FIYS106 MEDICAL MYSTERIES: *Neuroscience & Society*
Fall Semester 2003-2004
Shubhik K. DebBurman

BASIC INFORMATION

Class Hours:

Lecture:	9:00 am - 9:50 am	M-W	Johnson 200
Laboratory:	12:30 pm- 2:20 pm	T	Johnson 215

Instructor Office Hours:

10 am-12 noon	MWF	Johnson 201

Dropping in: If I am in the office and free of other duties, I'll be happy to meet with you.
If I am busy in office or in lab, respect my non-availability and schedule an appointment.
Phone: 735-6040 (office), 615-2647 (home); avoid calling after 9 pm unless its an emergency.
email: debburman@lfc.edu. Email is better than phone.

Peer Instruction (see yellow handout on Out-Of-Classroom Support for more details on peer instruction)
Peer Teachers: Katrina Brandis'06 (brandka@lfc.edu) and D'Anne Duncan (duncads@lfc.edu)
Peer Writing Consultant: Rachel Gratis'04 (gratira@lfc.edu)
Peer Mentors: Louise Mason'05, Alla Naryzhny'05, Julia Shklovskaya'04

Library Research Guide: http://www.lib.lfc.edu/resource/bio.html

COURSE GOALS

1. To learn beginning neuroscience material from lectures, introductory texts, and basic brain anatomy.
2. To appreciate that research is integral to solving medical mysteries and to understand the research process.
3. To recognize and understand ethical dilemmas in biomedical research.
4. To improve your skills in written and oral communication and use it to educate peers.
5. To learn to collaborate with peers and develop skills in collective responsibility.

DESCRIPTION

Welcome to Medical Mysteries! This first year studies (FIYS) course is designed to excite beginning students about how the study of the human brain ("neuroscience") connects with biomedical issues in human society. Neuroscience is one of the best funded, actively growing areas of medical research. Uncovering how our brains work is one of the final frontiers for scientific exploration. Unfortunately, neurological diseases are fast becoming the major 21st century health concern of the United States. As you mentioned to me in phone conversations this summer, you chose this course because you are interested about how your brain helps you think, feel emotions, hear, see, smell, taste, move, talk, read, write, eat, sleep, dream, learn and form memories. Many of you have serious interest in the biomedical/health professions, natural sciences, or psychology; several simply have a strong natural curiosity for the biology of the mind and were drawn to the topic.

Through summer readings, you have already become acquainted with two tragic incurable illnesses by reading Deadly Feasts (prion diseases) and Piecing Alzheimer's Together. You will further explore Alzheimer's by meeting with scientists and medical experts during your Chicago Experience on August 24, by reading Sue Miller's Story of My Father, and by watching Oscar-winning movie *Iris*. Through lecture and classroom discussions, you will not only explore the basic biology of the human nervous system, but also investigate how its dysfunction causes devastating, mysterious medical illnesses. By watching several highly acclaimed documentaries and cinema, you will discover the complex symptoms and biology of Williams Syndrome, Autism, Usher's syndrome, and Schizophrenia. Leading neuroscience researchers from the Chicago area universities will present seminars on the cutting edge of discovery through special visits to LFC. I am confident you will realise that despite astonishing advances, major mysteries remain to be solved. You will debate ethical dilemmas that face society as scientists race towards solving these mysteries and experiment with potential new treatments. You will also dissect real human brains to make connections between its complex structures and human behavior. Lastly, you will collaborate with peer mentors from BIO346 Molecular Neuroscience (the advanced neurobiology course that I also teach) to organize a campus-wide "brain awareness" week, as part of demonstrating your learning and connecting it to society's concerns.

READINGS

Introduction to Brain & Behavior, by Bryan Kolb and Ian Wishaw.
Deadly Feasts, by Richard Rhodes
Story of My Father, by Sue Miller

EXPECTATIONS

Academic Honesty:

I have zero tolerance for abuses. Please consult your student handbook regarding academic honesty and the honor system by which you should conduct yourself.

