

COURSE SYLLABUS

**BIOLOGY 480W, SECTION 1\***  
**MOLECULAR BIOLOGY**  
**3 CREDIT HOURS**  
**FALL 2007**  
**10-10:50 MW, CFS 102**  
**1-3:50 W, LDB 125**

**INSTRUCTOR**

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OFFICE HOURS: MONDAYS 11 AM-12 PM AND 2 PM-4 PM;  
TUESDAYS 2 PM-4 PM; OR BY APPOINTMENT

**COURSE DESCRIPTION**

A HANDS-ON STUDY OF THE STRUCTURE AND FUNCTION OF MOLECULES IMPORTANT FOR THE CENTRAL DOGMA OF MOLECULAR BIOLOGY, INCLUDING DNA AND PROTEIN, WITH EMPHASIS ON ELECTROPHORETIC ANALYSIS AND GENE CLONING.

**PREREQUISITES**

A GRADE OF "C" OR BETTER IN BIO 138/118 AND BIO139/119, OR A GRADE OF "C" OR BETTER IN BIO 161/111, BIO 162/112 AND BIO 234; A GRADE OF "C" OR BETTER IN BIO 345, 347, AND ORGANIC CHEMISTRY

**METHODS OF INSTRUCTION**

LECTURES CONSIST OF SELECTED TOPICS IN MOLECULAR BIOLOGY, COORDINATED WITH THE LABORATORY PORTION OF THE COURSE. THE LABORATORY IS COMPRISED OF A HANDS-ON, SEMESTER-LONG PROJECT ON GENE CLONING. THE COURSE WILL ALSO EMPHASIZE THE DEVELOPMENT OF SCIENTIFIC WRITING SKILLS THROUGH LABORATORY-BASED WRITING ASSIGNMENTS.

\* FOR GRADUATE CREDIT

## **COURSE OBJECTIVES**

- LEARN FUNDAMENTAL PRINCIPLES AND THEORIES OF MOLECULAR BIOLOGY
- DEVELOP TECHNICAL SKILLS AND COMPETENCIES NEEDED BY MOLECULAR BIOLOGISTS
- LEARN TO ANALYZE AND CRITICALLY EVALUATE EXPERIMENTAL DATA
- DEVELOP KNOWLEDGE OF PRIMARY LITERATURE

## **REQUIRED MATERIALS**

TEXTBOOKS: THIEL, T. ET AL. *BIOTECHNOLOGY: DNA TO PROTEIN, A LABORATORY PROJECT IN MOLECULAR BIOLOGY*. CUSTOM EDITION. MCGRAW-HILL. ISBN 978-0-390-83115-6

KNISELY, K. *A STUDENT HANDBOOK FOR WRITING IN BIOLOGY*. SECOND EDITION. SINAUER ASSOCIATES/FREEMAN. ISBN 0-7167-6709-0

## **REQUIRED SUPPLIES**

- SCIENTIFIC NOTEBOOK (A BOUND LABORATORY NOTEBOOK)
- PERMANENT MARKING PEN (I.E. SHARPIE®)

## **ATTENDANCE POLICY**

REGULAR AND PUNCTUAL CLASS ATTENDANCE IS EXPECTED.

IN ACCORDANCE WITH THE UNIVERSITY'S ATTENDANCE POLICY, STUDENTS ARE ALLOWED NO MORE THAN THREE HOURS OF ABSENCE FROM CLASS FOR THE ACADEMIC TERM.

ATTENDANCE AT THE LABORATORY SESSIONS IS MANDATORY. STUDENTS ARE EXCUSED FROM LAB ONLY IN THE CASES OF EXTREME ILLNESS, DANGEROUS WEATHER CONDITIONS, FAMILY EMERGENCY, OR PARTICIPATION IN A UNIVERSITY-SPONSORED EVENT. STUDENTS MAY BE ASKED TO PROVIDE DOCUMENTATION SUPPORTING THE REASON FOR THE ABSENCE. UNEXCUSED ABSENCES FROM LAB WILL RESULT IN A GRADE OF "F" FOR THE COURSE.

## METHODS OF EVALUATION

EXAMS	3 AT 75 PTS. EACH	225 PTS.
WRITING ASSIGNMENTS	2 AT 50 PTS. EACH	100 PTS.
PRIMARY LITERATURE REVIEWS	2 AT 25 PTS. EACH	50 PTS.
LAB NOTEBOOK EVALUATION (UNANNOUNCED)		75 PTS.
DNA SEQUENCING REPORT		25 PTS.
COMPREHENSIVE FINAL EXAM		100 PTS.
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TOTAL		575 PTS.

