

*Registrar*

GRANDE PRAIRIE REGIONAL COLLEGE  
DEPARTMENT OF SCIENCE  
COURSE OUTLINE: BI 297 HEREDITY  
FALL 1991



**INSTRUCTOR:** Dr. David C. Creasey  
office: J224 phone: 539-2863

**LAB TECHNICIAN:** Rick Scott lab phone: 539-2953

**PREREQUISITE:** High School Biology 30 (BI 30)

**TEXTBOOK:** Weaver, R.F. and P.W. Hedrick, Genetics, Wm. C. Brown Publishers, Iowa, 1989.

**LAB MANUAL:** Genetics 197, 1991-1992, Heredity Laboratory Manual, Department of Genetics, University of Alberta, Wm.C. Brown Publishers, Iowa, 1992.

**LECTURES:** PLACE: J201  
TIME: Tuesdays & Thursdays 09:30-10:50

**LABORATORIES:** PLACE: J126 (Blue Lab)  
TIME: L1: Wednesdays 15:00-17:50  
L2: Fridays 15:00-17:50

**EVALUATION:**

Assignments and Lab Reports	10%
Pre-Mid-Term Quiz	10%
Mid-Term Test	20%
Post-Mid-Term Quiz	10%
Final Lab Test	10%
Final Course Examination	40%

NOTE: STUDENTS ARE RESPONSIBLE FOR ALL COURSE MATERIAL (LECTURES, LABS, ASSIGNED READINGS & PROBLEMS) IN ALL QUIZZES & EXAMINATIONS)

**FINAL GRADE:** Final course grades are given on a nine-point scale as follows:

- 9
- 8 ..... Excellent
- 7
- 6 ..... Good
- 5
- 4 ..... Pass
- 3 ..... Fail
- 2
- 1

**ATTENDANCE:** Attendance is required in both lectures and labs. Students with more than 3 unexcused absences (combined lectures and labs) may be debarred from writing the Final Course Exam.

#### COURSE DESCRIPTION:

An introductory course in genetics with emphasis on basic principles of heredity. A laboratory component accompanies the lectures and is an integral component of the course. The course is comprised of 3 hours of lecture material and 3 hours of laboratory participation each week. Topics will include: historical perspectives; basic cell biology; mitosis and meiosis; Mendelian inheritance; statistical genetics and probability; genic interactions; genetic linkage; chromosome structure and changes; sexual differentiation and determination; sex-influenced and sex-linked genetics; gene chemistry and DNA structure; DNA replication, transcription, translation and control of gene expression; basic microbial genetics; DNA and chromosome structure, function; genetic code and gene action; problem solving techniques. Additional topics may be discussed. Owing to the introductory nature of the course and the broad concepts involved, STUDENTS ARE REQUIRED TO READ TEXT AND ASSIGNED MATERIALS IN ADVANCE OF LECTURES AND LABS.

#### RESOURCE MATERIAL:

Students are encouraged to purchase and use Schaum's Outline of Theory and Problems of Genetics, 2<sup>nd</sup> ed., W.D. Stansfield, McGraw-Hill Inc., Toronto, 1983. A third edition has recently been published (1991), but only the second edition is available in the campus book store. These outlines are excellent sources of solved genetics problems and topical review, BUT THEY DO NOT REPLACE THE TEXT IN THIS COURSE. The LRC has many excellent texts and books covering a wide range of subjects in genetics (look in section QH on the second floor). In addition to these holdings, the LRC offers many audio/visual resources for students of heredity, with the necessary machinery to view/hear these resources. Students are strongly encouraged to use all LRC resources.

THIS SCHEDULE IS MEANT TO SERVE AS A ROUGH GUIDE TO COURSE CONTENT. TEXT READING NOTED BELOW IS NOT FINAL. SPECIFIC READING ASSIGNMENTS WILL BE GIVEN BY INSTRUCTOR IN CLASSES.

