EVPP 423 - 201
Beekeeping and Sustainability Class – SPRING 2020
Research Hall 202 Wednesdays 10:30 am - 1:10 pm
Instructor: Germán Perilla
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Office Hours Wednesdays 2:00pm – 5:00pm
Enterprise Hall 123

Course Description

This course explores the social structure, intense cooperation, and organization of honey bees as a natural phenomenon. The main course goals are introducing students to sustainable beekeeping through lecture and hands-on field experience and examining beekeeping as a tool for sustainable development.

Recognizing the nutritional and economic impact that honey bees have on the food we eat, this course explores the current challenges accountable for the increasingly high losses of native and managed bee colonies in recent years. This course also examines the resulting effects of these losses on beekeeping and on pollination industries worldwide as they adjust to the losses and attempt to provide the food we want at a cost we can afford.

Looking beyond the United States, we will review beekeeping throughout recorded history, examine the social impact and implications of beekeeping around the world, and explore its current place in the modern socio-economic structure as well as implications for beekeeping in the future.

Learning Objectives

Students will:

1. Examine the history of beekeeping and its contemporary role in the global economy
2. Analyze the biology and ethology of honey bees
3. Explore beekeeping as a tool for sustainable development.
4. Develop a range of skills, tools and questions for analyzing various texts relating to beekeeping and sustainability.
5. Become competent beekeepers
6. Effective communicators
7. Have an interdisciplinary perspective
8. Recognize the importance of ethical decisions
9. Knowledgeable about team dynamics and the characteristics of effective teams
10. Understand the value of diversity and the importance of managing diversity in the context of business and global trade
11. Demonstrate oral and written communication skills and will be critical thinkers.

Required Texts

- **The Beekeeper's Bible – Stewart – Tabori – Chang, New York**
  Available at www.amazon.com
- **A Field Guide to Honey Bees an**d their Maladies
  Penn State Agricultural Science (to be provided)
- Primary (peer-reviewed) literature provided to students as required

Course Evaluation:

- Class Participation 10 Points
- Class Quiz (6 Quizzes 1 point each) 6 Points
- Literature Review Presentation 4 Points

- Journal Front Line 5 Points
- Journal Reflective 5 Points
- Experiential Learning Activities 10 Points
- Field Expertise 10 Points
- Exam 20 Points
- Group Presentation Final Project 20 Points
- Final Paper 10 Points
- **Total 100 Points**

Grading Scale

(A = 100 - 93) – (A- = 92-90) – (B+ = 89-86) – (B = 85-80) – (C = 79-70) – (D = 69 - 60) - (F = >60)

Class Participation - (10 points): Students are expected to attend class, to participate actively and responsibly, to hand in all assignments when due, and to support other students in the learning process. Each student will be an active learner, coming fully prepared to engage in that enterprise by raising questions and suggesting answers or tracks to follow in search of answers. Students are expected to read, and be prepared to discuss, the assigned texts. The instructor will evaluate students for individual contributions to classroom discussions.

Class Quiz (6 Quizzes 1 point each) (6 Points)

Literature Review Presentation - (4 points): This activity involves working in groups of two people. Each group will select related peer reviewed articles for analysis. With group members using the same general topic, although not necessarily with the same focus, each student will summarize the main points of their specific article and present the summary to the class for comment and discussion. Students will be graded on their individual presentation as well as the ability of the group to develop points of debate related to the topic(s) discussed in the articles. Each student is to record and formally cite the article and the main points chosen for discussion in their journal.

For example: If a group selects a topic such as "beekeeping in Asia" and finds articles describing foraging differences or competition between Apis mellifera vs. Apis cerana, then each student in the group will find one article discussing this same topic to present to the class. Students in the group are not to use the same article. The student summary of her/his specific article will either highlight points of view that support the viewpoints presented by other members in the group, or present and support opposite points of view. Such analysis is intended to prompt class discussion and interaction, as well as increase understanding and exposure to multiple scholarly viewpoints.

Student groups are to present their selected articles to the professor for approval at least one week before the scheduled presentation. An electronic copy of each article is to be made available for class members' review via the class DropBox. If articles are not placed in DropBox on time, 2 (two) points will be deducted from the student's score.
Note that a good place to search for articles related to class topics is The Mid-Atlantic Apiculture Research and Extension Consortium (MAAREC), http://agdev.anr.udel.edu/maarec/.

