

SEP 1995

**Grande Prairie Regional Regional College
Department of Science and Technology
Fall 1995 Course Outline for GN 2700**

- Course :** Genetics 2700 - Foundations of Molecular Genetics
- Prerequisite :** Genetics 1970
- Instructor :** Dr. Sean Irwin
Office - J 223
Telephone - 539-2860 (office)
- 538-1278 (home)
- Description :** Genetics 2700 is a course dealing with the molecular genetics of prokaryotes. Basic concepts on the organization of genetic material and its expression will be developed from experiments on bacteria and viruses.
- Requirements :** Attendance of lectures/seminars and completion of course work as outlined in the Academic Guidelines of the College.
- Evaluation :**
- | | |
|-----------------|-------|
| Midterm Exam I | - 25% |
| Midterm Exam II | - 25% |
| Final Exam | - 35% |
| Assignments | - 15% |
- Resources :** A compilation of journal articles acquired from the GN 270 instructor at the U of A will be used as the primary resource for this course. These articles have been bound and are on sale in the bookstore.
- Lectures :** Place: J229
Time: Tues. and Thurs. 11:00-12:20
- Seminar :** Place: J101
Time: Fri. 15:00-16:20

Course Outline

Lecture	Date	Topic
1	Sept 7	Introduction
2	Sept 12	Bacteria and viruses
3	Sept 14	Genetic map of T4
4	Sept 19	The T4 DNA molecule
5	Sept 21	Relationship between genetic and physical maps
6	Sept 26	Genetic fine structure
7	Sept 28	Restriction and modification
8	Oct 3	Restriction Analysis
9	Oct 5	DNA cloning (i)
10	Oct 10	DNA cloning (ii)
11	Oct 12	DNA sequencing, polymerase chain reaction
12	Oct 17	Midterm 1
13	Oct 19	Induced mutation - (i) Base substitutions
14	Oct 24	Induced mutation - (ii) Frameshifts
15	Oct 26	Induced mutation - (iii) Ames test and SOS repair
16	Oct 31	Mutagens and Carcinogens
17	Nov 2	Spontaneous mutation
18	Nov 7	Chromosome replication - (i)
19	Nov 9	Chromosome replication - (ii)
20	Nov 14	Midterm 2
21	Nov 16	The <i>lac</i> operon - Basic regulatory elements
22	Nov 21	The <i>lac</i> operon - Operon fusions
23	Nov 23	The <i>lac</i> operon - Polarity
24	Nov 28	The <i>lac</i> operon - The promoter
25	Nov 30	The <i>lac</i> operon - The repressor and the operator
26	Dec 5	The <i>lac</i> operon - DNA sequence and DNA looping
27	Dec 7	Introduction to Eukaryotic gene structure

Genetics 2700 Required Reading Schedule

Sept. 11-15 :

J.D. Watson and F.H.C. Crick (1953) Nature 171:964-969
R.S. Edgar and R. Epstein (1965) Sci. Amer. Feb.
W. Wood and R.S. Edgar (1967) Sci. Amer. July

Sept. 18-22 :

A.D. Hershey (1970) Science 168:1425-1427
G.S. Stent and R. Calendar (1978) Molecular Genetics Ch. 11 pp345-351

Sept. 25-29 :

S. Benzer (1962) Sci. Amer. Jan
W. Arber (1979) Science 205:363-364

Sept. 29 : Assignment #1 Due. (5% of final grade)

Oct. 2-6 :

H.O. Smith (1979) Science 205:455-458
S.N. Cohen (1975) Sci. Amer. July p.25-33
P. Berg (1981) Science 213: 296-303

Oct. 9-13 :

A. Kornberg (1960) Science 131:1503-1508
F. Sanger et al (1977) P.N.A.S 74:5463-5467
F. Sanger (1981) Science 214:1205-1210
S. Tabor and C.C. Richardson (1987) P.N.A.S. 84:4767-4771

Oct. 16-20 :

W. Hayes (1968) The Genetics of Bacteria and their Viruses, 2nd Ed.Chap. 13,
pp 302-325
S. Brenner et al. (1961) J. Mol. Biol. 3:121-124
F.H.C. Crick et al. (1961) Nature 192:1227-1232
F.H.C. Crick (1962) Sci Amer. Oct. p.66-74

Oct. 23-27 :

F.H.C. Crick (1966) Sci. Amer. Oct p.55-62
B. Ames et al. (1973) P.N.A.S. 70:2281-2285
G.C. Walker (1985) Ann. Rev. Biochem. 54:425-437
L.A. Loeb (1985) Cell 40:483-484

Oct. 27 : Assignment #2 Due. (5% of final grade)

Oct. 30-Nov. 2 :

A. Kornberg (1980) DNA Replication p.90-93, 104-107, 116-121, 127-134,
134-139
P. Modrich (1991) Ann. Rev. Genet. 25:229-239
J.D. Watson (1972) Nature New Biology 239:197-201
C.C. Richardson (1983) Cell 33:315-317

Nov. 6-10 :

T. Cavalier-Smith (1974) Nature 250:467-468
A.J. Bateman (1975) Nature 253:379
V. Zakian et al. (1990) Trends. Genet. 6:12-16
A. Murray and J. Szostak (1987) Sci. Am. Nov. p.62-68

Genetics 2700 Required Reading Schedule Cont.

Nov. 13-17 :

F. Jacob and J. Monod (1961) Cold Spring Harbor Symp. Quant. Biol. 26:193-209
S. Brenner (1961) CSHSQB 26:101-108
J.H. Miller (1978) "The Lac I gene" in The Operon (J.H. Miller and W.S. Reznikoff, Eds) p31-42

Nov. 20-24 :

W.A. Newton et al. (1965) J. Mol. Biol. 14:290-296
J. Richardson (1991) Cell 64:1047-1049
K. Ippen et al. (1968) Nature 217:825-827
Zubay et al. (1970) Proc. Nat. Acad. Sci. USA 66:104-110

Nov. 27-Dec. 1 :

L. Eron and R. Block (1971) Proc. Nat. Acad. Sci. USA 68:1828-1832
M.D. Barkeley and S. Bourgeois (1978) "Repressor recognition of Operator", in The Operon (J.H. Miller and W.S. Reznikoff, Eds) p190-195
W. Gilbert and B. Muller-Hill (1966) Proc. Nat. Acad. Sci. USA 56:1891-1898

Dec. 1 : Assignment #3 Due. (5% of final grade)