BI 297 HEREDITY TENTATIVE CLASS SCHEDULE FALL 1991 (p 1 of 2)

DATE	TOPICS	TEXT
SE05	introduction; course outline; genetics in society; cell structure/function overview	
SE10	cellular information flow; chromosome & DNA structure overview; mitosis/meiosis overview	1:4-11 4:68-72
SE11	LAB #1 EXERCISE #1: MITOSIS	
SE12	historical perspectives; Mendel's first three postulates; Punnett square; monohybrid	2:14-20
SE17	testcross; Mendel's fourth postulate; dihybrid testcross; chi-square analysis	2:23-33
SE18	LAB #2 EXERCISE #2: MEIOSIS	4:73-74
SE19	basic probability formulae; permutations; combinations; sum and product rules;	2:20-23
SE24	statistical probability; binomial probability and genetics problem solving	
SE25	LAB #3 EXERCISE #3: MONOHYBRID CROSSES	
SE26	PRE-MID-TERM QUIZ	
OC01	allelic and gene interactions; symbolism for alleles; dominance; incomplete dominance;	3:36-42 3:46-50
OC02	LAB #4 EXERCISE #4: DIHYBRID CROSSES	
OC03	codominance; epistasis; modified dihybrid ratios; genetics problem solving	
OC08	lethals; pleiotropy; multiple alleles	3:59-62
OC09	LAB #5 PROBLEM SOLVING; REVIEW FOR MID-TERM EXAM	
OC10	linkage; linkage maps; 3-point crosses; interference; 4-strand X-overs; tetrad	5:98-118
OC15	analysis; unequal X-overs; mapping & physical distance; somatic cell hybrids	
OC16	LAB #6 EXERCISE #5: MEASUREMENT OF LINKAGE	
OC17	chromosome changes; duplication; deletions; inversions; translocations; euploidy; polyploidy; aneuploidy; human diseases	4:78-90
OC22	question period and problem solving session in preparation for mid-term test	
OC23	MID-TERM TEST NO LAB THIS WEEK	

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BI 297 HEREDITY TENTATIVE CLASS SCHEDULE FALL 1991 (p 2 of 2)

DATE	TOPICS	TEXT
OC24	sexual differentiation & life cycles; sex determination; sex linkage	3:43-46 4:66-68
OC29	sex determination in humans; holandric genes; X chromosome; sex-limited/influenced genes; spermatogenesis & oogenesis in humans	4:92-95 4:75-77
OC30	LAB #7 EXERCISE #6: SORDARIA MAPPING	
OC31	gene chemistry; history: Miescher/Griffith/ Avery/MacLeod/McCarty/Hershey/Chase/Chargaff/ Watson/Crick/Meselson/Stahl; DNA structure;	6:122-146 8:196-206
NO05	DNA replication; transcription;	9:226-230 13:268-273
NO06	LAB #8 EXERCISE #9: COMPLEMENTATION IN SACCHAROMYCES	
NO07	translation; genetic code/proteins; gene expression; operons; biochemical pathways	
NO12	bacterial genetics overview; conjugation- mapping; Hfr, F, F' plasmids	13:340-352
NO13	LAB #9 EXERCISE #8: GENE ACTION IN BIOCHEM PATHWAYS	
NO14	POST-MID-TERM QUIZ	
NO19	bacteriophage genetics overview; transduction; life cycles	13:360-362
NO20	LAB #10 EXERCISE #10: BACTERIAL CONJUGATION	
NO21	gene mutation; type of mutation; chemical, physical, spontaneous mutagenesis;	11:290-302
NO26	DNA repair; mutation and human disease; inborn errors of metabolism; cancer	11:302-309 17:472-475
NO27	LAB #11 EXERCISE #11: ENZYME INDUCTION	
NO28	population genetics; genetic variation and its measurement; Hardy-Weinberg principle	18:494-502
DE03	molecular genetics overview; restriction enzymes; cloning vehicles; techniques	16:440-445 16:462-467
DE04	LAB #12 FINAL LAB TEST	
DE05	course review; sample exam questions; question period; problem solving	
DE10	course review; sample exam questions; question period; problem solving; last class	
DE12	FINAL COURSE EXAMINATION SCHEDULED BY REGISTRAR'S OFFICE	
DE20	DURING THIS TIME PERIOD	