

SAMPLE SYLLABUS FOR A MIND, BRAIN, AND EDUCATION COURSE

To put Mind, Brain, and Education (MBE) Science information in the most utilitarian context possible, a two-semester introductory course for a master's program in Mind, Brain, and Education: The Science of Teaching and Learning is described below. This course is aimed primarily at neuroscientists and educators seeking a basic foundation in the new discipline. This can also be useful to teacher study groups, who may want to choose one of the 23 topics and use the suggested readings to formulate a program around a single theme (e.g., emotion, attention, memory, etc.). If the syllabus is used as a two-semester course, each class is designed as a 1½-hour unit (3 hours a week). Each semester is presumed to be 16 weeks long, for a total of 48 hours per semester, or 96 hours total.

Subsequent courses will likely go into further detail about different academic subjects and the best ways they can be taught using the MBE Science guidelines. The new model will hopefully become a core element in teacher formation and in-service training. Conscientious practitioners in MBE Science will recognize the new model as a starting point, not the final solution. This means that the field should be subjected to constant review as new evidence becomes available. This syllabus for a first course on MBE Science is a broad overview of the field intended for new professionals in the field. The core readings in this emerging field will be dynamic and should be subject to new evidence from the field. This, however, should not stop current course designers from seriously reflecting on the current list. Such caution does not mean we need to dampen enthusiasm for the new field. If anything, the information should be a celebration of science in the context of the art of teaching.

What follows is the syllabus, developed with feedback from Christina Hinton, Marc Schwartz, Kurt Fischer, Jelle Jolles, Mary Helen Immordino-Yang, and Virginia Berninger.

MIND, BRAIN, AND EDUCATION: THE SCIENCE OF TEACHING AND LEARNING

Meeting time:

Professor:

Office hours:

Office:

E-mail:

Website:

AUDIENCE

This course is directed at master's of education, psychology, or neuroscience students specializing in Mind, Brain, and Education Science. Students are presumed to have some experience teaching.

DESCRIPTION

How does the brain learn, and how can we teach in a way that elicits the maximum potential of every student? Our brains are all different, from the genes that we inherit to the life experiences that change them. Should all students be expected to achieve the same level of competence in all subject areas, despite having dissimilar brain content? Which teaching activities, methodologies, and strategies best nurture the brain's natural way of learning? This is an introductory course on the basic principles, tenets, and instructional guidelines in the new academic discipline of Mind, Brain, and Education Science. This is a 1-year course, divided into 2 semesters. Each semester is 16 weeks long, with two 90-minute classes each week (for a total of 96 hours of class time).

CONTENT

This course is divided into 23 topics related to mind, brain, and education science:

Semester I

Introduction: Neuromyths and the Downfall of Brain-Based Education

1. Academic roots
2. History
3. Research, practice, and policy goals
4. Standards

5. Beliefs and neuromyths
6. Principles
7. Tenets
8. Instructional guidelines
9. Neuroethics
10. Neurophysiology and neuropharmacology
11. Social aspects of teaching and learning
12. Emotional aspects of teaching and learning
13. Memory
14. Attention

Semester II

15. Math
16. Reading
17. Art and creativity
18. Music
19. Culture
20. Mind–body link (nutrition, exercise, and sleep)
21. Genetics and environment (nature versus nurture)
22. Atypical behavior, anomalies, and disabilities
23. Technology

In the first semester, this course will consider the academic roots of the new discipline (mind, brain, and education science) and its historical foundations. This will be followed by a review of the major research, practice, and policy goals of the field. To structure the work in the field, the principles, tenets, and instructional guidelines of the field will be reviewed. After this basic review, we will look at ethical implications of work in the field. The neurophysiological and neuropharmacological aspects of mind, brain, and education will then be studied. After discussing the basic neural networks involved in learning, we will turn to the social and emotional aspects of learning. The first semester will conclude with the two fundamental aspects of learning that are necessary in every experience: attention and memory.

The second semester will build on the basic foundation information from semester one and delve into the specifics of the academic subjects of math, reading, art and creativity, and music. The cultural influences on learning will be reviewed in the context of the field of mind, brain, and education, followed by the mind–body link, which looks at how nutrition, exercise, and sleep impact learning. The relationship between genetics and environment will be considered in the context of mind, brain, and education. We will then turn to atypical behavior, anomalies in brain structure, and the variety of disabilities that affect an individual's potential to learn. This course will conclude by considering the role of technology in the teaching–learning process based on mind, brain, and education principles.

EXPECTED STUDENT LEARNING OUTCOMES

This course should help students:

- Improve research skills (correctly identify and analyze MBE Science studies)
- Improve practice (appropriately apply MBE Science research)
- Improve consideration of policy issues in MBE Science

- Improve understanding of the basic terminology of the field
- Know the difference between MBE Science and other academic fields
- Distinguish between “traditional” pedagogical practices and the proven methods, strategies, and activities of MBE Science
- Improve the ability to develop and evaluate learning strategies using MBE Science principles, tenets, and instructional guidelines

Basic Knowledge:

- Students should develop the fundamental vocabulary of MBE Science
- Students should be able to explain the goals of MBE Science
- Students should know the primary thinkers and leaders in the field
- Students should understand the historical development of MBE Science
- Students should understand how MBE Science differs from “brain-based education”
- Students should be able to distinguish the core tenets, principles, and instructional guidelines of MBE Science
- Student should be able to identify the neuromyths in MBE Science

Basic Skills:

- Students should be able to teach using MBE Science instructional principles
- Students should be able to accurately distinguish proven information from unproven information in MBE Science
- Students should be able to research and author documents in accordance with MBE Science tenets, principles, and instructional guidelines
- Students should be able to explain to others how MBE Science differs from “brain-based education”

Basic Attitudes:

- Students should develop a critical view of the literature and claims related to the brain and teaching techniques
- Students should express cautious optimism for the promises of MBE Science
- Students should enthusiastically acknowledge the MBE Science paradigm shift of pedagogy
- Students should promote the benefits of MBE Science as both a philosophy and a best practice of education

FORMAT

This class will be conducted in an interactive manner and will require a great deal of student participation. Your work in this class will include presentations, group work, two important essays, four reflections, four article reviews, weekly readings, a final project, and a final exam. All student work will be kept in a portfolio, which will be reviewed periodically and considered individually as well as cumulatively at the end of the semester.

COOPERATIVE LEARNING (1 + 1 = 3)

This class is structured according to the premise that when we work together, we learn better. Cooperative learning has been shown to yield better learning than isolated study because learners

benefit not only from their own insights but from those of others, as well. To do this, we need to work well together, which requires a certain level of trust. All members of the class are responsible for building this trust.

GROUP LEARNING AND INDIVIDUAL RESPONSIBILITIES

Many of the activities in this class will be conducted in small groups. There is a shared level of responsibilities within these groups.

Each person should:

- Ask questions and evaluate the material at hand
- Ensure that each group member is collaborating to the best of his or her ability

The professor also agrees to

- Create an appropriate class atmosphere
- Facilitate student learning
- Ensure that each student is treated equally

“HOW” TO THINK VERSUS “WHAT” TO THINK

We learn more efficiently when we are forced to think critically instead of simply repeating memorized lists of concepts without reflection. Respectful disagreement often is a good way to improve thinking skills. This course will offer many opportunities for energetic debate. You are encouraged to take divergent approaches to the material in the course, to challenge findings, and simply to disagree, so long as you articulately justify your position.

GRADING

Evaluation, assessment, and grading are part of formal education. Consciously or unconsciously, we are constantly evaluating others and ourselves with every interaction we have. While your professor will give you your final grade for this course, true learning depends on the feedback we give and receive from one another. Formative evaluation given by all the members in the class to one another can enhance learning, and you are encouraged to guide each other with constructive feedback. To be able to do this will require a high level of trust within the group, which is best cultivated in a learning community, not a competitive environment. This community shares a single goal—to learn—which is achieved not through negative criticism or punishment but rather by evaluating one another in a way that cultivates intellectual and social growth.

Grading in this class acknowledges that different people learn in different ways. Some people perform more strongly when writing than when making presentation, for example. There is sufficient flexibility in this course for everyone who works hard to demonstrate his or her mastery of the subject.

Your grade will be comprised of six elements, as follows:

- *Presentations* (15% of final grade):
 - One article presentation = 5% of grade

- Debates and group work = 5% of grade
- Final project = 5 % of grade
- *Essays* (20% of final grade):
 - Essay #1 = 10% of grade
 - Essay #2 = 10% of grade
- *Written portfolio work* (38% of final grade):
 - Article reviews (total of four per semester) = 12% of grade
 - Reflections (total of four per semester) = 16% of grade
 - Interview of MBE professional = 10% of grade
- *Final project* (10% of grade)
- *Final exam* (10% of grade)
- *Class participation* (7% of grade)

Grades will be awarded according to the following criteria:

Grade	Minimum expectations
A	Complete all of the readings Attend 90% of the classes Complete 100% of the homework Achieve an average of 90%+ on all work (average)
B	Complete all of the readings Attend 85% of the classes Complete 90% of the homework Achieve an average of 80%+ on all work (average)
C	Complete all of the readings Attend 80% of the classes Complete 75% of the homework Achieve an average of 70%+ on all work (average)
D	Complete all of the readings Attend 70% of the classes Complete 50% of the homework Achieve an average of 60%+ on all work (average)
F	Fail to complete the readings Attend less than 70% of the classes Complete less than 50% of the homework Achieve less than 60% on the work (average)

If you manage an average grade of 90% on ALL work, then you will be excused from the final exam.