URL: http://www.lfc.edu/template.cgi?activities/handbook/section-7.html#HONESTY

Attendance:

***Philosophy*:** I will work hard to present to you with relevant information in neurobiology in a lucid and interesting manner. In return, I expect that you will regularly attend my lectures and actively participate in the classroom, lab, and assignments. I will assume that you have read your assignments prior to class so that you can best engage in an interesting classroom discussion and gain maximum benefit from my lectures. If you skip class, you will miss out both on valuable new information and possibly an interactive dialog. As a first year student, missing classes is a not a habit you want to cultivate in college.

***Punctuality*:** My pet peeve is when students arrive late to class. Apart from being disruptive to my teaching efforts, it is also disrespectful of the class.

***Absences*:** Unexcused absences from quizzes, exams, and labs will result in an appropriate loss in points. Health-related absences must be confirmed by student health services. Absences due to religious observations must also be made far in advance. Family or other personal emergencies will require confirmation by the Dean of College's office. I will make every effort to reschedule a missed quiz or a deadline, as a result of such excused absences.

***Unexcused Late Assignments*:** I strongly discourage assignments being handed in late without a valid excuse. AVOID THIS INDULGENCE. Each late day is a 25% deduction in points. No assignment will be accepted three days after it is due.

Lastly, But Not In The Least:

I am a professor in the LFC Biology Department. I am also member of LFC's Health Professions Advisory Committee and the Biology Internship Advisor. I teach several science courses in cell & molecular biology, neurobiology, and human diseases. I conduct biomedical research to understand how neurological diseases, like Parkinson's disease and Huntington disease, occur. Several talented and motivated LFC students (many planning to attend graduate school or medical school) work in my lab and conduct individualized research projects and senior theses. As a teacher, I find few things more satisfying than working with academically motivated, hardworking collaborative students like you. I enjoy giving you diverse opportunities for personal and professional growth and I work closely with you to help you achieve academic success. I am always experimenting with new ways of teaching science to beginning and advanced undergraduates. I expect you will push me hard to do my best job! If you encounter problems understanding the material, please do not hesitate to talk with me. My job here is *to help you learn*. Your feedback and participation in class is very important. Remember also that I am here to learn from you. I have often found my students to be my most important teachers. I hope this course will be a rewarding experience for all.

GRADING

A. Your Skills at Learning Beginning Neuroscience Material	**350**	
1. Deadly Feasts Discussion	50	**already done!**
2. Integrating Alzheimer's: Summer Reading & The Chicago Experience	50	**already done!**
3. Quizzes (Best 5 of 6): 50 points each	250	

Quiz I: Chapter 1-2
Quiz II: Chapter 3-4
Quiz III: Chapter 5-6
Quiz IV: Chapter 7-9
Quiz V: Chapter 10-12
Final Quiz: Chapter 13-15
(Optional: only take if you want to drop or missed an earlier quiz). Also see note below.

B. Your Skills at Connecting Your Brain Structure To Function	**100**	
1. Functional Anatomy in the Lab	100	
C. Your Skills at Engaging & Educating Peers	**300**	
1. Medical Ethics Project (Learning To Evaluate Scientific Practices)	100	
2. Brain Awareness Project (Learning To Teach Neuroscience To the Public)	200	
D. Your Skills at Communicating By Writing	**150**	
Response Papers (Best 3 of 4): 50 points each	150	

1. On Story of My Father and *Iris*
2. On the PBS *The Secret Life of the Brain* Video Series
3. On the BBC *The Mind Traveler: Oliver Saks* Video Series
4. On A Beautiful Mind
(Optional; only take if you want to drop or missed an earlier Response paper). Also see note below.

E. Four Simple Ways to Earn the Last 100 points	**100**	
1. Don't Miss Class	40	
2. Demonstrate Resource Use, Creativity, Collaboration	30	
3. Complete FIYS106 Course Survey & Reflection	20	
4. Attend a Medical Colloquia Talk	10	
TOTAL	**1000**	

Important Note on Optional Assignments:
1. To qualify for optional Final Quiz or Final Response, you must not miss classes during weeks 15 and 16.

