UPDATED: Syllabus for the Fall 2011 GMU Course for the London Internship Program

**Course Title: Science in Context: Newton, Darwin, and the Royal Society**

Professor Michael R. Gabel, Ph.D.

Monticello House 45

Russell Square.

Monday, 12:30-4:30

**Course Description:**

The Royal Society, more formally, The Royal Society of London for Promoting Natural Knowledge, was founded 1660. Its goal is to “ensure that our contribution to shaping the future of science in the UK and beyond has a deep and enduring impact.” Emblematic of this goal are two of its arguably most renowned and influential members: Sir Isaac Newton (1642-1727) and Charles Darwin (1809-1882), each of whom provided breath-taking explanations of the nature of our world.

In this course we will examine the scientific contributions of each of these men, placed in the context of their time and location. We will learn that Newton was more the rationalist and Darwin more the empiricist. And so we will also explore this apparent conflict.

In Newton’s case, we will examine his contribution to cosmology and the nature of his mathematical discoveries, which solidified rationalist science. Along the way we will learn of those “giants” whom Newton referenced when he said, “If I have been able to see further, it was only because I stood on the shoulders of giants.”

In Darwin’s case, we will follow his journey to the Galapagos (and beyond) to see how eventually overwhelming empirical evidence led to his Theory of Evolution. We will also examine the societal tensions that his ideas produced, many of which remain today. In addition, we will examine the ways in which more modern discoveries have supported his ideas.

**Required Texts:**

Charlesworth, Brian & Deborah. Evolution - A Very Short Introduction. Oxford: Oxford University Press, 2003 (Paperback).

Darwin, Charles. The Essential Darwin. Ed. Julian Huxley. Mineola, NY: Dover Publications, 2006 (Paperback).

Dolnick, Edward. The Clockwork Universe: Isaac Newton, the Royal Society, and the Birth of the Modern World. New York: HaperCollins, 2011.

Howard, Jonathan. Dawin - A Very Short Introduction. Oxford: Oxford University Press, 2001 (Paperback).

Iliffe, Rob. Newton - A Very Short Introduction. Oxford: Oxford University Press, 2007 (Paperback).

**Optional Text:**

Bryson, Bill, ed. Seeing Further: The Story of Science & the Royal Society. London: HarperCollins, 2010.

**Course Requirements:**

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| **CATEGORY** | **Per Cent** |
| Biography of a current member of the Royal Society (focused on the science) (750 words) | 20% |
| Oral Presentations on the Readings (two)  | 10% |
| Research Paper on some aspect either Newton, Darwin or the Royal Society (1000 words) | 30% |
| Directed Questions (arising from class discussions) – due at the following class (two) | 10% |
| Field Journal (based on the London Experiences) | 20% |
| Course reflection (due the last day of class) (350 words) | 10% |
| TOTAL |  |

**The Reading/Discussion Schedule:**

The Nature and History of the Royal Society

[From ]

Introduction to Newton

[From and ]

Introduction to Darwin

[From ]

Cosmology before Newton – Ptolemy, Copernicus, Brahe, Kepler, Galileo

[From ]

Darwin’s Voyage of the Beagle: The Galapagos Archipelago

[From ]

Darwin’s Theory of Evolution

[From , and ]

Newton and Kepler’s Laws – the culmination (for now) of a long journey

[From and ]

**The London Experiences:**

Visit the Royal Society

Lecture at the Royal Society

Royal Society Waking Tour: The Science of the City

Royal Society Walking Tour: Walk in the Footsteps of the Giants of Science

The Darwin Center at the London Natural History Museum

The London Museum of Science Exhibit: Cosmos & Culture: how astronomy has shaped our world

**Some Regulations and Requirements:**

It is expected that you will attend all class meetings, complete all reading assignments before class, and to participate fully in class discussions and activities. Successful completion of the course will not be possible for students who miss classes or activities. Written assignments should be typed double-spaced with 1-inch margins in a 12-point font. Late papers will be penalized at 1/3 grade per day.

**HONOR CODE**: GMU is an Honor Code university; please see the University Catalog for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. Except when explicitly stated to the contrary, all work is to be your own work. In particular, collaboration on homework is permitted. Evidence of violation of this policy constitutes grounds for referral to the University Honor Committee.

**GMU EMAIL ACCOUNTS** Students must use their Mason email accounts—either the existing “MEMO” system or a new “MASONLIVE” account to receive important University information, including messages related to this class. See [http://masonlive.gmu.edu](http://masonlive.gmu.edu/) for more information.

**UNIVERSITY POLICIES** The University Catalog, [http://catalog.gmu.edu](http://catalog.gmu.edu/), is the central resource for university policies affecting student, faculty, and staff conduct in university academic affairs. Other policies are available at <http://universitypolicy.gmu.edu/>. All members of the university community are responsible for knowing and following established policies.