THERE WILL BE **NO EXTRA CREDIT** AVAILABLE IN THIS COURSE.

COURSE GRADES WILL BE DETERMINED BY THE PERCENTAGE OF TOTAL POINTS THE STUDENT HAS EARNED, ACCORDING TO THE FOLLOWING GRADING SCALE:

90-100%	A	60-70%	D
80-90%	B	< 60%	F
70-80%	C		

STUDENTS ARE REQUIRED TO TAKE EXAMINATIONS AT THE SCHEDULED TIMES. MAKE-UP EXAMS WILL BE ALLOWED ONLY IN THE CASES OF EXTREME ILLNESS, DANGEROUS WEATHER CONDITIONS, FAMILY EMERGENCY, OR PARTICIPATION IN A UNIVERSITY-SPONSORED EVENT. STUDENTS MUST NOTIFY THE INSTRUCTOR WITHIN 24 HOURS OF A MISSED EXAM IN ORDER TO SCHEDULE A MAKE-UP EXAM. STUDENTS MAY BE ASKED TO PROVIDE DOCUMENTATION SUPPORTING THE REASON FOR THE ABSENCE.

ASSIGNMENTS ARE DUE BY 5 PM ON THE DUE DATE. ASSIGNMENTS RECEIVED AFTER THAT TIME WILL BE CONSIDERED LATE, AND WILL RECEIVE A LATE PENALTY OF 10% FOR EACH DAY OVERDUE. FOR EXAMPLE, THE MAXIMUM NUMBER OF POINTS A STUDENT CAN EARN ON A 50-POINT ASSIGNMENT TURNED IN TWO DAYS LATE IS 40 POINTS ( $50 \times 0.8 = 40$ ).

EXAM AND ASSIGNMENT SCORES WILL BE POSTED ON BLACKBOARD AS SOON AS THE SCORES ARE AVAILABLE. STUDENTS MAY CHECK THEIR PROGRESS IN THE COURSE AT ANY TIME THROUGH THE BLACKBOARD COURSE WEBSITE.

IF A STUDENT BELIEVES THAT AN EXAM OR ASSIGNMENT HAS BEEN GRADED IN ERROR, OR THAT AN EXAM OR ASSIGNMENT SCORE HAS BEEN POSTED INCORRECTLY, THE STUDENT SHOULD CONTACT THE INSTRUCTOR IMMEDIATELY TO DETERMINE IF AN ERROR HAS BEEN MADE. ALL DECISIONS REGARDING THE CHANGE OF A SCORE WILL BE MADE BY THE INSTRUCTOR AND ARE FINAL; HOWEVER, THE INSTRUCTOR WILL PROVIDE THE STUDENT WITH A RATIONALE FOR THE DECISION.

## **ACADEMIC DISHONESTY**

THE UNIVERSITY EXPECTS STUDENTS TO ENGAGE IN ALL ACADEMIC PURSUITS IN A MANNER THAT IS ABOVE REPROACH. STUDENTS ARE EXPECTED TO MAINTAIN COMPLETE HONESTY AND INTEGRITY IN THE ACADEMIC EXPERIENCES BOTH IN AND OUT OF THE CLASSROOM. ANY STUDENT FOUND GUILTY OF DISHONESTY IN ANY PHASE OF ACADEMIC WORK WILL BE SUBJECT TO DISCIPLINARY ACTION. THE UNIVERSITY AND ITS OFFICIAL REPRESENTATIVES MAY INITIATE DISCIPLINARY PROCEEDINGS AGAINST A STUDENT ACCUSED OF ANY FORM OF ACADEMIC DISHONESTY INCLUDING, BUT NOT LIMITED TO, CHEATING ON AN EXAMINATION OR OTHER ACADEMIC WORK WHICH IS TO BE SUBMITTED, PLAGIARISM, COLLUSION, AND THE ABUSE OF RESOURCE MATERIALS.

STUDENTS SHOULD REFER TO POLICY 810213 IN THE STUDENT SECTION OF THE ACADEMIC POLICY MANUAL FOR SPECIFIC EXAMPLES OF ACADEMIC DISHONESTY.

