

**Updated 01/16/26**

# **Relevance of distribution classes to ending world hunger: epistemologies and connections, parts of a topology**

**Cornell University (Undergraduate Degree, Minor):**

**Disclaimer:** This document is not intended to be a substitute for formal education. It does not involve the critical thinking and epistemological and malinative development and intellectual enrichment that a formal education entails. Reading this document may make you smarter, but it pales in comparison to the benefits derived from working hard in classes at a formal university. Please think of it as a construct parallel to a recruiting effort, meant to increase your motivation to apply yourself and pursue a similar track at Cornell or another University in order to be part of the movement of ending world hunger. In other terms, this is one intellectual loadout you can play in the game of life, and logging hours on it will develop your level.

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

# Introduction to Architecture

## Course Description

Intended to familiarize non-architecture students with the art and science of architecture. The fundamentals of plan, section, and elevation, the primary elements that comprise an architectural form; basic organizational principles; the ways in which we perceive architectural space; and the various concepts of function in relation to form will be included among the topics to be covered, using examples from numerous times and cultures as well as from contemporary Cornell campus.

## Summary: one sentence

Development of thinking systems in a latticed structure which has impact and purpose, and is simultaneously objective

## Summary: one paragraph

## Summary: one page

## Summary: ~five pages

# **Beginning Mandarin for Professional Students**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

# **Contemporary Southeast Asian Independent Cinema**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

## **Intergroup Dialogue**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

## **Great New Books**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

# **Shakespeare**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

## **Creative Writing**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

## **Fibers Fabrics and Finishes**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

## **Just Food**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

# **Perspectives in International Agriculture and Rural Development**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

# Biomaterials For The Skeletal System

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

Eve Donnelly eld26

Biomaterials exist at the intersection of biology and engineering. This course explores natural structural materials in the human body, their properties and microstructure, and their synthetic and semi-synthetic replacements. Bones, joints, teeth, tendons, and ligaments are used as examples, with their metal, plastic, and ceramic replacements. Topics covered include mechanical properties, corrosion, toxicity, and biocompatibility. Case studies of design lead to consideration of regulatory approval requirements and legal liability issues.

Basic Mechanics and mechanical properties of materials

Response of tissue to implantation

biocompatibility Biomedical ethics

FDA regulations Teeth

Dental materials Bones

bone repair materials and devices Joints

cartilage and ligaments

Total joint replacement

Tissue engineering

Case studies: Hip/knee implants, Cardiovascular implants (stents, artificial hearts), Dental amalgams, etc

## **Textbooks**

**“The science and engineering of materials”, Askeland and Phulé, Fifth edition**

### **Chapter 1: Introduction to materials science and engineering**

1-1 What is materials science and engineering

1-2 Classification of materials

1-3 Functional classification of materials

1-4 Classification of materials based on structure

1-5 Environmental and other effects

1-6 Materials design and selection

1-7 Summary

1-8 Glossary

### **Chapter 2: Atomic structure**

2-1 The structure of materials: technological relevance

2-2 The structure of the atom

2-3 The electronic structure of the atom

2-4 The periodic table

2-5 Atomic bonding

2-6 Binding energy and interatomic spacing

2-7 Summary

2-8 Glossary

### **Chapter 3: Atomic and ionic arrangements**

3-1 Short-range order versus long-range order

- 3-2 Amorphous materials
- 3-3 Lattice, unit cells, basis, and crystal structures
- 3-4 Allotropic or polymorphic transformations
- 3-5 Points, directions, and planes in the unit cell
- 3-6 Interstitial sites
- 3-7 Crystal structures of ionic materials
- 3-8 Covalent structures
- 3-9 Diffraction techniques for crystal structure analysis
- 3-10 Summary
- 3-11 Glossary

#### **Chapter 4: Imperfections in the atomic and ionic arrangements**

- 4-1 Point defects
- 4-2 Other point defects
- 4-3 Dislocations
- 4-4 Significance of dislocations
- 4-5 Schmid's Law
- 4-6 Influence of crystal structure
- 4-7 Surface defects
- 4-8 Importance of defects
- 4-9 Summary
- 4-10 Glossary

#### **Chapter 5: Atom and ion movements in materials**

- 5-1 Applications of diffusion
- 5-2 Stability of atoms and ions
- 5-3 Mechanisms for diffusion
- 5-4 Activation energy for diffusion
- 5-5 Rate of diffusion [Fick's first law]
- 5-6 Factors affecting diffusion
- 5-7 Permeability of polymers
- 5-8 Composition profile (Fick's second law)
- 5-9 Diffusion and materials processing
- 5-10 Summary
- 5-11 Glossary

#### **Chapter 6: Mechanical properties: part one**

- 6-1 Technological significance
- 6-2 Terminology for mechanical properties
- 6-3 The tensile test: Use of the stress-strain diagram
- 6-4 Properties obtained from the tensile test
- 6-5 True stress and true strain
- 6-6 The bend test for brittle materials
- 6-7 Hardness of materials
- 6-8 Strain rate effects and impact behavior
- 6-9 Properties obtained from the impact test
- 6-10 Summary
- 6-11 Glossary

#### **Chapter 7: Mechanical properties: part two**

- 7-1 Fracture mechanics
- 7-2 The importance of fracture mechanics
- 7-3 Microstructural features of fracture in metallic materials
- 7-4 Microstructural features of fracture in ceramics, glasses, and composites
- 7-5 Weibull statistics for failure strength analysis
- 7-6 Fatigue
- 7-7 Results of the fatigue test
- 7-8 Application of fatigue testing