REQUIREMENTS AND CLARIFICATIONS

- Attendance is important in this course, and your participation is highly valued. If you miss more than three classes in a semester, it will result in lowering your grade a full mark (A→B→C→D→F).
- Completion of all readings and homework is key to your full understanding of the subject matter. The professor has taken the time to choose relevant and interesting readings and to develop a variety of activities to help your learning; it is almost impossible to do well in this course without keeping up with the readings and participating to your best ability.
- You will have several in-class presentations. This is your chance to develop your own teaching style and be as creative as possible. Take the time to prepare

well; nothing is more wasteful than having to sit through a poorly prepared presentation.

- All your work should be kept in a portfolio, which will serve as a permanent record of your development in class and will be reviewed several times each semester. You are responsible for keeping your graded work in chronological order, as portfolios can be collected at any time.
- There are two essays each semester. You will not be able to pass the class if you fail to submit the essays.
- A backup of your submitted work should be submitted by e-mail and will be subject to plagiarism checks.
- Each student will present a final project. This can take the form of an essay; a “show;” a video, song, poem, poster; or any other creative format you choose. This can be completed individually or as a group (though the grades are individual).
- The final exam will be written and cumulative.

ESSAY FORMAT

Essays should be submitted in APA (American Psychological Association) format. For reference, a sample of this format can be found on the university website. Students will be graded on a 100-point scale in a five-topic rubric:

1. Content (well-developed thesis): 0–20 points
2. Structure (organization of ideas): 0–20 points
3. Format (APA style): 0–20 points
4. Source (good use of references/research/class readings, etc.): 0–20 points
5. Style (fluid writing, sophisticated use of appropriate vocabulary, development of your own voice): 0–20 points

There is a rubric for essay scoring, as well as for all aspects of grading at the end of this syllabus.

Writing is a form of thinking and the professor understands that you will commit errors. So long as you don’t commit the same error twice, this class has a rewrite policy. This means that if you are not satisfied with your grade, you can rewrite your work up to three different times within the time limits of the course.

	Original grade (20-point scale)		
	20	19–11	<10
First “rewrite”		Regraded work minus 1 point	Regraded work minus 1 point PLUS extra work
Second “rewrite”		Regraded work minus 2 points	Regraded work minus 1 point PLUS extra work
Third “rewrite”		Regraded work minus 3 points	Regraded work minus 1 point PLUS extra work

COURSE TIMELINE:**Semester I**

Date	Main topics	Classroom work	Homework (Readings are set for 1 week prior to the class in which they are discussed.)
Week 1	Introduction Academic roots of the field History of the field	<ul style="list-style-type: none"> • Neuromyths and the downfall of brain-based education • Academic roots of the field • History of the field • Overview of readings 	<p>Selected readings from this list: <i>The Jossey-Bass reader on the brain and learning</i> (2008) <i>The educated brain: Essays in neuroeducation</i> (Battro, Fischer, & Léna, 2008) <i>Educating the human brain</i> (Posner & Rothbart, 2007) “Educator’s views on the role of neuroscience in education: Findings from a study of UK and international perspectives” (Pickering & Howard-Jones, 2007) “Some ways in which neuroscientific research can be relevant to education” (Byrnes, 2007) <i>The learning brain: Lessons for education</i> (Blakemore & Frith, 2007) <i>Brain matters: Translating research into classroom practice</i> (Wolfe, 2001a) “The neurological basis of intelligence: Implications for education: An abstract” (Geake, 2005) <i>A mind at a time</i> (Levine, 2000); <i>Neuroscience: Breaking down scientific barriers to the study of brain and mind</i> (Kandel & Squire, 2000) <i>Igniting student potential: Teaching with the brain’s natural learning processes</i> (Gunn, Richburg, & Smilkstein, 2007), chs. 2–3.</p> <p>In your portfolio, write an analysis of Article 1. Choose an article related to Mind, Brain, and Education and analyze it. WHO wrote it? WHEN was it written? WHAT was the subject? WHY is it an important contribution to this field? CAN this information be replicated in your school context? (2–5 pages)</p>
	Research, practice, and policy goals of the field	<ul style="list-style-type: none"> • Goals of the field • Overview of readings 	<p>Selected readings from this list: <i>Strategies that work: Teaching comprehension for understanding and engagement</i> (2nd ed.) (Harvey & Goudvis, 2007) <i>Brain-compatible assessments</i> (2nd ed.) (Ronis, 2007) <i>The art and science of teaching: A comprehensive framework for effective instruction</i> (Marzano, 2007), p. xx <i>How the brain learns</i> (Sousa, 2000) The art of changing the brain (Zull, 2002) <i>Brain-friendly strategies for the inclusion classroom</i> (Willis, 2007) “Reinforcement learning signals predict future decisions” (Cohen & Ranganath, 2007) “Contributions of inadequate source monitoring to unconscious plagiarism during idea generation” (Marsh, Landau, & Hicks, 1997) “Educating executive attention” (Holmboe & Johnson, 2005) “Strategies for mathematics: Teaching in context” (Crawford & White, 1999)</p> <p>In your portfolio, write Reflection 1: Do you believe that people are born with differences in their brains that impede or help learning, or are experiences what really determine an individual’s potential to learn? (2–5 pages)</p>
Week 2	Standards in the field: Judging the information	<ul style="list-style-type: none"> • What are standards based on? • Steps to judge the quality of information in the field • Overview of readings 	<p>Selected readings from this list: <i>Strategies that work: Teaching comprehension for understanding and engagement</i> (2nd ed.) (Harvey & Goudvis, 2007) <i>Brain-compatible assessments</i> (2nd ed.) (Ronis, 2007) <i>The art and science of teaching: A comprehensive framework for effective instruction</i> (Marzano, 2007), p. xx <i>How the brain learns</i> (Sousa, 2000) The art of changing the brain (Zull, 2002) <i>Brain-friendly strategies for the inclusion classroom</i> (Willis, 2007) “Reinforcement learning signals predict future decisions” (Cohen & Ranganath, 2007) “Contributions of inadequate source monitoring to unconscious plagiarism during idea generation” (Marsh, Landau, & Hicks, 1997) “Educating executive attention” (Holmboe & Johnson, 2005) “Strategies for mathematics: Teaching in context” (Crawford & White, 1999)</p> <p>In your portfolio, write Reflection 1: Do you believe that people are born with differences in their brains that impede or help learning, or are experiences what really determine an individual’s potential to learn? (2–5 pages)</p>
	Basic teaching concepts in the field	<ul style="list-style-type: none"> • Basic teaching concepts in Mind, Brain, and Education • Overview of the readings 	<p>Reading: Beliefs and neuromyths table (Delphi panel findings, 2008)</p> <p>In your portfolio write Reflection 2: Do you believe it is ethical to apply information in classroom practice if it has not been 100% confirmed by neuroscience? (2–5 pages)</p>
Week 3	Basic teaching concepts in the field	<ul style="list-style-type: none"> • Basic teaching concepts in Mind, Brain, and Education • Overview of readings • Presentation of articles (Students 1, 2) 	<p>Reading: Beliefs and neuromyths table (Delphi panel findings, 2008)</p> <p>In your portfolio write Reflection 2: Do you believe it is ethical to apply information in classroom practice if it has not been 100% confirmed by neuroscience? (2–5 pages)</p>
Week 4	Beliefs and neuromyths	<ul style="list-style-type: none"> • Delphi panel review of beliefs and neuromyths classifications (category 1: What is well established) • Overview of readings 	<p>Reading: Beliefs and neuromyths table (Delphi panel findings, 2008)</p> <p>Prepare an outline for Essay 1. Option 1: Choose one of the theories or studies in last week’s reading and explain how it could be applied in your classroom. Option 2: Choose one of the beliefs or neuromyths in the table and find other studies that either support or debunk its status.</p>
	Beliefs and neuromyths	<ul style="list-style-type: none"> • Delphi panel review of beliefs and neuromyths classifications (category 2: What is probably so) • Overview of readings 	

