

## **Course: Current Enigmas in Memory Research**

### **Contact Information**

Course Directors: Yadin Dudai, Cristina Alberini  
Office location; Brown Building 951  
Phone: 212-998-7721  
E-mail: [ca@nyu.edu](mailto:ca@nyu.edu)

### **Teaching Assistant**

Office: TBD  
Phone: TBD  
E-mail: TBD

### **Course Information**

Semester & year: Spring 2014  
Meeting days & time: Once/week, 2 hours, **WEDNESDAY**, Time **2-4 pm**  
Course location: Meyer 815

### **Course Description**

**New York University, Neuroscience Graduate Program: “ Current Enigmas in Memory Research”**

#### **Description:**

This lecture course will discuss important enigmas in research on learning and memory. The enigmas will touch various subfields including molecular and cellular mechanisms, circuit, systems, neuroanatomy, theory and models. Several systems in which learning and memory is studied will be included, ranging from invertebrates, including *Aplysia* and *Drosophila*, to mammals, including rodents, primates and human. Recent findings in the field will also be related to diseases of learning and memory.

#### **Format:**

**The format of this course is specifically designed, in alternate classes, to expose students to leaders in the field of learning and memory who will present a selected enigma that relates to their work. In each preceding class, the students will receive by the instructor an introduction to the topic, its history and development and debated issues. In addition, an extensive discussion on specific questions will be conducted. Hence, the students will be prepared in advance to ask questions and interact with each invited speaker.**

#### **Background Preparation (Prerequisites)**

A general undergraduate level introduction to neuroscience, genetics, molecular biology, and behavior is required.

#### **Texts and Journals References**

1. Squire, L. Memory and Brain. Oxford University Press, 1987. (selected chapters will be assigned as background reading for some lectures).
2. Squire, L. and Kandel, E. Memory: From Mind to Molecules. Scientific American Library, 2000 (selected chapters will be assigned as background reading for some lectures).

3. Dudai Y. Memory from A to Z. Keywords, Concepts and Beyond. Oxford University Press, Oxford, 2002, (Selected chapters will be assigned as background reading for the different lectures).

4. Schacter, D. L. The Seven Sins of Memory: How the Mind Forgets and Remembers. Houghton Mifflin Co, 2001.

5. Luria, A. R. The Mind of a Mnemonist. Harvard University Press, 1968.

6. Bear, M., Connors, B. W., and Paradiso, M. A. Neuroscience: Exploring the Brain. Lippincott Williams & Wilkins, 3rd Edition.

7. Mechanisms of Memory, 2nd Edition, Print Book, Author(S) : J Sweatt Published: 23 Nov 2009 Imprint: Academic Press

In addition, 1-3 research papers will be discussed and assigned as reading for each lecture.

### **Course Learning Outcomes**

By the end of the course students will:

1. Have knowledge of the history of research in the learning and memory field that has led to the current state of the art.
2. Gained knowledge of different approaches to research in learning and memory
3. Understand general concepts of learning and memory
4. Be able to critically analyze papers in the literature of learning and memory
5. Conduct critical analysis of contemporary basic research in learning and memory
6. Discuss essential concepts of learning and memory

### **Course Requirements & Assignments**

Attendance:

Attendance is mandatory. Three or more unexcused absences will result in a grade of "F" for the course.

Assignments:

Readings from the books listed for background information and from research papers in the current literature will be assigned for each class. Successful completion of a final exam is required.

### **Grading**

Final grades will be weighted accordingly: The majority of a student's grade will be determined by three factors: (i) preparation for class, (ii) engagement and participation in discussions, and (iii) the final exam. Grading of the exams will be based on the student's general understanding of the subject matter as determined by answers to short-answer and essay questions. Class participation will be evaluated on the quality and quantity of participation in classroom discussions.

| <b>Letter Grade</b> | <b>Grade Point</b> | <b>Description</b>  | <b>Learning Outcome</b> |
|---------------------|--------------------|---|-------------------------|
| A                   | 4.0                | Superior achievement  | Exemplary               |
| B                   | 3.0                | Satisfactorily demonstrated ability in the field of study           | Proficient              |
| C                   | 2.0                | Below average, work not at level expected of a CNS graduate student | Developing              |

|   |     |                |      |
|---|-----|----------------|------|
| F | 0.0 | Not acceptable | Fail |
|---|-----|----------------|------|

### Class format

Each 120 min class will consist of a lecture from a faculty member for approximately 75 min. The last 45 min will be used to discuss and highlight one or more recent research papers that contribute important and recent information to the topic under discussion. Lectures will be accompanied by slide presentations (PowerPoint) assembled by the lecturer.

### Class Schedule

The following is a tentative schedule subject to modifications for the course beginning in Spring of 2014.

| Class Session | Date  | Instructor | Topic   |
|---------------|-------|------------|---|
|               |       |            |   |
| 1             | 01/29 | CA/YD      | Introduction to Course  |
| 2             | 02/05 | CA/YD      |   |
| 3             | 02/12 | Carew      | Using a simple system to explore a complex question: The role of pattern formation and growth factor signaling in memory formation in Aplysia |
| 4             | 02/19 | Klann      | What's good and bad about using rodents to model human memory and clinical questions?   |
| 5             | 02/26 | CA/YD      |   |
| 6             | 03/05 | LeDoux     | The Role of Conscious States in Learning: From the Law of Effect and Morgan's Cannon to Contemporary Research on Fear and Reward"             |
| 7             | 03/12 | CA/YD      |   |
| 8             | 03/26 | Dudai      | Is there a beginning and an end to memory?  |
| 9             | 04/02 | CA/YD      |   |

|    |       |          |                              |
|----|-------|----------|------------------------------|
| 10 | 04/09 | Alberini | Unconscious memories?        |
| 11 | 04/16 | CA/YD    |                              |
| 12 | 04/23 | Davachi  | Are memories ever forgotten? |
| 13 | 04/30 | CA/YD    |                              |
| 14 | 05/07 | Suzuki   | What is declarative memory?  |
| 15 | 05/14 | CA/YD    | Exam                         |

### Instructors

Yadin Dudai Center for Neural Science, New York University, yd5@nyu.edu Cristina

Alberini: Center for Neural Science, New York University, ca60@nyu.edu