Microarray Data Analysis

The University of Toledo
BRIM Program in Bioinformatics & Proteomics/Genomics
BIPG5500/7500 Microarray Analysis, Section 001, CRN #32932

Instructor:	Sadik Khuder, PhD	**Course Website**:	Blackboard Learn
Email:	Sadik.Khuder@utoledo.edu	**Class Location**:	Online
Office Hours:	Thursdays 3-4pm	**Class Day/Time**:	Tuesdays/11-12 AM
Office Location:	0012 RHC		
Instructor Phone:	419-383-4089 / 419-897-9258 office	**Lab Location**: 127 HEB	
		Lab Day/Time:	TBA
Offered:	Summer	**Credit Hours**: 1 cr	

CATALOG/COURSE DESCRIPTION

This course aims at providing hands-on training on analysis of data from gene expression and protein microarrays experiments. Topics covered include downloading data, preprocessing, identifying differentially expressed genes, classification and presentation of findings. Different microarray technologies will be covered in this course.

STUDENT LEARNING OUTCOMES

After successfully completing the course, students will be able to:

L_1. Download and read data from GEO and other data repositories
L_2. Describe various gene expression microarray technologies.
L_3. Describe various protein microarray technologies.
L_4. Discuss the roles and methods for data preprocessing.
L_5. Interpret results, including tests of significance, to identify differentially expressed genes (DEGs).
L_6. Classify statistically significant DEGs in biologically appropriate ways.
L_7. Demonstrate use of appropriate presentation formats so results can be shared meaningfully.

PREREQUISITES AND COREQUISITES
None

TEXTS AND ANCILLARY MATERIALS

There is no required text for this course. All the required materials will be available on the course web site. Readings will consist of original literature, review articles, and R based books (available free online).

UNIVERSITY POLICIES

Policy Statement on Non-Discrimination on the basis of Disability (ADA). The University is an equal opportunity educational institution. Please read The University's Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance.

Academic Accommodations

The University of Toledo is committed to providing equal access to education for all students. If you have a documented disability or you believe you have a disability and would like information regarding academic accommodations/adjustments in this course please contact the Student Disability Services Office.

GRADING

Assignments (A)   30%

There are 6 assignments in this course. These assignments are intended to improve skills in statistical analysis and interpretation and reporting the results.

Quizzes (Q)   20%

There will be a total of 3 quizzes. Each quiz will cover the material presented in that particular weeks. Further instructions will be supplied for each particular quiz.

Project   50%

The project involves combining data from different microarray platform. Examples of previous projects along with detailed instructions are posted under The Project.

Grading System:

≥ 90 A, 87-89 A-, 84-86 B+ , 80-83 B, 77-79 B- , 74-76 C+, 70-73 C, < 70 D, < 50 F.

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Students can find this policy along with other university policies listed by audience on the University Policy webpage (http://www.utoledo.edu/policies/audience.html/#students).

https://www.utoledo.edu/title-ix/policies.html
https://www.utoledo.edu/policies/administration/diversity/pdfs/3364_50_01.pdf
https://www.utoledo.edu/policies/main_campus/student_life/pdfs/3364_30_04_Student_code_of_conduct.pdf

Academic Accommodations

The University of Toledo embraces the inclusion of students with disabilities. We are committed to ensuring equal opportunity and seamless access for full participation in all courses. For students who have an accommodations memo from Student Disability Services, I invite you to correspond with me as soon as possible so that we can communicate confidentially about implementing accommodations in this course. For students who have not established affiliation with Student Disability Services and are experiencing disability access barriers or are interested in a referral to healthcare resources for a potential disability or would like information regarding eligibility for academic accommodations, please contact the Student Disability Services Office (http://www.utoledo.edu/offices/student-disability-services/) by calling 419.530.4981 or sending an email to StudentDisability@utoledo.edu.

ACADEMIC AND SUPPORT SERVICES

Please follow this link to view a comprehensive list of Student Academic and Support Services (http://www.utoledo.edu/studentaffairs/departments.html) available to you as a student.

SAFETY AND HEALTH SERVICES FOR UT STUDENTS

Please use the following link to view a comprehensive list Campus Health and Safety Services available to you as a student.

COURSE SCHEDULE

NOTE: Lectures will be available online via the Blackboard course site. The following is for lab sessions only. The expectation is that each week's lecture will be viewed *before* the lab session for that week.

DATES	Lecture Title	ASSIGNMENTS /Quiz
5/18	Overview of Microarray technologies	A1*
5/25	Downloading data from GEO & other data repositories	Q1 **
6/01	Combining DEGs data	A2
6/08	Combining protein microarray data	A3
6/15	Combining methylation data	A4
6/22	Pathway Analysis & Regulatory network	Q2
6/29	Microarray vs RNA-seq	A5
7/06	Presentation of results	A6
7/13	Report writing	Q3
7/20	Project presentation	Online PPT presentation

A1* assignment   Q1 ** quiz