



## Oficial Syllabus

### Genetics BIOL 3300

<b>Credit hours:</b> 3	<b>Contact hours:</b> 5
<b>Prerequisites:</b> BIOL 3022 or BIOL 3052 or BIOL 3435 or BIOL 4015 or CIBI 3032 or CIBI 3002.	<b>Corequisites:</b> none
<b>Course description in Spanish:</b>	
<b>Course description in English:</b>	
<p>“Study of nuclear and non-nuclear organisms; their nature and the transmission and mode of action of genetic material.” Lecture and laboratory are combined into a single course which covers important components of classical, molecular and population genetics. This course is a prerequisite for BIOL 5395, AGRO 5501, INPE 4019, and CFIT 4007.</p> <p>Genetics is a required course for majors in the Biology Department and many Agricultural majors as well.</p> <p>This course will provide the basis upon which the student may build in other courses, or in real-life situations. In the laboratory, the student will prepare slides of mitosis, identify the stages of mitosis and meiosis, extract DNA, transform bacteria, induce mutations with UV irradiation, use restriction enzymes, conduct electrophoresis, paper chromatography, and PCR, apply analytical methods using probabilities and Chi-square tests of significance. They will also analyze pedigrees, karyotypes, and gene frequencies in populations. They will also use representative data bases and discuss relevant ethical problems.</p>	
<b>Objectives:</b>	
<p>Specific goals for this course are to give the students an understanding and mastery of the principles and practice of basic genetics, and the ability to analyze and solve genetic problems and situations in and out of the classroom which involve the different modes of inheritance which are commonly found.</p>	

**Outline of content:**

<i>Topics to be covered</i>	<i>Contact hours</i>
Introduction to course and to the field of genetics.	0.5

Monohybrid cross: terminology, complete dominance, Punnett squares, genotypic and phenotypic ratios, test cross.	1.5
Dihybrid cross: terminology, complete dominance, Punnett squares, genotypic and phenotypic ratios, algebra, test cross, back cross, selfing.	2
Incomplete dominance and codominance.	0.5
Multiple alleles, the ABO series, C series, albinism in humans (tyrosinase negative and tyrosinase positive albinism).	2
Lethal genes and their modified phenotypic ratios.	1
Gene interactions and their modified phenotypic ratios.	3
Hormones and their roles in genetic systems.	0.5
The genetics of sex determination in mammals with an emphasis on humans.	1
Abnormalities in human sex determination: karyotypic formulas, Klinefelter syndrome, Turner syndrome, XXX syndrome, XYY syndrome, testicular feminization.	2
Sex determination in <u>Drosophila</u> , <u>Hymenoptera</u> , <u>Lepidoptera</u> , and birds.	1
Sex linkage.	1.5
Sex influenced, and sex limited traits.	1
Two point linkage, crossing over and mapping.	1
Three point linkage and mapping in plants and animals.	2
Ordered tetrad analysis in <u>Neurospora</u> .	1.5
The nature of the gene: muton, recon, and cistron. Cis-trans test and complementation. Intragenic recombination. What is a gene?	2
Chromosomal aberrations in Eukaryotes: deletions, duplications, inversions and translocations.	2
Lecture exams	4
Structure, replication, and packaging of DNA.	3
Chromosome structure and mitosis.	1.5
Meiosis.	1.5
From gene to protein. Topics include: the genetic code, transcription, translation, interrupted gene sequences, the operon model.	3
Gene mutations and their effects.	3
Biochemical pathways: eye pigments in <i>Drosophila</i> .	3
Probability and the chi-square test of significance.	3
Population genetics.	3
Pedigree analysis.	1
Medical cytogenetics. The common aneuploid conditions are shown and discussed.	2
Extraction of DNA	3
PCR	3
Electrophoresis and restriction enzymes	3
Bioinformatics and bioethics	3
Laboratory exams	6
<b>Total hours: (should be equivalent to the contact hours of the course)</b>	<b>72</b>

<p><b>Instructional strategies:</b>  <input checked="" type="checkbox"/>lecture    <input type="checkbox"/>discussion    <input type="checkbox"/>computation    <input checked="" type="checkbox"/>laboratory  <input type="checkbox"/>seminar with formal presentation    <input type="checkbox"/>seminar without formal presentation    <input type="checkbox"/>workshop  <input type="checkbox"/>art workshop    <input type="checkbox"/>practicum    <input type="checkbox"/>trip    <input type="checkbox"/>thesis    <input type="checkbox"/>special problems    <input type="checkbox"/>tutorial  <input type="checkbox"/>research    <input type="checkbox"/>other (specify):</p>
<p><b>Minimal resources available:</b></p> <p>Various reagents, glassware, prepared slides of mitosis and meiosis, biological stains, slides and cover slips, microscopes, incubators, waterbaths, freezers, refrigerators, computers with an internet connection, projector, PCR cyclers, UV hood, DNA electrophoresis chamber and power supply, Drosophila strains, vials, plugs, media, micropipets.</p>
<p><b>Evaluation strategies and their relative weight:</b></p> <p style="text-align: center;">x</p> <p style="text-align: center;">x</p>
<p><b>Grading system:</b>  <input checked="" type="checkbox"/>quantifiable (letter grade)    <input type="checkbox"/> not quantifiable</p>
<p><b>References:</b></p> <p>(1) Snustad, Peter, and Michael Simmons, 2000, <u>Principles of Genetics</u>, third edition. John Wiley &amp; Sons, NY  (2) Elrod, S., and Stansfield, W. (2002), <u>Theory and Problems of Genetics</u>, fourth edition, McGraw-Hill, N.Y.  (3) Squire, Richard (2000), <u>Genetics Laboratory Manual</u>, second edition, Impresos RUM.</p>

Después de identificarse con el profesor y la institución, los estudiantes con impedimento recibirán acomodo razonable en sus cursos y evaluaciones. Para más información comuníquese con Servicios a Estudiantes con Impedimentos en la Oficina del Decano de Estudiantes (Q-019), 787-265-3862 ó 787-832-4040 x 3250 ó 3258.

Attachments included:

Yes      
No