



Course Syllabus - The Impact of Materials on Society

Fall 2016

EMA 1004, ANT 3930, CLA 3930, HIS 3931, and IDS 4930

Meeting Times – MWF, Period 3 (9:35-10:25am)

Meeting Location – Pugh 170

Credit Hours - 3 credit hours

Instructor – Prof. Kevin Jones; Office: 160 Rhines; Telephone: 846-3301; e-mail:

kjones@eng.ufl.edu

Office Hours: Tuesday, Wednesday, Friday Period 4; or when I'm in my office.

Prof. Jones will be joined by Dr. Sophia Krzys Acord (Sociology), Prof. Susan Gillespie (Anthropology), Prof. Ken Sassaman (Anthropology), Prof. Mary Ann Eaverly (Classics), Prof. Florin Curta (History), Prof. Sean Adams (History), Prof. Bonnie Effros (History), Prof. Terry Harpold (English) and Prof. Marsha Bryant (English)

Catalog Description –

This course explores the connections between the discovery of new materials -- such as ceramics, concrete, precious stones and metals, glass, steel, plastics and semiconductors -- and social transformations worldwide. To see these connections, the course will fuse basic concepts in materials science and engineering with perspectives and methods from anthropology, history, English, classics, and sociology. From ancient cities and Roman baths, to steel foundries and Tupperware parties, to virtual communities and nanomedicine, we will learn how the physical properties of different materials intersect with cultural variables like gender, race, power/authority, religious beliefs, values, and financial and political systems to shape human civilization. By connecting lessons from the past to the inventions of cutting-edge materials, we will also explore the future social impacts of new materials in medicine, construction, transportation, clean energy, sports, and other areas. Engineers play important roles in changing or maintaining the structure and fabric of society. This course will explore how their materials-based technologies shape our society, as well as how society shapes engineering innovations.

Prerequisites and Co-requisites - none

Required Reading –*The Substance of Civilization* by Stephen L. Sass, ISBN-13:

9781559704731; IMOS Online Textbook [TBA]. Additional readings and course materials

will be provided On-Line throughout the semester.

Course Objectives

This course will introduce students to how new materials impacted social structure both historically and in the present day, and to the social and cultural forces that shape the development and use of materials and technologies from the past to future. To do this, this course will:

- Examine the interrelated nature of society and materials engineering
- Demonstrate how materials can be manipulated to solve technical and sociocultural problems
- Explore how social and cultural systems shape how humans perceive the intrinsic physical properties of materials
- Discuss how the impact of materials on society varies with the cultural and historical context.
- Give students a variety of approaches from the humanities, social sciences, and sciences to examine and shape the impact of materials on society.
- Teach students basic skills in cross-disciplinary communication, team work, and argumentative writing.
- Teach critical thinking about how disciplinary approaches and personal beliefs shape our understanding of materials.
- Teach creative thinking about how to apply this knowledge through applied projects discussing future materials innovations.

Course Outline

This course serves as a test bed for the development of a new course at universities and colleges around the country. Each week of the course will focus on a particular class of materials. The first two days of each week will examine the discovery of a particular material, its physical properties, and historical case studies of its major social impacts. In preparation for the third class meeting each week, we will watch a short video lecture on modern materials developed by scientists from around the U.S. The third class meeting will feature an in-class group activity to discover the possible social impacts of these future materials. A schedule of topics will be provided in the course notes.

Attendance and Expectations - All students are expected to attend and participate in class. The class is taught in an interactive lecture format, and includes discussion and practice activities. Cell phones should be turned off in class. Reading of newspapers, work on assignments for this or other classes, or other activities that are not part of the class are not allowed during class time.

<i>Assignment</i>	<i>Due Date</i>	<i>Credit</i>
Homework assignments	before each 3 rd lecture	30%
Midterm	Monday Oct. 12	20%
Second Exam	Monday Dec. 7	20%

**Impact of Materials on Society
Fall 2016 – Course Outline**

Module 1: Introduction to class - Prof. Kevin Jones

8/22 – Introduction to materials and why they matter

8/24 – Introduction to the Impact Paradigm, and the physical and social properties of materials

- Read “Physical and Social Properties of Matter”; IMOS Textbook Chapter 1 (Introduction)
- Turn in Homework

Module 2: The Entanglement of Earth: The Age of Clay versus the Age of Rare Earths - Team with Prof. Susan Gillespie (Anthropology)

8/26 – Materials lecture on Clay

- Read Sass pp. 13-37

8/29 – Humanities lecture on the Age of Clay

- Read IMOS Textbook Chapter by Susan Gillespie on *The Entanglement of Earth in the Age of Clay*

8/31 – Flipped Classroom – Rare Earths

- Watch IMOS Video on *Rare Earths*
- Read “How to Make a Tanglegram”
- Turn in Homework

Module 3: Glass/Ceramics and Modern Functional Materials - Team with Prof. Ken Sassaman (Anthropology)

9/2 – Materials lecture on glass and ceramics

- Read Sass pp. 98-123

9/5 – Labor Day

9/7 – Humanities lecture on Obsidian to Porcelain and Early Materials Manipulation

- Read IMOS Textbook Chapter by Ken Sassaman on *Firing Clay, Breaking Glass and the Past Futures of Ceramics*

