

CAPILANO UNIVERSITY COURSE OUTLINE	
Term: SPRING 2018	Course No. SCI 369
Course: REVOLUTIONS AND REVOLUTIONARY THINKING IN SCIENCE	Credits: 3.0 Section:
INSTRUCTOR(S) Office: Tel: 604- email: @capilanou.ca	

COURSE FORMAT: Three hours of class time, plus an additional hour of supplemental activity delivered through on-line or other activities for a 15-week semester, which includes two weeks for final exams.

PREREQUISITES: 42 credits of 100-level or higher coursework and one of the following: MATH 101 or 105 or PSYC 213 or LBST 201 or BADM 102 or Pre-calculus 12 with a minimum B grade or Math Placement Test

Note: This course is intended for students in the 3rd or 4th year of a degree program and serves as a required science elective for degree programs requiring such.

COURSE DESCRIPTION: Science is both a body of knowledge and a process of gathering knowledge. As a discipline, there have been key paradigm shifts throughout its history. Scientists triggering the shifts are considered revolutionaries because their ideas changed not only the course and progress of science but also the way humans see and understand the workings of the world's natural systems. Revolutions in scientific thought have fundamentally transformed society's view of the dynamic relationship between nature and humanity.

COURSE OBJECTIVES:

Student Learning Outcomes:

Upon successfully completing the course, the student will be able to:

- defend the value of science and the methodology of information gathering
- distinguish between key scientists and their contributions to the emergence of modern science
- explain how science has revolutionized the world
- categorize the basic principles considered revolutionary in the field of physics, biology, chemistry, and mathematics; and

- assess the application of science and technology to society.

REQUIRED COURSE MATERIALS:

Selected readings from:

- Aminov, Rustam. *A Brief History of the Antibiotic Era: Lesson Learned and Challenges for the Future*. Frontiers in Microbiology, 2010.
- Bell, Madison. *Lavoisier in the Year One: The Birth of a New Science in an Age of Revolution*. Norton, 2005.
- Bryson, Bill. *A Short History of Nearly Everything*. Bill Bryson, 2003.
- Darwin, Charles. *On the Origin of Species by Means of Natural Selection, Or, The Preservation of Favoured Reaces in the Struggle for Life*. J. Murray Publisher, 1859.
- Feynman, Richard P., Leighton, Robert B., Sands, Matthew. *The Feynman Lectures on Physics*. Addison-Wesley, 1963-1965.
- Hannam, James. *The Genesis of Science*. 2011
- Kuhn, Thomas. *The Structure of Scientific Revolutions*. University of Chicago Press, 1970.
- Le Couteur, Penny and Jay Burreson. *Napoleon's Buttons: How 17 Molecules Changed History*. Penguin Press, 2004.
- Lindberg, David C. and Ronald Numbers. *God and Nature: Historical Essays on the Encounter Between Christianity and Science*. University of California Press, 1986.
- McGrayne, Sharon. *Prometheans in the Lab: Chemistry and the Making of the Modern World*. McGraw-Hill, 2001.
- Singer, Charles. *A Short History of Science to the Nineteenth Century*. Clarendon Press, 1941.
- Stott, Rebecca. *Darwin and the Barnacle*. Norton & Co, 2004.
- Wallace, Alfred. *Natural Selection and Tropical Nature: Essay on Descriptive and Theoretical Biology*. MacMillan and Co., 1895.
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- Weiner, Jonathan. *The Beak of the Finch: A Story of Evolution in Our Time*. Vintage, 1995.
- Zimmer, Carl. *Soul Made Flesh: The Discovery of the Brain – and How it Changed the World*. New York: Free Press, 2004.

COURSE CONTENT:

Weeks	Topics
1-3	<ul style="list-style-type: none"> • Science – Its Creativity and Its Rigour • Timeline of Thought: Leaving Aristotle Behind • Egocentricity to Ecocentricity

Weeks	Topics
	<ul style="list-style-type: none"> Revolutions of All Sorts: Agriculture, Neolithic; Industrial; Commercial; Digital; Chemical; Medical and Information
4,5	From Alchemy to the Age of Polymers - Revolutions and Revolutionaries in Chemistry (Lavoisier, Boyle; Dalton, Mendeleev, Carothers)
6,7	From Optics to Waves to Exoplanets Revolutions and Revolutionaries in Physics (Copernicus, Galileo, Newton, Maxwell, Schrödinger; Einstein)
8,9	From the Abacas to Game Theory to Information Theory Revolutions and Revolutionaries in Mathematics and Computer Science (Euclid; Napier, Godel; Shannon)
10-12	From Aristotle's Humors to Stem cells and Jumping Genes Revolutions and Revolutionaries in Biology (Vesalius, Harvey, van Leeuwenhoek; Darwin; Wallace)
13	Overview and timeline production
14, 15	Final examination period

EVALUATION PROFILE:

Final grades for the course will be computed based on the following schedule:

Annotated Bibliography	15%
Poster Presentation	15%
Unit Exams (3)	35%
Final Exam	35%
TOTAL	100%

SUPPLEMENTAL 4TH HOUR ACTIVITY:

Supplemental activity might be a scheduled tutorial, an on-line activity, a group meeting, or some other activity as indicated by your instructor.

