Ph.D Biomedical Genetics Lab Syllabus

Objectives and Goals: The objective of these laboratory exercises is to give you a hands on experience in the detection of mutations and disease genes. The goal of this course is to instruct you on when and where to use the appropriate techniques for detection of genetic mutations.

Background: Personalized medicine is fast becoming a reality and this course will introduce to you the various technologies available to detect genetic mutations and how to associate these mutations with specific diseases.

Prerequisites: Biochemistry and biochemistry lab

Textbook: *Exploring Genomes, 2nd edition.* Young, P. G. W.H. Freeman, Inc.

Other course material: Some faculty members will post their lecture material on Blackboard and will send an announcement to the students prior to class concerning their expectations for the material.

Course content, Schedule and Assignments:

Date	Topic	Instructor
	Bioinformatics Assignment	Newman
	Isolation and quantification of DNA	Newman
	Insertion/deletion analysis	Lyn
	TaqMan SNP analysis	Newman
	Written Exam	
	SNP analysis - WAVE	Song
	SNP analysis - Pyrosequencing	Song
	Microarray analysis - gene expression	Anderson
	Written Exam	

Assignments:

1. Bioinformatics, (Gale Newman) - usage of public databases for genetic analysis. Textbook supplies basic techniques.

2. Isolation and quantification of DNA, (Newman) - extraction of DNA from blood for future experiments

3. Insertion/deletion analysis (Deborah Lyn) - use of primers, PCR and agarose gel detection of insertion/deletion mutations.

4. TaqMan SNP analysis (Newman)- use of TaqMan SNP probes and real time PCR to detect a specific SNP

5.. SNP analysis – WAVE analysis (Qing Song)

6. SNP analysis - Pyrosequencing (Song) - use of the Pyrosequencer to validate the SNP detected by the TaqMan probes.

7. Microarray – (Leonard Anderson) – detection of gene expression using microarray analysis

Laboratory:

Written exams - 50% each- Short answer questions about experimental design will be submitted by instructors to the course director. Final exam will be cumulative.

Instructors:

Gale Newman, Ph.D.	Course director	X 1636	HG 325
Deborah Lyn, Ph.D.		X1521	MEB 215
Qing Song, M.D., Ph.D.		X1845	RW 2
Leonard Anderson, Ph.D.		X8920	RW 2