

SCIGNRL105 Science and Society
Fall 2020



**SCIGNRL105 Science and Society
Fall 2020**

Classroom no: F14
Class times: Tuesday 08.45-10.45h, Friday 13.45-15.45h
Instructor: L.T. van den Broeke, PhD; T. Dinse, PhD
Email: l.broeke@ucr.nl; t.dinse@ucr.nl
Tel: 06-37597645; 0118-655546
Office no. & location: F2.06; F2.07
Office hours: Weekdays on appointment

I. Track information

- a. Prerequisites for this course: none
- b. This course is not part of a specific track but valuable for any track taken at UCR.
- c. This course is specifically designed for non-science majors. Science majors are discouraged to take it (see also II)

II. Course description

This course is intended primarily for students that do not have a background in the (natural) sciences, hence is especially suitable for non-science majors. The students will start to grasp and use scientific methods and develop their scientific thinking and reasoning skills. The aim is to "do science" at a level that is appropriate and to cover many scientific fields with guest lecturers from various disciplines, providing a broad perspective.

The focus of the Science and Society course is to provide students an improved understanding of the vital role of Science in Society. The course will broadly travel through the various scientific disciplines. Special attention will be given to issues that bear great global and societal relevance. Such issues may include climate change, vaccination, the digital revolution, genetic manipulation and more. The class will also be welcome to suggest other hot issues they would like included in class discussion.

III. Study Load

This course earns students four credits (equivalent to 7.5 ECTS). The class meets twice a week for two hours. Preparation time is approximately 10 hours per week.

IV. Course materials

- a) Suggested books and literature: there is no requirement to purchase a book.
- b) Other materials: information presented on Moodle.

V. Course organization and requirements

- a) Each day will be devoted to a particular topic or theme. There is a tentative schedule in section VII; which is subject to change. Thus refer to Moodle only, for the most up-to-date schedule.

- b) Meetings will begin with a student sharing a news item relevant to the theme or topic of the day. The presenting student will lead/moderate a short discussion; see schedule in section VII.
- c) The theoretical background of the day's topic will be presented. Typically in a traditional lecture format. For some class sessions, the second half will be dedicated to alternative in-class activities.
- d) Although in class participation is not graded directly, active participation is expected from you as it will improve your learning.
- e) Use of laptops are **not** allowed in class, unless required by the instructor (try to be involved).
- f) Occasionally, you will be asked to prepare for class: read assigned literature and/or perform homework assignments. In case of evident lack of appropriate preparation, you can be expelled from the session and have to catch up individually on another date at the end of the semester.
- g) Absenteeism needs to be communicated in advance whenever possible.
- h) Repeated lateness may affect your grade or lead to expelling from the course.
- i) Missing more than two classes will lead to a grade deduction; missing more than six classes will lead to a fail.
- j) Deadlines for individual or group work are to be met. Missing deadlines means grade deduction. Late work will only be accepted up to 5 work days (max) after the initial date due. There will be a 4% penalty for the assignment, for each day the work is late. If you hand in work after those 5 days, you will need permission of the instructor to submit for grading. Work handed in after an extension date (after 5 days plus the additional days allowed by the instructor) will not be accepted and a score of Zero will be assigned. This is to protect students to fail the course by not handing in assignments.
- k) Missing an exam without proper reason and prior communication means scoring 0%. If you miss an exam with a proper reason that has been communicated in advance, you will be offered the opportunity to do the exam on December 15th or 18th.
- l) In the unlikely event (because of COVID-19), a field trip is scheduled, your participation is compulsory. Absence should be approved by the tutor or senior tutor in writing. When absent, you will be given a replacement assignment (which will take you more time).
- m) If asked to submit work through Moodle, use either Word or Excel format (no pdf) to facilitate feedback.
- n) Grade information in Moodle is unofficial. Final grades for a course are set only after a final review by the instructor and the Board of Examiners. Your official final course grades are communicated to you by the Registrar.
- o) Special needs: students with documented learning disabilities or special needs should make their needs known to the instructor at the start of the course.
- p) Plagiarism is a serious academic offence which carries heavy sanctions. Acquaint yourself with the UCR Plagiarism Policy (see Student Handbook). All cases of suspected plagiarism have to be reported to the Board of Examiners.
- q) You are expected to speak English at all times.