Date	Main topics	Classroom work	Homework (Readings are set for 1 week prior to the class in which they are discussed.)
Week 5	Beliefs and neuromyths	<ul style="list-style-type: none"> • Turn in portfolios. At a minimum this should include <ul style="list-style-type: none"> —Reflection 1 —Reflection 2 —Article summary 1 —Outline of essay #1 • Discuss essay #1 outline expectations • Delphi panel review of beliefs and neuromyths classifications (category 3: What is intelligent speculation) • Overview of readings 	Readings: Beliefs and neuromyths table (Delphi panel findings, 2008) <i>Applying MBE Science</i> , Chapters 2, 3, 4, 5, and 6. Work on Essay 1. Consider using one of your reflections of articles and developing it into an essay. Alternately you may deepen your understanding of any of the other theories discussed in class over the past 4 weeks.
	Beliefs and neuromyths	<ul style="list-style-type: none"> • Presentation of articles (Students 3, 4) • Delphi panel review of beliefs and neuromyths classifications (category 4: What is a neuromyth) • Overview of readings 	
Week 6	Principles in the field	<ul style="list-style-type: none"> • Principles in the field • Overview of readings 	Readings: Tenets of Mind, Brain, and Education: The science of teaching and learning. In your portfolio, write Reflection 3: Choose one of the neuromyths in the table and write examples of that myth that you have personally experienced/witnessed (2–5 pages)
Week 7	Tenets in the field	<ul style="list-style-type: none"> • Presentation of articles (Students 5, 6) • Tenets in the field • Overview of readings 	Readings: <i>Applying MBE Science</i> , Chapters 2, 3, 4, 5, and 6. In your portfolio, write an analysis of Article 2. Choose an article related to Mind, Brain, and Education and analyze it. WHO wrote it? WHEN was it written? WHAT was the subject? WHY is it an important contribution to this field? CAN this information be replicated in your context? (2–5 pages)
Week 8	Instructional guidelines	<ul style="list-style-type: none"> • Instructional guidelines in the field • Overview of readings 	Selected readings from this list: “Neuroethics: The practical and the philosophical” (Farah, 2005) “Social, legal, and ethical implications of cognitive neuroscience: ‘Neuroethics’ for short” (Farah, 2007) <i>Neuroethics in the 21st century</i> (Illes, 2005) <i>Neuroethics: Mapping the field</i> (Marcus, 2004) <i>Defining right and wrong in brain science: Essential readings in neuroethics</i> (Glannon, 2007) Neuroethics (Glannon, 2006) “Neuroimaging research with children: Ethical issues and case scenarios” (Coch, 2007) “When genes and brain unite: Ethical implications of genomic neuroimaging” (Canli, 2006) In your portfolio, write an analysis of Article 3. Choose an article related to Mind, Brain, and Education and analyze it. WHO wrote it? WHEN was it written? WHAT was the subject? WHY is it an important contribution to this field? CAN this information be replicated in your context? (2–5 pages)
	Neuroethics	<ul style="list-style-type: none"> • Presentation of articles (Students 7, 8) • Neuroethics • Overview of readings 	
Week 9	Neuroethics	<ul style="list-style-type: none"> • Debate on Neuroethics <ul style="list-style-type: none"> —Position 1: Teachers should use every means possible to know the strengths and weaknesses of their students —Position 2: Anything that can improve student learning, including drugs, should be encouraged” • Overview of readings 	Selected readings from this list: <i>Neuroscience: Exploring the brain</i> (3rd edition) (Bear, Connors, & Paradis, 2007); <i>The cognitive neuroscience, III</i> (Gazzaniga, 2005b) <i>Cognitive development: The learning brain</i> (Goswami, 2007) “What can neuroimaging tell us about the mind? Insights from prefrontal cortex” (Poldrack & Wagner, 2004) Prepare outline for Essay 2.
	Neurophysiological and neuropharmacological aspect of learning	<ul style="list-style-type: none"> • Neurophysiological and neuropharmacological aspect of learning. • Overview of readings 	

Date	Main topics	Classroom work	Homework (Readings are set for 1 week prior to the class in which they are discussed.)
Week 10	Neurophysiological and neuropharmacological aspect of learning	<ul style="list-style-type: none"> • Presentation of articles (Students 9, 10) • Neurophysiological and neuropharmacological aspect of learning • Overview of readings 	<p>Selected readings from this list:</p> <p>“Activation of the primary visual cortex by Braille reading in blind subjects” (Sadato, Pascual-Leone, Rafman, Ibanez, Deiber, Dold, & Hallett, 1996)</p> <p>“Development of neural systems for reading” (Schlaggar & McCandliss, 2007)</p> <p>“Brain activation profiles during the early stages of reading acquisition” (Simos, Fletcher, Foorman, Francis, Castillo, Davis, Fitzgerald, Mathes, Denton, & Papanicolaou, 2002)</p> <p>“Neural systems for compensation and persistence: Young adult outcome of childhood reading disability” (Shaywitz, Shaywitz, Fulbright, Skudlarski, Mencl, Constable, Pugh, Loan, Marchione, Fletcher, Lyon, & Gore, 2003)</p> <p>“Brain organization for music processing” (Peretz & Zatorre, 2005)</p> <p>“Brain changes after learning to read and play music” (Stewart, Henson, Kampe, Walsh, Turner, & Frith, 2003)</p> <p>“The promises of change-related brain potentials in cognitive neuroscience of music” (Tervaniemi & Huotilainen, 2003)</p> <p>“When the brain plays music: Auditory-motor interactions in music perception and production” (Zatorre, Chen & Penhune, 2007)</p> <p>“Music and language side by side in the brain: A PET study of the generation of melodies and sentences” (Brown, Martinez, & Parson, 2006);</p> <p>“The neural basis of social behavior” (Damasio, 2004)</p> <p>In your portfolio, write an analysis of Article 4. Choose an article related to Mind, Brain, and Education and analyze it. WHO wrote it? WHEN was it written? WHAT was the subject? WHY is it an important contribution to this field? CAN this information be replicated in your context? (2–5 pages)</p>
	Neurophysiological and neuropharmacological aspect of learning	<ul style="list-style-type: none"> • Neurophysiological and neuropharmacological aspect of learning • Overview of readings 	
Week 11	Identifying MBE professionals	<ul style="list-style-type: none"> • Presentation of articles (Students 11, 12) • Develop interview questions in class for teachers • Overview of readings 	<p>Selected readings from this list:</p> <p>“How do we know the minds of others? Domain-specificity, simulation, and enactive social cognition” (Adolphs, 2006)</p> <p>“Cognitive neuroscience of human social behavior” (Adolphs, 2003)</p> <p>“Amygdala activation during masked presentation of emotional faces predicts conscious detection of threat-related faces” (Suslow, Ohrmann, Bauer, Rauch, Schwindt, Arolt, Heindel, & Kugel, 2006)</p> <p>“Emotion and attention interactions in social cognition: Brain regions involved in processing anger prosody” (Sander, Grandjean, Pourtois, Schwartz, Seghier, Scherer, & Vuilleumier, 2005)</p> <p>INTERVIEW: Choose a professor and conduct an interview based on the questions developed in class today. Write up your results in 4–5 pages.</p>
	Interview	<ul style="list-style-type: none"> • Use this class to conduct your interview 	
Week 12	Social aspect of teaching and learning	<ul style="list-style-type: none"> • Submit portfolio. At a minimum this should include: <ul style="list-style-type: none"> —Reflection 3 —Article 2 —Article 3 —Article 4 —Outline of essay #2 • Discuss essay topic possibilities • Social aspects of teaching and learning • Review of readings 	<p>Selected readings from this list:</p> <p>“The neural basis of social behavior” (Damasio, 2004)</p> <p><i>The feeling of what happens: Body and emotion in the making of consciousness</i> (Damasio, 2000)</p> <p><i>Synaptic self: How our brains become who we are</i> (LeDoux, 2003)</p> <p>“At the interface of the affective, behavioral, and cognitive neurosciences: Decoding the emotional feelings of the brain” (Panksepp, 2003)</p> <p>“Emotion processing and the developing brain” (Wisner Fries & Pollack, 2007)</p> <p><i>Understanding motivation and emotion</i> (4th ed.) (Reeve, 2004)</p> <p><i>Cognitive neuroscience of emotional memory</i> (LaBar & Cabeza, 2006)</p> <p>“Emotional scaffolding: An exploration of the teacher knowledge at the intersection of student emotion and the subject matter” (Rosiek, 2003)</p> <p>“Children’s emotion processing: Relations to emotionality and aggression” (Schultz, Izard, & Bear, 2004).</p> <p>Work on Essay 2. Consider using one of your reflections on articles and developing it into an essay. Alternately you may deepen your understanding of any of the other theories discussed in class over the past 12 weeks.</p>
	Social aspect of teaching and learning	<ul style="list-style-type: none"> • Presentation of Articles (Students 13, 14) • Social aspects of teaching and learning • Review of readings 	

