Registrar

GRANDE PRAIRIE REGIONAL COLLEGE
DEPARTMENT OF SCIENCE
COURSE OUTLINE: BI 297 HEREDITY
WINTER 1992

COURSE OBJECTIVES:

The principle objective of the course is to gain an understanding of the basic principles of transmission genetics in procaryotes and eucaryotes and to understand the basis for heredity in its many forms. Students should gain an understanding of cellular information flow and insight into the complexity of the genetic apparatus.

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

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: J226
TIME: Tuesdays & Thursdays 11:00-12:20

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

EVALUATION:

Assignments, Labs, Quizes	20%
Mid-Term Test (Feb 18)	20%
Post-Mid-Term Test (Mar 24?)	10%
Final Lab Test (Apr. 8 & 9)	15%
Final Course Examination	35%

STUDENTS ARE RESPONSIBLE FOR ALL COURSE MATERIAL IN ALL QUIZZES & EXAMINATIONS. LATE ASSIGNMENTS WILL NOT BE GRADED WITHOUT PRIOR APPROVAL. TEST DATES ARE TENTATIVE.

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; mitosis and meiosis; Mendelian inheritance; statistical genetics and probability; genic interactions; genetic linkage; chromosome structure and changes; sex determination; sex-influenced and sex-linked genetics; gene chemistry and DNA structure; DNA replication, transcription, translation; basic microbial genetics; 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, 2nd 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 good 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). An excellent resource for terminology used in this course is King and Stansfields' A Dictionary of Genetics (fourth edition), located in the reference section of the LRC. 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.

A ROUGH GUIDE TO COURSE CONTENT AND ORDER OF PRESENTATION

THE TEXT READINGS NOTED BELOW ARE NOT FINAL

cellular information flow; chromosome & DNA structure overview; mitosis/meiosis overview	1:4-11 4:68-74
historical perspectives; Mendel's first three postulates; Punnett square; monohybrid testcross; Mendel's fourth postulate; dihybrid testcross; chi-square analysis	2:14-20 2:23-33
basic probability formulae; permutations; combinations; sum and product rules; statistical probability; binomial probability and genetics problem solving	2:20-23
allelic and gene interactions; symbolism for alleles; dominance; incomplete dominance; codominance; epistasis; modified dihybrid ratios; genetics problem solving	3:36-42 3:46-50
lethals; pleitropy; multiple alleles	3:59-62
linkage; linkage maps; 3-point crosses; interference; mapping and physical distance somatic cell hybrids	5:98-118
chromosome changes; duplication; deletions; inversions; translocations; euploidy; polyploidy; aneuploidy; human diseases	4:78-90
sex determination; sex linkage sex determination in humans; holandric genes; X chromosome; sex-limited/influenced genes; spermatogenesis & oogenesis in humans	3:43-46 4:66-68 4:92-95 4:75-77
gene chemistry; history: Miescher/Griffith/ Avery/MacLeod/McCarty/Hershey/Chase/Chargaff/ Watson/Crick/Meselson/Stahl; DNA structure; DNA replication; transcription; translation; genetic code/proteins; gene expression; operons; biochemical pathways	6:122-146 8:196-206 9:226-230 13:268-273
bacterial genetics overview; conjugation-mapping; Hfr, F, F' plasmids	13:340-352
gene mutation; type of mutation; chemical, physical, spontaneous mutagenesis	11:290-302

BI297 HEREDITY LABORATORY SCHEDULE

WINTER 1992

JAN 15 & 16
LAB #1 EXERCISE #1: MITOSIS

JAN 22 & 23
LAB #2 EXERCISE #2 (PART 1): MEIOSIS

JAN 29 & 30
LAB #3 EXERCISE #3: MONOHYBRID CROSSES

FEB 5 & 6
LAB #4 EXERCISE #4: DIHYBRID CROSSES

FEB 12 & 13
LAB #5 PROBLEM SOLVING LAB AND TUTORIAL

MAR 4 & 5
LAB #6 EXERCISE #5: MEASUREMENT OF LINKAGE

MAR 11 & 12
LAB #7 EXERCISE #2 (PART 2): ORDERED ASCI, CENTROMERE MAPPING
PROBLEM SOLVING LAB AND TUTORIAL

MAR 18 & 19
LAB #8 EXERCISE #8: GENE ACTION IN BIOCHEM PATHWAYS (WEEK 1)

MAR 25 & 26
LAB #9 EXERCISE #8: GENE ACTION IN BIOCHEM PATHWAYS (WEEK 2)
EXERCISE #10: BACTERIAL CONJUGATION (WEEK 1)

APR 1 & 2
LAB #10 EXERCISE #10: BACTERIAL CONJUGATION (WEEK 2)
PROBLEM SOLVING LAB AND TUTORIAL

APR 8 & 9
LAB #11 FINAL LAB TEST