SCALE

A	900 and above
B	800-899
C	700-799
D	600-699
F	<600

I rarely curve. If I do, you will only benefit and your grade will not be lower than the scale above. If you are on the borderline between two grades, I may reward improved performances over the semester and may look favorably on your overall use of resources, collaborative ness, and positive intellectual attitude during the semester (see Green Handout).

ASSIGNMENTS IN DETAIL

A. Your Skills at Learning Beginning Neuroscience Material 350 points

1. Deadly Feasts; Summer Reading#1, 50 points

This summer you should have read this fascinating very-easy-to-read gripping account of one of the most enigmatic medical illnesses known, written by the Pulitzer Prize winning author, Richard Rhodes. As you read this book, you should have filled out in reasonable detail the Deadly Feasts Book Discussion Sheet. To be fully prepared for the Deadly Feasts Book Discussion, answer all questions in the sheet. Make a photocopy of this completed discussion sheet and bring both copies to your First Day of Class (Sunday, August 24). Bring the photocopy on the day of class discussion, take down additional notes, and hand in photocopy to me. You are expected to actively participate in class to receive full credit.

2. Integrating Alzheimer's: Summer Reading #2 & Chicago Experience, 50 points

This summer you should have also read ***Piecing Alzheimer's Together,*** by Peter St. George-Hyslop, one of the world's leading Alzheimer's scientists. Only answer Questions 1,2 & 3 for the First Day of Class meeting (Sunday, August 24) and hand in your answers to me. On Tuesday (August 26), the entire freshman class will visit a Chicago institution relevant to their FIYS course. As a student in FIYS106 Medical Mysteries, you will accompany me to downtown Chicago's Northwestern University Medical School. There, we will visit with world-renowned scientists and doctors engaged in cutting-edge scientific research on Alzheimer's Disease and talk with these scientists about the importance of biomedical research in medicine and to society. After this experience, complete Question 4 and submit to me at the next class meeting (September 1).

3. Quizzes, 250 points
50 points each, Best 4 of 5

The Five quizzes (during lecture time; see Schedule) and the Final quiz (during final exam time) will be based on classroom discussions (supported by chapters assigned from your textbook). Quizzes will be mostly objective questions. I will give the first 25 minutes of class-time for each quiz. For each chapter, I will provide a list of concepts that will form the basis of quiz questions. You are allowed to drop one quiz score, since I will use only the best 5 scores towards your course grade. *The final quiz becomes optional, if you have taken the first five quizzes and are happy with your scores*.
Note: To qualify to not take the Final Quiz, you must not miss classes for unexcused reasons during weeks 15 and 16. An unexcused absence will require you to take final quiz and it will count towards your five quizzes. I will drop the lowest score from one of your earlier quizzes.

B. Your Skills at Connecting Your Brain Structure To Function 100 points

1. Functional Neuroanatomy, 100 points

Most students have to wait till medical or graduate school before they can handle human brains. You get to study them first-hand your first semester in college! The brain is simply one of the most fascinating organs of your body. You will get to handle, dissect and learn the basic anatomy of human brains in this class and compare it to sheep and calf brains. After exposing to various aspects of brain function in class, I expect you to learn anatomy by correlating it with brain function. You will be given six weeks (weeks 7-12) to gain this familiarity. During this time, we will spend one hour of Tuesday lab time to focus on certain aspects of brain structure and function. On Week 13, you will take an anatomy exam during lab time. Your peer teacher will be happy to conduct a mock anatomy exam on week 11 to help you become used to the exam format.
Form a group of 4-5 members. This group should study anatomy together and conduct the two projects in the next session.
Anatomy is best learned as a group and by repeated exposure to the brains. You should plan on returning to lab during non-lab times to practice your anatomy between weeks 7-12.

C. Your Skills at Engaging & Educating Peers 300 points

The same neuroanatomy study group should conduct both the following projects. Do not form new groups.
Everyone must participate equally within a group.

