

INTS 395 - 001 78068
Beekeeping and Sustainability Class - Fall 2016
Innovation Hall 323 Fridays 10:30 am - 1:10 pm
Instructor: German Perilla
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Office Hours by Appointment

Course Description

This course explores the social structure, intense cooperation, and organization of honey bees as a natural phenomenon. The main goals of this introductory beekeeping class include exposing students to sustainable beekeeping through lecture and hands-on field experience, as well as the examination of beekeeping as a tool for sustainable development.

In recognition of the nutritional and economic impact that honey bees have on the food we eat, this course will explore the current challenges accountable for the increasingly high losses of native and managed bee colonies each year. This course also examines the resulting effects of these losses on the beekeeping and on pollination industries worldwide as they adjust to the shortage 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

- Examine the history of beekeeping and its contemporary role in the global economy
- Analyze the biology and ethology of honey bees
- Understand the field of bee management
- Explore beekeeping as a tool for sustainable development.
- Develop a range of skills, tools and questions for analyzing various texts relating to beekeeping and sustainability.
- Demonstrate college-level oral and written communication skills.
- Apply skills that will facilitate collaborative learning.

School of Integrative Studies Competencies Addressed:

Communication

Beekeeping is a fascinating topic in which students will become proficient in understanding the role of bees in nature, as well as the natural history and ethology of bees. During the course students will participate in class discussions and will make several presentations, where they will deliver an effective and coherent message to a variety of audiences.

Critical Thinking

The course will provide ample opportunities for students to become familiar with beekeeping industry problems and current sound solutions. Students will have several experiential learning opportunities to present solutions to local beekeeping challenges, such as how to improve existing equipment, or how to control bee pests more effectively or economically than current practices, etc.

Civil Engagement

Pollinators are essential not only for a healthy environment, but also to provide proper pollination for agricultural products, and to preserve nature as we know it. Students in the course will come to recognize the responsibility that each citizen has to keep our planet healthy. Each student in the class

will become a voice to spread the message of social responsibility using beekeeping as a model of sustainable activity.

Required Texts

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

Course Evaluation:

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|---------------------------------------|-------------------|
| • Class Participation | 10 Points |
| • Class Quiz (6 Quizzes 1 point each) | 6 Points |
| • Literature Review Presentation | 4 Points |
| • Journal Front Line and Reflective | 10 Points |
| • Experiential Learning Activities | 20 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): Collaborative learning is an important feature of the School of Integrative Studies. 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 three. 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 the 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 article's topic(s). Each student is to formally site 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 find articles describing foraging differences or competition between *Apis mellifera* vs. *Apis cerana*, then each student in the group will find one article within the topic to present to the class. The student summary of the 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/>.

Journal - (10 points): The journal is a vital component of this course; it will have two components Front Line Entries and Reflective Entries.

- **Front-Line Journaling:** These entries are a detailed record of all factual information obtained during lectures and field activities. This journal is to also include plans to be executed during future bee managing activities.
- **Reflective Journaling:** In these entries each student is asked to write their opinions, recommendations, possible solutions to a problem, disagreement with a topic, etc. Thoughts must be clearly stated and supported by evidence and logical reasoning.

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

Experiential Learning Activities - (20 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 trips in this course. This fee will be automatically charge to your George Mason University student account.

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 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.

Final Paper - (10 Points): Each student will produce a written paper supporting the thesis he/she presented in the case study. The final paper **should have a 300 – 400 word abstract**. The paper will be 8-10 pages (not including bibliography), and must contain at least ten (10) peer reviewed references.

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 medical 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 – if you do not, it is plagiarism. 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.

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 – September 6th, 2016
- Last Day to Drop with 33% refund – September 20th, 2016
- Last Day to Drop – September 30th, 2016
- Selective Withdrawal Period – October 3rd – October 28, 2016

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.

SCHOOL OF INTEGRATIVE STUDIES

COMMUNICATION

Communication is the process of creating and sharing meaning through human interaction. A competent communicator will be able to:

- Speak, read, write and listen effectively, with attention to audience, purpose and context.
- Use appropriate language, nonverbal and visual symbols.
- Organize ideas and information strategically.
- Design, revise and produce work tailored to diverse audiences.

CRITICAL THINKING

Critical thinking is a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating a judgment or conclusion. Someone who is a good critical thinker will be able to:

- Explore the issues and identify any problems to be solved.
- Identify and evaluate relevant, valid information and evidence.
- Understand the influence of context and assumptions.
- Summarize and synthesize key issues.
- Articulate his or her own position using evidence-based arguments.
- Design and implement problem solving plans.

GROUP COLLABORATION

Group collaboration is the process of working toward a shared agenda and/or common purpose while capitalizing on the diversity within the group. Effective group collaboration means that students should be able to:

- Create shared expectations and a common purpose.
- Understand and choose roles and tasks.
- Make decisions and track progress collaboratively.
- Facilitate constructive consensus-building, compromise and conflict.
- Integrate individual talents and strengths toward the accomplishment of goals and tasks.
- Be inclusive and value the diversity of the group.

