REQUIRED MATERIALS:

Text: Global Climate Change: Turning Knowledge Into Action by David Kitchen

COURSE LEARNING OUTCOMES:

The impact of global climate change is far-reaching, both for humanity and the environment. This course will provide students with the scientific background to understand the role of natural and human-forced climate change so that they are better prepared to become involved in the discussion. Students will learn how past climates are determined and why humans are causing most of the observed modern day warming. The technical and political solutions to climate change will also be addressed.

Upon completion of this course students will be able to:

a. Develop well-reasoned arguments for the long- and short-term causes of climate change
b. Identify and classify past climate by analyzing various temperature proxies such as isotopic chemical signatures from ice cores and sediment, tree rings, corals, and boreholes
c. Evaluate and describe the observed evidence for modern climate change
d. Describe the relationship between atmosphere and oceans and demonstrate their application to climate change
e. Describe the carbon budget and demonstrate its role in climate change
f. Describe the radiative heat budget of Earth and evaluate the role of greenhouse gases in this budget
g. Detail the impacts of climate change on humans and nature
h. Evaluate and describe the various solutions for addressing modern day climate change and the increasing world energy needs

EVALUATION OF STUDENT PERFORMANCE:

Chapter Tests: 25%  Homework: 28%  Term Paper: 22%  Final Exam: 25%

- Chapter test questions are multiple-choice and short-answer. Time to complete: 60 minutes. A missed test will be considered a zero - no exceptions.

- Homework due dates are posted on class bulletin board. Homework is always due by the start of class (in person or via email). A missed or late homework will be considered a zero - no exceptions.

- Final exam will consist of 50 multiple-choice questions (cumulative). Time to complete: 60 minutes.

- Term paper is due TUE NOV 29. Topics must be submitted to me no later than TUE NOV 15. A rubric will be used to assign the final grade. Students should use this rubric to maximize their success. A late topic choice or a late paper will be assigned a zero – no exceptions. Hard copy and e-copy of final paper are required to receive a grade.

*** There is NO GRADE CURVE. There are NO MAKE-UP TESTS. ***

You may officially withdraw from this course NO LATER than WED NOV 2. No W will be granted after this date without a well-documented emergency. Any student whose name appears on the final grade roster will receive a grade.

WEEKLY OUTLINE OF TOPICS AND ASSIGNMENTS:
Week 1: So What’s Up with the Weather?
- Climate Stability
- Climate Forcing & Feedback
- Long-Term Climate Changers: Tectonics & Milankovitch Cycles
- Short-Term Climate Changers: El Nino & Volcanoes
- Ocean – Atmosphere Balance
- Greenhouse Gases
- Climate Models

Week 2 - 3: The Evidence: Observing Climate Change
- Measuring Global Temperature Data
- Changes in Sea Level
- Changes in the Cryosphere (ice)
- Changes in the Atmosphere
- Changes in the Oceans
- Changes in Precipitation
- Changes in Severe Weather

Week 4-5: Energy & Earth’s Climate
- Sunspots
- Milankovitch Cycles
- Seasons

Week 6-7: Energy & Earth’s Climate (cont.)
- Atmospheric Temperature Structure
- Global Energy Budget
- Greenhouse Effect
- Aerosols and Global Dimming
- Black Carbon
- Ozone Depletion

Week 8: Understanding Weather & Climate
- Three-Cell Global Atmospheric Circulation Model
- Weather Fronts
- Ocean Structure
- Ocean Circulation

Week 9: Understanding Weather & Climate (cont.)
- Monsoons
- Interannual and Longer-Term Natural Variations
- NAO, ENSO, MJO, PDO, AMO cycles

Week 10-11: Determining Past Climate
- Dendrochronology (Tree-rings)
- Corals
- Sediments
- Ice Cores
- Isotopic Chemistry
- Boreholes

Week 12: Determining Past Climate (cont.)
- Climate Reconstructions
• Medieval Warm Period
• Little Ice Age
• “Hockey Stick” Controversy

**Week 13: Impact of Climate Change**
• Sea Level Rise
• Diminishing Cryosphere
• Environmental Vulnerabilities (land and ocean)
• Water Scarcity
• Ocean Acidification

**Week 14: Impact of Climate Change - Geopolitics**
• Military National Security Documents
• Immigration
• Famine & Higher Food Costs
• Increased Authoritarian Governments
• Water Conflicts Between Nuclear Nations

**Week 15: Final Exam**

**OFFICIAL RULES AND POLICIES:**

• The College defines excessive absence or lateness as more than the equivalent of one week of class meetings during the normal semester. Excessive absence may result in a "W" for the course.
• Do NOT schedule ANY appointments during normal class times unless it is health-related.
• An absence is excused only if I consider it to be an emergency.
• While in discussions students will be focused on task at hand and not on "social activities.”
• Cheating of ANY sort will result in a zero on that assignment and possibly an "F" for the course.
• A calculator is the ONLY device allowed during quizzes and exams. **A student caught with ANY other device (cell phone, PDA, computer, etc.) is assumed to be cheating.** Please put all devices away before quizzes and exams!
• If I determine your behavior to be disruptive, you will be excused from class. Phones, **text messaging**, beeps, popping gum, talking, etc., are all considered disruptive. **The result will be an unexcused absence and no materials will be accepted for that day.**
• **NEVER TEXT MESSAGE WHILE IN CLASS – YOU CANNOT LEARN IF YOU ARE NOT PAYING ATTENTION.** I will give you one warning before asking you to leave the class.
• Suffolk County Community College provides reasonable accommodations to registered students with disabilities who have self-identified and been approved by the Office of Disability Services. See online bulletin board (College Announcements) for more information.

If you miss a class, it is YOUR responsibility to ask me for any materials missed. If your absence is unexcused you will NOT be able to make up missed content.