IND-1369A: Neuroplasticity
Course Syllabus

- **Instructor: Dr. Maryam Torbati**
- **Number of Credits/Units: 3 Semester Credits/Units**
- **Format: Online Self-Paced Course**

Course Overview (for catalog/online and Syllabi):
Discover & explore the adaptive power of the brain to meet learning challenges. Learn the characteristics of Neuroplasticity and its role in learning. Be introduced to scientific research, instructional methods and classroom activities that apply the principles of Neuroplasticity to everyday learning and improving student achievement. Apply your new knowledge of Neuroplasticity to meeting CCSS.

Required Text: ***Soft-Wired: How the New Science of Brain Plasticity Can Change Your Life*** by Dr. Michael Merzenich Amazon eBook Download pdf

Background:

Neuroplasticity refers to the brain's ability to adapt. According to Harvard University, "Our brains are truly extraordinary; unlike computers, which are built to certain specifications and receive software updates periodically; our brains can actually receive hardware updates in addition to software updates. Different pathways form and fall dormant are created and are discarded, according to our experiences". Finland teaches the topic & stages of it to their k-12 students

How do all these terms fit together?

You may have heard that the brain is plastic, as you well know. Our brain is not made of plastic…, or brain plasticity, refers to the brain's ability to CHANGE throughout life. The human brain has the amazing ability to reorganize itself by forming new connections between brain cells (neurons).

In addition to genetic factors, the environment in which a person lives, as well as the actions of each person, plays a significant role in plasticity.

How does this course help teachers & their students? "When the senses are stimulated, the brain turns that data into information. As the neurons (the basic cell of the brain) get activated, neuroplasticity allows for new neural pathways to be formed. This encoding process requires activation of prior knowledge.

"Neuroimaging research supported by cognitive testing reveals that the most successful construction of working (short-term) memory takes place when there has been activation of the brain's prior knowledge before the new information is taught" (Willis, 2012). In conclusion learning about the topic helps teachers to discuss how our brain changes by learning & also helps the students by understanding we can never be stuck with the mindset of can-not do.

Course Objectives: This course will give you opportunity to learn:

- What is Neuroplasticity
- What is myelin? Why we do need to know this & what happens when myelin is lacking.
- How Neuroplasticity occurs in the brain
- The Stages of plasticity
- Why Neuroplasticity should be required for all students
- Why Transference & Neuroplasticity go hand in hand
- How Common Core ties into neuroplasticity

Course Relation to CCS, NGSS or other Professional Standards:

- Performance & Expectations: this will Provide a key tool for learning to investigate more complex ideas and solving problems through investigation
- Students will learn how to observe, write and draw conclusions about an investigation
- Students will learn how to daily graph learning to see patterns in their own learning & improve on their memory
- Students will learn how to Ask Questions and Define Problems
- Students can relate the neuroplasticity to their own life experiences
- Students will learn to Develop & teach through multisensory lessons through concepts of neuroplasticity and record their learning experiences.

Assignments

Assignment 1: Readings to acquaint you with neuroplasticity. 20 hours
This assignment will help you to understand & reflect on what you have read about neuroplasticity and how you can transfer this knowledge to your classroom. There are 2 activities to complete.

Objective: Read, reflect & connect to what can be transferred to your classroom & your standards. You will:

- Describe practical applications of these concepts into your classroom environment.
- Connect how this content will help meet the academic standards in your curriculum.

Activities:

- **Read the following Chapters from the text,** *Soft-Wired: How the New Science of Brain Plasticity Can Change Your Life*
- **View the Videos linked below.**
    1. Create one, multiple-page document to submit to the Assignment 1 Dropbox in Moodle. Note that you are asked to write a one-page reflection about each chapter, and a one-paragraph reflection for each video. The reflections must include a connection of content read or watched, to your classroom learning environment, teaching method and learning standards.
    2. Create a 1-2 page summary of how, what you have learned in this assignment can be transferred to your classroom & CCSS or other standards.

Reading Chapters:

1. Read Chapter 10 How Does a Brain Remodel Itself. Write a one page reflection on what you learned by reading this chapter.
2. Read Chapter 17 A Typical Day in the Life of a Brain. Write a one page reflection on what you learned by reading this chapter.
3. Read Chapter 23 Why Is My Brain Slowly Losing It. Write a one page reflection on what you learned by reading this chapter.
4. Read Chapter 27 That Troublesome Body Hooked Up to My Brain. Write a one page reflection on what you learned by reading this chapter.
5. Read Chapter 34 My Memory Is Pretty Good. Write a one page reflection on what you learned by reading this chapter.
6. Read Chapter 37 Today Is the First Day. Write a one page reflection on what you learned by reading this chapter.

