PHGY 518
ARTIFICIAL CELLS
Fall 2019
(3 Credits)

Time: **Tuesdays** from **4:05 p.m. – 5:55 p.m.**

Location: **McIntyre Medical Sciences Building, Room 1027**

Course supervisor: Professor T.M.S.Chang (artcell.med@mcgill.ca)
Course co-supervisor: Professor Satya Prakash (satya.prakash@mcgill.ca)
Course Secretary: Ms. Jennifer Rondeau (undergrad1.physiology@mcgill.ca)

DATE	TIME	TOPIC	LECTURER
Sept. 3	4-6pm	Artificial Cells: Principles & Examples	Dr. T.M.S Chang
Sept. 10	4-6 pm	Artificial Cells: Nanobiotechnology of Blood Substitutes	Dr. T.M.S Chang
Sept. 17	4-6 pm	Artificial Cells: Enzyme, Cell & Stem Cell Therapy	Dr. T.M.S Chang
Sept. 24	4-6 pm	Artificial Cell Probiotics	Dr. S. Prakash
Oct. 1	4-6 pm	Artificial Cells Islets Diabetes	Dr. C. Hoesli
Oct. 8	4-6 pm	Stem Cells: Cardiovascular Tissue Engineering	Dr. D. Shum-Tim
Oct. 15	4-6 pm	Dialysis	Dr. P. Barre

SEMINAR: ***Two-hour sessions below related to examples of ARTIFICIAL CELLS: for Nanomedicine, Nanobiotechnology, Regenerative Medicine, Cell and Stem Cell Therapy, Enzyme Therapy and other areas.***

Oct 22	4-6 pm	Seminar:	Dr. T.M.S Chang
Oct. 29	4-6 pm	Seminar:	Dr. T.M.S Chang
Nov. 5	4-6 pm	Seminar:	Dr. T.M.S Chang

*****Nov. 5: Deadline for Term Paper submission as an email attachment to Dr. T.M.S. Chang*****

Nov. 12	4-6 pm	Seminar:	Dr. S. Prakash
Nov. 19	4-6 pm	Seminar:	Dr. S. Prakash
Nov. 26	4-6 pm	Seminar:	Dr. S. Prakash

McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/students/srr/honest/ for more information).

In accord with McGill University's Charter of Students' Rights, students have the right to submit in English or in French any written work that is to be graded (except in courses where knowledge of a language is one of the objectives of the course).

In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.

ARTIFICIAL CELLS: AN ADVANCED COURSE PHGY 518
INFORMATION AND REQUIREMENTS

(*Summarized at the beginning of class and details posted on www.artcell.mcgill.ca*)

This information can be found on: www.medicine.mcgill.ca/artcell under "Teaching" click on subheading "artificial cells". Please check this link frequently for updates including seminar assignments and term paper assignments.

PLANS FOR THIS ADVANCED COURSE (see timetable of schedule):

This advanced course is to give the class an overview of this large interdisciplinary area. It will start with reading and lectures to give students sufficient basic background. After this, the students will be able to learn how to obtain up-to-date materials on their own (online and the library).

(1) As an introduction to this course, the class starts by reading related material on this topic from the website www.medicine.mcgill.ca/artcell on Sept 8. This includes the first chapter of the 2007 book on the website and also other material on this website that are of a general nature written for the public.

(2) The 5 two-hour lectures on Artificial Cells are more advanced and they will introduce the class to the basic advanced principles of Artificial Cells.

(3) The 2 two-hour lectures on important related areas will be each by specialists from McGill's teaching hospital.

(4) **Seminars on Artificial Cells:** These are detailed presentations of the different aspects of Artificial Cells that follow the 5 two-hours of lectures on Artificial Cells. A total of 6 Two-hour sessions relate to examples of ARTIFICIAL CELLS for Nanomedicine, Nanobiotechnology, Regenerative Medicine, Cell and Stem Cell Therapy, Enzyme Therapy and other areas. The material for these seminars will come from chapters in the 2007 book on Artificial Cells plus updated information of material in the period of 2008-2015.

