Genomics (GNIC)
CTY Course Syllabus

WEEK ONE	TOPICS	ACTIVITIES	STUDY HALL
Day 1:	Review What is a Gene?	**Morning:** -Lab Safety Video -Getting to Know You -Community Standards -Laptop Distribution -Review of Lab Safety **Afternoon** -What is a Gene? (group research/discussion) - Pre-assessment	Ch2: *Discovering Genomics, Proteomics and Bioinformatics* (2nd Edition) Answer questions 1, 3, 4, 5, 12, 13
Day 2:	What is Genomics?	**Morning:** - **FIELD TRIP: DR. FEINBERG'S LAB** **Afternoon:** - DNA Sequencing (lecture) - Edvotek kit 339 - Edvotek kit 340	- Quiz on DNA Sequencing focusing on the differences between the Sanger Method and the Automated Method. - Completion of Edvotek kit 340
Day 3:	The Human Genome Project	**Morning:** -Primary literature readings from Feb 2001 *Science* & *Nature* publications **Afternoon:** - BSCS Bioinformatics Lesson 1 - BSCS Bioinformatics Lesson 2	- BSCS Bioinformatics Lesson 3
Day 4:	Comparative Genomics (Part I)	**Morning:** - Genomic Libraries (lecture) - Blotting (Southern, Northern, Western) (lecture) - RFLPs (lecture) - ESTs (lecture) - Genomic Analysis (shotgun vs. contigs) (lecture) - Primary literature readings and presentations by groups from Lawrence 2005, Modi and Crews 2005, Bennetzen 2005, Dujon 2005, Hall and Carlton 2005, Catillo-Davis 2005 **Afternoon:** - Phylogenic Trees Activity - Review of Basic Lab Techniques Lab - Introduction to Disease Project	*Discovering Genomics, Proteomics and Bioinformatics* (2nd Edition) pp. 178-198 #1, 2, 5, 25, 26, 27, 29, 30, 31.
Day 5:	Comparative Genomics (Part2)	-Weekly Quiz -Environmental Case Study	Ch 4: Genomic Variations (Campbell & Heyer)

WEEK TWO	TOPICS	ACTIVITIES	STUDY HALL
Day 6:	Special Chromosomes: Mitochondrial DNA	**Morning:** - Endosymbiont theory and mitochondrial DNA (lecture) -Mitochondrial Control Region Polymorphisms & Molecular clocks (lecture) - Review procedure for mitochondrial DNA lab - Cheek swab and DNA extraction - PCR of DNA **Afternoon:** - Review of electrophoresis procedure - Load and run electrophoresis - Primary literature reading of Medini et al., 2005 - Discussion of paper - Stain gels	- 16S and 18S rRNA (lecture) - Work on disease project.
Day 7:		**FIELD TRIP TO NIH Intramural Sequencing Center (NISC)** **DEPART: 9:30 AM** **RETURN: 3:00 PM**	- Isolated colony from environmental lab & inoculate LB broth - Disease project
Day 8:	Bacterial Genomics	**Morning:** - Review procedure for purification of bacterial DNA and PCR amplification **Afternoon:** - Purify genomic DNA	- PCR amplification of 16S rRNA gene - Disease project
Day 9:	Complex Traits	**Morning:** - Purification of PCR product - Electrophoresis of PCR product **Afternoon:** - Cut out DNA bands - Case study: "What's wrong with my child?" chapter 11 *Discovering Genomics, Proteomics and Bioinformatics* (2nd Edition)	- Review for quiz - Disease project
Day 10:	Complex Traits HapMap	**Morning:** - Gel extraction using a microcentrifuge - Weekly quiz **Afternoon:** - Quantify amount of DNA for sequencing - HapMap tutorial	- Disease project

WEEK THREE	TOPIC	ACTIVITIES	STUDY HALL
Day 11:	Microarray Technology Genomics & Proteomics: Expansionist Biology	**Morning:** - Review of weekly quiz - Microarray technology (lecture) - Gene-chip microarray activity #2: structure and function **Afternoon:** - Gene-chip microarray activity #3: build a model of a microarray	- Disease project
Day 12:	Epigenetics	**Morning:** - In Search of the Cancer Gene lab **Afternoon:** - Epigenetics (lecture) - Primary literature reading Bjornsson et al., 2004 and Feinberg and Tycko 2004 - Discussion of papers	- Look at results of In Search of the Cancer Gene - Complete lab write up
Day 13:	Proteomics	**Morning:** - Determination of Amino Acid Sequence of a Peptide lab **Afternoon:** - Proteomics (lecture)	- Review of DNA sequences from Bacterial Identification lab - BLAST and ClustralW of DNA sequences
Day 14:	Presentations	**Morning:** - Disease presentations **Afternoon:** - Disease presentations	- Movie
Day 15:	Farewells	Parent Conferences	