9/9 – Flipped Classroom – Functional Ceramics

- Watch IMOS Video on *Ceramics*
- Turn in Homework

Module 4: Copper and Bronze – Team with Prof. Florin Curta (History)

9/12 – Materials lecture on copper and bronze

- Read Sass pp. 49-67

9/14 – Humanities lecture on The Bronze Age

- Read IMOS Textbook Chapter by Florin Curta on *Copper and Bronze: The Far-Reaching Consequences of Metallurgy*

9/16 – Flipped Classroom - Photovoltaics

- Watch IMOS Video on *Photovoltaics*

- Turn in Homework

Module 5: Gold, Silver, and the Creation of Value- Team with Prof. Florin Curta (History)

9/19 – Materials introduction to gold and silver

- Read Sass pp. 68-81

9/23 – Humanities lecture on the development of coinage systems

- Read IMOS Textbook Chapter by Florin Curta on *Gold and Silver: Precious Metals and Coinage*

9/26 - Flipped Classroom – Gold Nanoparticles

- Watch IMOS Video on *Gold*
- Turn in Homework

Module 6: Concrete: Engineering Society through Social Spaces - Team with Prof. Mary Ann Eaverly (Classics)

9/28 – Materials introduction to concrete

- Read Sass pp. 124-133

9/30 – Humanities lecture on Roman concrete, aqueducts, and the Coliseum

- Read IMOS Textbook Chapter by Mary Ann Eaverly on *Engineering Society Through Social Spaces*

10/3- Flipped Classroom – New Building Materials

- Watch IMOS Video on *Building Materials*
- Turn in Homework

Module 7: Activity to make and break concrete bars; review Impact Paradigm

10/5 – Make concrete bars

- Optional reading: Tim Ingold, “In the Making” excerpt

10/7 - Review impact paradigm and review for Exam 1

10/10 – Break concrete bars

10/12 – Exam 1

10/14 – homecoming (no class)

Module 8: Iron, Steel, and the Entrepreneur - Team with Prof. Sean Adams (History)

10/17 – Materials introduction to iron and steel

- Read Sass pp. 83-97, 203-214

10/19 – Humanities lecture on Andrew Carnegie and American Steel

- Read IMOS Textbook Chapter by Sean Adams on *Carnegie, Creative Destruction and American Steel*

10/21 Flipped Classroom – Magnesium Alloys

- Watch IMOS Video on *Magnesium Alloys*
- Turn in Homework

Module 9: Aluminum, Intellectual Property and Materials Regulation - Team with Prof. Seam Adams (History)

10/24 – Materials introduction to aluminum

- Read Sass pp. 186-197

10/26 - Humanities lecture on the birth of ALCOA and anti-trust legislation

- Read IMOS Textbook Chapter by Sean Adams on *Aluminum, Alcoa and Anti-Trust*

10/28 - Flipped Classroom – Amorphous Metals

- Watch IMOS Video on *Bulk Metallic Glass-Amorphous Metals*
- Turn in Homework

Module 10: Writing Materials: The Politics and Preservation of Knowledge - Team with Prof. Bonnie Effros (History)

10/31 - Materials introduction to writing materials

- Read Sass pp. 134-146

11/2 - Humanities lecture on the history of the book

- Read IMOS Textbook Chapter by Bonnie Effros on *The Politics of Knowledge*

11/4 - Flipped Classroom – Magnetic Information Storage Materials

- Watch IMOS Video on *Information Storage Systems*
- Review URLs to digitized scroll and codex
- Turn in Homework

Module 11: Plastics, Polymers, and Materials Marketing - Team with Prof. Marsha Bryant (English)

11/7 - Materials introduction to writing materials

- Read Sass pp. 215-237

11/9 - Humanities lecture on the creation of Tupperware and postwar America

- Read IMOS Textbook Chapter by Marsha Bryant on *Fantastic Plastics in Postwar America: Earl Tupper, Brownie Wise, and Materials Marketing*
- View vintage Tupperware ads
- Browse Museum of Modern Art website

11/11- Veterans Day

11/14 - Flipped Classroom – Biopolymers

- Watch IMOS Video on *Polymers*
- Turn in Homework

Module 12: Silicon, Semiconductors and Cyborgs - Team with Dr. Sophia Acord (Sociology)

11/16 - Materials introduction to semiconductors

- Read Sass pp. 265-276

11/18 - Humanities lecture on mobile technologies

- Read IMOS Textbook Chapter by Sophia Acord on *Semiconductors and Cyborgs: Human-Material Relations in the Networked Society*

11/21 -- Flipped Classroom – 2-D Materials

- Watch IMOS Video on *2-D Materials*
- Read Cliff Kuang, “Why a New Golden Age for UI Design is Around the Corner”
- Conduct personal interview
- Turn in Homework

Thanksgiving 11/23-11/25

Bonus Module 13: Carbon and Its forms - Team with Terry Harpold (English)

11/28 – Materials introduction to carbon and climate change

11/30 - Humanities lecture on Climate Fiction and imagining possible adaptations to an altered future world

Exam 2 and Final Posters

12/2 – Review for Exam 2

12/5 – Exam 2 in class

12/6 (Tuesday evening) – Poster session 1 in the classroom from 6:15-8:00PM

12/7 (Wednesday evening) – Poster session 2 in the classroom from 6:15-8:00PM