1. Medical Ethics Project (*Learning To Evaluate Scientific Practices*), 100 points

Neuroscientists are constantly faced with their own ethical dilemmas. Part of being a good scientist is being aware of such issues and knowing how to work with them. You will work with your assigned BIO346 peer mentor to pick an ethical case study from the list below. Your peer mentor will advice this group to prepare a one-hour class presentation during assigned lab hours that discusses the many issues that underlie your assigned case, the choices a scientist faces, and steps to overcome the ethical dilemma. Part of the group's presentation will also be to research real ethical problems that have been highlighted in science journals and the popular media in the last five years that resemble the problem you are discussing. The entire FIYS class should be involved in a broader discussion of the same problem during or after the group's presentation. The peer mentor should not play an active role during the presentation. Instead, he/she should mentor behind the scenes and prepare you for discussion.

Ethics Topics:	**Ethics Dates**	
Promotional Pressures	Week 5 (FIYS106 Lab Time)	BIO346 Student will peer lead
To be a Consultant … or Not	Week 6 (FIYS106 Lab Time)	BIO346 Student will peer lead
A Political Power Keg		
Concerning Confidentiality		
Sound Practices		
Cotter's Quandary		
A Subject for Discussion		

Consult handout on Ethics Case Studies.
I will reserve 10 points for your group to provide me a written summary of your discussion and all consulted materials.

2. Brain Awareness Project (*Learning To Teach Neuroscience To the Public*), 200 points
Week of November 17-21

This is a highly creative and collaborative project designed to provide you with an exciting opportunity to educate the LFC community about a neuroscience topic and to work closely with FIYS peers and senior peers. You will work with your assigned BIO346 peer mentor to pick one topic from among the following four areas of complex brain functions: **Learning & Memory**, **Emotions**, **Cognition**, and **Language**. Your peer mentor will help you to design, research and conduct a Brain Awareness Campaign educating the community on the biology underlying this topic on our campus on the week of November 10 (2003). The BIO346 Peer mentor's goal is to motivate, organize, educate, counsel, help plan, and serve as both role model and academic and campus resource. The actual format of how your group decides to conduct outreach is completely open-ended. I encourage you to be highly creative and have a really enjoyable time with this project. Make it personal to you—invest in it. Remember, *I love being surprised*!

The bottom line for the group's outreach plan:
-educate the non-scientist about the topic in an interesting and effective way
-reach a significant proportion of the campus community (middle campus, peak time)
-combine visual with oral and written forms of communication with some hands-on exercise
-include a physical display of some kind that can later be showcased in Johnson Science Building
-reflect the liberal arts (try and combine science with fine arts, theater, humanities, or social sciences)
-use multiple resources (books, internet, research) and must connect with brain anatomy

Must address:

Why is this an important human behavior to study?
What is the basic way our brain performs this activity?
What are the current medical mysteries for this brain activity?

I will reserve 20 points for practicing your presentation as a group in front of your peer teachers a week before the final presentation and for revising the presentation based on feedback.

D. Your Skills at Communicating By Writing 150 points

All FIYS courses at LFC are writing-intensive.

Response Papers (Best 3 of 4): 50 points each

1. On Story of My Father and *Iris*

Sue Miller, one of America's best-selling contemporary novelists, has once again won critical acclaim for her writing: this time, for publishing her latest book which memoirs her role as caregiver to her father's Alzheimer's condition. This vivid portrayal is sure to move you and make you think of neurological conditions with new insight, adding to your Chicago experience at Northwestern Memorial Hospital and the impact of your summer readings. You will also see the oscar-winning movie, *Iris,* during lab on September *9.* This movie is about Iris Murdoch, one of 20th century's great British novelists, who also died of Alzheimer's. Your first response paper explores your ability to critique. Write a 1000-word review to the *Editor* of Stentor, our college newspaper, providing a joint assessment of this book and the movie for its student readers. Pretend you are a book and movie critic and provide a positive/negative recommendation to read this book and see this movie and justify your recommendation. I will provide some good examples of book /movie reviews, so you can become familiar with content and style. I encourage you to support your opinions in this review using: your summer readings, Chicago trip, and your own personal experiences with neurologies like Alzheimer's, if any.

The best-written review from this class will be published in Stentor, according to an arrangement I have made with Stentor's staff.

You are required to get your draft read by Rachel Gratis'04 at the Writing Center a week before it is due. I will reserve 10 points for this consultation. Make appointments ahead of time to see her.