Videos

1. Please watch this clip: Science of neuroplasticity. Write a one paragraph reflection.
2. Please watch this clip: Neuroplasticity, Animation. Write a one paragraph reflection

3. Please watch this clip: The brain-changing benefits of exercise. Write a one paragraph reflection
4. Please watch this clip: Harnessing the Power of Neuroplasticity: The Nuts and Bolts of Better Brains. Write one paragraph reflection
5. Please watch this clip: How Moken children see with amazing clarity underwater - Inside the Human Body - BBC One Write a one paragraph reflection

Assignment 2: Neuroplasticity Lesson Pre-Planning 10 hours

Objective: To produce creative activities to teach neuroplasticity.

Activities: Utilizing the Pre-Lesson Plan Template located in the course Moodle page, put into practice what you have learned from Assignment 1. In your Pre-Lesson Plan, focus especially on the following elements: - Detail all your responses.

- Reflect on the concepts included in your written assignment above and select a goal
- Identify 3 classroom objectives that should be tied to the content of the course
- Include a sequential list of 5 activities designed toward meeting those objectives.
- Identify 3 main benefits of teaching the topic & why

Assignment 3: Lesson Plan and Presentation 15 hours

Objective: Create a detailed, multi-paged, 3-Day lesson plan for applying Neuroplasticity concepts in your classroom. Use content, where appropriate, from Assignment 2 to help fulfill lesson plan requirements.

Activities:

1. Using the Lesson Plan Template located in the course Moodle page write one, three-day multi-paged, detailed lesson plan, incorporating ideas from assignments 1 and 2 and implement these lessons with your students.

The lesson plan needs to indicate state and/or national Content Standards that can be addressed through your plan.

2. Create a 10-slide *Powerpoint* or *Google Slides* project based on 5 articles of the 12 Extra Readings found in Moodle, to present to an audience of peers. The presentation's goal is to communicate the meaning of Neuroplasticity, its connection to learning and its applications in K-12 classrooms to support learning.

- Include Presenter Notes. The notes would aid in supporting your narrative when presenting or if the presentation was simply viewed. Cite in the notes section, where fitting, the Extra Reading(s) used.

Assignment 4: Forum Posting 2 hours

Objectives: Share your experience with course participants

- Place a 3-4 paragraph reflection on knowledge gained from this course and how you hope to use that knowledge as an educator and (optional) if applicable, as a parent.
- Respond to a peer posting

Course Assessment Rubric:

EXCELLENT Meets or Exceeds Course Objectives:	**ACCEPTABLE** Majority of Work Meets Course Objectives:	**NOT ACCEPTABLE** Needs Considerable Improvement: Resubmit Work Suggested
All work submitted reflects in-depth understanding of course objectives.	Most work submitted reflects in-depth understanding of course objectives.	Work shows little or no in-depth understanding of course objectives.
Assignment responses show evidence of new knowledge evidenced by thoughtful, detailed and accurate assignment responses.	Most assignment responses show evidence of new knowledge evidenced by thoughtful, detailed and accurate assignment responses.	Responses show little to no evidence of new knowledge as evidenced by lack of thoughtful, detailed and accurate assignment responses.

Work submitted was organized and clearly articulated. The student carefully followed all assignment instructions. The instructor did not have to provide continual assignment clarification or request revisions.	Most work submitted was organized and clearly articulated. The student carefully followed all assignment instructions. The instructor had to provide continual assignment clarification or ask for revisions.	Work submitted was not organized or not clearly articulated. The instructor had to provide constant clarification and ask for continued revisions.
Assignment content and required projects were original.	Assignment content and required projects were original.	Evidence that not all assignment content and required projects were original.
Work is free of spelling and/or grammatical errors.	Work has few spelling and/or grammatical errors.	Work has numerous spelling and/or grammatical errors.

Resources:

- Reading related material & reading the book Soft-Wired: How the New Science of Brain Plasticity Can Change Your Life by Dr. Michael Merzenich
- Multiple readings provided in the course syllabus and Moodle
- Extra Readings. There are 12 articles located in the course Moodle page.