HON 310-01                                    2020 Spring
Term
(Experiencing Forms and Colors: Goethe’s Approach to Science)

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Office Hours: Mondays and Wednesdays, 12:00-12:45, 14:30-15:15, or by appointment.
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Catalog Description: Prerequisite: acceptance to the University Honors Program, or consent of instructor. (Offered as needed.) 3 credits. Is it possible to imagine a science that has subjective experience at its core, that acknowledges the primacy of daily experiences as mediated by the senses, all along without diminishing its own rigor, objectivity and predictive power? In this course we will attempt to find answers to these questions by taking Johann Wolfgang von Goethe’s scientific work as a starting point.

Course Learning Outcomes:
By the end of this course, students will have:
   1) Obtained a nuanced knowledge of the assumptions and beliefs on which scientific understanding is built, providing an example of how shared values inform a fundamental form of human understanding.
   2) Developed a rigorous and effective ability to distinguish science from non-science, through a careful study of the significance of subjective perceptual experience in approaching scientific problems.
   3) Understood the key ideas and the quantitative methods used in mathematics, physics and biology to approach the concepts of form and metamorphosis. Students will learn how to find quantitative evidence to support the theoretical development of such concepts, and how to analytically discuss and write about them.

Honors Program Learning Outcomes:
Upon completing a course in the University Honors Program students will have:
   a) Obtained a starting point for integrative exploration of the development of cultures and intellectual achievements through a variety of disciplinary and interdisciplinary perspectives;
b) Sharpened their ability to critically analyze and synthesize a broad range of knowledge through the study of primary texts and through engagement in active learning with fellow students, faculty, and texts (broadly understood);

c) Understood how to apply more integrative and interdisciplinary forms of understanding in the advancement of knowledge and in addressing complex challenges shaping the world;

d) Developed effective communication skills, specifically in the areas of written and oral exposition and analysis.

General Education Learning Outcomes for this course:

1) NI/Natural Science Inquiry: Provide students an opportunity to engage with scientific investigation and the knowledge it produces.

2) QI/Quantitative Inquiry: Students creates sophisticated arguments supported by quantitative evidence and can clearly communicate those arguments in a variety of formats (using words, tables, graphs, mathematical equations, etc., as appropriate).

Content:
Today Johann Wolfgang von Goethe is better known for his literary output, which includes works such as *Faust*, and the *West-East Divan*, and yet his fame as a writer often obscures the intellectual basis of all his work: his longtime dream of a science that would overflow from the subjective experience of life and of change.

Goethe’s scientific approach developed especially in two directions: a study of the constancy and individuality of life forms despite their multiform changes (primarily as manifested in plants); and a study of colors as they appear to us in the full variety of natural settings to which we are exposed.

Goethe’s scientific efforts are only partially compatible with the interests and methods of contemporary scientific practice mostly because of his rejection of the value of isolated key experiments as linchpins of a theory. And yet Goethe’s ideas managed to have a profound influence in the Gestalt theory of perception, as well as the study of animal and plant morphology.

Ultimately, despite their most obvious limitations, the significance of Goethe’s scientific theories rests on their explicit goal of demonstrating the profound unity of all forms of human knowledge. A unity that is mediated by the twofold realization of the power of the senses in shaping our view of the world, and of the transformative value of natural knowledge in shaping us as individuals.

We will see that every significant poetic work of Goethe can be reinterpreted in light of his effort of constructing a fluid, living natural philosophy suitable for his times. And maybe suitable for ours as well? In today’s fragmented intellectual landscape, in a society
that seems unwittingly bent on objectifying our humanity, it is worth exploring to which extent Goethe’s vision of the unity of experience and knowledge can be recovered.

It is in this perspective that we will confront Goethe’s core ideas on science with our contemporary understanding of concepts such as form, metamorphosis and color. More particularly we will study:

▪ The key ideas and techniques underpinning the study of shape and form invariance in mathematics.
▪ Plant and animal morphology and its relations to evolution as understood in evo-devo biology.
▪ Modern theories of color perception as well as the physical causes and properties of colors.
▪ We will also explore the role of observers and first person thought experiments in classical, quantum and relativistic physics.

To test to which extent Goethe’s vision of a humanistic science is still possible today, we will also carefully expand our discussions to possibly include: precursors such as Nicholas of Cusa with his art of conjecturing and Giordano Bruno with his mnemonic theories; neo-confucianist scholars such as Chu Xi that developed forms of natural philosophy in very different cultural settings; and modern philosophers, such as the phenomenologist Edmund Husserl, that put the foundations of another first person approach to science, quite different from the one envisioned by Goethe.

Current Required Texts:


Instructional strategies:
The course will include daily, in-depth discussions, based on a variety of readings. Scientific topics will be introduced by lectures. Weekly creative, written reflections will be assigned every Wednesday. There will be a comprehensive, two weeks take-home midterm on possible contemporary implications of Goethe’s approach to science. Moreover, students will prepare for a 10 minutes presentation and 25 minutes Q and A session on a specific topic agreed with the instructor by the fifth week of class. A detailed outline of the presentation with a 4 pages summary will be due at the time of the presentation.

Methods of Evaluation:
Assessment of student performance will be based on the following items:

**In-class discussions (25% of the grade).** Each student is expected to be directly
involved in the discussion during each meeting. Because of this, attendance is required
and at most two justified absences are permitted. For each additional absence, 2.5% of
the grade will be deducted from the overall grade.

Weekly written reflections (20% of the grade): Written reflections (2 or 3 pages, 12pt
font, 1” margin and double spaced) will be assigned every Wednesday and are due the
following Monday. These reflections will take the form of creative and accurate syntheses
of the topics discussed during the week, as well as of commentaries on specific problems
and topics.

Midterm evaluation (30% of the grade). There will be a two-weeks, take-home
exploration of the key literary, philosophical and scientific ideas that we will introduce.
The midterm exam will be assigned on Monday March 30th and is due Wednesday
April 15th at the beginning of class.

Final presentation (25% of the grade). By the end of the fifth week of class, students
need to confirm a topic for their presentation, related to the main themes of the course
and chosen among a wide selection of given topics. They will prepare for a 10 minutes
presentation and 25 minutes Q and A session on their chosen topic. Students will be assessed based on the accuracy and creativity of their approach to the
topic; the ease and effectiveness of their answers during the discussion; and the broadness
and depth of their understanding of the themes of the course. Presentations will be
scheduled for the last week of class, and for the day of the final exam. A summary (4
pages, 12pt font, 1” margin and double spaced) and a detailed outline of the presentation
is due on the same day students will be presenting.

Chapman University Academic Integrity Policy:
Chapman University is a community of scholars which emphasizes the mutual
responsibility of all members to seek knowledge honestly and in good faith. Students are
responsible for doing their own work, and academic dishonesty of any kind will not be
tolerated anywhere in the university

Students with Disabilities Policy:
In compliance with ADA guidelines, students who have any condition, either permanent
or temporary, that might affect their ability to perform in this class are encouraged to
inform the instructor at the beginning of the term. The University, through the Center for
Academic Success, will work with the appropriate faculty member who is asked to
provide the accommodations for a student in determining what accommodations are
suitable based on the documentation and the individual student needs. The granting of
any accommodation will not be retroactive and cannot jeopardize the academic standards
or integrity of the course.

Last revised: 02/02/2020