

NCLC 395 – 004 CRN 76297
Beekeeping & Sustainability Fall 2015
Wednesdays 10:30a.m. – 1:10p.m. Location: Innovation Hall - Room 338

Instructor: German Perilla

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Open Office Hours - Wednesdays from 2:00pm to 4:00pm

Appointments by request

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 (behavior) 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.

New Century College/School of Social Impact and Innovation Competencies Addressed: Communication

Students will come to understand the role of native bees in nature as well as managed bees in their current role in food production as well as become familiar with the natural history and ethology of bees. During the course students participate in class discussions and make several public presentations, where they are expected to deliver effective and coherent messages to different audiences.

Critical Thinking

The course provides 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 ongoing beekeeping challenges, such as the improvement of current equipment, or how to control bee pests in a more effective and economic manner, etc.

Civil Engagement

Pollinators are essential for a pleasant environment and for agricultural products, but also to preserve nature as we know it. Students in this course come to understand the responsibility that each citizen carries to be mindful of the as they make choices which impact the health of our planet particularly the welfare of pollinators. Each student in the class will have the opportunity to become a voice to spread this message of social responsibility.

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 (provided in class)
- Primary (peer-reviewed) literature provided to students as required

Course Evaluation Criteria:

Class Participation	10 points
Literature Review Presentation	5 points
Journal Front Line and Reflective	10 points
Experiential Learning Activities	30 points
Mid Term Exam	20 points
Case Study Proposal-Abstract	5 points
Group Case-Study Presentation	10 points
Final Paper based on Case-Study	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 New Century College learning communities. 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.

“Participation” is comprised of both attendance and preparation, and students will be are graded on their informed participation which requires careful, timely preparation and study, and regular attendance. Attendance is both expected and required. Since each student will also be a member of at least one class group, the success of the class is dependent on the attendance of the whole.

Students are advised to be active learners, coming fully prepared to engage in topic discussions by having read the assignments prior to coming to class. Preparation is reflected through the raising of questions and suggesting answers or paths to follow in search of answers. Students are expected to read and be prepared to discuss the assigned texts and review information provided in class.

Absences: Please contact the instructor as soon as possible when an excused (emergency) absence has occurred, to explore make-up options. Unexcused absences will cause a forfeit of 1 point from the student's course grade for each occurrence.

****NOTE CLASS SCHEDULE****

Because this course deals with live animals, an occasional rescheduling of activities or lectures may be required. Schedule exceptions will be announced as soon as possible directly by email and/or uploaded to the class DropBox page. Students are responsible for being aware and checking for weekly updates to the course schedule.

Literature Review Presentation (5 points): This activity involves working in groups of two or three. With guidance, each group will select peer reviewed articles of related topics to study and analyze for presentation. Group members will use the same general topic, although not necessarily with the same focus or perspective. 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 and also on the ability of the group to develop points of debate related to the article's topic(s). Each student is to formally cite in their journal the article they are using and the main points chosen for discussion.

Example: A group selects a topic such as “beekeeping in Asia” and locates articles describing foraging differences or competition between *Apis mellifera* vs. *Apis cerana*. Each student in the group will then find and identify one article concerning the topic to present to the class. The student summary of that article will either highlight and support the viewpoints presented by other members in the group, or present and support opposing points of view. Such analysis is intended to prompt class discussion and interaction, as well as increase understanding and exposure to multiple scholarly viewpoints.

Total presentation time should last between 10-15 minutes for the entire group with a Q&A session open to the class for discussion continuing as deemed appropriate by the instructor.

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 review via the class DropBox. If articles are not made accessible to the class (by placement in the class DropBox on time) 2 (two) points will be deducted from the student's individual score.

Note: 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/>. Other locations will be discussed in class.

Journals (10 points):

Journals are a vital component of this course and will consist of both Front Line Entries and Reflective Entries as explained below:

- **Front-Line Journaling** are similar to class notes, but focused on important impressions during lectures or presentations rather than precise lecture notes. Entries are detailed records of factual information gleaned during each lecture and field activity and should also include plans to be executed during future bee managing activities.
- **Reflective Journaling** entries include opinions, recommendations, possible solutions to a problem, disagreements with a topic, etc., that come to mind during preparation or study periods. These reflective statements must be supported by evidence and logical reasoning rather than simply a naked statement.

These journals are an important component to success in this course and will be brought to each lecture to be reviewed. Plan to spend a minimum of two hours per week on the journals. Journal content will be graded on thoroughness and completeness. Legibility is required. All entries must be dated, but other formatting is of the student's individual choice and is not constrained.

Experiential Learning Activities (30 Points):

This is an *experiential* learning class. Several field activities will be held during the semester (refer to the syllabus for anticipated dates). The purpose of these field activities is to model established beekeeping best-practices in procedures and management and to introduce and explore new techniques. Activities will take place in the GMU Fairfax campus apiary (located at the corner Shenandoah Lane and Roberts Road) during regular class hours.

With guidance, each students will participate in hands-on hive management activities in groups of two (or possibly three) students. Student groups will be responsible for the successful management of at least one bee hive and, by the end of the course, individually demonstrate their understanding of practical aspects and procedures of honey bee management and. If time permits, value-added products of the hive will also be considered.

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

Participation in additional field activities may be possible depending on the needs of the apiary. These activities may take place on Saturdays, and the apiary locations for these extra activities may vary. Meeting times and specific details will be discussed early on in the semester.

With the approval of the instructor, one Field Activity day may be used as a make-up day to an unexcused absence, if the tasks in the field activity are congruent with the class topic missed.

The one hundred dollar (\$100.00) Special Course Fee that was included in the charges when registering for this course is used to cover a portion of the costs associated with the equipment and bees and management supplies.

Midterm Exam - (20 points): Will cover all lectures to date and will be a one and a half hour multiple choice and short essay exam. This exam is considered “open note” as students may consult their *journals* during the exam.

Case Study Proposal - Abstract - (5 Points): Each student will compose a scientific abstract detailing a portion of the group case study presentation. The final abstract will be 500 words in length (Times New Roman 12 point font double spaced, 1” margins), and will be accompanied by an adequate list of scholarly sources (at least 10). Each student will submit an outline and annotated bibliography for their portion of the study before submitting the final abstract (see syllabus for due dates).

Group Case-Study Presentation - (10 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 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, i.e. complete before class, the required readings and other assignments.

Late Work

Assignments are to be turned in at the beginning of class on the date due.

Work turned in late but within 24 hours after it is due will be penalized 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 cite your sources, the result 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 "in text." APA is preferred.

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 – 8 September 2015
- Last Day to with 33% refund – 15 September 2015
- Last Day to Drop – 2 October 2015
- Selective Withdrawal Period – 5-30 October 2015

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.

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 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 2015 Weekly Schedule (Revised August 2015)

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:

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

Class 4 - September 23 – Field TWO

Guest Speaker: Remote Hive Monitoring – Frank Linton, Master Beekeeper & author – Part 1

- 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 12, 2015 (Monday) Columbus Day Recess

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

Guest Speaker: Remote Hive Monitoring – Frank Linton, Master Beekeeper & author – Part 2

- 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 – Midterm NO CLASS

Class 10 – November 4– Field FIVE

- Bee Management V
- GMU apiary

Class 11 – November 11 - Pollinators and Pollination (Group 4)

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 (Proposal outline & references due) (Group 5)

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 - Bee Health and Reproduction (Research proposal due) (Group 6)

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 14 – December 9 - Case Study Group Presentations

- Three Groups

Class 15 – December 16 – Case Study Group Presentations

- Three Groups
- Final Paper Due
- Journal Due