Date	Main topics	Classroom work	Homework (Readings are set for 1 week prior to the class in which they are discussed.)
Week 13	Emotional aspects of teaching and learning	<ul style="list-style-type: none"> Emotional aspects of teaching and learning Overview of readings 	Selected readings from this list: <i>In search of memory: The emergence of a new science of mind</i> (Kandel, 2007) <i>Neuropsychology of memory</i> (3rd ed.) (Squire & Schacter (Eds.), 2002) "Synaptic plasticity and the neurobiology of learning and memory" (Benfenati, 2007) "Learning and memory: Recent findings" (Bright & Kopelman, 2001) "Developments in declarative memory" (Bauer, 2005) "The working memory networks of the human brain" (Linden, 2007b) "Neural correlates of memory for items and for associations: An event-related functional magnetic resonance imaging study" (Achim & Lepage, 2005) "Working memory and the vividness of imagery" (Baddeley & Andrade, 2000) "Getting explicit memory off the ground: Steps toward construction of a neurodevelopmental account of changes in the first two years of life" (Bauer, 2004) "Brain development: Memory enhancement in early childhood" (Liston & Kagan, 2002).
	Emotional aspects of teaching and learning Individual feedback sessions	<ul style="list-style-type: none"> Presentation of articles (Students 15, 16) Emotional aspects of teaching and learning Overview of readings 	
Week 14	Memory and Mind, Brain, and Education principles Brainstorm on final presentation formats	<ul style="list-style-type: none"> Discuss final projects (brainstorm) Submit essay #2 Article presentations (backup) Memory Review of readings 	FINAL PROJECT: Decide the theme of your final project, the form this will take, and your audience. THEME: Choose a method of teaching that is consistent with MBE principles, tenets, or instructional guidelines. FORM: Write an essay, create a lesson plan, give a class, design a visual (poster, diagram, etc.), or use any other creative means you like.. AUDIENCE: Clearly define the audience (age group, subject matter) that you are addressing. REMEMBER, THE MOST IMPORTANT ASPECT OF THIS FINAL PROJECT IS YOUR ABILITY TO JUSTIFY WHY YOU CHOSE THE MBE TOPIC THAT YOU DID.
	Memory and Mind, Brain, and Education principles	<ul style="list-style-type: none"> Memory Review of readings 	
Week 15	Attention	<ul style="list-style-type: none"> Presentation of articles (Students 17, 18) Attention Overview of readings. 	Selected readings from this list: <i>Cognitive neuroscience of attention</i> (Posner [Ed], 2004) "Developing attention skills" (Posner & Rothbart, 1998) "Research on attention networks as a model for the integration of psychological science" (Posner & Rothbart, 2007) "Multiple neuronal networks mediate sustained attention" (Lawrence, Ross, Hoffmann, Garavan, & Stein, 2003) <i>Attention and performance</i> (Pashler, Johnsyon, & Ruthruff, 2001) "Modulation of visual processing by attention and emotion: Windows on causal interactions between human brain regions" (Vuilleumier & Driver, 2007) "Reciprocal links between emotion and attention" (Vuilleumier, Harmony, & Dolan, 2003) "The neural mechanisms of top-down attentional control" (Hopfinger, Buonocore & Mangun, 2000) "The effort of divided attention on encoding and retrieval in episodic memory revealed by positron emission tomography" (Iidaka, Aderson, Kapur, Cabeza, & Craik, 2000)); "The control of attention and actions: current research and future developments" (Kok, Ridderinkhof, & Ullsperger, 2006) "Quick minds don't blink: Electrophysiological correlates of individual differences in attentional selection" (Martens, Munneke, Smid, & Johnson, 2006)
	Attention	<ul style="list-style-type: none"> Attention Questions about final projects. 	
		<ul style="list-style-type: none"> Submit completed portfolios, including: —Reflection 4 and —Interview 	
Week 16	Final project presentation	<ul style="list-style-type: none"> Presentation of final projects 	Feedback Final project presentations
	Final	Final exam	Review for final

SEMESTER II

Date	Main topics	Class Work	Homework
Week 1	Review of semester I	<ul style="list-style-type: none"> • Review of semester I • Expectations • Articles • Reflections • Essays • Presentations • Overview of readings 	<p>Selected readings from this list:</p> <p>“The number sense: How the mind creates mathematics” (Dehaene, 1999)</p> <p><i>Math skills</i> (Byrnes, 2008)</p> <p>“Small heads for big calculations” (Dehaene, 2008)</p> <p><i>Arithmetic and the brain</i> (Dehaene, Moiko, Cohen, & Wilson, 2004)</p> <p>“Young mathematical brains” (Geake, 2003)</p> <p>“Development of arithmetic skills and knowledge in preschool children” (Bisanz, Sherman, Rasmussen, & Ho, 2005)</p> <p>“Numerical competence in young children and in children with mathematics learning disabilities” (Desoete & Grégoire, 2006)</p> <p>“Individual differences in mathematical competence predict parietal brain activation during mental calculation” (Gardner, Ansari, Reishofer, Stern, Ebner, & Neuper, 2007)</p> <p>“The effects of integrated social and cognitive strategy instruction on the mathematics achievement in secondary education” (Hoek, van den Eeden, & Terwel, 1999)</p> <p>“Disabilities of arithmetic and mathematical reasoning: Perspectives from neurology and neuropsychology” (Rourke & Conway, 1997)</p> <p>In your portfolio write an analysis of Article 1. Choose an article related to Mind, Brain, and Education and analyze it. WHO wrote it? WHEN was it written? WHAT was the subject? WHY is it an important contribution to this field? CAN this information be replicated in your context? (2–5 pages)</p>
	Introduction to semester II	<ul style="list-style-type: none"> • Introduction to semester II • Overview of readings 	
Week 2	Math	<ul style="list-style-type: none"> • The neural correlates of math and the brain • Overview of readings 	<p>Selected readings from this list:</p> <p><i>Mind, brain, and education in reading disorders</i> (Fischer, Bernstein, & Immordino-Yang [Eds.], 2007)</p> <p><i>Connecting neuroscience and education: The neural correlates of phonemic awareness in normal reading children</i> (Pare-Blagoev, 2006)</p> <p>“Predicting reading performance from neuroimaging profiles: The cerebral basis of phonological effects in printed word identification” (Pugh, Shaywitz, Shaywitz, Shankweiler, Katz, & Fletcher, 1997)</p> <p>“The visual word form area: Spatial and temporal characterization of an initial stage of reading in normal subjects and posterior split-brain patients” (Cohen, Dehaene, Naccache, Lehericy, Dehaene-Lambertz, Henaff, & Michel, 2000)</p> <p><i>fMRI auditory language differences between dyslexic and able reading children</i> (Corina, Richards, Serafin, Richards, Steury, Abbott, Echelard, Maravilla, & Berninger, 2001)</p> <p>“Relationships of naming skills to reading, memory, and receptive vocabulary: Evidence for imprecise phonological representations of words by poor readers” (Fowler & Swanison, 2004)</p> <p>“Principles for literacy assessment” (Johnston & Costello, 2005)</p> <p><i>Development of left occipitotemporal systems for skilled reading in children after a phonologically-based intervention</i> (Shaywitz, Shaywitz Blachman, Pugh, Fulbright, Skudlarski, Mencl, Constable, Holahan, Marchione, Fletcher, Lyon, & Gore, 2004).</p> <p>In your portfolio, write Reflection 1: What are the differences between how you were taught math as a kid, and how MBE says you should teach math? (2–5 pages)</p>
	Math	<ul style="list-style-type: none"> • How math is taught using Mind, Brain, and Education instructional guidelines • Overview of readings. 	
Week 3	Reading	<ul style="list-style-type: none"> • The neural correlates of reading and the brain • Overview of readings 	<p>Selected readings from this list:</p> <p><i>Art for the brain's sake</i> (Sylwester, 1998)</p> <p><i>The brain and the arts</i> (Sousa, 2008)</p> <p>“Creative cognition: The diverse operations and the prospect of applying a cognitive neuroscience perspective” (Abraham & Windmann, 2007)</p> <p>“Cognitive neuroscience of creativity: EEG based approaches” (Srinivasan, 2007)</p> <p><i>Handbook of creativity</i> (Sternberg, 1998)</p> <p>“On the neurobiology of creativity. Differences in frontal activity between high and low creative subjects” (Carlsson, Wendt, & Risberg, 2000)</p> <p><i>Creativity: Flow and the psychology of discovery and invention</i> (Csikszentmihalyi, 1996)</p> <p><i>Magic trees of the mind: How to nurture your child's intelligence, creativity, and healthy emotions from birth through adolescence</i> (Diamond & Hopson, 1998)</p> <p>The role of the arts in transforming consciousness: Education is the process of learning how to invent yourself (Eisner, 2008)</p> <p>“Who's afraid of a cognitive neuroscience of creativity?” (Dietrich, 2007)</p> <p>In your portfolio, write Reflection 2: What aspect of MBE reading did you find surprising, intriguing, questionable, or remarkable? (2–5 pages)</p>
	Reading	<p>Presentation of articles (Students 1, 2)</p> <ul style="list-style-type: none"> • How reading is taught using Mind, Brain, and Education instructional guidelines • Overview of readings 	

