301V: “Revolutionary Ideas in Science” Course Summary

In 2010 the Nobel prize committee awarded the following prizes:

• In physics, to Andre Geim and Konstantin Novoselov "for groundbreaking experiments regarding the two-dimensional material graphene"

• In chemistry, to Richard F. Heck, Ei-ichi Negishi and Akira Suzuki "for palladium-catalyzed cross couplings in organic synthesis"

• In physiology or medicine to Robert G. Edwards "for the development of in vitro fertilization"

Why?
Why these subjects?
Why these results?
Why these scientists?
Why now?
Who decides?
How have these three results changed you life, or your family’s life, or society, or the world?
Are these the modern scientific revolutions?

By the end of this course you will able to work our the answer to these questions. And, more importantly, you’ll be able to ask your own questions. In this course we will be addressing the issue of revolutionary ideas in science. We’ll be looking at what constitutes a revolution in science, from the time of Aristotle, to Newton, to Darwin, to Einstein. We’ll be doing this by adopting a team-based-learning program, so you’ll be doing a lot of talking, debating, arguing, and figuring things out for yourself. The course is based around 8 learning objectives, in which I detail what you will be able to DO by the end of the course. The course content (what you’ll KNOW) is not as important and hence is very flexible depending on what you, the student, would like to learn about.

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Learning Objectives

By the end of this course you will be able to do the following objectives, thereby distinguishing you from a student who has not taken this course.

• **Demonstrate** an effective ability to succeed in a team by **contributing** to team success and **listening** to students who possess different skills than you may have.
• **Appraise** the relative impact of several scientific revolutions throughout history.
• **Debate** the trials and tribulations of scientists and **empathize** by deciding what you would do in their circumstances.
• **Determine** and **explain** the role of society, money, and religion in the progress of science.
• **Construct** a series of arguments for accepting or dismissing a potential scientific revolution.
• **Engage** in the scientific thought process, and **think** like a scientist.
• **Distinguish** between science and pseudo-science.
• **Assess** the potential future science revolutions during your life, and over the next millennium.

Course content

In this course you will appreciate and discuss multiple examples of scientific revolutions. The course will be broken down into several learning units. Each unit will contain its own specific learning outcomes. The subjects of each unit will be chosen by you, student.

Unit 0: Introduction to Team-Based-Learning: 2 classes

Unit 1: Scientific Revolution 1 4 classes, 1 class test or debate

Labor Day

Unit 2: Scientific Revolution 2 4 classes 1 class test or debate
Unit 3: Scientific Revolution 3 5 classes, 1 class test or debate
Unit 4: Scientific Revolution 4 5 classes, 1 class test or debate
Unit 5: Scientific Revolution 5 5 classes, 1 class test or debate
Unit 6: Scientific Revolution 6 5 classes, 1 class test or debate

Special Events 3 classes, interspersed in semester

Thanksgiving week

Review Week 3 classes

Final Exam One 2-hour exam, Exam week
Viewing a Wider World

Viewing a wider world courses foster intelligent inquiry, abstract logical thinking, critical analysis, and the integration and syntheses of knowledge; it strives for literacy in writing, reading, speaking, and listening; it teaches mathematical structures; it encourages an understanding of science and scientific inquiry; it provides a historical consciousness, include an understanding of one’s own heritage as well as respect for other peoples and cultures; it includes an examination of values and stresses the importance of a carefully considered values system; it fosters an appreciation of the arts; and general education provides the breadth necessary to have a familiarity with the various branches of human understanding.

Textbooks and materials

The required book for my course is “Great Ideas of Science”. It is published by Cognella Academic Publishing, distributed by University Readers, Inc. and is available through the University Readers’ student store (https://students.universityreaders.com/store/).

I have carefully chosen this book to provide you with the best learning experience. It is required that you buy your own copy before the second day of class (Monday August 22), as you will be using this to decide what you would like to study in this course. The book price is $59.95, and includes readings that we will use in class daily. Also, please keep in mind that our institution adheres to copyright law, so any copyrighted material should not be copied or duplicated in any manner.