Journaling - (10 points): Two types of journaling are required and are a vital component of this course. As thorough record-keeping is an essential quality of sound research, keen observation and good note-taking ability is a vital asset to research and will provide your individual project with a written and illustrated history of data. The experiences you record will be used to populate your final project with first-hand accounts and anecdotal evidence of your research topic. While you may think your memory is infallible, day after day of field work, data collection, and new experiences have a tendency to blend together until the details are indecipherable. Keeping a thorough field notebook is

both an art and a science.

Your field notebook will include two types of entries:

1. Front-line journaling: These are notes taken during the actual encounter, observation, or experience that include drawings, habitat descriptions, behavioral notes, verbal exchanges, etc. This type of journaling creates the raw data/observational framework of your note-taking.
2. Reflective journaling: This type of journaling fleshes out your front-line entries into a complete narrative. The process requires a filling-in of your frontline notes to create a coherent story.

And don't forget the essential elements that should be noted with every entry – name, date, time, weather, location, etc. Your notes should be thorough and clear enough that another person (like your professor!) can easily read and understand them.

Your journal is an important component to your success in this course and will be graded periodically throughout the semester. Plan to spend a minimum of two hours per week on your journal.

Experiential Learning Activities - (10 Points): This is an experiential learning class. We will have several field activities over the course of the semester (please refer to the syllabus). Students will work in groups of two; each group will be responsible for the successful management of at least one bee hive. Field activities will include winter management, early spring management, swarm control techniques, colony reproduction, and colony preparation to obtain a good honey harvest; if time allows we will work in value-added products of the hive.

These hands-on beekeeping activities will take place in the GMU Fairfax campus apiary during regular class hours where best-practice beekeeping procedures will be modeled, procedures that you will use in the hive or hives that you are managing.

Please note that you must complete these experiential learning requirements in order to pass the class.

Some additional Field activities will take place on Saturdays, and the apiary locations for these extra activities may vary. Meeting times and specific details will be discussed during the first class period.

A special course fee of one hundred dollars ($100.00) covers the costs associated with the various field activities bee population needs in this course. This fee will be automatically charge to your George Mason University student account.

Field Expertise – (10 Points): Students will be tested on the skills required to manage a honey bee colony in the field.

Exam - (20 points): Will cover all lectures to date and will be a one and a half hour multiple choice and short essay exam. Students can consult their journal during the exam.

Group Case-Study Presentation - (20 Points): Student groups will present the results of their case study to the class. Each presentation must include a background history and identification of the problem. The current state of affairs demonstrating the consequences of the problem and a conclusion presenting the possible solutions. Presentations will take place at the end of the semester and final grades will be influenced by peer-evaluations of the group's work. All students in the same group will receive the same grade for the presentation.

Research Paper - (10 Points): Each student will produce a written paper supporting the thesis he/she presented in the case study.
A **final paper** that includes:

A background Summary

A background summary should provide a well-researched and referenced overview of any information your audience needs to understand your study. This section of your paper should be ~1000 words and include a minimum of 10 scholarly sources properly cited (using MLA or APA format) both in-text and in a works cited at the end of the paper.

> The background summary or literature review should be presented with scholarly authority to support all claims. Your own opinions should not be presented in this part of your paper, as the goal is to provide an objective, unbiased review of expert research. Save your own thoughts and analysis for the results and conclusion section of your paper. Your review should prime your audience with a concise, yet thorough, overview of the issue and gradually lead them into your proposed study.

Experimental design and methods

> A brief description of how you designed your experiment or investigation and what methods you employed to test your hypothesis or answer your research question.

Study results and conclusions

> This section should include a thorough review of the results of your study and what conclusions can be drawn from these findings, as well as your own personal experiences. Self-generated graphs, charts, tables, figures, or diagrams should be used when appropriate – e.g. wherever a visual conveys information more concisely or appropriately than text.

The final paper will be submitted electronically, and formatted with one-inch margins, double spaced, in an easily readable size 12 font.

Course Policies

Attendance and Preparation

Students are expected to attend every class session and to be prepared, meaning having completed the required readings and other assignments before class begins.

Late Work

Assignments are to be turned in at the beginning of class on the due date. For work turned in late but within 24 hours after it is due, scores will be reduced by 10%; by 20% if it is between 24 and 48 hours late. No work will be accepted without a valid written excuse if it is more than 48 hours late.

Makeup and Extra Credit

No makeup work will be given unless you have made prior arrangements with the instructor. Makeup requests for the Midterm and the Case Study Presentation will only be approved for students that present a doctor's note that states the students cannot or could not attend class, or if there is a documented death or grave injury in the student's immediate family.

