The University of Texas M.D. Anderson Cancer Center
The School of Health Sciences

The Program in Cytogenetic Technology

CC 4530: Syllabus

Course Title
Basic Laboratory Techniques

Course Schedule
August – November, FALL SEMESTER

Course Number
CC 4530

Catalog Description
A comprehensive study of maintaining laboratory quality control in accordance with federal, state, and local regulations, as well as College of American Pathologist on-site inspections and proficiency testing. Also, a study of laboratory skills as they apply to amniotic fluid, chorionic villus sampling, abortus tissue, blood, bone marrow, and solid tissue samples with respect to transporting, preparing, culturing, harvesting, banding, analyzing, photographing, karyotyping, and reporting final results of specimens. Students will also be instructed in fluorescent in situ hybridization techniques and computer imaging of cytogenetic specimens. 5 hours

Prerequisites
Enrollment in GT 4300

Semester Hours
Five (lecture and laboratory)

Location/Time
CGT Senior Classroom Y2.6004 for Lecture.
B7.4624 for wet lab activities.
B7.4518 for microscopic & imaging activities.
Days & time are M-F variable.
In addition, this course requires individual time of 10 hours/week to complete all course requirements.

Faculty
Vicki L. Hopwood, MS, CLSp(CG) (Primary Faculty)
vhopwood@mdanderson.org
Office Hours: Open door for short (less than 10 minutes questions) – if you need more time please request an appointment by email. I check email M-F and will attempt to answer your question(s) within 24 hours – if you do not received a response by 48 hours please contact me to be assured I received your original message.

Jun Gu, M.S., MD, CLSp(CG)
jungu@mdanderson.org
Office Hours: Open door for short (less than 10 minutes questions) – if you need more time please request an appointment by email. I check email M-F and will attempt to answer your question(s) within 24 hours – if you do not received a response by 48 hours please contact me to be assured I received your original message.

Lecturer
Ming Zhao, MD, CLSp(CG)
Office Hours: Open door for short (less than 10 minutes questions) – if you need more time please request an appointment by email. I check email M-F and will attempt to answer your question(s) within 24 hours – if you do not received a response by 48 hours please contact me to be assured I received your original message.

Course Approval
Approved: August 2000-2001
Reviewed: August 2009

Methods of Instruction
Lecture
Discussion
Demonstrations
Laboratory Exercises
Slide Practical
Course Goal
To educate students using both lectures and laboratory practice about basic cytogenetic techniques in clinical laboratory setting. This course will incorporate clinical cytogenetic theory with daily laboratory practice that will prepare students to become certified technologists. Techniques learned in this class will be expanded on in CC4320, CC4152, and CC4130.

Lecture Objectives
At the completion of this course the student will be able to:
1. Describe procedures required for laboratory safety.
2. Compare and contrast quality control and quality assurance
3. Describe the set up and harvesting procedure for peripheral blood cultures.
4. Discuss the basic concepts required for successful tissue culture.
5. Discuss the various banding procedures and their underlying mechanisms.
6. Identify the parts and functions of the microscope.
7. Identify parts and functions of computerized imaging equipment.
8. Assess how molecular cytogenetics complements conventional cytogenetics.
9. Understand the rules of ISCN nomenclature used to describe both normal and abnormal chromosome constitution.

Affective Objectives
At the completion of this course the student will be able to:
1. Arrives on time.
2. Dresses and acts in a professional manner. No open toe shoes in the lab.
3. In case of absences, the student is expected to make up work and get notes from another student.

Psychomotor Objectives
At the completion of this course the student will be able to:
1. Prepare media and solution for culture and harvesting.
2. Correctly use laboratory instruments, such as centrifuge, micropipettor, microscope…
3. Dropping slides for metaphase preparation.
4. Scanning and analyzing slides using light microscope.
5. Properly use a fluorescent microscope.
6. Perform and understand the different steps in the set up and harvesting of peripheral blood cultures.
7. Demonstrate knowledge and ability to perform the main types of chromosome banding techniques.
8. Achieve a working knowledge of the steps in capturing microscope images using both photomicroscopy and computer imaging techniques.
9. Become proficient at mapping metaphases under the microscope.
10. Perform and describe the basic steps of Fluorescent in situ hybridization.