GLOBAL UNDERSTANDING

Global Understanding is the respect for and appreciation of the interconnections among biocultural systems. Global understanding includes the ability to:

- Appreciate and apply diverse perspectives, ways of knowing, and values.
- Analyze the complexity of the interconnectedness of local and global communities politically, economically, socially, and culturally.
- Understand and respect various life forms and the environment.
- Recognize and address the global implications of human, environmental, and economic exploitation.

CIVIC ENGAGEMENT

Civic engagement is practice based on an informed understanding of communities and the roles and responsibilities of individuals within those communities. Students will:

- Develop the ability to examine contemporary issues and their historical contexts.
- Recognize and value multiple perspectives in civic life.
- Understand how actions are shaped by multiple forces, including values, and economic and social inequity.
- Make informed choices regarding personal community involvement, social justice issues and leadership roles.
- Work collaboratively with diverse partners to solve problems for a common good

DIGITAL LITERACY

As information and communication technologies permeate more and more aspects of personal, professional and civic life, students need to be able to apply and critique existing and emerging technologies. Competence in digital literacy requires that students will be able to:

- Research, evaluate and apply the digital information and communication tools and platforms appropriate to each activity undertaken.
- Demonstrate a readiness to learn new information communication technology (ICT) confidently and independently in the creation of original digital work.
- Integrate existing personal and networked ICTs with emerging tools and platforms.
- Understand and ethically resolve the privacy, security, accessibility and identity-management issues associated with the integration of digital literacy into everyday life.

AESTHETIC AWARENESS

Aesthetic awareness encourages individual to develop intellectual and emotional responses to nature or human creativity. An aesthetically aware person can:

- Understand the historical, social, political, environmental or gendered contexts of specific created works.
- Appreciate the complex processes of creative expression in multiple forms and media.
- Recognize and explore the transformative potential of creativity in effecting societal change.
- Value creative expression and the natural world to enrich everyday life.

WELL-BEING

Well-being is the life-long experience of life satisfaction and purpose. Students will:

- Develop insights and habits of regularly assessing one's own quality of life.
- Develop self-efficacy and control over one's own life.
- Effectively self-manage stress and anxiety.
- Find equanimity and resiliency in the face of adversity.
- Develop imaginative and inclusive ways to solve problems.
- Create and sustain positive relationships and social support.
- Demonstrate pro-social behaviors and emotions (e.g., compassion, gratitude, cooperation).

Fall 2016 Weekly Schedule
Innovation Hall 323 Fridays 10:30 am - 1:10 pm
Apiary 10:30 am - 1:10 pm

Class 1 – 2 September – Introduction to Beekeeping

- History of beekeeping from ancient to current days
- Reading: **The Beekeeper's Bible p 12-63**

Class 2 – September 9 – Field ONE

- Bee Management I
- GMU apiary

Class 3 – September 16 – Bees and beekeeping in the world (Group 1)

Guest Speaker: Tom Carter Environmental Justice

- Bees of the world
- Economic importance of beekeeping
- Reading: **The Beekeeper's Bible 64-93**

Class 4 - September 23 – Field TWO

- Bee Management II
- GMU apiary
- Reading: ABJ. V.115 #8 (Aug 2015) pages 875-879

Class 5 – September 30 – *Apis mellifera* (G2) (Group 2)

- Anatomy
- Physiology
- Reading: **The Anatomy of the Honey Bee RE Snodgrass**

Class 6 – October 7 – Field THREE

- Bee Management III
- GMU apiary

October 10, 2015 (Monday) Columbus Day Recess

Class 7 – October 14 – *Apis mellifera* Biology of a Super organism (Group 3)

Research Proposal Due

Guest Speaker: Remote Hive Monitoring – Frank Linton, Master Beekeeper & author

- 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 8 - October 21 – Field FOUR

- Bee Management IV
- GMU apiary

Class 9 – October 28 – Bee Health and Reproduction (Group 4)

Guest Speaker: Remote Sensing Techniques - Dr. Siddiq Kalaly

Hive Products

- Healthy Bees
- Honey bee diseases
- Community Driven Development
- Honey tasting
- Reading: **Value Added Products (provided)**
- Reading: **A Field Guide to Honey Bees and Their Maladies (provided)**
- **Reading: The Beekeeper's Bible 234-246**

Class 10 – November 4– Field FIVE

- Bee Management V
- GMU apiary

Class 11 – November 11 - Pollinators and Pollination (Group 5)

Guest speaker: Pollination - Organic Food Production – Sam Quinn, Sunnyside Farms

- 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 12 - November 18 - How to set up an apiary (Group 6)

Guest Speaker: Beekeeping Resources - Ms. Louise Edsall, Sweet Virginia Education

- Apiary distribution
- Apiary location
- Record Keeping
- Finding Bees
- Reading: **The Beekeeper's Bible 154-235**

25 – 29 November 2014 - Thanksgiving Break

Class 13 – December 2 – EXAM - NO CLASS

Class 14 – December 9 - Case Study Group Presentations

- Final Paper Due
- Journal Due