ANSC/FSHN/MBBE 650 COURSE SYLLABUS

DNA and Genetic Analysis, 2 Credits

**Class hours:** Lecture: Tuesday 10:30 – 11:45 AM  
Lab: Tuesday 1:30 – 4:15 PM

**Instructor:** Dr. Jinzeng Yang  
AgSci Building Room 314F  
Ph: 956-6073, E-mail: Jinzeng@hawaii.edu

**Office Hours:** Tuesday and Thursday 11:45-1:30 or by appointment

1. COURSE OBJECTIVES

The goal of this course is to introduce DNA-based molecular biology techniques to graduate students and seniors, and to stimulate interests in applying the techniques to their thesis and research projects. Students are expected to develop intellectual ability to analyze the technology for research and development in the area of their interests. Therefore, the course is designed to promote the techniques and their applications to various research projects, including animal genetics and species conservation, biomedical science, and nutritional sciences.

2. TEXTBOOK USED

No textbook is required. Supplementary reading materials will be provided.

3. COURSE FORMAT AND POLICY

Class periods will include lectures, discussions, lab demonstrations, student presentations and analyses of learning progress. This course contains five topics: 1) the basic technology of DNA and DNA manipulation; 2) gene mutations, microsatellite DNA and genetic analysis; 3) from DNA to phenotype and functional genomics; 4) impacts of genetic variations; 5) applications of DNA-based genetic analysis to research projects in the area of animal genetics, conservations, nutrition, and biomedical research. The course will be mostly instructed by classroom lectures and laboratory demonstrations. The fourth and fifth topics will be taught by critical review of publications and student oral presentations in combination with writing assignments. To help students develop teamwork and communication skills, the instructor will arrange and tutor the student class presentation. For each presentation, the instructor will help students prepare reading materials, such as reviews and original research papers. After the student presentation, the instructor will work together with the students to summarize the topics and answer questions. This format is intended to enhance opportunities for the exchange of ideas and critical analysis. Active participation in class discussion is therefore expected. Failure to attend class regularly and/or habitual tardiness will be taken as lack of commitment to the educational process. No make-ups will be given for any exam or assignment.

Laboratory demonstrations and practices will be scheduled for two to three hours per week, including basic laboratory techniques in molecular biology; PCR, RT-PCR and real-time PCR; DNA sequencing and fragment analysis; data analysis for molecular studies; microsatellite DNA detections and parentage testing.
4. TENTATIVE SCHEDULE

Week 1    Introduction and overview
Week 2     DNA, gene, genome and genetic analysis
Week 3-4  Recombinant DNA Technology
          (Lab: plasmid RE map and transformation)
Week 5-6  SNP and microsatellite DNA
          (Lab: PCR and DNA fragment analysis)
Week 7-8  Gene Expression and Functional Genomics
          (Lab: RT-PCR and Real-time PCR)
Week 9-10 Knock-out mice and transgenic Animal
          (Lab: microinjection demonstration)
          Mid-term exam
Week 11-12 Impacts of genetic variations
          (Lab: Class evaluation and feedback)
Week 13-14 DNA-based genetic analysis and animal breeding
          (Lab: Data analysis and statistical methods)
Week 14-15 Applications of DNA-based genetic analysis to research
          projects, Student oral presentations
Week 16-17 Review and final exam

5. WRITING ASSIGNMENT (TERM PAPER):

Any relevant topic in the application of recombinant DNA and molecular biotechniques to life science and agriculture would be appropriate. The term paper should be 5-7 single-spaced typed pages in length. Diagrams, tables and simplified drawings are strongly encouraged. The assignment will be graded on both content and quality of writing such as style, grammar and punctuation. To request comments from the instructor, students need to have the draft of their essays and references ready two weeks before the deadline.

6. GRADING

Mid-term examination ........................................ 25 points
Student presentation ........................................ 10 points
Assignment Essay ............................................. 15 points
Class and laboratory attendance ......................... 20 points
Final exam ..................................................... 30 points
Total ............................................................ 100 points

Grades will be assigned using the following scale:
A: >80 pts; B: 70-80 pts; C: 60-70 pts; D: 50-60 pts, F: <50 pts.
7. ACADEMIC DISHONESTY (UHM STUDENT CONDUCT CODE)

UHM is an academic community with high professional standards, its teaching, research, and service purposes are seriously disrupted and subverted by academic dishonesty. Such dishonesty includes cheating and plagiarisms as defined below. Ignorance of these definitions will not provide an excuse for acts of academic dishonesty. 1). Cheating includes but is not limited to giving or receiving unauthorized assistance during an examination; obtaining unauthorized information about an examination before it is given; submitting fabricating or falsifying data in experiments and other research; altering the record of any grade; altering answers after an examination has been submitted; falsifying any official University record; or misrepresenting of facts in order to obtain exemptions from course requirements. 2). Plagiarism includes but not limited to submitting, in fulfillment of an academic requirement, any work that has been copied in whole or in part from another individual’s work without attributing that borrowed portion to the individual; neglecting to identify as a quotation another’s idea and particular phrasing that was not assimilated into the student’s language and style or paraphrasing a passage so that the reader is misled as to the source; submitting the same written or oral or artistic material in more than one course without obtaining authorization from the instructors involved; or “drylabbing,” which includes obtaining and using experimental data and laboratory write-ups from other sections of a course from previous terms. Disciplinary sanctions. One or more of the following sanctions may be imposed whenever a student is found to have violated any of the rules contained in the Conduct Code: Warning, probation, restitution, remission of grades, suspension, and expulsion.