Grading
Grading consists of UTBB homework assignments (10%), laboratory journal (10%), slide practical (25%), competency testing (15%), midterm exam (15%), and final exam (25%).

Assignments
To complete the homework assignments for this course you will need to have access to the internet. Log onto http://blackboard.uth.tmc.edu/. Enter your blackboard ID and password. These assignments are located in the Cytogenetic New Blackboard Course under the exams and homework tab. Print out the adobe acrobat copy of the homework to use to draft your answers. When finished type in your final answers for submission.

Complete the following homework assignments
1. CAP, Competency Testing, Laboratory Safety And Quality Control Homework
2. Banding Homework Matching
3. Banding Homework Multiple Choice

Complete the following homework assignments
1. ISCN Homework
2. Culture Room & Harvesting Homework
3. Microscopy Homework
4. ISCN Writing Homework
5. FISH Homework

**Laboratory Journal**
- Proper Documentation of Procedures (4%)
- Explanation of Critical Steps or Troubleshooting (4%)
- Complete and Neat (2%)

**Due days are posted in course site calendar.**

**Slide Practical**
Students complete a Peripheral Blood Slide Practical. 20 cells from 4 samples will be mapped using a provided mapping form. Slide coordinates together with the New England Finder coordinates will be transcribed onto a standard record sheet used for chromosome analysis. Two representative cells with good banding, band length of at least 450 with minimum overlaps will be karyotyped for each sample. The ISCN will be placed on each line of the record sheet for each of the 20 cells. All cells mapped should be captured and saved inside your student folders on AI system. Metaphases captured need to be submitted to instructors as image files on ZIP disks provided for grading. **Students may work with other students in identification of chromosomes however copying of chromosome maps is not allowed in this course.**

**Competency Testing**
Students must demonstrate competency for common cytogenetic skills. Demonstration of competency of the skills listed below is required to enroll in Spring 2010 courses. Each competency skill test is worth 1% of the course grade.

**Pass with first attempt: 100%**
**Pass with second attempt: 50%**
**Pass with third attempt: 25%**

**Wet Lab:**
1. Blood culture setup.
2. Harvesting.
5. C Banding.
7. Q Banding.

**Microscope:**
1. Parts and their functions.
2. Koehler illumination.
4. Capture FISH images using AI.
5. Capture FISH images using ASI.
6. FISH scoring.
7. FISH procedure.

Homework due dates are also posted in your Blackboard course site. Make note of the due dates – I will **not accept items** submitted after the due date. All homework assignments must be completed or submitted in Blackboard by 12AM midnight. Late submission is subject to 10% grade deduction for each day late.

**Exam Dates**
Exam days are posted on course site calendar.

**Absences:**
The student is expected to make up work and get notes from another student. This class builds from one lesson to the next so absences will definitely make learning much more difficult. Plan ahead!

**Minimum Grade**
The minimum passing grade for this course is **75 (C).**
All policies for the UTMDACC – School of Health Professions will be followed in this course. Please refer to your CGT student handbook, the school catalog, SHP handbook. It is strongly suggested that you read the Academic Integrity Policy and the Disciplinary Action policy to become acquainted with SHP requirements in these areas.

Attendance: Required.

Note: If you have problems with online access you must first attempt to resolve with UTMDACC computer help desk (713)794-4636 and/or the UTHSCH computer help desk (713)500-4848. You should also promptly notify your instructor. Instructors are NOT able to resolve Blackboard access issues or course management issues.

If you need course adaptations or accommodations because of a disability, if you have emergency medical information to share with me, or if you need other special arrangements, you should meet with me as soon as possible.

All policies for the UTMDACC – School of Health Sciences will be followed in this course. Please refer to your CGT student handbook and the school catalog.

Required Text
AGT Cytogenetics Laboratory Manual, 3rd ed

Suggested Texts
The Cytogenetic Symposia 2006