

CHAPMAN UNIVERSITY
University Honors Program
One University Drive
Orange, CA 92866

HON 310-01: “Experiencing Forms and Colors: Goethe’s Approach to Science”

COURSE SYLLABUS

Dr. Domenico Napoletani

Spring 2021

Office: DeMille 110F

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Classroom: DeMille 107 (**remote instruction until further notice**)

Time: T-TH 2:30PM-3:45PM

Office Hours via Zoom: T-TH 12:30PM– 2:00PM and by appointment

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:

Goethe on Science. An anthology of Goethe's Scientific Writings, edited by Jeremy Naydler, Floris Books, 2009.

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 7 minutes presentation and 15 minutes Q and A session on a specific topic agreed with the instructor by March 2nd. Students will also prepare a 5 pages synthesis of the presentation's content and a diary of the research performed during the semester.

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 (minimum of 2 pages, maximum of 3 pages, 12pt font, 1" margin and double spaced) will be assigned every Thursday and are due the following Tuesday. 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. Reflections are to be placed in the appropriate Turnitin folder on Canvas by 2:30PM on Tuesdays. *Late reflections are not accepted.*

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 Tuesday March 30th and is due Tuesday April 13th at the beginning of class. It must be placed in its assigned Turnitin folder on Canvas by 2:30PM.

Final presentation (25% of the grade). By **March 2nd**, 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 7 minutes presentation and 15 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 three lectures, and for the day of the final exam.**

A compelling synthesis of the presentation's content (5 pages, 12pt font, 1" margin and double spaced) and a detailed diary of the research performed during the semester are **due on May 4th at 11:59PM**, to be placed in the appropriate Turnitin folder on Canvas.

Chapman University Academic Integrity Policy

Chapman University is a community of scholars that 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 be subject to sanction by the instructor/administrator and referral to the university Academic Integrity Committee, which may impose additional sanctions including expulsion. Please review the full description of Chapman University's policy on [Academic Integrity](#).

Chapman 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 contact the [Office of Disability Services](#). If you will need to utilize your approved accommodations in this class, please follow the proper notification procedure for informing your professor(s). This notification process must occur more than a week before any accommodation can be utilized. Please contact Disability Services at (714) 516-4520 if you have questions regarding this procedure, or for information and to make an appointment to discuss and/or request potential

accommodations based on documentation of your disability. Once formal approval of your need for accommodation has been granted, you are encouraged to talk with your professor(s) about your accommodation options. The granting of any accommodation will not be retroactive and cannot jeopardize the academic standards or integrity of the course.

Equity and Diversity Statement

Chapman University is committed to fostering learning and working environments that encourage and embrace equality and diversity, multiple perspectives, and the free exchange of ideas as important measures to advance educational and social benefits. Our commitment and affirmation are rooted in our traditions of peace and social justice and our mission of producing ethical and responsible global citizens. The term diversity implies a respect for all and an understanding of individual differences in age, class, disability, ethnicity, gender, language, national origin, race, religion, sexual orientation, and socioeconomic status. Students and professors are reminded to show respect at all times as outlined in [Chapman's Harassment and Discrimination Policy](#). Any violations of this policy should be discussed with the professor, the [Dean of Students](#), and/or otherwise reported in accordance with this policy.

Protocols for Remote Instruction

1. Instructional Strategies: The course will start with remote instruction, switching to in-person instruction when approved; All lectures will be synchronous, unless specifically indicated by the instructor.
2. Required technology resources for remote instruction is access to WiFi, and a computer or a tablet with camera and speaker or headphones. Cell phone use for remote instruction is highly discouraged.
3. Attire requirements for remote instruction will be the same as for in-person instruction.

4. All office hours and small group meetings between students and faculty will be conducted remotely via Zoom, Teams, or other methods; they will be arranged by Canvas scheduling.
5. Course format may be subject to change with little to no notice.

Safety Protocols for Pivoting to On-Campus Instruction

In response to the current COVID-19 pandemic, Chapman University has developed the CU Safely Back program (CUSBP) and mandatory safety measures (<https://news.chapman.edu/coronavirus/>). The University's mandatory safety measures may be stricter than local, state or federal guidelines and may be subject to change at any time. Students are expected to adhere to the University's safety measures while attending classes, including when entering and exiting classrooms, laboratories, or other instructional areas. Individual faculty may choose to have requirements for their courses that are stricter than the University's. Safety precautions and procedures may change in response to emerging findings and the recommendations of scientific experts and authorities. Refusal to abide by the University's mandatory safety measures or to the safety requirements specific to this course will result in your being asked to leave the area immediately, and may result in an administrative dismissal from this course.

The COVID-19 pandemic requires all of us to accept the possibility that changes in how this course is taught may be required and that some changes may occur with little or no notice. For example, some or all of the in-person aspects of a course may be shifted to remote instruction. If this occurs, you will be given clear instructions as to how to proceed. The uncertainty of the situation is not ideal for any of us. We must all try to approach this situation with good-will, flexibility, and mutual understanding.