2. On PBS *The Secret Life of the Brain* Video Series

The mystery begins in the womb four weeks after gestation. 500,000 brain cells are forming very minute. Eventually, there will be billions of cells and trillions of links, with every cell finding its place and every link carefully organized. How does this happen? Renowned filmmaker David Grubin draws on neuroscience's leading researchers and latest discoveries for answers. This series explores the startling new map of the brain that has merged from the past decade of neuroscience and shares a revelatory view of this complicated organ. You will not only learn startling new truths about the brain, but also voyage inside it.

Video 1: **The Baby's Brain**: Wider Than the Sky
Video 2: **The Child's Brain**: Syllable from Sound
Video 3: **The Teenage Brain**: A World of Their Own
Video 4: **The Adult Brain**: To Think By Feeling
Video 5: **The Aging Brain**: Though Many Lives

Your second response paper explores your ability to narrate. Imagine you are a neuron. Pick the part of the brain where you most like to reside! Tell the story of your life (from your birth as neuron till your death) as part of a human being who lives a long productive life but dies from a neurological disease that affects the part where you live and function. Use insights from the 5-video series on brain development and function during the different stages of a human's lifetime, and from classroom discussions. This creative writing adventure should be in first person and should explain biology in a lay simple style.

The best-written essay from this class will be published in Stentor, according to an arrangement I have made with Stentor's staff.

You are required to get your draft read by Rachel Gratis'04 at the Writing Center a week before it is due. I will reserve 10 points for this consultation. Make appointments ahead of time to see her.

3. On the BBC The *Mind Traveler: Oliver Saks* Video Series

Details of Response Paper TBA later.

4. On *A Beautiful Mind*

Details of Response Paper TBA later.

This is an optional response paper. To qualify to not write the Final Response paper, you must have written the first three response papers, and you must also not miss classes for unexcused reasons during weeks 15 and 16 An unexcused absence will require you to write this final paper and it will count towards your best of three response paper grades. I will drop the lowest score from one of your earlier three responses.

E. Four Simple Ways to Earn the Last 100 points: *GO FOR IT!*

1. Don't Miss Class, 40 points
Respect the process of learning, and the efforts of your peers and teacher- come to class!
We meet 45 times this semester. Your peer teacher will take attendance for each meeting. You are allowed five unexcused absences without penalty (labs not included). After that each absence is loss of one point.

2. Demonstrate Resource Use, Collaboration, & Intellectual Enthusiasm, 30 points
How you learn is just as important as what you learn. If you demonstrate positive learning habits, good collaborative ability, and use the placed resources well, I will be happy to award you up to 30 points. Consult Green Handout on how to maximize your efforts.

3. Complete FIYS106 Course Survey & Reflection, 20 points
I never teach the same course twice the same way. I constantly strive to improve my teaching, refining things that work and changing or removing things that are not effective. You are the best source of advice I use for such revisions. I expect and respect careful, thoughtful feedback from motivated, hardworking students like you. So, I have designed a course survey and a course reflection statement that I will ask you to complete on the last day of class. By this date, you will have all your assignments graded and returned, so you can confidently and accurately self-evaluate your learning and accomplishments.

4. Attend One of Two Medical Colloquia Talks, 10 points
I believe that it is important to expose undergraduates to the dedicated scientists who are working at the forefront of research. This semester I will invite several well-known medical experts and researchers to visit Lake Forest College and educate us about their efforts to solve diverse medical mysteries. If you attend any one of these talks fully, you will receive 10 points.

Fall 2003 Medical Colloquium Talks include:
A. 4:15 pm, October 9, Regina Stevens-Truss, Kalamazoo College, Importance of Nitric Oxide in the Brain
B. November 17-21 week, date/time TBA, Raymond Roos, University of Chicago, On Mad Cow Disease
C. 8 am, Dec 4, Benjamin Wolozin, Loyola Medical School, On Parkinson's Disease
D. Dec 4, Linda Van Eldik, Northwestern Medical School, On Alzheimer's Disease
E. A talk on Brain Tumors, Time, date, week TBA