Date	Main topics	Class Work	Homework
Week 4	Art and creativity	<ul style="list-style-type: none"> • Art and creativity in Mind, Brain, and Education • Review of readings 	<p>Selected readings from this list:</p> <p>“The Mozart effect: Musical phenomenon or musical preference? A more ecologically valid reconsideration” (Cassity, Henley, & Markley, 2007)</p> <p>“Brain structures differ between musicians and non-musicians” (Gaser & Schlaug, 2003)</p> <p>“Do mental speed and musical abilities interact?” (Gruhn, Galley, & Kluth, 2003)</p> <p>“Intelligent music teaching: Essays on the core principles of effective instruction” (Hepp, 2006)</p> <p>“Dynamic development of hemispheric biases in three cases: cognitive/hemispheric cycles, music and hemispherectomy” (Immordino-Yang & Fischer, 2007)</p> <p>“The Mozart effect and primary school children” (Ivanov & Geake, 2003)</p> <p>“Swinging in the brain: Shared neural substrates for behaviors related to sequencing and music” (Janata & Grafton, 2003)</p>
	Art and creativity	<ul style="list-style-type: none"> • Art and creativity in Mind, Brain, and Education • Review of readings 	<p>“Neural substrates of processing syntax and semantics in music” (Koelsch, 2005)</p> <p>“Individual differences in learning and remembering music: Auditory versus visual presentation” (Korenman & Peynircioglu, 2007)</p> <p>“Playing piano in the mind: An fMRI study on music imagery and performance in pianists” (Meister, Krings, Foltys, Boroojerdi, Miller, & Topper, 2004)</p> <p>“The rewards of music listening: Response and physiological connectivity of the mesolimbic system” (Menon & Levitin, 2005)</p> <p>“The intersection between vocal music and language arts instruction” (O’Herron & Siebenaler, 2005)</p> <p><i>Increased auditory cortical representation in musicians</i> (Pantev, Oostenveld, Engelien, Ross, Roberts, & Hoke, 1998)</p> <p>“Music and the brain” (Zatorre, 2003)</p> <p>“My favorite thing: Why do we like the music we like?” (Levitin, 2008)</p> <p>Prepare an outline for Essay 1. Option 1: Explain in depth some angle of MBE Math, Reading, or the Arts and Creativity. Option 2: Choose one of the readings from the past 3 weeks and find another study that supports or rejects its premise.</p>
Week 5	Music	<ul style="list-style-type: none"> • Turn in portfolios. At a minimum this should include <ul style="list-style-type: none"> —Reflection 1 —Reflection 2 —Article summary 1 —Outline of essay #1 • Neural correlates of music • Overview of readings 	<p>Selected readings from this list:</p> <p>“Biological abnormality of impaired reading is constrained by culture” (Siok, Perfetti, Jin, & Tan, 2004)</p> <p>“Cognitive science contributions to culture and emotion” (Posner, Rothbart, & Harman, 1994)</p> <p><i>Cultural origins of human cognition</i> (Tomasello, 1999)</p> <p><i>Genes, environment and behavior</i> (Ehrlich & Feldman, 2007)</p> <p><i>A biological brain in a cultural classroom</i> (Sylwester, 2002)</p>
	Music	<ul style="list-style-type: none"> • Discuss essay #1 expectations • Presentation of articles (Students 3, 4) • Teaching music in Mind, Brain, and Education • Overview of readings 	Work on Essay 1.
Week 6	Culture	<ul style="list-style-type: none"> • Cultural influences on teaching and learning • Submit essay 1 • Overview of readings 	<p>Readings:</p> <p>“Can dietary intervention play a part in the treatment of attention deficit and hyperactivity disorder?” (Marcason, 2005)</p> <p>A study of the relationship between physical fitness and academic achievement in California using 2004 test results (California Department of Education, 2005)</p> <p>“Exercise: A behavioral intervention to enhance brain health and plasticity” (Cotman & Berchtold, 2002)</p> <p>“Evaluation of an exercise-based treatment for children with reading difficulties” (Reynolds, Nicolson, & Hambly, 2003)</p> <p>“The influence of physical fitness and exercise upon cognitive functioning: A meta-analysis” (Eimer et al., 1997)</p> <p>“Mind and muscle: The cognitive-affective neuroscience of exercise” (Stein et al., 2007)</p> <p>“Malnutrition at age 3 years and externalizing behavior problems at ages 8, 11, and 17 years” (Liu, 2004)</p>
	Culture	<p>Presentation of articles (Students 5, 6)</p> <ul style="list-style-type: none"> • Cultural influences on teaching and learning • Overview of readings 	<p>In your portfolio, write Reflection 3: How and to what extent do cultural expectations influence learning outcomes? (2–5 pages)</p>

Date	Main topics	Class Work	Homework
Week 7	Mind–brain link Nutrition	<ul style="list-style-type: none"> • Mind–body link: Nutrition • Overview of readings 	<p>Selected readings from this list: <i>Genetic and environmental influences on early literacy</i> (Byrne, Olson, Samuelsson, Wadsworth, Corley, DeFries, & Willcutt, 2006) “The genetics of learning to read” (Coltheart, 2006) “Genetic and environmental mediation of the prediction from preschool language and nonverbal ability to 7-year reading” (Hayiou-Thomas, Harlaar, Dale, & Plomin, 2006) Reading and genetics: an introduction (Nation, 2006)</p> <p>In your portfolio, write an analysis of Article 2. Choose an article related to Mind, Brain, and Education and analyze it. WHO wrote it? WHEN was it written? WHAT was the subject? WHY is it an important contribution to this field? CAN this information be replicated in your context? (2–5 pages)</p>
	Mind–brain link Exercise	<ul style="list-style-type: none"> • Presentation of articles (Students 7, 8) • Mind–body link: Exercise • Overview of readings 	
Week 8	Mind–brain Link Sleep	<ul style="list-style-type: none"> • Mind–body link: Sleep • Overview of readings 	<p>Selected readings from this list: “Human behavior, learning, and the developing brain: Atypical development” (Coch, Dawson & Fischer, 2007) “Music and the brain: Disorders of musical listening” (Stewart, von Kriegstein, Warren, & Griffiths, 2006) “Neurological studies of reading and reading disability” (Pugh, 2001) “Neuropsychologic theory and findings in attention-deficit/hyperactivity disorder: The state of the field and salient challenges for the coming decade” (Nigg, 2005) <i>Neural systems for compensation and persistence: Young adult outcome of childhood reading disability</i> (Shaywitz, Shaywitz, Fulbright, Skudlarski, Mencl, Constable, Pugh, Loan, Marchione, Fletcher, Lyon, & Gore, 2003) “Differentiation instruction for students with learning disabilities” (Bender, 2002) “Numerical competence in young children and in children with mathematics learning disabilities” (Desoete & Grégoire, 2006) “Interpreting intelligence test results for children with disabilities: Is global intelligence relevant?” (Fiorello, Hale, Holdnack, Kavanagh, Terrell, & Long, 2007) “Disabilities of arithmetic and mathematical reasoning: Perspectives from neurology and neuropsychology” (Rourke & Conway, 1997) “Atypical trajectories of number development: A neuroconstructivist perspective” (Ansari & Karmiloff-Smith, 2002) Atypical and typical development of visual estimation abilities (Ansari, Donlan, & Karmiloff-Smith, 2007) “The development of reading impairment: A cognitive neuroscience model” (McCandliss & Noble, 2003) “What makes counting count? Verbal and visuo-spatial contributions to typical and atypical number development” (Ansari, Donlan, Thomas, Ewing, & Karmiloff-Smith, 2003)</p> <p>In your portfolio, write an analysis of Article 3. Choose an article related to Mind, Brain, and Education and analyze it. WHO wrote it? WHEN was it written? WHAT was the subject? WHY is it an important contribution to this field? CAN this information be replicated in your context? (2–5 pages)</p>
	Genetics and environment: Nature versus nurture	<ul style="list-style-type: none"> • Presentation of articles (Students 9, 10) • Genetics and environment: Nature and nurture • Overview of readings 	
Week 9	Atypical behavior, anomalies, and disabilities	<ul style="list-style-type: none"> • Atypical behavior, anomalies • Overview of readings 	<p>Selected readings from this list: “An evolutionary perspective on reading and reading disorders?” (Immordino-Yang, 2007b) “A new factor in evolution” (Baldwin, 1896) “Précis of foundations of language: Brain, meaning, grammar, evolution” (Jackendoff, 2003) <i>The naked neuron: Evolution and the languages of the body and brain</i> (Joseph, 1993) <i>The accidental mind: How brain evolution has given us love, memory, dreams and God</i> (Linden, 2007a) “Evolution of cognitive function via redeployment of brain areas” (Anderson, 2007)</p> <p>Prepare outline for Essay 2. Option 1: How and to what extent does nutrition (or exercise or sleep) influence learning outcomes? Option 2: Consider the relationship between genes and intelligence.</p>
	Atypical behavior, anomalies, and disabilities	<ul style="list-style-type: none"> • Presentation of articles (Students 11, 12) • Disabilities • Overview of readings 	