This course is subject to UCR academic rules and procedures. Both students and instructors are required to know and follow these rules and procedures.

VI. Assessment

- a) News Item Presentation: 0%
- b) Written Exam (4x): 15% each
- c) Small Project (2x): 10%
- d) Final Poster: 15%
- e) Participation and in-class assignments: 5%

a. News Item Presentation:

All students are expected to present a short, current, news item about the topic of the day. Take something that is relevant to society. News items can be found, for example, in newspapers, or popular internet news sites. The item should be presented using visual aids and be about 5 minutes long. End the presentation with a discussion statement and moderate a short discussion. This small assignment is not graded but serves as an appetizer for each session and will help you to build a sense of the role of science in our current society. In addition it provides a low-stakes opportunity to present and act as discussion moderator.

See section VII in course manual for the schedule.

b. Written Exam:

There will be a total of four written exams. These will each cover one or two Modules. Exams may include multiple choice, matching, drawing diagrams and open-ended questions about the topics discussed in class. All study materials, presentations and background information will be made available on Moodle.

Mobile telephones are not permitted. The memory of Graphics Calculators should be empty.

c. Small Project:

There will be two small projects each worth 10% of the total course grade. One will be due in each half of the course. Detailed instructions are provided in Moodle.

d. Final Poster:

For your research project, you are requested to investigate a question about a scientific/technological topic with relevance to society, and to create a poster about it that will be presented at the symposium on the last session of the course. Examples of such question could be:

- Is it useful to recycle my plastic waste?
- Would it be possible to fly an airplane on solar energy?
- Why do people die from anorexia while they theoretically could also start eating again?
- How does a "heat pump" work and will it be a replacement for gas?

- Will it be possible to grow meat in the lab?
- Will it be possible to regrow a severed limb?
- Could we postpone ageing?
- What are the risks of GM food?
- Why don't we harvest the power of ocean waves to fuel the production of electricity?
- Why don't we see hydrogen used more prevalently as a fuel source?
- Is it "better" to buy a real or artificial Christmas tree?
- Do the profits from bitcoin mining outweigh the energy costs?

Try to think of something that you really would like to know. It need not be a big overarching topic; it can also be an "everyday" question

Detailed instructions are provided in Moodle.

e. Participation and in-class assignments:

Although in class participation is not graded directly, active participation is expected from you. As a consequence, perseverance, involvement, attitude, presence, being on time etc. will be monitored.

VII. Course schedule (subject to changes)

Date	Time	Topic	News Item Presentation
Module I: Basic Science.			
Sep 01	Tuesday 08:45-10:45 h	- Course Manual Explanation. - Science Principles.	NA.
Sep 04	Friday 13:45-15:45 h	- Periodic Table of Elements. - Science Communication.	Sterre Boute
Sep 08	Tuesday 08:45-10:45 h	- Atomic Build-up. - Electricity.	Noémi Garrido Ayala
Sep 11	Friday 13:45-15:45 h	- Radioactivity. - Nuclear Energy.	Bart Humer
Module II: Water.			
Sep 15	Tuesday 08:45-10:45 h	- Electromagnetism. - Stratification.	Teodora Ivanović
Sep 18	Friday 13:45-15:45 h	- Salinity/pH. - Nutrient cycling.	Fleurtje Jansen
Sep 22	Tuesday 08:45-10:45 h	- Written Exam: Module I + II.	NA.
Module III: Plastics.			
Sep 25	Friday 13:45-15:45 h	- Basics of Polymers.	Boudica Gast
Sep 29	Tuesday 08:45-10:45 h	- Bioplastics. - Life Cycle Analysis.	Jasmin Bengi-Akyürek