A note on the Honor Code. George Mason University has an Honor Code, which requires all members of this community to maintain the highest standards of academic honesty and integrity. Cheating, plagiarism, lying, and stealing are all prohibited. Always cite your sources – <u>if you do not, it is plagiarism</u>. Plagiarism means lifting someone else's ideas or words and presenting them as your own without proper attribution of the source. This requirement is for all sources and resources,

including Internet references. Use an approved citation method, such as MLA, APA, etc. (NOTE: The school of business has its own honor cod e a

The Office of Disability Resources
If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Resources at 703.993.2474. All academic accommodations must be arranged through that office.

Enrollment Statement
Students are responsible for verifying their enrollment in this class.

- Last Day to Add – January 28th 2020
- Last Day to Drop – February 11th 2020
- Selective Withdrawal Period February 25th – March 30st

After the last day of the Selective Withdrawal Period, withdrawing from this class requires the approval of the dean and is only allowed for nonacademic reasons.

NOTE:

During Spring Break (March 5th – March 14th, 2020), there is a highly encouraged trip to Colombia. Dr. Lisa Gring-Pemble and her students from MGMT 454: Social Impact and Entrepreneurship will be traveling with us, we did this trip last spring and it was AMAZING!

The total cost of the trip is around $2200 BUT GREAT NEWS! The Global Discovery Office has awarded us a significant grant and will pay half the program costs and Dr. Gring-Pemble and I worked hard to raise funds too. Thus, hotels, airfare, entrance fees, and some lunches and dinners are included. You have to get to and from the Dulles airport) your share is about US$300, there are few places left. I will present this opportunity in detail during the first class.

Beekeeping and Sustainability Class – SPRING 2020
Apiary Wednesdays 10:30 am - 1:10 pm

Weekly Schedule

Class 1 – January 22 – Introduction to Beekeeping
- History of beekeeping from ancient to current days
- Reading: **The Beekeeper's Bible p 12-63**

Class 2 – January 29 - Bees and beekeeping in the world (G1)
- Bees of the world
- Economic importance of beekeeping
- Reading: **The Beekeeper's Bible 64-93**

Class 3 - February 5 – Apis mellifera (G2)
- Anatomy
- Physiology
- Reading: **Honey bee flight (provided)**
- Reading: **The Anatomy of the Honey Bee RE Snodgrass**

Class 4 - February 12 – Apis mellifera Biology of a Super organism (G3)
- The colony
- Feral vs. Managed
- Bee ethology
- Mammal Characteristics of the honey bee
- Honey bee strategies for success
- Bee diet
- Bee intelligence
- Bee society
- Reading: **The Beekeeper's Bible 94-118**
- Reading: **The Honey Bee Dance Language (provided)**
- Reading: **The honey Bee as a Super Organism Thomas Seeley (provided paper)**

Class 5 – February 19 – Pollinators and Pollination (G4)
- Bee hives and equipment
- The Beekeeping Year
- Flowers and bees
- Flowers and other pollinators
- Film on pollination **"Wings of Life"**
- Reading: **The Beekeeper's Bible 119-122, 131-143**
- Reading: **Bee Pollination hand Book McGregor (provided)**

Class 6 – February 26 – How to set up an apiary (Proposal outline and references due) (G5)
- Apiary distribution
- Apiary location
- Record Keeping
- Finding Bees

- Reading: The Beekeeper's Bible 154-235

Class 7 - March 4 – Bee Health and Reproduction (Research proposal due) (G6)

- Healthy Bees
- Honey bee diseases
- Reading: **A Field Guide to Honey Bees and Their Maladies (provided)**
- **Reading: The Beekeeper's Bible 234-246**

March 9th – 15th Spring Break Colombia Trip

Class 8 - March 18 – Hive Products

- Community Driven Development
- Honey tasting
- Reading:

- **Value Added Products (provided)**

Class 9 – March 25 – Prepare apiary for bee package introduction

Class 10 - April 1 - Introduction to Bee Management I

- Hive Management (Field activity)
- GMU apiary
- Reading:

March 28th – Pick up Bees 485 Stewart Rd, Wilkes-Barre, PA 18706

March 29th – Bee Package Installation (Field Activity **- Recommended)**

Class 11 – April 8 - Introduction to Bee Management II

- Hive Management (Field activity)
- GMU apiary
- Reading:

Class 12 - April 15 - Introduction to Bee Management III

- Hive Management (Field activity)
- GMU apiary
- Reading:

Class 13 – April 22 – Exam (no class)

Class 14 – April 29 - Case Study Group Presentations

- Final Paper Due
- Journals Due