To buy the textbook, please follow the instructions below:

Step 1: Log on to https://students.universityreaders.com/store/.

Step 2: Create an account or log in if you have an existing account to purchase.

Step 3: Easy-to-follow instructions will guide you through the rest of the ordering process. Payment can be made by all major credit cards or with an electronic check.

Step 4: After purchasing, you can access your partial e-book (FREE 20% PDF) by logging into your account and clicking My Digital Materials to get started on your readings right away.

Orders are typically processed within 24 hours and the shipping time will depend on the selected shipping method and day it is shipped (orders are not shipped on Sundays or holidays). If you experience any difficulties, email orders@universityreaders.com or call 800.200.3908 ext. 503.

This book will be supplemented by free materials which I will make available though blackboard and by the New York Times (available free on campus). You must pick up a copy of the New York Times every Tuesday, read the science supplement, and bring it to class on Wednesday and Friday. Also scan over the New York Times Science website (http://www.nytimes.com/pages/science/) as we may use podcasts or blogs for our discussion.
Course Website

We will make extensive use of blackboard throughout this course. It will be used for providing your grades, announcements, pre-class reading assignments, dates and time of special events, and all of my lectures notes. You should also use your blackboard to email me or your TA with any questions or comments you have. I will email you through blackboard so ensure you either check your blackboard email regularly or have your blackboard email forwarded to you chosen email address. Assistance on the effective use of blackboard can be found at http://learn.nmsu.edu, by calling the ICT Help Desk at (575) 646-1840 or emailing the ICT help desk at help@nmsu.edu.

Grading

This course will use a student-interactive grading system. This will take place during class on August 19th and August 22. Your grade will reflect two components of student learning; independent study and team success. The exact weighting of each component will be decided by you, the student, within set boundaries. The result of this exercise will be binding, and made available on blackboard as an addendum to this syllabus. The final result will be curved to assign letter grades. Your living-grade (an updated grade reflecting your up-to-date work) will be available through blackboard. Each unit will contain a readiness assurance test (RAT) which will be carried out both individually and as a team. The individual RAT will be open book; this means you may bring along and use any of your own notes but no other source (e.g., no books, no internet) will be allowed. The team RAT will not be open book. Each unit will end with a class test or debate. Both of these will be carried out individually and as a team. The individual component will be open book (only your own notes will be allowed) and team component will not be open book. The final exam will not be open book. There will be no mid term exam.

Time and Location

Classes will meet on Monday, Wednesday, and Friday at 12:30-1:20pm in Biology Annex room 102.

Instructor

Prof R.T.James McAteer’s office is room 206, astronomy building (Corner of Williams and Frenger Street), directly across the parking lot from the biology annex). You can contact me through blackboard, or phone (575-646-4087). If you wish to email me, include the class title somewhere in the subject line, always begin the email ‘Dear Prof McAteer,’ and end your email with your full name, e.g., ‘Regards, Rebecca Smith.’ My fixed office hours are 1:30pm until 2:30pm on Monday (i.e., directly following the Monday class). I expect every single student to visit my office hours sometime before Labor Day. Visiting my office and telling me what you like about the course, what you find difficult, etc., will count as a component of your independent study grade.
Teaching Assistant

Nikki Nielsen’s office is room 209, astronomy building. You can contact her by email through blackboard or phone (575)646-7724. For an email, include the class title in the subject, always begin the email ‘Dear Ms Nielsen,’ and end your email with you full name. Nikki will be assisting during class, and is also available for questions outside of class.

Policies and Procedures

1. Syllabus. This syllabus, including any addendum, is a legally binding document. By taking this class you are agreeing to everything documented within this syllabus.

