**COURSE SYLLABUS**

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| **Subject: Stem Cell and Regenerative Medicine** | **Academic field: Biology** |
| **Lecturers:** **Dr. Narisorn Kitiyanant (NK)****Dr. Patompon Wongtrakoongate (PW)** |  |
| **Phone:**  | **E-mail:** **narisorn.kit@mahidol.ac.th** **(Dr. Narisorn Kitiyanant)****patompon.won@mahidol.ac.th** **(Dr. Patompon Wongtrakoongate)** |
| **Academic year:** 2016-2017 (for B3) |  |

**COURSE DESCRIPTION**

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| **Credit points** | 3 |
| **Level** | Undergraduate |
| **Teaching time** **Location** | University of Science and Technology of Hanoi |
| **Time Commitment** | Lecture | 27 hrs |
| Exercises | 06 hrs |
| Practicals | 07 hrs |
| Total | 40 hrs |
| **Prerequisites** | NO |
| **Recommended background knowledge** | Molecular and Cell Biology |
| **Subject description:** |  Stem cells have been proven to hold great promises for modeling human development and diseases, for drug discovery and toxicological test and for regenerative medicine. Understanding how stem cells maintain their property and give rise to functionally mature cells is therefore essential toward those applications. This course provides graduate students the historical perspective of stem cell research and development; basic aspects of stem cell fates, key characteristics of self-renewal and differentiation potential; cellular reprogramming to change one cell type to another; cancer counterparts of stem cells; various types of adult stem cells of the three germ layers and pluripotent stem cells; and the potential of their biomedical application.During the course students will learn also the technique of reading, oral presentation and discussion of original scientific articles in the domain of stem cell biology and technology.The obtained results will allow students to accumulate the knowledge and skills to follow the advanced master course in the further stage.  |
| **Objectives & Out-come** | *(Knowledge &/ Skills gained via the course)* |
| **Assessment/ Evaluation** | Attendance/Attitude | 10% |
| Exercise(s) | 20% |
| Practicals | 20% |
| Mid-term test | NA |
| Final exam | 50% |
| **Prescribed Textbook(s)** | **Essentials of Stem Cell Biology**, Second Edition (2009) Edited by Lanza R, Gearhart J, Hogan B, Melton D, Pedersen R, Thomas D, Thomson J and Wilmut I. Elsevier Inc. |

**COURSE CONTENTS & SCHEDULE**

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| --- | --- | --- | --- | --- |
| **Class**  | **Contents** | **Hours** | **Ref./Resources** | **Assignment(s)**  |
| **Lect.** | **Exr.** | **Prc.** |
|  | **Section 1-Lectures, 27 hours****Regulation of Stem Cell Fates**1) Self-Renewal vs. Differentiation 2) Stem Cell Metabolism 3) Cellular Reprogramming4) Cancer Stem Cells**Adult and Pluripotent Stem Cells**5) Neural Stem Cells6) Hematopoietic Stem Cells7) Mesenchymal Stem Cells8) Stem Cells of the Endoderm9) Embryonic and Induced Pluripotent Stem Cells | 27 |  |  |  |  |
|  | **Section2- Reading, oral presentation and discussion, 6 hours**1. Critical reading, oral presentation and discussion of original scientific papers on regulation of stem cell fates
2. Critical reading, oral presentation and discussion of original scientific papers on adult and pluripotent stem cells
 |  | 6 |  |  |  |
|  | **Section 3- Laboratory practical works, 7 hours**Laboratory Practical work: 1. Culture and maintenance of human pluripotent embryonal carcinoma stem cells
2. Characterizations of human pluripotent embryonal carcinoma stem cells
 |  |  | 7 |  |  |

*Notes:*

* *Abbreviation: Lect. (lecture), Exr. (Exercise), Prc. (Practise).*
* *Exercises may include assignment, reports, student’s presentation, homework, class exercises ...for each class sessions*
* *Practicals mostly refer to Lab- work or outside practice such as field trip.*

**Stem Cell and Regenerative Medicine Schedule for the First Semester, Year 2016**

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| **Date** | **Time** | **Topic** | **Room** | **Lecturer** |
| 1 Dec 16 | 9.00-9.10 | Course Orientation |  | PW |
|  |  | **Regulation of Stem Cell Fates** |  |  |
| 1 Dec 16 | 9.10-12.00 | L1: Self-Renewal vs. Differentiation |  | PW |
| 1 Dec 16 | 13.00-16.00 | L2: Stem Cell Metabolism |  | PW |
| 2 Dec 16 | 9.00-12.00 | L3: Cellular Reprogramming |  | PW |
| 2 Dec 16 | 13.00-16.00 | L4: Cancer Stem Cells |  | PW |
|  |  | **Adult and Pluripotent Stem Cells** |  |  |
| 5 Dec 16 | 9.00-12.00 | L5: Neural Stem Cells |  | NK |
| 5 Dec 16 | 13.00-16.00 | L6: Hematopoietic Stem Cells |  | NK |
| 6 Dec 16 | 9.00-12.00 | L7: Mesenchymal Stem Cells |  | NK |
| 6 Dec 16 | 13.00-16.00 | L8: Stem Cells of the Endoderm |  | NK |
| 7 Dec 16 | 9.00-12.00 | L9: Embryonic and Induced Pluripotent Stem Cells |  | PW |
| 8 Dec 16 | 9.00-12.00 | E1: Paper presentation and discussion: Regulation of Stem Cell Fates |  | PW |
| 8 Dec 16 | 13.00-16.00 | E2: Paper presentation and discussion: Adult and Pluripotent Stem Cells |  | NK |
| 9 Dec 16 | 8.30-12.00 | P1.1: Stem Cell Culture and Maintenance (Gr. 1) |  | PW |
| 9 Dec 16 | 13.00-16.30 | P1.2: Stem Cell Culture and Maintenance (Gr. 2) |  | NK |
| 12 Dec 16  | 8.30-12.00 | P1.3: Stem Cell Culture and Maintenance (Gr. 3) |  | PW |
| 12 Dec 16 | 13.00-16.30 | P1.4: Stem Cell Culture and Maintenance (Gr. 4) |  | NK |
| 13 Dec 16 | 8.30-12.00 | P2.1: Stem Cell Characterization (Gr. 1) |  | PW |
| 13 Dec 16 | 13.00-16.30 | P2.2: Stem Cell Characterization (Gr. 2) |  | NK |
| 14 Dec 16 | 8.30-12.00 | P2.3: Stem Cell Characterization (Gr. 3) |  | PW |
| 14 Dec 16 | 13.00-16.30 | P2.4: Stem Cell Characterization (Gr. 4) |  | NK |
| 15 Dec 16 |  | **EXAM** |  |  |

**Lecture: 27 hr**

**Exercise: 6 hr**

**Practice: 28 hr**