

## **ZOOL576. SEMINAR IN ECOLOGY.**

### **ENDLESS FORMS AND IMPERFECT SIMULATIONS: AN INTRODUCTION TO HISTORICAL AND CONTEMPORARY BIOGEOGRAPHY**

**Lecture & Lab:** R 9:00 am (or 10:00 am) to noon, Life Science II 256

**Instructor:** Dr. Jason L. Brown

**Co-instructors:** *Morgan Muell and Wilson Guillory*

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**Office Hours:** by appointment, Life Science II 254

#### **Course Overview**

This course exams the mechanisms that drive the evolution and maintenance of biodiversity through geological time. This course explores novel active learning techniques to teach associated concepts. The class format will include discussion of primary literature coupled with hands-on exercises (in the form of computer simulations or analog simulations using strategic board games). Participants will be expected to conduct two projects: 1) where they develop curriculum associated with key concepts presented in one of the four strategy board games used in this class, and 2) they will modify one of the games so that they better implement a key evolutionary or ecological concept to increase the scientific accuracy and educational value.

**The Board games:** Evolution: The Beginning (2016), Evolution Climate (2016), Biosphere (2017), Bios: Megafauna (second edition) (2017). These games were chosen due to their strong link of gameplay to key biological concepts. As we progress through the four games, as ordered above, they increase in complexity and spatio-temporal scope, moving from population-level processes over short periods of time to global processes over half a billion years.

#### **Course Evaluation**

Grades (given as 'pass' or 'fail') will be assigned based on: class participation, two projects and the 'final' essay.

**Dominant Species:** As we play games, we are going to keep scores through the semester (Most times we will play 4 players. As follows are the points awarded: 1<sup>st</sup> = 3 pts, 2<sup>nd</sup> = 2pts, 3<sup>rd</sup>= 1 pts, and 4<sup>th</sup> = 0 pt). The person with the highest points at the end of the course will take home a copy of 'Evolution: The Beginning'. Tiebreaker determined by a game of 'Evolution: The Beginning' with Natural Selection rules.

#### **Attendance Policy**

You are expected to arrive on time and fully attend each class. Excused absences must be documented (e.g., death in the family, extreme sickness, etc.). Unexcused absence from more than 2 class periods can result in class failure.

#### **Diversity policy**

SIU contains people from all walks of life, from many different cultures and sub-cultures, and represents most strata of society, nationalities, ethnicities, lifestyles, genders and sexualities. Tolerance and respect for diversity is required in this course, is vital for a global education, as well an essential preparation for any career.

### **Cell phones, laptops, and other digital devices**

When participating in hands-on exercises, I ask that people do not use their phones **at all**. This helps ensure that activities finish on time--- as when phones are present, activities can take a lot longer due to distractions.

### **Be a team player**

I reserve the right to transfer any participant from this section of ZOOL576 to the standard section. Reasons for this could be, but are not limited to: a lack of participation, general apathy, poor gamesmanship, excessive competition. It is important to me that this experience is fun and occurs in a friendly environment – if you are the reason this course is not, you likely will be asked to switch sections.

### **Dr. Brown's Associated Pet Peeves**

I am endlessly annoyed by people who bend cards, deliberately or unknowingly. I also ask that people don't eat food during class. Just like the cell phone use, it slows activities down and we will often be short on time.

### **Tentative Schedule**

#### **January 17<sup>th</sup>: 10am-noon. Week 1. Intro to course**

*Class:*

- Discuss Syllabus
- Learn and play: Evolution: The Beginning

*Homework:*

- Read paper: 'What really is Evolution?', 'Historical Biogeography: Evolution in Time and Space'

#### **January 24<sup>th</sup>: 10am-noon. Week 2. What really is evolution?**

*Class*

- Discuss: 'What really is Evolution?' , 'Historical Biogeography: Evolution in Time and Space'
- Play: Evolution: The Beginning
- Discuss how board games emulate evolution
- Play again: Evolution: The Beginning (with new rules)

*Homework:*

- Read article: "Simulating evolution: how close do computer models come to reality?"
- Watch video: <https://youtu.be/2I000Gu8ZyM>

#### **January 31<sup>th</sup>: 10am-noon. Week 3. Simulations and science**

*Class:*

- Discuss: "Simulating evolution: how close do computer models come to reality?"
- Assign Project 1
- Learn and Play: Evolution: Climate

*Homework:*

- Read paper: "Human Evolution Out of Africa: The Role of Refugia and Climate Change"

#### **February 7<sup>th</sup>: 10am-noon. Week 4: The role of climate and geography in evolution**

*Class:*

- Discuss: "Human Evolution Out of Africa: The Role of Refugia and Climate Change"
- Rule refresh and Play: Evolution: Climate

**February 14<sup>th</sup>: 10am-noon. Week 5: Project 1**

*Class:*

- Present/Discuss Project 1
- Assign Project 2

*Homework:*

- Read paper: "Population Genetics and Demography Unite Ecology and Evolution"
- Watch video: <https://youtu.be/Tc68VQzrHNE>

**February 21<sup>th</sup>: 10am-noon. Week 6: Simulating demography and genetics**

*Class:*

- Discuss "Population Genetics and Demography Unite Ecology and Evolution"
- Run Splatche Simulations – bring a laptop if you have one

**February 28<sup>th</sup>: 9am-noon. Week 7. Demography and evolution**

*Class:*

- Learn and play: Biosphere --- Random habitats

**March 7<sup>th</sup>: 10am-noon. Week 8. Biogeography and evolution**

*Class:*

- Play: Biosphere – North America Scenario

**March 14<sup>th</sup>: Spring break. Week 9. No class**

**March 21<sup>st</sup>: 10am-noon. Week 10. Landscape mosaic, demography and evolution**

*Class:*

- Discuss Biosphere Scenarios
- Discuss differences between active learning mediums (computer vs. board games)

*Homework:*

- Read paper: "On the causes of mass extinctions"

**March 28<sup>th</sup>: 10am-noon. Week 11: Present Project 2**

*Class:*

- Discuss paper: "On the causes of mass extinctions"
- Present/Discuss Project 2
- Assign 'final' Essay

*Homework:*

- Watch Video: <https://youtu.be/Tc68VQzrHNE>

**April 4<sup>th</sup>: 9am-noon. Week 12. 541 million years of evolution in Phanerozoic eon**

*Class:*

-Learn and Play: Bios- Megafauna (structured events)

**April 11<sup>th</sup>: 10am-noon. Week 13. Wrap-up, 'Dominant Species' Award, Kumbaya**

*Class:*

-Wrap-up course

-Discuss what worked/didn't

-Present the 'Dominant Species' award

**April 18<sup>th</sup>. Weeks 14. No Class**

**April 25<sup>th</sup> - Week 15. Essay is due. END OF CLASS**