**UNIVERSITY OF FLORIDA**

ENGINEERING THE RENAISSANCE:

AN INTRODUCTION TO EARLY MODERN INNOVATION

IDH2931 Section 19GB

ITT3930 Section 0430

MEM3931 Section 19GH

**INSTRUCTOR INFORMATION:**

|  |  |
| --- | --- |
| Instructor: Dr. Mary Watt | Dr. Mark Law |
| Office: 2014 Turlington Hall |  |
|  |  |
| Office Hours[[1]](#footnote-1): R 2 – 3 pm | Office hours: |
| E‑Mail: [marywatt@ufl.edu](mailto:marywatt@ufl.edu) | E-mail: [mlaw@ufl.edu](mailto:mlaw@ufl.edu) |

**COURSE INFORMATION:**

**Time & Location**

Anderson Hall 0021

Tuesday Period 8 - 9 (3:00 PM - 4:55 PM)

Thursday Period 9 (4:05 PM - 4:55 PM)

**Description and Objectives:**

This course will introduce students to pivotal moments in technological innovation and the physics underlying those changes in the European Renaissance. The course aims to provide students with an understanding of the ideals and practical exigencies that motivated engineers and artists to transform their communities, through the application of scientific, economic, social, and practical knowledge.

The course will introduce some of the challenges of materials, physical knowledge, construction techniques, and societal pressures that medieval and renaissance engineers faced.

Special attention will be paid to bridge building, water and wind power, castle and cathedral construction. At the same time, students will study problems associated with such innovation, for example, corrosion and degradation. The aim of such study will be to link the problems of the past with the modern search for more and more effective solutions.

Students will gain hands-on knowledge by constructing models of some of the examples from class and will be introduced to topics like force, work, and energy. As such students will acquire the ability to work in groups to create, imagine, design, realize and recreate key engineering achievements that moved the Western world from antiquity to modernity, all rooted in an accessible exploration of key physics principles.

Students will also learn to recognize and articulate how certain developments in European economic systems, military institutions, spirituality and esthetics affected technological progress in the medieval and early modern period. We will also discuss how this case study of Renaissance physics informs modern innovations of these technologies.

**Course Materials and Resources:**

*Cathedral, Forge, and Waterwheel: Technology and Invention in the Middle Ages*, Frances and Joseph Gies, Harper Perennial Press, ISBN 0-06-016590-1, 1995;

*A World Lit Only by Fire*, William Manchester (excerpts);

*Pillars of the Earth*, Ken Follett (excerpts)

*The Agony and the Ecstasy,* Irving Stone

*Brunelleschi’s Dome*, Ross King.

Davinci’s Notebooks: <http://www.bl.uk/manuscripts/Viewer.aspx?ref=arundel_ms_263_f001r>

*The Yearling*, Marjorie Kinnan Rawlings (excerpts)

Visit to St. Peter’s Basilica: [http://www.vatican.va/various/basiliche/san\_pietro/vr\_tour/index-en.html](http://www.vatican.va/various/basiliche/san_pietro/vr_tour/index-en.html" \t "_blank)

Visit to the Leaning Tower of Pisa: <http://www.airpano.com/360Degree-VirtualTour.php?3D=Pisa-Tuscany-Central-Italy>

Visit to the Cathedral of Florence: <http://www.panoramicearth.com/5380/Florence/Florence_Cathedral>

Tower of London: <http://www.londononline.co.uk/towerguide/Intro/>

Chartres Cathedral: <http://gallery.sjsu.edu/chartres/home.html>

Windmills of Holland: <http://www.holland.com/global/tourism/article/dutch-windmills.htm>

**Assessment:**

Presentation (30%): Students will research and present to the class on a topic covered in the course

Group Project: (25%)

Participation: (20%)

Writings (25%): Writings for the most part will be consist of questions about the reading assignment and / or about other medieval and early modern studies resources.

**Class Outline:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Topic** | **Readings** | **Activity** | **Assessment** |
| Tues. Aug. 23 | Introduction to course | Gies: Chap. 1: Nimrod’s tower, **Noah’s ark**  **Read excerpts from Genesis**  **Manchester: Chapter 1 – The medieval Mind** | Listen to: Welcome to the Renaissance  Take a look at the Tower of Babel  <https://en.wikipedia.org/wiki/Nimrod#/media/File:Pieter_Bruegel_the_Elder_-_The_Tower_of_Babel_(Vienna)_-_Google_Art_Project_-_edited.jpg>  <https://en.wikipedia.org/wiki/Tower_of_Babel#/media/File:Meister_der_Weltenchronik_001.jpg> |  |

