUPPORT

All e-mail received during normal business hours will be replied within 48 hrs and e-mails received during weekends will be responded on the following Monday.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

University Specific Procedures

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the Student Guidebook.
http://www.tamuc.edu/admissions/registrar/documents/studentGuidebook.pdf

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: Netiquette
http://www.albion.com/netiquette/corerules.html

TAMUC Attendance

For more information about the attendance policy please visit the Attendance webpage and Procedure 13.99.99.R0.01.
http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedur es/13students/academic/13.99.99.R0.01.pdf

Academic Integrity

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

Undergraduate Academic Dishonesty 13.99.99.R0.03

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedur es/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf

Graduate Student Academic Dishonesty 13.99.99.R0.10

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf

Use of Artificial Intelligence, Open AI, Chat GPT, Chat Bot Software Statement

Texas A&M University-Commerce acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. **If no instructions are provided the student should assume that the use of such software is disallowed.**

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources.

13.99.99.R0.03 Undergraduate Academic Dishonesty

https://inside.tamuc.edu/aboutus/policiesproceduresstandardsstatements/rulesprocedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf

13.99.99.R0.10 Graduate Student Academic Dishonesty

https://inside.tamuc.edu/aboutus/policiesproceduresstandardsstatements/rulesprocedures/13students/graduate/13.99.99.R0.10.pdf

Students with Disabilities

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services

Texas A&M University-Commerce Gee Library- Room 132

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

Email: Rebecca.Tuerk@tamuc.edu

Website: Office of Student Disability Resources and Services

http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServ ices/

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun.

Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the Carrying Concealed Handguns On Campus document and/or consult your event organizer.

Web url: http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedur es/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M- Commerce campuses. Report violations to the University Police Department at 903- 886-5868 or 9-1-1.