2. Attendance. Attendance to the lectures is mandatory and a role will taken in every class. Your absence will only be excused if you provide prior warning to Prof. McAteer or the class TA, and include proper documentation. These excused absences will be marked as E. Unexcused absences on any occasion will marked as an U. This can be changed to an E if you provide proper reason and documentation the next time you come to class. Any student who receives a U twice will be called into my office and may be removed from the class. Your final attendance (minus E and U) will be factored as a component into your final grade. There will be no make-up opportunity for any component of the course. If the time of the final exam clashes with any other subjects, you must let me know 7 days in advance in order to make alternative arrangements.

3. Deadlines. The deadline for registration / course additions is Monday, August 29, 2011. The last day to drop a course with a W is Tuesday, October 11, 2011. The last day to Withdraw from the University is Friday, November 11, 2011.

4. Code of Conduct. The current Student Code of Conduct can be found at: http://www.nmsu.edu/~vpsa/SCOC/misconduct.html. It reads as follows:

“Academic Misconduct - Any student found guilty of academic misconduct shall be subject to disciplinary action. Academic misconduct includes, but is not limited to, the following actions:

a. Cheating or knowingly assisting another student in committing an act of cheating or other forms of academic dishonesty.

b) Plagiarism is using another person’s work without acknowledgment, making it appear to be one’s own. Any ideas, words, pictures, or other source must be acknowledged in a citation that gives credit to the source. This is true no matter where the material comes from, including the internet, other student’s work, unpublished materials, or oral sources. Intentional and unintentional instances of plagiarism are considered instances of academic
misconduct. It is the responsibility of the student submitting the work in question to know, understand, and comply with this policy. If no citation is given, then borrowing any of the following would be an example of plagiarism:

- An idea or opinion, even when put into one’s own words (paraphrase)
- A few well-said words, if these are a unique insight
- Many words, even if one changes most of them
- Materials assembled by others, for instance quotes or a bibliography
- An argument
- A pattern or idea
- Graphs, pictures, or other illustrations
- Facts
- All or part of an existing paper or other resource

This list is not meant to include all possible examples of plagiarism. See the University Library’s web page on plagiarism for further examples.

c) Unauthorized possession of examinations, reserve library materials, laboratory materials, or other course-related materials.

d) Unauthorized changing of grades on an examination, in an instructor’s grade book, or on a grade report; or unauthorized access to academic computer records.

e) Nondisclosure or misrepresentation in filling out applications or other University records in, or for, academic departments or colleges.

Students who engage in disruptive activities in an academic setting (e.g., classrooms, academic offices or academic buildings) are subject to disciplinary action in accordance with Section IV-Non Academic Misconduct-All Students. Such students are also subject to administrative actions in accordance with the NMSU Graduate and Undergraduate Catalogs.”

5. American Disabilities Act. If you have, or believe you have a disability, you may contact the Student Accessibility Services (SAS) Office located in Corbett Center, Room 244, 575-646-6840, or email sas@nmsu.edu. Appropriate accommodations may then be provided for you. All medical information will be treated confidentially. If you have a condition which may affect your ability to exit safely from the premises in an emergency during class, you are encouraged to discuss this in confidence with the instructor and/or the Director of University Disability Services/ADA Coordinator, Diana Quintana, at the SAS Office.
Questions regarding the Americans with Disabilities Act (ADA), the American with Disabilities Amendment Act and/or Section 504 of the Rehabilitation Act of 1973 should be directed to the SAS Office.

6. **Non Discrimination Policy.** Questions regarding NMSU's Nondiscrimination Policy and discrimination complaints should be referred to Gerard Nevarez, Office of Institutional Equity, 575-646-3635

7. **Student Success Services.** The student success center is located on the Zuhl library (second floor - tel: 575 646 5107) and provides advice on improving study skills, time management, note taking and test preparation. The student writing center is located in the Clara Bell William building (room 102 - tel: 575 646 5297) and provides one-on-one writing consultation. The math success center is located in the Walden building (rm 101 - tel: 575 646 7143) and provides math tutoring for all undergraduates.