(5) **Term Paper:** Each student will be assigned a term paper on topics related to Artificial Cells. The term paper should include:

   (1) Introduction and historical review;

   (2) Recent research based on lecture material, 2007 books, www.medicine.mcgill.ca/artcell website PLUS summary of 5 key papers on the assigned topic published between 2008-2015 ***Students should select these independently on his/her own***.

   (3) General discussions, conclusions and future research based on your own views of (1) and (2) above.

REQUIREMENTS FOR THIS ADVANCED COURSE:

You are responsible for knowing the following material:

(1) Lecture materials;
(2) Sections on 2007 book on Artificial Cells assigned for all the seminars;
(3) Related details on the website www.medicine.mcgill.ca/artcell It is the key reference source for Artificial Cells around the world. A search on Google.com (not .ca) for "Artificial Cells" on July 1, 2013 showed that this site is ranked third among millions of hits on this topic. *Wikipedia encyclopedia ranks first and cited McGill (Chang) as the inventor of Artificial Cells.*

This is an advanced course on the basic principles and recent advances in the area of Artificial Cells. Based on students' feedback, the major problem faced by previous classes is that this is a highly interdisciplinary area. As a result, it is difficult for anyone to gather all the background information needed for this course. There is now a 454 page 2007 monograph by TMS Chang on "ARTIFICIAL CELLS: Biotechnology, Nanomedicine, Regenerative Medicine, Blood Substitutes, Bioencapsulation and Cell/Stem Cell Therapy".

This is published by the World Science Publisher/Imperial College Press (*The official publisher of Nobel Prize Award Lectures from 1921 to now*).

The publisher has given the author the right to place this book on his website for all to read without cost starting April 2010. The author has also donated 4 copies of this book on the reserve shelf in the McIntyre Medical Sciences Library for the class. The publisher has published both a hard-cover and a lower cost soft-cover form of the book. The later may still be available at the McGill Bookstore.

EVALUATION TO BE USED IN THIS ADVANCED COURSE*:*

(1) **Term paper (40%):**

Students will be assigned a term paper on topics related to Artificial Cells. The term paper should not be more than **10 pages single space and 12 font (*figures, references or tables should not be included in the page count)*** and should include:

(1) Introduction and historical review **(10%)**;

(2) Recent research results based on lecture material, 2007 books, www.medicine.mcgill.ca/artcell website PLUS summary of 5 key papers on the assigned topic published between 2008-2015 that the student should select independently on his/her own **(20%)**.
(You can find these key papers by searching the website including www.medicine.mcgill.ca/artcell, *the journal of "Artificial cells, Nanomedicine and Biotechnology" that is available online at McGill, and other journals like Nature Medicine, Nature Biotechnology etc.*);

(3) General discussions, conclusions and future research **(10%)** based on your own views of (1) and (2) above.

The deadline for submission to Professor TMS Chang artcell.med@mcgill.ca as an e-mail attachment (maximal size of 1 megabyte) is November 5, 2019.

(2) **Participation and answer to questions by the rest of the class during seminar presentations (20%):**

Attendance, participation, discussion and answer to questions in all the seminars will account for the 20%.

(3) **Based on Seminar Presentation (40%)**:

Topics will be assigned at a later date. Each presentation will start with a summary of background from the 2007 followed by the presentation and discussion of 3 key papers on the assigned topic – published between 2008-2015. Grades will be based on presentation and answers to questions related to the assigned material for the seminar presentation. The time allotted for the actual presentation is 15 min. Please keep to this time. This will be followed by questions by the professor to the presenter and the class followed by open discussion by the whole class.

Seminar and Term Paper Assignments will be given at a later date
Check www.medicine.mcgill.ca/artcell frequently for updates on this and other matters related to this course