IF THE INSTRUCTOR DETERMINES THAT A STUDENT HAS BEEN ACADEMICALLY DISHONEST ON AN ASSIGNMENT OR EXAMINATION, THE INSTRUCTOR MAY IMPOSE A GRADE OF "F" FOR THE ASSIGNMENT/EXAMINATION OR IMPOSE A GRADE OF "F" FOR THE COURSE. IF THE STUDENT INVOLVED DOES NOT ACCEPT THE DECISION OF THE INSTRUCTOR, THE STUDENT MAY APPEAL THE DECISION TO THE CHAIR OF THE DEPARTMENT OF BIOLOGICAL SCIENCES. IF THE STUDENT DOES NOT ACCEPT THE DECISION OF THE DEPARTMENT CHAIR, THE STUDENT MAY APPEAL THE DECISION TO THE DEAN OF THE SCHOOL OF ARTS AND SCIENCES.

## **CLASSROOM RULES OF CONDUCT**

STUDENTS MUST REFRAIN FROM BEHAVIOR IN THE CLASSROOM THAT INTENTIONALLY OR UNINTENTIONALLY DISRUPTS THE LEARNING PROCESS, AND THUS, IMPEDES THE MISSION OF THE UNIVERSITY. CELLULAR TELEPHONES AND PAGERS MUST BE TURNED OFF BEFORE THE START OF CLASS. NO TALKING IS ALLOWED DURING CLASS EXCEPT WHEN A STUDENT IS ADDRESSING A SPECIFIC QUESTION OR COMMENT TO THE INSTRUCTOR. STUDENTS WHO ARE ESPECIALLY DISRUPTIVE MAY BE ASKED TO LEAVE CLASS AND MAY BE REPORTED TO THE DEAN OF STUDENTS FOR DISCIPLINARY ACTION IN ACCORDANCE WITH UNIVERSITY POLICY.

## **VISITORS IN THE CLASSROOM**

UNANNOUNCED VISITORS TO CLASS MUST HAVE APPROVAL BY THE INSTRUCTOR TO BE PRESENT IN THE CLASSROOM. VISITORS MUST NOT PRESENT A DISRUPTION TO THE CLASS BY THEIR ATTENDANCE.

## **AMERICANS WITH DISABILITIES ACT**

IT IS THE POLICY OF SAM HOUSTON STATE UNIVERSITY THAT NO OTHERWISE QUALIFIED DISABLED INDIVIDUAL SHALL, SOLELY BY REASON OF HIS/HER HANDICAP, BE EXCLUDED FROM THE PARTICIPATION IN, BE DENIED THE BENEFITS OF, OR BE SUBJECT TO

DISCRIMINATION UNDER ANY ACADEMIC OR STUDENT LIFE PROGRAM OR ACTIVITY. DISABLED STUDENTS MAY REQUEST ASSISTANCE WITH ACADEMICALLY RELATED PROBLEMS STEMMING FROM INDIVIDUAL DISABILITIES BY CONTACTING THE DIRECTOR OF THE COUNSELING CENTER IN THE LEE DRAIN ANNEX OR BY CALLING (936) 294-1720.

## RELIGIOUS HOLIDAYS

UNIVERSITY POLICY STATES THAT A STUDENT WHO IS ABSENT FROM CLASS FOR THE OBSERVANCE OF A RELIGIOUS HOLY DAY MUST BE ALLOWED TO TAKE AN EXAMINATION OR COMPLETE AN ASSIGNMENT SCHEDULED FOR THAT DAY WITHIN A REASONABLE TIME AFTER THE ABSENCE. STUDENTS MUST ALSO BE EXCUSED FOR TRAVEL FOR THE OBSERVANCE OF A RELIGIOUS HOLY DAY. A STUDENT WHO WISHES TO BE EXCUSED FOR A RELIGIOUS HOLY DAY MUST PRESENT THE INSTRUCTOR WITH A WRITTEN STATEMENT DESCRIBING THE HOLY DAY(S) AND THE TRAVEL INVOLVED. THE INSTRUCTOR WILL THEN PROVIDE THE STUDENT WITH A WRITTEN DESCRIPTION OF THE DEADLINE FOR THE COMPLETION OF MISSED EXAMS OR ASSIGNMENTS.