**UNIT 1 AGRICULTURE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Topic** | **Readings** | **Activity** | **Assessment** |
| Thurs., Aug. 25 | A World lit by Fire | **Gies Chapter 2:** Agricultural Engineering: Flail, Harvesters | Read a few pages out of the Luttrell Psalter: (19, 20, 21, 22, 23, 24)  <http://www.bl.uk/onlinegallery/ttp/luttrell/accessible/introduction.html> |  |
| Tues. Aug. 30 | Out of the Darkness | Gies **Chapter 3:** The Plow and Harness |  |  |
| Thursday, September 1 | Out of the Darkness | **Gies: Chapter 6** Estate Management and The Black Death:  Boccaccio’s *Decameron* Day 1 | Look at Brueghel’s Triumph of Death  http://www.wikiart.org/en/pieter-bruegel-the-elder/the-triumph-of-death-1562-1 |  |
| Tuesday, September 6 | Beyond the Sunset |  | Look at Breughel’s Haymaking  <http://www.wga.hu/support/viewer/z.html> |  |
| Thursday, September 8 | Project Day |  | Meet with your groups start planning your projects | Questions on Reading (5%) |

**UNIT 2 TEXTILES**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Topic** | **Readings** | **Activity** | **Assessments** |
| Tues. Sept. 13 | A World Lit by Fire | **Manchester: Chapter 2 – The shattering – Savonarola, Borgias, superstition, travel,**  **Pillars of the Earth** | Spin like you’re medieval:  https://www.youtube.com/watch?v=205NAurrMOU Use a spindle!  Read a page or two out of the Luttrell Psalter  http://www.bl.uk/onlinegallery/ttp/luttrell/accessible/pages19and20.html#content |  |
| Thursday, September 15 | Project Day |  |  |  |
| Tuesday, September 20 | Out of Darkness | Gies: **Chapter 3** Textiles: silk and wool, spinning and looms  **Gies: Chapter 6** Cloth, Paper and Banking: Spinning Wheel | Build your own Bayeux Tapestry  <http://www.bayeuxtapestry.org.uk/interactive/BayeuxCreate.htm>  and then learn how to dye it!  <https://bayeux.wordpress.com/2008/05/11/medieval-dyes-and-dyeing/>  Look at a Roman edition of Boccaccio's "De Casibus Virorum Illustrium" showing Lady Fortune spinning her wheel. (1467) <https://commons.wikimedia.org/wiki/File:ForutuneWheel.jpg> |  |
| Thursday, September 22 | Project Day |  |  |  |
| Tuesday, September 27 | Beyond the Sunset | Read: Fabric and Dress in Bronzino's Portrait of Eleanor of Toledo and Son Giovanni https://www.jstor.org/stable/1482735?seq=1#page\_scan\_tab\_contents | Examine Eleonora of Toledo’s clothing  <https://www.google.com/culturalinstitute/beta/asset/portrait-of-eleonora-di-toledo-with-her-son-giovanni/QAEccCsLDtbB4A>    https://www.khanacademy.org/humanities/renaissance-reformation/mannerism1/v/bronzino-portrait-of-eleonora-di-toledo-with-her-son-giovanni-1544-1545 |  |
| Thursday, Sept. 22 | Project Day |  |  | Questions on Reading (5%) |

**UNIT 3 POWER**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Topic** | **Reading** | **Activity** | **Assessment** |
| Tues. Sept. 27 | A World Lit by Fire | The Yearling  Gies, **Chapter 2:** Harnessing the wind and water: The Mill | Visit the mills at Barbegal  <http://www.romanaqueducts.info/aquasite/arlesb/index.html>  <http://ascelibrary.org/doi/10.1061/%28ASCE%29IR.1943-4774.0000359>  <http://www.waterhistory.org/histories/barbegal/> |  |
| Thurs. Sept. 29 | Project Day |  |  |  |
| Tuesday, Oct. 4 | Out of Darkness | **Gies Chapter 5:** Open fields and Water power  Mills, windmills, watermills  **Gies: Chapter 6** Metallurgy: The water powered blast Furnace | Windmills of Holland: <http://www.holland.com/global/tourism/article/dutch-windmills.htm>  Look at Breughel’s Haymaking (Detail)  <http://www.wga.hu/support/viewer/z.html>  Consider horsepower in the Middle Ages: (pages 25, 26)  <http://www.bl.uk/onlinegallery/ttp/luttrell/accessible/introduction.html> |  |
| Thurs. Oct. 6 | Project Day |  |  |  |
| Tues. Oct. 11 | Beyond the Sunset |  |  |  |
| Thurs. Oct. 13 | Project Day |  |  | Questions on Reading (5%) |