- 7-9 Creep, stress rupture, and stress corrosion
- 7-10 Evaluation of creep behavior
- 7-11 Use of creep data
- 7-12 Summary
- 7-13 Glossary

### **Chapter 8: Strain hardening and annealing**

- 8-1 Relationship of cold working to the stress-strain curve
- 8-2 Strain-hardening mechanisms
- 8-3 Properties versus percent cold work
- 8-4 Microstructure, texture strengthening, and residual stresses
- 8-5 Characteristics of cold working
- 8-6 The three stages of annealing
- 8-7 Control of annealing
- 8-8 Annealing and materials processing
- 8-9 Hot working
- 8-10 Summary
- 8-11 Glossary

### **Chapter 9: Principles of solidification**

- 9-1 Technological significance
- 9-2 Nucleation
- 9-3 Applications of controlled nucleation
- 9-4 Growth mechanisms
- 9-5 Solidification time and dendrite size
- 9-6 Cooling curves
- 9-7 Cast structure
- 9-8 Solidification defects
- 9-9 Casting process for manufacturing components
- 9-10 Continuous casting and ingot casting
- 9-11 Directional solidification [DS], single crystal growth, and epitaxial growth
- 9-12 Solidification of polymers and inorganic glasses
- 9-13 Joining of metallic materials
- 9-14 Summary
- 9-15 Glossary

### **Chapter 10: Solid solutions and phase equilibrium**

- 10-1 Phases and the phase diagram
- 10-2 Solubility and solid solutions
- 10-3 Conditions for unlimited solid solubility
- 10-4 Solid-solution strengthening
- 10-5 Isomorphous phase diagrams
- 10-6 Relationship between properties and the phase diagram
- 10-7 Solidification of a solid-solution alloy
- 10-8 Nonequilibrium solidification and segregation
- 10-9 Summary
- 10-10 Glossary

### **Chapter 11: Dispersion strengthening and eutectic phase diagrams**

- 11-1 Principles and examples of dispersion strengthening
- 11-2 Intermetallic compounds
- 11-3 Phase diagrams containing three-phase reactions
- 11-4 The eutectic phase diagram
- 11-5 Strength of eutectic alloys
- 11-6 Eutectics and materials processing
- 11-7 Nonequilibrium freezing in the eutectic system
- 11-8 Summary
- 11-9 Glossary

## **Chapter 12: Dispersion strengthening by phase transformations and heat treatment**

- 12-1 Nucleation and growth in solid-state reactions
- 12-2 Alloys strengthened by exceeding the solubility limit
- 12-3 Age or precipitation hardening
- 12-4 Applications of age-hardened alloys
- 12-5 Microstructural evolution in age or precipitation hardening
- 12-6 Effects of aging temperature and time
- 12-7 Requirements for age hardening
- 12-8 Use of age-hardenable alloys at high temperatures
- 12-9 The eutectoid reaction
- 12-10 Controlling the eutectoid reaction
- 12-11 The martensitic reaction and tempering
- 12-12 the shape-memory alloys (SMAs)

## **Chapter 13: Heat treatment of steels and cast irons**

- 13-1 Designations and classification of steels
- 13-2 Simple heat treatments
- 13-3 Isothermal heat treatments
- 13-4 Quench and temper heat treatments
- 13-5 Effect of alloying elements
- 13-6 Application of harden ability
- 13-7 Specialty steels
- 13-8 Surface treatments
- 13-9 Weldability of steel
- 13-10 Stainless steels
- 13-11 Cast irons
- 13-12 Summary
- 13-13 Glossary

## **Chapter 14: Nonferrous alloys**

- 14-1 Aluminum alloys
- 14-2 Magnesium and beryllium alloys
- 14-3 Copper alloys
- 14-4 Nickel and cobalt alloys
- 14-5 Titanium alloys
- 14-6 Refractory and precious metals
- 14-7 Summary
- 14-8 Glossary

## **Chapter 15: Ceramic materials**

- 15-1 Applications of ceramics
- 15-2 Properties of ceramics
- 15-3 Synthesis and processing of ceramic powders
- 15-4 Characteristics of sintered ceramics
- 15-5 Inorganic glasses
- 15-6 Glass-ceramics
- 15-7 Processing and applications of clay products
- 15-8 Refractories
- 15-9 Other ceramic materials
- 15-10 Summary
- 15-11 Glossary

## **Chapter 16: Polymers**

## **Chapter 17: Composites: teamwork and synergy in materials**

## **Chapter 18: Construction materials**

**Chapter 19: Electronic materials**

**Chapter 20: Magnetic materials**

**Chapter 21: Photonic materials**

**Chapter 22: Thermal properties of materials**

**Chapter 23: Corrosion and wear**

**"Biomaterials: the Intersection of biology and materials science", Temenoff and Mikos; 2008; ISBN-13: 978-0130097101- source of Chs 1, 10 and 11**

**"Basic Biomechanics of the Musculoskeletal System" Nordin & Frankel; 3rd Edition 2001 ISBN-13: 978-0683302479**

**"SPINE Technology Handbook" Kurtz and Edidin; 2006 ISBN-13: 978-0123693907 Ch2**

## **Brazilian Jiu Jitsu**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

# **Salsa**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

## **Ashtanga Modified**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

## **Intermediate Yoga**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

# **Basic Rock Climbing**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

# **Food Cycle: Systems Thinking**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

# **Introduction to Acting**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**

## **Food, Energy, and Water Nexus,**

**Summary: one sentence**

**Summary: one paragraph**

**Summary: one page**

**Summary: ~five pages**