Module IV: General Global Issues.			
Oct 02	Friday 13:45-15:45 h	- Contamination/Toxicology. - Guest Speaker.	Olivia Billiet
Oct 06	Tuesday 08:45-10:45 h	- Environment.	LUIS Heredia Andrés
Oct 09	Friday 13:45-15:45 h	- Artificial Intelligence. - Astronomy.	Diya Kochar
Oct 13	Tuesday 08:45-10:45 h	- Written Exam: Module III + IV.	NA.
Oct 16	Friday 13:45-15:45 h	- Revision - Consultation session.	NA.
Oct 20	Tuesday 08:45-10:45 h	- Midterm Break	NA.
Oct 23	Friday 13:45-15:45 h	- Midterm Break	NA.
Module V: Biology			
Oct 27	Tuesday 08:45-10:45 h	- The origins of life - <i>Life's Rocky Start</i>	Manon Maillart
Oct 30	Friday 13:45-15:45 h	- Cells: The Building Blocks of Life. - <i>Visualizing the invisible</i>	Roxane van Oosterhout
Nov 03	Tuesday 08:45-10:45 h	- Moderation Day - No Class	NA
Nov 06	Friday 13:45-15:45 h	- The Central Dogma - <i>The Rules of Life</i>	Noa Stijziger
Nov 10	Tuesday 08:45-10:45 h	- Cellular Communication - Pharmacology	Julien van De Graaf
Nov 13	Friday 13:45-15:45 h	- TBD	
Nov 17	Tuesday 08:45-10:45 h	- Written Exam: Module V.	
Module VI: Life Sciences			
Nov 20	Friday 13:45-15:45 h	- Epidemiology and Vaccination - Public Health	Jetske van Veen
Nov 24	Tuesday 08:45-10:45 h	- Genomes and Inheritance - <i>Nature vs. Nurture</i>	Gaspard Goethals
Nov 27	Friday 13:45-15:45 h	- Stem Cells and Cloning - <i>Risks and Benefits</i>	
Dec 01	Tuesday 08:45-10:45 h	- Healthy Living (pt 1)	Arian Gonzalez Höflich
Dec 04	Friday 13:45-15:45 h	- Healthy Living (pt 2) - Trash or Treasure (Small Project)	NA
Dec 08	Tuesday 08:45-10:45 h	- Human Bodies - <i>Fear, fantasy and ownership</i>	NA

Dec 11	Friday 13:45-15:45 h	- Written Exam: Module VI.	NA
Dec 15	Tuesday 08:45-10:45 h	- Poster Presentation.	NA.
Dec 18	Friday 13:45-15:45 h	- Poster Presentation.	NA.

VIII. Student learning outcomes

By the end of this course, students will have

- a) Developed the ability to recognize and identify the role of science in some of today's most pressing global societal issues.
- b) Gained an initial experience in executing the scientific method.
- c) Gained an initial understanding of some of the contemporary techniques and processes in science.
- d) Gaining an initial understanding of both the power and limitations of science.
- e) Developed numerical literacy by becoming more familiar with numbers, graphs, the scale of things (from particles to planetary systems) and simple formulas.
- f) Gained awareness of and worked on academic (scientific) integrity by considering ethics, transparency, objectivity etc.
- g) Can critically examine research techniques and results that are used to gain our understanding of the world. Recognizing limitations of published studies and comparing reproducibility in other studies.

IX. Class lay-out

Rotating schedule for in-class attendance:

Tuesdays at UCR, Fridays by Zoom:	
Noémi	Garrido Ayala
Teodora	Ivanović
Jasmin	Bengi-Akyürek
LUIS	Heredia Andrés
Manon	Maillart
Julien	Van De Graaf
Gaspard	Goethals
Arian	Gonzalez Höflich

Fridays at UCR, Tuesdays by Zoom:	
Sterre	Boute
Bart	Humer
Fleurtje	Jansen
Boudica	Gast
Olivia	Billiet
Diya	Kochar
Roxane	Oosterhout van
Noa	Stijsiger
Jetske	Veen van