BSC 517, Stem Cell Biology (CRN: 82900)
Fall, 2015

Instructor: Dr. Venu Cheriyath
Office: Science Building, STC 261.
Phone: 903-468-6064
Email: venu.cheriyath@tamuc.edu
Web page: http://faculty.tamuc.edu/vcheriyath/
eCompanion Site: eCollege @ MyLeo

Lectures: Tues and Thu @ 11 – 12.15 PM in AGIT233
Electronic Office hours: Tue, Thu & Fri 4 – 5 PM

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 issues associated with embryonic stem cells and stem cell therapy with a global bioethics perspective. (G)

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 eCollege. You could also download the electronic version of the following books from internet.

7. 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


Class Policies:

Attendance & Participation (50 points):

I expect your attendance in ALL classes. Since this class follows active learning principles, your active participation is required in this course. You will work both in groups and individually during and after the class to complete various assignments. You may earn up to 15 extra credit points for not making more than 3 unexcused absences and 35 extra credits for active class participation. Attendance would be taken in the beginning of every class and if you are 5 min late for a class that would be counted as absence towards attendance credit. You are responsible for all material and assignments covered in class whether you are present or not. Additionally, during each lecture you will be given several opportunities to respond to questions and participate in discussions.

Lecture Materials:

Power Point slides that I use for delivering lectures will be available at eCollege, the ecompanion site for this course. However, I would like to stress the point that Power Point slides are meant for me to deliver lectures and not be treated as lecture notes. You may use it as a reference or guide to read the book but not as study material. If you just use the PowerPoint slides for study, you may not perform good in tests.

Overview of Assignments:
1) Weekly Quizzes (100 points of total):
After covering each chapter, there will be a quiz which needs to be taken online in eCollege. Quizzes are due @11.59 PM on every Monday. Each quiz will contain 10 questions and worth of 10 points. If you miss a quiz, there won’t be any makeup quiz.

3) Stem Cell Research Debate (100 points): Towards the end of the course, two debate sessions will be held to discuss the bioethics of stem cell research. In these debates you are required to provide a global perspective on stem cell research. One debate will be on the ethics and guidelines of Stem Cell Research and the second session will be on the political and religious viewpoints of Stem Cell Research. You are required work in groups for these debate sessions and are required to take either “affirmative” or “negative” stand irrespective of your political, and/or religious viewpoint. For active participation and presentation of debates you will
receive 50 points and 50 points will be awarded for written summary. One fourth of the presentation score (12.5 points) will be determined by the audience and 3/4th of the score (37.5 points) will be determined by me. Considering this is a global course, other faculty, staff, and students may be present during debate.

**Exams and Grades:**
There will be three exams (200 points each) throughout the term and a cumulative final exam (200 points). The exam will consist of three parts, multiple choice (50% of the total score), essays/short answers/comprehension (50% of total scores) and bonus questions (for 10% of total score). Exam questions will test critical thinking, analytical ability, and the understanding of subject matter, and concepts. Therefore, it is important to understand concepts and apply them to perform well in this course.

**Grading Policy:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 exams including the final</td>
<td>800</td>
</tr>
<tr>
<td>Assignments</td>
<td>100</td>
</tr>
<tr>
<td>Weekly Quizzes</td>
<td>100</td>
</tr>
<tr>
<td>Debate</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1000</strong></td>
</tr>
</tbody>
</table>

**Grading Scale:**
A = 900 to 1000 points (>90%)
B = 800 to 899 points (>80%)
C = 700 to 799 points (>70%)
D = 580 to 699 points (>58%)
F = 579 or fewer (<58%)