Date	Main topics	Class Work	Homework
Week 10	Atypical behavior, anomalies, and disabilities	<ul style="list-style-type: none"> • Atypical behavior • Overview of readings 	Catch up on readings. In your portfolio, write an analysis of Article 4. Choose an article related to Mind, Brain, and Education and analyze it. WHO wrote it? WHEN was it written? WHAT was the subject? WHY is it an important contribution to this field? CAN this information be replicated in your context? (2–5 pages)
	Atypical behavior, anomalies, and disabilities	<ul style="list-style-type: none"> • Atypical behavior • Overview of readings • Prepare for debate and prepare questions for interview 	
Week 11	Debate	<ul style="list-style-type: none"> • Debate: “All people have the same capacity to learn” • Discuss teacher interviews 	INTERVIEW: Choose a professor and conduct an interview based on the questions developed in class today. Write up your results in 4–5 pages.
	Debate	<ul style="list-style-type: none"> • Debate: “Mind, Brain, and Education cannot be applied in certain settings” 	
Week 12	Technology	<ul style="list-style-type: none"> • Technology in Mind, Brain, and Education 	Work on Essay 2.
	Technology	<ul style="list-style-type: none"> • Technology in Mind, Brain, and Education 	
Week 13	Mind, Brain, and Education in practice Interview	<ul style="list-style-type: none"> • Submit portfolio. At a minimum this should include <ul style="list-style-type: none"> —Reflection 3 —Article 2 —Article 3 —Article 4 —Outline of essay #2 • Discuss essay topic possibilities. • Social aspects of teaching and learning. • Review of readings. • Discuss essays. 	Catch up on the readings.
	Mind, Brain, and Education in practice Interview	Use this week to conduct your interview.	
Week 14	Mind, Brain, and Education in practice Interview	Discuss results of the interviews. Surprises?	FINAL PROJECT: Decide the theme of your final project, the form this will take, and your audience. THEME: Choose a method of teaching that is consistent with MBE principles, tenets, or instructional guidelines. FORM: Write an essay, create a lesson plan, give a class, design a visual (poster, diagram, etc.), or use any other creative means you like.. AUDIENCE: Clearly define the audience (age group, subject matter) that you are addressing REMEMBER, THE MOST IMPORTANT ASPECT OF THIS FINAL PROJECT IS YOUR ABILITY TO JUSTIFY WHY YOU CHOSE THE MBE TOPIC THAT YOU DID.
	Final projects	<ul style="list-style-type: none"> • Lottery of presentation order for presentations • Discuss final projects (brainstorm) • Submit essay #2 • Article (backup) • Review of readings • Joint development of final project grading rubric. 	
Week 15	Final project presentations	Presentation of final projects	Prepare for final exam.
		Submit completed portfolios, including reflection 4 and interview.	
Week 16	Final project presentation	Presentation of final projects Feedback on final projects	Final project presentations.
	Final	Final exam	Review for final exam.

SYLLABUS RUBRICS FOR MIND, BRAIN, AND EDUCATION FIRST COURSE

ARTICLE PRESENTATION RUBRIC

Possible: 30 points.

Mind, Brain, and Education Science

<i>Criteria</i>	<i>1 Nonperformance</i>	<i>2 Basic</i>	<i>3 Proficient</i>	<i>4 Very Skillful</i>	<i>5 Distinguished</i>
Organization	Audience cannot understand presentation because there is no sequence of information.	Audience has difficulty following presentation because student jumps around.	Student presents information in logical sequence that audience can follow.	Student presents information in logical, interesting sequence that audience can follow.	Exemplary.
Subject knowledge	Student does not have grasp of information; student cannot answer questions about subject.	Student is uncomfortable with information and is able to answer only rudimentary questions but fails to elaborate.	Student is at ease and answers most questions with explanations and some elaboration.	Student demonstrates full knowledge by answering all class questions with explanations and elaboration.	Student builds off student questions to go into depth (more than required)
Visual aids	Student uses superfluous visual aids or no visual aids.	Student occasionally uses visual aids that rarely support the presentation.	Student's visual aids relate to the presentation.	Student's visual aids explain and reinforce the presentation.	Extraordinary design and/or use of visual aids
Handouts	No handouts.	Handouts in student's presentation has four or more spelling errors and/or grammatical errors.	Handouts have three misspellings and/or grammatical errors.	Handouts have no more than two misspellings and/or grammatical errors.	Handouts have no misspellings or grammatical errors.
Eye contact	Student makes no eye contact and only reads from notes.	Student occasionally uses eye contact but still mostly reads from notes.	Student maintains eye contact most of the time but frequently returns to notes.	Student maintains eye contact with audience, seldom returning to notes.	Student knows presentation so well; there is no use of notes.
Verbal technique	Student mumbles, incorrectly pronounces terms, and speaks too quietly for audience in the back of class to hear.	Student's voice is low. Student incorrectly pronounces terms. Audience members have difficulty hearing presentation.	Student's voice is clear. Student pronounces most words correctly. Most audience members can hear presentation.	Student uses a clear voice and correct, precise pronunciation of terms so that all audience members can hear presentation.	Student interacts with audience, projects voice, and modifies tone in an appropriate way.

A: 24.2–30

B: 21.2–24.1

C: 18.2–21.1

D: 15.2–18.1

F: <15.1

Based on <http://ed.fnal.gov/lincon/w01/projects/library/rubrics/presrubric.htm>

DEBATE RUBRIC

Possible: 25 points.

Mind, Brain, and Education Science

Criteria	1 Nonperformance	2 Basic	3 Proficient	4 Very Skillful	5 Distinguished
Information	Information had several inaccuracies or was unusually unclear.	Most information was accurate and clear but usually not thorough.	Most information was accurate and clear.	All information was accurate and clear.	All information was accurate and clear and was of high quality.
Rebuttal	Counter-arguments were not accurate or relevant.	Most counter-arguments were accurate and relevant, but several were weak.	Most counter-arguments were accurate, relevant, and strong.	All counter-arguments were accurate, relevant, and strong.	All counter-arguments were accurate, relevant, strong, and offered new insight.
Organization	Arguments were illogical and did not follow a premise.	Arguments were logical but did not always follow a premise.	Most arguments were logical and usually clearly followed a premise.	All arguments were logical but did not always clearly follow a premise.	All arguments were logical and clearly followed a premise.
Understanding of Topic/Teamwork	The team did not exhibit an adequate understanding of the topic.	The team understood the main points of the topic and presented them well.	The team clearly understood the topic and presented the information with ease.	The team clearly understood the topic, and most members presented in a convincing way.	The team clearly understood the topic fully and presented all arguments convincingly.
Respect for other team	Language, responses, and body language were consistently disrespectful.	Most members showed moderate respect for the other team in language, responses, and body language.	Most team members showed respect for the other team in language, responses, and body language.	All team members showed respect in language, responses, or body language.	All team members showed a high level of respect for the other team in terms of language, responses, and body language.

A: 22.6–25

B: 20.1–22.5

C: 17.7–20

D: 15.1–17.6

F: <15

Based on www.ioncmaste.ca/.../resources/web_resources/CSA_Astro9/files/html/module4/lessons/lesson5/debate_rubric.pdf -

FINAL PROJECT PRESENTATION RUBRIC

Possible: 35 points.

Mind, Brain, and Education Science

<i>Criteria</i>	<i>1 Nonperformance</i>	<i>2 Basic</i>	<i>3 Proficient</i>	<i>4 Very Skillful</i>	<i>5 Distinguished</i>
Organization	Audience cannot understand presentation because there is no sequence of information.	Audience has difficulty following presentation because student jumps around.	Student presents information in logical sequence that audience can follow.	Student presents information in logical, interesting sequence that audience can follow.	Exemplary.
Subject knowledge	Student does not have grasp of information; student cannot answer questions about subject.	Student is uncomfortable with information and is able to answer only rudimentary questions, but fails to elaborate.	Student is at ease and answers most questions with explanations and some elaboration.	Student demonstrates full knowledge by answering all class questions with explanations and elaboration.	Student builds off of student questions to go into depth (more than required).
Visual aids	Student uses superfluous visual aids or no visual aids.	Student occasionally uses visual aids that rarely support the presentation.	Student's visual aids relate to the presentation.	Student's visual aids explain and reinforce the presentation.	Extraordinary design and/or use of visual aids
Handouts	No handouts.	Student's presentation has four or more spelling errors and/or grammatical errors.	Presentation has three misspellings and/or grammatical errors.	Presentation has no more than two misspellings and/or grammatical errors.	Presentation has no misspellings or grammatical errors.
Eye contact	Student makes no eye contact and only reads from notes.	Student occasionally uses eye contact but still mostly reads from notes.	Student maintains eye contact most of the time but frequently returns to notes.	Student maintains eye contact with audience, seldom returning to notes.	Student knows presentation so well there is no use of notes.
Verbal technique	Student mumbles, incorrectly pronounces terms, and speaks too quietly for audience in the back of class to hear.	Student's voice is low. Student incorrectly pronounces terms. Audience members have difficulty hearing presentation.	Student's voice is clear. Student pronounces most words correctly. Most audience members can hear presentation.	Student uses a clear voice and correct, precise pronunciation of terms so that all audience members can hear presentation.	Student interacts with audience, projects voice, and modifies tone in an appropriate way.
Group work	Cannot work with others in most situations. Cannot share decisions or responsibilities.	Works with others but has difficulty sharing decisions and responsibilities.	Works well with others. Takes part in most decisions and shares in the responsibilities.	Works very well with others. Assumes a clear role in decision making and responsibilities.	Leadership role in uniting group.

A: 31.7–35.0

B: 28.2–31.6

C: 24.7–28.1

D: 21.3–24.6

F: <21.3

Based on <http://ed.fnal.gov/lincon/w01/projects/library/rubrics/presrubric.htm>

ESSAY RUBRIC

Possible: 20 points.