**UNIT 4 SACRED STRUCTURES**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Topic** | **Reading** | **Activity** | **Assessment** |
| Tues. Oct. 18 | A World Lit by Fire | Gies **Chapter 2** Aqueducts, baths and basilicas | Visit to the Colosseum: [http://www.airpano.ru/files/Italy-Rome-Colosseum/2-2](http://www.airpano.ru/files/Italy-Rome-Colosseum/2-2" \t "_blank)  Visit to the Pantheon: [http://www.panoramicearth.com/310/Rome/Pantheon](http://www.panoramicearth.com/310/Rome/Pantheon" \t "_blank)  Visit the Basilica of Constantine in Trier  http://ekkt.ekir.de/trier/index.php?id=2493  <http://ekkt.ekir.de/trier/index.php?id=2490>  Visit the Original St. Peter’s Basilica  <https://churchpop.com/2015/08/03/the-lost-1200-year-old-wonder-a-tour-of-the-old-st-peters-basilica/>  Visit Santa Sabina, Rome  <http://www.sacred-destinations.com/italy/rome-santa-sabina> |  |
| Thurs. Oct. 20 | Project Day |  |  |  |
| Tuesday, Oct. 25 | Out of Darkness | Gies Chap.3  Churches  **Gies: Chapter 5:** Cathedrals: Durham, Canterbury  Pillars of the Earth | Visit to the Leaning Tower of Pisa: <http://www.airpano.com/360Degree-VirtualTour.php?3D=Pisa-Tuscany-Central-Italy>  Take a virtual Tour of Canterbury CathedralChartres Cathedral: <http://gallery.sjsu.edu/chartres/home.html> |  |
| Thursday, Oct. 27 | Project Day |  |  |  |
| Tuesday, Nov. 1 | Beyond the Sunset | Gies **Chapter 7** Brunelleschi  King: Brunelleschi’s Dome  The Agony and the Ecstasy  **Manchester: Chapter 3 One man alone** | Visit to St. Peter’s Basilica: [http://www.vatican.va/various/basiliche/san\_pietro/vr\_tour/index-en.html](http://www.vatican.va/various/basiliche/san_pietro/vr_tour/index-en.html" \t "_blank)  Visit to the Cathedral of Florence: <http://www.panoramicearth.com/5380/Florence/Florence_Cathedral> |  |
| Thursday, Nov. 3 | Project Day |  |  |  |

**UNIT 5 WARFARE AND EXPLORATION**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Topic** | **Reading** | **Activity** | **Assessment** |
| Tuesday, Nov. 8 | A World Lit by Fire | Gies, **Chap. 2**  Roads and Bridges  Gies **Chapter 2** Military Engineering: Catapults | Take a trip on a Roman Galley:  <https://www.youtube.com/watch?v=5e1cmprH6BY>  Read a few pages of the Luttrell psalter: (pages 9,10, 27  <http://www.bl.uk/onlinegallery/ttp/luttrell/accessible/introduction.html> |  |
| Thursday, Nov. 10 | Project Day |  |  |  |
| Tuesday, Nov 15 | Out of Darkness | **Gies: Chapter 5:** Gies Brothers of the Bridge  **Gies: Chapter 5:** Gies Ships  Gies **Chapter 3**Warfare: Armor, Castles, swords  **Gies: Chapter 5:** Castles, Trebuchet and Crossbow  **Gies: Chapter 6**  “A Wonderful Clock”  **Gies: Chapter 6**Gies Navigation: The Compass Matures | Build your own Norman Warship: <http://www.bayeuxtapestry.org.uk/activities/bayeuxtap-ship.pdf>  Visit to the Tower of London: <http://www.londononline.co.uk/towerguide/Intro/> | Questions on Reading (5%) |
| Thursday, Nov. 17 | Project Day |  |  |  |
| Tuesday, Nov. 22 | Beyond the Sunset | **Manchester: Chapter 3 One man alone**  **Gies: Chapter 6** Cannons  **Gies: Chapter 6** Handguns  Gies **Chapter 7** Guns and National States  Gies **Chapter 7**The Ocean Ship  Gies **Chapter 7**1500 and After “Western Civilization” | Davinci’s Notebooks: <http://www.bl.uk/manuscripts/Viewer.aspx?ref=arundel_ms_263_f001r> |  |

**UNIT 6 STUDENT PRESENTATION OF PROJECTS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Topic** | **Reading** | **Activity** | **Assessment** |
| Thursday, Nov. 24 |  |  | Groups 1, 2 |  |
| Tuesday, Nov. 29 |  |  | Groups 3, 4, 5, 6 |  |
| Thursday, Dec. 1 |  |  | Groups 7, 8 |  |
| Tuesday, Dec 6. | Conclusions |  |  |  |

**Possible Project / Presentation Topics:**

The Monastery as Castle (or vice versa)

Labor Saving Devices

Materials – Glass, Stone, Wood,

Engines of War and Defense

Transportation – Moving Goods  
Spindle and distaff?

August 10

1. Please note: These office hours are subject to change from time to time – check instructor’s website for updates. The instructor will be available during office hours for consultation regarding assignments and questions raised during the lessons or by the assigned readings. Students are advised to have questions prepared ahead of time for the instructor so that office hour time may be used efficiently. Office hours are not to be used by students as a means of finding out what he or she missed during an absence. In the event that a student misses a lesson, the student should refer first to the syllabus and then consult with other students enrolled in the class. If there remain outstanding questions, then and only then should the student seek the instructor’s advice during office hours. Office hours are not intended as private tutoring sessions. [↑](#footnote-ref-1)