**To calculate where you stand:**
Your up to date scores and percentage will be available in the grade book of eCollege. 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:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
</table>
| Unit 1, Week 1 (Aug 31 – Sept 4) | Introduction to Stem Cells  
NIH Stem Cell Primer -  
http://stemcells.nih.gov/info/basics/basics1.asp  
Stemness”: Definitions, Criteria, and Standards. |
| Unit 2, Weeks 2 (Sept 7 - 11) | Embryonic Stem Cells  
A) PowerPoint presentation & Notes |
<table>
<thead>
<tr>
<th>Units</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B) Early Development, - Stem Cells Scientific Progress and Future Research Direction.</strong></td>
<td></td>
</tr>
</tbody>
</table>
| **Unit 3, Week 3 & 4 (Sept 14 - 18)** | Pluripotency  
A) StemBook: Cellular and nuclear reprogramming Ch. 1  
B) A New Path: Induced Pluripotent Stem Cells - Essentials of Stem Cell Biology |
| **Exam I, September 22 - Units 1, 2, and 3** | Molecular Bases of Pluripotency  
"Chapter 6: Molecular Basis of Pluripotency" - Essentials of Stem Cell Biology |
| **Unit 4, Week 5 & 6 (Sept 21 – Oct 2)** | Epigenetics and Stem Cells  
StemBook: Epigenetics Ch. 2 and 3 |
| **Unit 5, Week 7 (Oct 5 - Oct 9)** | Adult Stem Cells and Stem Cell Niches  
A) StemBook: Renewal Ch. 3  
B) Chapter 7: Stem Cell Niches - Essentials of Stem Cell Biology. |
| **Exam II, October 20 - Units 4, 5, and 6** | Hematopoietic Stem Cells  
A) Chapter 5: Hematopoietic Stem Cells - Stem Cells: Scientific Progress and Future Research Directions. |
| **Unit 7, Weeks 9 (Oct 19 - Oct 29)** | 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. |
| **Unit 8, Weeks 10 (Nov 2 - Nov 6)** | Stem Cells and Tissue Engineering  
StemBook: Tissue engineering Ch. 1, 2 and 4 |
| **Exam III, Nov 17 - Units 7, 8, and 9** | Stem Cells and cancer |
| **Unit 9, Week 11 (Nov 9 - Nov 13)** | The Stem Cell Debate: Politics, Religion and Ethics  
[http://pewforum.org/bioethics](http://pewforum.org/bioethics)  
B) Chapter 67: Stem Cell Research, Religious Consideration.  
Essential Stem Cell Biology. PDF article in Doc Sharing. |
| **Dec 15th, Final Exam** | **★ ALL DATES AND ASSIGNMENTS ARE TENTATIVE AND MAY SUBJECT TO CHANGE** |
| **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 result in "ZERO" on the exam and/or on the assignment. The second instance of cheating will result 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 Students’ Guide Handbook, Policies and Procedures, Conduct).

Cell Phones/Pagers/Laptop/Tablets:
Please turn your cell phone and/or pager (and other electronic devices) off during class. If you are on-call for your work, please place the cell phone or pager on silent or vibration mode. Electronic devices are strictly prohibited in lab.
If you utilize a laptop to take class notes, please be aware of potentially distracting others around you and seat yourself accordingly. Additionally, you may be asked to leave the class if it is determined you are utilizing a computer or electronic device to do outside work, surf the web inappropriately or communicate personal conversations. Texting is prohibited and devices will be collected and kept until the end of class.
All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment (See Students’ Guide Handbook, Policies and Procedures).

Tapes and Notes:
While recordings of this class may be made for personal use with prior permission, recordings may not be sold or distributed to others. While you may make copies of these notes for your personal use, no copy of these notes may be distributed to anyone other than persons who are currently enrolled in the class; nor may any copies be sold.

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
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).

Plagiarism: Plagiarism is a criminal activity. You must cite all sources of information. Unreferenced 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.

Early Intervention for First Year Students: Early intervention for freshmen is designed to communicate the University's interest in their success and a willingness to participate fully to help students accomplish their academic objectives. The university through faculty advisors and mentors will assist students who may be experiencing difficulty to focus on improvement and course completion. This process will allow students to be knowledgeable about their academic progress early in the semester and will provide faculty and staff with useful data for assisting students and enhancing retention. Grade reports will be mailed by the end of the sixth week of the semester.