Mind, Brain, and Education Science

Criteria	1 Nonperformance	2 Basic	3 Proficient	4 Distinguished
Content	Develops no viable point of view on the issue, or provides little or no evidence to support its position.	Develops a point of view on the issue, demonstrating some critical thinking, but may do so inconsistently or use inadequate examples, reasons, or other evidence to support its position.	Effectively develops a point of view on the issue and demonstrates strong critical thinking, generally using appropriate examples, reasons, and other evidence to support its position.	Effectively and insightfully develops a point of view on the issue and demonstrates outstanding critical thinking, using clearly appropriate examples, reasons, and other evidence to support its position.
Structure	Disorganized or unfocused, resulting in a disjointed or incoherent essay.	Limited in its organization or focus, or may demonstrate some lapses in coherence or progression of ideas.	Well organized and focused, demonstrating coherence and progression of ideas.	Well organized and clearly focused, demonstrating clear coherence and smooth progression of ideas.
Format	Inaccurate use of APA style (more than 5 formatting errors)	Inaccurate use of APA style (more than 2 formatting errors)	Nearly perfect use of APA style (1–2 formatting errors).	Completely accurate use of APA style.
Source	Use of inaccurate sources of information.	Use of 1 quality source.	Use of 3 or more quality sources.	Use of 5 or more quality sources.
Style	Displays fundamental errors in vocabulary. Demonstrates severe flaws in sentence structure. Contains pervasive errors in grammar, usage, or mechanics that persistently interfere with meaning	Displays developing facility in the use of language, but sometimes uses weak vocabulary or inappropriate word choice. Lacks variety or demonstrates problems in sentence structure. Contains an accumulation of errors in grammar, usage, and mechanics	Exhibits facility in the use of language, using appropriate vocabulary. Demonstrates variety in sentence structure. Is generally free of most errors in grammar, usage, and mechanics	Demonstrates meaningful variety in sentence structure. Is free of most errors in grammar, usage, and mechanics. Exhibits skillful use of language. Clear personal voice. Varied, accurate, and apt vocabulary.

A: 19.1–20

A: 18.1–19

B: 17.1–18

B: 16.1–17

C: 15.1–16

C: 14.1–15

D: 13.1–14

D: 12.1–13

D: 11.1–12

F: < 11

Based on http://www.collegeboard.com/student/testing/sat/about/sat/essay_scoring.html

ARTICLE REVIEW RUBRIC

Possible: 30 points.

Mind, Brain, and Education Science

<i>Criteria</i>	<i>1 Nonperformance</i>	<i>2 Basic</i>	<i>3 Proficient</i>	<i>4 Very Skillful</i>	<i>5 Distinguished</i>
Organization	Audience cannot understand presentation because there is no sequence of information.	Audience has difficulty following presentation because student jumps around.	Student presents information in logical sequence that audience can follow.	Student presents information in logical, interesting sequence that audience can follow.	Exemplary.
Choice of article	Promotes a neuromyth.	Article is inappropriate for Mind, Brain, and Education Science.	Article is appropriate for Mind, Brain, and Education Science but older and/or better articles are available.	Very good article.	State-of-the-art choice of article. Reflects best practice in MBE Science.
Visual aids	Student uses superfluous visual aids or no visual aids.	Student occasionally uses visual aids that rarely support the presentation.	Student's visual aids relate to the presentation.	Student's visual aids explain and reinforce the presentation.	Extraordinary design and/or use of visual aids
Handouts	No handouts.	Student's presentation has four or more spelling errors and/or grammatical errors.	Presentation has three misspellings and/or grammatical errors.	Presentation has no more than two misspellings and/or grammatical errors.	Presentation has no misspellings or grammatical errors.
Eye contact	Student makes no eye contact and only reads from notes.	Student occasionally uses eye contact but still mostly reads from notes.	Student maintains eye contact most of the time but frequently returns to notes.	Student maintains eye contact with audience, seldom returning to notes.	Student knows presentation so well there is no use of notes.
Verbal technique	Student mumbles, incorrectly pronounces terms, and speaks too quietly for audience in the back of class to hear.	Student's voice is low. Student incorrectly pronounces terms. Audience members have difficulty hearing presentation.	Student's voice is clear. Student pronounces most words correctly. Most audience members can hear presentation.	Student uses a clear voice and correct, precise pronunciation of terms so that all audience members can hear presentation.	Student interacts with audience, projects voice, and modifies tone in an appropriate way.

A: 24.2–30

B: 21.2–24.1

C: 18.2–21.1

D: 15.2–18.1

F: <15.1

Based on <http://ed.fnal.gov/lincon/w01/projects/library/rubrics/presrubric.htm>

REFLECTIONS RUBRIC

Possible: 20 points.

Mind, Brain, and Education Science

<i>Criteria</i>	<i>1 Nonperformance</i>	<i>2 Basic</i>	<i>3 Proficient</i>	<i>4 Distinguished</i>
Content	Unoriginal, banal. Poor or no understanding of major concepts.	Good ideas but no new or original concepts expressed.	Very good ideas. Some important concepts expressed.	Fabulous ideas. All key concepts salient. New or original combination of core understandings expressed.
Structure	Disorganized and lacking structure, illogical. Some basic parts of the essay (intro, body, conclusion) missing or very weak.	Some good points to organization. At times the reader is lost due to poor logic or transitions.	Very good organization: generally logical structure but weak transitional at times. Not all parts of the essay are cohesive.	Excellent organization: logical structure; excellent transitions; strong introduction, body; and conclusion.
Form	Only uses APA style in sporadic instances (lucky guesses).	Uses APA style but not consistently. Many errors.	Uses nearly perfect APA style with only minor faults.	Uses perfect APA style.
Voice	Appears to be a cut-and-paste of someone else's words. Not natural at all.	Starts to use own voice, then reverts to cut-and-paste tone.	At times appears to express a natural tone, but not consistently.	Expresses a natural, convincing, confident voice.
Sources	Chooses an inappropriate article. Makes no references.	Chooses an appropriate article but makes no references to supportive material.	Chooses an appropriate article and supports it with class references.	Chooses an appropriate article and supports it with class as well as other articles. references.

A: 19.1–20

A: 18.1–19

B: 17.1–18

B: 16.1–17

C: 15.1–16

C: 14.1–15

D: 13.1–14

D: 12.1–13

D: 11.1–12

< 11 = F

INTERVIEW RUBRIC

Possible: 40 points.
Mind, Brain, and Education Science

Criteria	1 Nonperformance	2 Basic	3 Proficient	4 Very Skillful	5 Distinguished	Who Grades?
Preparation before the interview	No preparation was made.	A few questions were prepared.	An adequate number of questions, most of which relate in some way to the research focus, was prepared.	A comprehensive list of questions relating directly to research focus was prepared.	A comprehensive list of questions and supplementary questions relating directly to research focus was prepared. Background knowledge of the person, if known, was included.	Interviewee
Establishing rapport	No attempt was made to establish rapport with the person.	The student introduced himself and began to ask questions.	The student introduced himself, briefly mentioned the purpose of the interview, and began with an easy question.	The student introduced himself, explained the purpose of the interview, and began with an easy open-ended question.	The student introduced himself, explained the purpose of the interview, made eye contact, smiled encouragement, and began with an easy, open-ended question.	Interviewee
Manner	The student interrupted or hurried the person being interviewed and forgot to thank interviewee at the end.	The student made an attempt to be polite. Listened, and thanked the person at the end of the interview.	The student was polite. Tried to make eye contact and nodded encouragement occasionally. Listened and thanked the person at the end of the interview.	The student was polite and tried to put the person at ease with the situation. Made some eye contact and nodded encouragement occasionally. Listened, didn't interrupt, and thanked the person at the end of the interview.	The student was friendly and polite, putting the person at ease with the situation. Made eye contact and nodded encouragement. Listened, didn't interrupt, and thanked the person at the end of the interview.	Interviewee
Matter	The student asked the person a few questions.	The student asked the person a reasonable number of appropriate questions.	The student asked appropriate questions and tried to encourage the person to give more detail.	The student asked appropriate questions, clarified comments, and encouraged the person to give more detail. Asked some supplementary questions.	The student asked appropriate questions, rephrasing them if necessary. Clarified comments, summarized what was said, and encouraged the person to give more detail. Asked relevant supplementary questions based on what the person said.	Interviewee
Knowledge gained	The student cannot answer questions about the person who was interviewed.	The student can answer some questions about the person who was interviewed.	The student can answer questions about the person's views and begins to make connections between the interview and the research focus.	The student can explain the person's views in detail and the ways in which they relate to the research focus.	The student can explain the person's views in detail and the ways in which they relate to the research focus. The student can also evaluate the significance of the interview to the project.	Teacher
Written report	Limited clarity and thought; unsophisticated and, at times, inappropriate vocabulary with simple sentences. Evidence of some organization. Chosen form rarely conveys content effectively. Inconsistent use of details to convey personality and experience of person interviewed. Surface feature errors may at times distract reader. Message is clear, understandable, and thought-provoking	Direct and usually clear; straightforward vocabulary and effective sentences that are rarely complex or varied; Organization evident; Chosen form generally appropriate for content; Competent use of details to convey personality and experience of person interviewed. Surface feature errors such as comma splice, spelling, or pronoun reference errors.	Quite well developed and detailed; generally precise vocabulary and complex sentence structures containing minimal errors. Obvious organization. Chosen form appropriate for content. Relevant use of details to convey personality and experience of person interviewed. Generally few surface feature errors; some punctuation, spelling, or pronoun reference errors	Clear and thoughtful. Complex. Precise vocabulary and varied sentences. Logical organization. Chosen form effectively conveys content. Relevant and careful use of details to convey personality and experience of person interviewed. Few surface feature errors; occasional spelling or punctuation errors	Engaging, creative, and thoughtful. Precise, vivid, and sophisticated vocabulary. Varied patterns and lengths of sentences. Coherent and organized structure. Chosen form effectively and innovatively conveys content. Relevant and intriguing use of details to convey personality and experience of person interviewed. Few surface feature errors. Only noticeable if looking for them.	Teacher

