

PS 325-201 2021 Spring (4437) - Development of Scientific Thought

4 credits M_W 17:00 - 19:15 pre-requisites: 12 credits of Natural Science

Catalog text: An introduction to the history and nature of science, emphasizing the logic of scientific reasoning and progress with social and historical influences. Includes lab.

Instructor: Dr.Curt Foltz , Science 159 ; foltzc@marshall.edu (304 696-2519)

office hours: M_W_F 10:00 – 11:30 & _T_R_ 11:30 – 12:30 & MTWR_ 1:30 – 3:30

I'll (try to) keep links and schedule on-line at : www.science.marshall.edu/foltzc/325_21sp.htm

Required: book Natural Science in Western History by Frederick Gregory (Houghton Mifflin, 2008)

We'll uncover about 2 chapters/week. Some ancient and non-Western aspects will be found elsewhere.

We'll also read (and present & discuss) materials from Science Ed organizations, or a Science Society, or other Science Interface – mostly from online sources ... for example:

WV State Curriculum Standards and Objectives ... NSTA/NSES or nextgenscience.org ... (NCATE)

American Assoc.Physics Teachers/Am.Chemical Society/Nat.Assoc.Biology Teachers, etc

Classic articles on Philosophy of Science - or Science, Tech & Society (from Gutenberg)

Course Description: Through discussion of readings, and experiments & simulations, we will investigate the history, methods and nature of science, and how “science” has interacted with politics and society and culture (often *via* economy or technology channels). Examples from all areas of science will be explored; each student will do special work in areas of interest. Intended for Science Education majors.

Objectives: explain why select scientific discoveries and theories became accepted, or ignored, or rejected; detail their interplay with engineering technology, with other science fields, & with contemporary society; critique narratives about science (and its related technology developments) in various current subcultures; discern actual discoveries from alternatives, and theories from pseudoscience, speculation, & concerns.

Students will distinguish Theory from Principle, Law from Model, and Discovery from Inference.

We'll evaluate the evidence around recent “scientific” claims, and the arguments used regarding them.

Students will gain appreciation for science as a way of knowing, in contrast to (say) history or religion, and for engineering as a foundation of doing, in contrast to (say) artcraft or commerce.

Assignments: Students will read each chapter before it is to be considered in class. Each student will guide the class discussion/activity for two (2) chapters' topics, and prepare & administer an assessment (quiz) for those chapters. Everyone will participate cordially in all chapter discussions and activities. Activities might include role-play of historical debates using past evidence and arguments, or achronistic (imagined) meetings of famous characters as proponents & detractors, or news interview or other media portrayals.

Also, to develop & implement a classroom experiment or demonstration, relevant to a grade level and subject matter that you intend to be teaching soon.

This course depends on us all being candid yet civil, as we discuss deep & perhaps controversial ideas.

Evaluation & Grading:

20 % - Discussion Leader for 2 chapters, including the Quiz (and its scoring key) for those chapters.

10 % - Lab Experiment/Demo “instruction manual” (age-appropriate), for the class to field-test.

13 % - 26/28 Chapter Quizzes; few questions each, but with a range of answer type and profundity level.

25% - Midterm Exam + Final Exam, mostly essay answers about connections between chapter topics.

20 % - Participation: discussion, activity-doing, critique Quizzes, critique Presentations.

7 % - Term Paper, due Finals week ... (assess “what’s missing” in your curriculum, other science theme)

Letter grade boundaries will be: 100% > A > 90% > B > 80% > C > 70% > D > 60% > F > 0%