GRADING PROFILE:

Letter grades will be assigned according to the following guidelines:

A+ 90 - 100%	B+ 77 - 79%	C+ 67 - 69%	D 50 - 59%
A 85 - 89%	B 73 - 76%	C 63 - 66%	F 0 - 49%
A- 80 - 84%	B- 70 - 72%	C- 60 - 62%	

Students should refer to the University Calendar for the effect of the above grades on grade point average.

For success in this course, students are expected to attend all lectures; come prepared to address topics presented; and

complete assigned text book readings. For every one hour of lecture material presented, students should expect to spend two hours reviewing material, completing online quizzes and study guide assignments.

OPERATIONAL DETAILS:

- University Policies:** Capilano University has policies on Academic Appeals (including appeal of final grade), Student Conduct, Cheating and Plagiarism, Academic Probation and other education issues. These and other policies are available on the University website.
- Attendance:** The student is responsible for all information given in the lectures, including times of examinations and assignment deadlines.
- Missed Exams:** Normally, a score of zero will be given for a missed exam, test, quiz, etc. In some **exceptional** situations, the student will be permitted to write a make-up test or to replace the score by other marks (see below). The date and timing of any make-up option is at the discretion of the instructor.
- Options will only be offered to students if:
1. Circumstances are beyond the control of the student which resulted in the exam, test, quiz, etc. to be missed. Such circumstances include serious illness or injury, or death of close family member. A departmental “medical form” to be completed by both the student and his/her physician may be requested. A copy of the death certificate of a close family member may also be required.

Reasons do **NOT** include forgetting about the test, lack of preparation for the test, work-related or social obligations.
 2. The student has notified the instructor (or the School of STEM office staff, if the instructor is not available) about the missed exam, test, quiz, etc. Such notification **MUST** occur in advance, if possible, or at the latest, on the day of the exam, test, quiz, etc.
 3. Proof of the circumstances is provided. Proper documentation of illness or injury requires a completed medical form from a physician. All documentation **must be submitted within 5 days** of the missed exam.
 4. The student has been fully participating in the course up until the circumstances that prevented the writing of the exam, test, quiz, etc. **Fully participating means attending all classes and turning in all assignments in the course.**

- Final Exam Period:*** Students should note that the final exam period is from **(date) to (date) -including Saturday (date)** and that they can expect to write exams at any time during this period. Individual exam times will not normally be rescheduled because of holidays, work, or other commitments. While efforts are made to spread exams throughout the exam period, an individual's particular course combination may result in exams being scheduled close together, or spread widely through the entire exam period.
- Cheating/Plagiarism:*** Students caught cheating on a test will normally receive a grade of "F" for the course. First incidents deemed to be particularly serious, or second or subsequent incidents of cheating and plagiarism, will be dealt with under the provisions of the University Policy on Cheating and Plagiarism. Plagiarism (including the copying of any part of assignments, laboratory reports and essays) is a serious offence and is a form of cheating.
- Incomplete Grades:*** Incomplete grades ("I") are given only when special arrangements have been agreed upon with the instructor prior to the end of the semester. Since "I" grades are granted only in exceptional circumstances (usually health problems), their occurrence is rare.
- Professionalism:*** Students should be able to demonstrate a professional attitude and behaviour: reliability, respect for and cooperation with colleagues, willingness to work calmly and courteously, respect for equipment and systems, and constructive response to criticism. The use of cellphones during lecture and lab sessions is prohibited. This policy is strictly enforced. Students using cell phones could be asked to leave the lecture hall or laboratory room by the instructor.
- English Usage:*** Students are expected to use correct standard English in their written and oral assignments, exams, presentations and discussions. Failure to do so may result in reduced grades in any part of the Evaluation Profile. Please refer to the guidelines provided in the Capilano Guide to Writing Assignments (available from the University bookstore).
- Emergency Procedures:*** Please read the emergency procedures posted on the wall of the classroom.