<p>Presentation: Awareness of audience</p>	<p>Fails to increase audience understanding or knowledge of topic. Fails to effectively convince the audience.</p>	<p>Raises some understanding. Some, but not many, points made, but without support.</p>	<p>Raises audience understanding and knowledge of some points. Point of view may be clear but lacks development or support.</p>	<p>Raises audience understanding and awareness of most points. Clear point of view, but development or support is inconclusive and incomplete.</p>	<p>Significantly increases audience understanding and knowledge of topic. Effectively convinces an audience to recognize the validity of a point of view.</p>	<p>Teacher/Class</p>
<p>Presentation: Strength of material, Organization</p>	<p>Subject and purpose are not clearly defined. Very weak or no support of subject through use of examples, facts, and/or statistics. Totally insufficient support for ideas or conclusions. Major ideas left unclear; audience left with no new ideas.</p>	<p>Some attempt to identify main topic. Insufficient facts. Lack of data.</p>	<p>Attempts to define purpose and subject. Weak examples, facts, and/or statistics, which do not adequately support the subject. Includes very thin data or evidence in support of ideas or conclusions. Major ideas may need to be summarized or audience is left with vague idea to remember.</p>	<p>Has some success defining purpose and subject. Some examples, facts, and/or statistics support the subject. Includes some data or evidence that supports conclusions or ideas. May need to refine summary or final idea.</p>	<p>Clear purpose and subject. Pertinent examples, facts, and/or statistics. Conclusions/ideas are supported by evidence. Major ideas summarized and audience left with full understanding of presenter's position.</p>	<p>Teacher/Class</p>
<p>Presentation: Delivery</p>	<p>Nervous tension obvious and/or inappropriately dressed for purpose or audience. No effort to make eye contact with audience. Low volume and/or monotonous tone cause audience to disengage.</p>	<p>Some tension or indifference apparent. Obvious discomfort.</p>	<p>Occasional but not sustained eye contact with audience. Uneven volume with little or no inflection.</p>	<p>Quick recovery from minor mistakes. Appropriately dressed. Fairly consistent use of direct eye contact with audience. Satisfactory variation of volume and inflection.</p>	<p>Relaxed, self-confident, and appropriately dressed for purpose or audience. Builds trust and holds attention by direct eye contact with all parts of audience. Fluctuation in volume and inflection help to maintain audience interest and emphasize key points.</p>	<p>Teacher/Class</p>

A: 36.3–40

B: 32.3–36.2

C: 28.3–32.2

D: 24.3–28.2

F: <24.2

Based in part on:

<http://www.sdcoe.k12.ca.us/score/actbank/interview.html>,

www.wimona.edu/air/documents/INTERVIEWING_RUBRIC.doc

http://www.louisianavoices.org/unit3/edu_unit3_rubric_for_oral.html

FINAL PROJECT RUBRIC

Possible: 30 points.

Mind, Brain, and Education Science

<i>Criteria</i>	<i>1 Nonperformance</i>	<i>2 Basic</i>	<i>3 Proficient</i>	<i>4 Very Skillful</i>	<i>5 Distinguished</i>
Organization	Audience cannot understand presentation because there is no sequence of information.	Audience has difficulty following presentation because student jumps around.	Student presents information in logical sequence that audience can follow.	Student presents information in logical, interesting sequence that audience can follow.	Exemplary.
Subject knowledge	Student does not have grasp of information; student cannot answer questions about subject.	Student is uncomfortable with information and is able to answer only rudimentary questions but fails to elaborate.	Student is at ease and answers most questions with explanations and some elaboration.	Student demonstrates full knowledge by answering all class questions with explanations and elaboration.	Student builds off student questions to go into depth (more than required)
Visual aids	Student uses superfluous visual aids or no visual aids.	Student occasionally uses visual aids that rarely support the presentation.	Student's visual aids relate to the presentation.	Student's visual aids explain and reinforce the presentation.	Extraordinary design and/or use of visual aids
Handouts	No handouts.	Student's presentation has four or more spelling errors and/or grammatical errors.	Presentation has three misspellings and/or grammatical errors.	Presentation has no more than two misspellings and/or grammatical errors.	Presentation has no misspellings or grammatical errors.
Eye contact	Student makes no eye contact and only reads from notes.	Student occasionally uses eye contact but still mostly reads from notes.	Student maintains eye contact most of the time but frequently returns to notes.	Student maintains eye contact with audience, seldom returning to notes.	Student knows presentation so well there is no use of notes.
Verbal technique	Student mumbles, incorrectly pronounces terms, and speaks too quietly for audience in the back of class to hear.	Student's voice is low. Student incorrectly pronounces terms. Audience members have difficulty hearing presentation.	Student's voice is clear. Student pronounces most words correctly. Most audience members can hear presentation.	Student uses a clear voice and correct, precise pronunciation of terms so that all audience members can hear presentation.	Student interacts with audience, projects voice, and modifies tone in an appropriate way.

A: 24.2–30

B: 21.2–24.1

C: 18.2–21.1

D: 15.2–18.1

F: <15.1

FINAL EXAM RUBRIC

Possible: 100 points.

Mind, Brain, and Education Science

		<i>Percent of Final Exam Grade</i>	<i>Format</i>
Basic knowledge	Fundamental vocabulary of Mind, Brain, and Education Science. Goals of Mind, Brain, and Education Science. Main thought leaders of the field. Historical development of Mind, Brain, and Education Science. Comparing Mind, Brain, and Education Science differs from “brain-based education.” Core tenets, principles, and instructional guidelines of Mind, Brain, and Education Science. Neuromyths in Mind, Brain, and Education Science.	33%	Essay question format
Basic skills	Able to teach using Mind, Brain, and Education Science instructional principles. Able to accurately differentiate proven information from unproven information in Mind, Brain, and Education Science. Able to research and author documents worthy of Mind, Brain, and Education Science tenets, principles, or instructional guidelines. Able to explain to others how Mind, Brain, and Education Science differs from “brain-based education.”	33%	Multiple choice questions Short-answer comparative questions Essay question
Basic attitudes	Successfully develops a critical view of the literature and claims related to the brain and teaching techniques. Successfully expresses cautious optimism for the promises of Mind, Brain, and Education Science. Enthusiastically demonstrate acknowledgment of the Mind, Brain, and Education Science paradigm shift in pedagogy. Promotes the benefits of Mind, Brain, and Education Science as both a philosophy and a best-practice of education.	33%	Essay question

A: 90.1–100

B: 80.1–90

C: 70.1–80

D: 60.1–70

F: <60

CLASS PARTICIPATION RUBRIC

Possible: 16 points.

Mind, Brain, and Education Science

<i>Criteria</i>	<i>1 Nonperformance</i>	<i>2 Basic</i>	<i>3 Proficient</i>	<i>4 Distinguished</i>
Applies relevant course concepts, theories, or materials correctly.	Does not explain relevant course concepts, theories, or materials.	Explains relevant course concepts, theories, or materials.	Applies relevant course concepts, theories, or materials correctly.	Analyzes course concepts, theories, or materials correctly, using examples or supporting evidence.
Collaborates with fellow learners, relating the discussion to relevant course concepts.	Does not collaborate with fellow learners.	Collaborates with fellow learners without relating discussion to the relevant course concepts.	Collaborates with fellow learners, relating the discussion to relevant course concepts.	Collaborates with fellow learners, relating the discussion to relevant course concepts and extending the dialogue.
Applies relevant professional, personal, or other real-world experiences.	Does not contribute professional, personal, or other real-world experiences.	Contributes professional, personal, or other real-world experiences but lacks relevance.	Applies relevant professional, personal, or other real-world experiences.	Applies relevant professional, personal, or other real-world experiences to extend the dialogue.
Supports position with applicable knowledge.	Does not establish relevant position.	Establishes relevant position.	Supports position with applicable knowledge.	Validates position with applicable knowledge.

A: 14.5–16

B: 12.9–14.4

C: 11.3–12.8

D: 9.6–11.2

E: < 9.5

Based on Capella University's ED 5500 course rubric

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, or any information storage and retrieval system, without permission from the publisher.

TEACHERS COLLEGE PRESS

Teachers College, Columbia University
1234 Amsterdam Ave, New York, NY 10027
800.575.6566 • www.tcpres.com