## COURSE SCHEDULE (TENTATIVE)

### UNIT I: STUDY OF $\alpha$ -AMYLASE STRUCTURE AND FUNCTION

<u>WEEK OF:</u>	<u>TOPIC:</u>	<u>LAB:</u>
8/20	INTRODUCTION TO $\alpha$ -AMYLASE	-----
<b>LITERATURE REVIEW #1, DUE 5 PM FRIDAY, AUGUST 31<sup>ST</sup></b>		
8/27	STRUCTURE AND FUNCTION OF ENZYMES	LAB 2 (PART I), LAB 3
<b>MONDAY, SEPTEMBER 3<sup>RD</sup>, LABOR DAY HOLIDAY, NO CLASSES</b>		
9/3	PROTEIN STRUCTURE, RASMOL, SDS-PAGE	LAB 5A, LAB 5B
9/10	WESTERN BLOTTING, DNA ISOLATION	LAB 5B

### **EXAM I, MONDAY, SEPTEMBER 17<sup>TH</sup>, IN CLASS**

### UNIT II: CLONING AN $\alpha$ -AMYLASE GENE

<u>WEEK OF:</u>	<u>TOPIC:</u>	<u>LAB:</u>
9/17	DNA STRUCTURE, DNA ELECTROPHORESIS, GENETIC CODE	LAB 7

### **WRITING ASSIGNMENT #1, DUE 5 PM, MONDAY, SEPTEMBER 24<sup>TH</sup>**

<u>WEEK OF:</u>	<u>TOPIC:</u>	<u>LAB:</u>
9/24	PCR, PRIMER DESIGN, RESTRICTION ENZYMES	LAB 7, LAB 8, LAB 9A
10/1	RFLP; GENE CLONING	LAB 8, LAB 9A, LAB 9B
<b>WEDNESDAY, OCTOBER 10<sup>TH</sup>, LAST DAY TO DROP COURSE</b>		
<b>LITERATURE REVIEW #2, DUE FRIDAY, OCTOBER 12<sup>TH</sup></b>		
10/8	GENE CLONING; SOUTHERN BLOTTING	LAB 9B, LAB 9C
<b>EXAM II, WEDNESDAY, OCTOBER 17<sup>TH</sup>, IN CLASS</b>		
10/15	SOUTHERN BLOTTING	LAB 9C
10/22	DNA MICROARRAYS; PLASMID DNA; DNA LIGATION	SET UP RESTRICTION DIGESTS** LAB 10A, LAB 10B, LAB 10C
10/29	BACTERIAL TRANSFORMATION; SELECTION OF TRANSFORMANTS	LAB 10D, LAB 10E (PART I)***
11/5	ANALYSIS OF TRANSFORMANTS; SERIAL DILUTIONS; VERIFICATION OF CLONES	LAB 10E (PART II), LAB 11A
<b>WRITING ASSIGNMENT #2, DUE 5 PM, FRIDAY, NOVEMBER 16<sup>TH</sup></b>		
11/12	BIOINFORMATICS	LAB 11A
<u>UNIT III: ANALYSIS OF DNA PLASMIDS</u>		

<u>WEEK OF:</u>	<u>TOPIC:</u>	<u>LAB:</u>
<b>EXAM III, MONDAY, NOVEMBER 19<sup>TH</sup>, IN CLASS</b>		
11/19	EXAM III	-----
11/26	PLASMID DNA ISOLATION AND ELECTROPHORESIS	SET UP MINIPREPS**, LAB 11B, LAB 11C (PART I)
12/3	PLASMID DNA RESTRICTION MAPPING	LAB 11C (PARTS I AND II)
<b>DNA SEQUENCING REPORT, DUE 5 PM, THURSDAY, DECEMBER 6<sup>TH</sup></b>		

- \*\* WILL BE PERFORMED OUTSIDE OF CLASS—ON THE DAY BEFORE YOUR SCHEDULED LAB  
\*\*\* WILL BE PERFORMED OUTSIDE OF CLASS—1-3 DAYS AFTER YOUR SCHEDULED LAB

**FINAL EXAM, MONDAY, DECEMBER 10<sup>TH</sup>, 11 AM-1 PM**

### **TIPS FOR SUCCESS**

- BE PREPARED FOR LAB
- KEEP DETAILED NOTES IN YOUR LAB NOTEBOOK
- SEEK HELP FROM YOUR INSTRUCTOR EARLY AND OFTEN (IF NEEDED)
- PREPARE FOR EXAMS EARLY
- START YOUR WRITING ASSIGNMENTS EARLY