And Guess what, if you attend more than one such advertised talk, each additional talk is bonus of 10 points that will simply be added to your overall course score and grade. Great way to make up for a low score in a quiz or paper! *Always make sure your peer teacher notes your presence, when you attend a talk, so that you receive credit.*

YELLOW HANDOUT

FIYS106: *OUT-OF-CLASSROOM RESOURCES*

Peer Teachers

Katrina Brandis'06 (For Lecture, Lab, Projects) email: brandka@lfc.edu phone: x5196
D'Anne Duncan'04 (for Lab & Projects only) email: duncads@lfc.edu phone: x5974

Katrina Brandis'06 is your official peer teacher and is expected to participate in all aspects of this course. She is a biology and chemistry major and was a Richter scholar in my research lab last summer and she plans to conduct her senior thesis with me. She will attend all lectures and labs. She will hold weekly tutorials in the evenings that I encourage you to attend so that you can review your lecture and classroom discussions and be best prepared for your quizzes.

D'Anne Duncan'04 is your peer orientation leader and she has enthusiastically volunteered to be an unofficial peer teacher. D'Anne is a biology senior and a well-respected leader of the LFC student community and a member of the Senior 25. She has taken two classes with me, enjoyed the way I teach, and thrived in my classroom. She can give you the inside scoop on how to do well in my classroom. She will attend all lab sections and her role is to help you specifically on two collaborative group projects and mastering anatomy labs.

Peer Writing Consultant (Writing Center):

Rachel Gratis'04 email: gratira@lfc.edu phone:

Rachel Gratis'04 is a writing consultant at the LFC Writing Center. She is also a senior biology major, has been an excellent student in my classroom, and has very good understanding of my expectations. Her writing talents and ability to critique peer work is outstanding. For each response paper, you are expected to show your draft to Rachel a week before the paper is due and revise it to accommodate her criticisms before you hand in your final draft for grading.

BIO346 Peer Mentors

Julia Shklovskaya'04 email: shkloja@lfc.edu phone:
Louise Mason'05 email: masonl@lfc.edu phone:
Alla Naryzhny'05 email: naryzaa@lfc.edu phone:

This class will divide into three groups of 4-5 members each for the two collaborative projects: on Medical Ethics and Brain Awareness Week. To each of these groups, one of the above three BIO346 students will be placed as senior peer mentor. They are responsible for successful implementation of your projects and to aid your scientific understanding of the neuroscience subject matter. You are expected to involve them in all aspects of your group projects. In addition to helping you, they will engage in similar ethics and outreach projects in BIO346, the advanced neurobiology course. In fact, their individual outreach project is closely linked to your project (their research will simply be more in-depth).

Reference Librarian

Nancy Bohm, reference librarian in Donnelley library, is specialized in sciences. She has been invaluable to my students in other courses. I encourage you to seek her advice on your search for relevant boks, papers, web sources for your projects.

Library Research Guide: http://www.lib.lfc.edu/resource/bio.html
This is handy course guide will help you find resources via the library and the internet for your research projects in this course. I will go over features of this guide during your syllabus workshop during lab time on September 2.

GREEN HANDOUT

FIYS106: *Tips on Resource Use, Collaboration, & Intellectual Enthusiasm*

You have used resources effectively if you

Did not miss appointments with me and did not wait till the last minute to work on assignments
Consulted regularly with peer teachers when you needed advice or help and attended peer teacher sessions
Incorporated Writing Consultant's feedback on Response papers
Took mock practical exam in preparing for anatomy exam
Practiced your talks in front of peer teachers/peer mentors

You have collaborated well if you

Contributed equally to developing each group project and participated equally in presenting each talk.
Involved BIO346 peer mentor and accorded respect to senior peer.
Provided support for your group members if they needed it.
Did not complain about each other and tried to solve conflicts by talking to each other.
Maintained healthy collegiality and supported other groups by enthusiastic participation in their efforts

You have demonstrated positive intellectual attitude if you

Were attentive and participated actively in class and lab and pushed me to be even more effective
Were prepared ahead in readings and were not absent or late for class, labs, or meetings
Demonstrated curiosity and creativity in your assignments
Showed personal initiative and leadership (plenty of scope to do so in this class)