

LECTURE TOPIC SEQUENCE & READINGS---SYLLABUS

BIOL 310 GENERAL MICROBIOLOGY

Dr. Susan Morrison

Spring 2017

TEXT (required): see notes on information handout. Text details are in coursepack.

COURSEPACK: Morrison, Susan J. BIOL310 & BIOL310L Coursepack for Spring 2017 (available at SAS-E-Ink, 219 Calhoun St)

=====

TEXT: In lieu of *requiring* you to purchase a *specific* text, there is a list of possible text books in your coursepack. You may choose to purchase any one of these from a bookstore or discount source, borrow one from someone else, use a next-to-the-last edition (rather than the current one), and/or use an online source (such as the free textbook by Todar). Several different texts are on reserve in the library under my name.

Microbial Life: Overview & Introduction; The History of Microbiology (general and medical) Coursepack 31-43

- Brock Chapter 1 Sections 1.6-1.10 (pages 10-23)
- Prescott Chapter 1 (pages 5-12)
- Slonczewski Chapter 1 (pages 11-26, Sec 1.2 & 1.3) Table 1.2
- Tortora Pages 6-15
- Wessner inside front cover, pages 27-33
- Swanson Chapter 1

Basic Concepts & Terminology of Microbial Interactions, Infection, Infectious Disease & Epidemiology Coursepack 44-50

- Brock Chapters 27, 32, 33, 34 (pp. 787-815, pp. 913-943, 961-1003)
- Prescott Part 8 Chapters 30 & 33 (pages 726-745; 787-808)
- Slonczewski Chapters 25 & 26 (pp. 937-1028)
- Tortora Chapters 14 & 15 (pp. 401-450)
- Wessner Part IV, Chapters 18, 21, 24 (pp. 600-635, 714-759, 822-853)
- Swanson Chapter 22: pages 623-647

Biological Molecules: Chemical Bonds; Water; Proteins; Polysaccharides; Nucleic Acids; Lipids [no lecture---independent review Refer to appropriate section when needed.]

- Brock none
- Prescott Appendix I
- Slonczewski Appendix I
- Tortora Chapter 2
- Wessner none
- Swanson none

Antiseptics & Disinfectants Coursepack 195

There will be little or no lecture on this topic but it will be on a test.

- Brock Chapter 26 Sec. 26.4-26.5 (pages 762-766)
- Prescott Chapter 8 (pages 153-160-167) Fig. 8.1
- Slonczewski Pages 170-172, 175-176
- Tortora Chapter 7 (pages 181-184, 190-203, Table 7.8)
- Wessner Pages 195-199
- Swanson none
- Leboffe & Pierce Lab Manual Ex. 2-13
- Pearson Lab Manual pp.251-254

Observing Microbial Cells: Microscopy & Specimen Preparation; Cell Sizes & Shapes Coursepack 51-60

- Brock Chapter 2-Part I, pp 25-31 (See Chapters 16-19 for micrographs)
- Prescott Chapter 2
- Slonczewski Chapter 2
- Tortora Chapter 3 (see Chapter 11 for lots of micrographs)
- Wessner Appendix B; Gram stain on page 55
- Leboffe & Pierce Lab Manual Section 3
- Swanson Chapter 1, pp. 7-12; Chapter 2, pp. 25-31

Membranes and Transport Coursepack 61-65

- Brock Chapter 2 (Sec. 3.3-3.5, pp. 47-58); pp. 141-143
- Prescott Sec. 3.2 (pp. 38-41); Section 6.6 (pp. 114-118)
- Slonczewski Sec. 3.3 (pp. 82-88); Sec. 4.2 (121-127)
- Tortora Chapter 4 (pp. 88-93, 100-101)
- Wessner Chapter 2 (pp. 45-50), page 79
- Swanson Chapter 2 (pp 31-45)

Prokaryotic Cell Structure and Function Coursepack 61-79

- Brock Chapter 3 (pp. 47-84)
- Prescott Chapter 3 (pp. 33-64)
- Slonczewski Chapter 3 (pp. 73-82, 88-113)
- Tortora Chapter 4 (pp 75-110)
- Wessner Chapter 2 (pp. 36-71)
- Swanson Chapter 3 (pp. 58-80); other scattered (see index for specific items)

Three Domains; Universal Phylogenetic Tree; Comparison of Prokaryotes & Eukaryotes Coursepack 80-88

- Brock Section 2.7 (pp. 34-36); Chapter 16 (Sec 16.8, pp 459-462; Table 16.1); Sec 7.4 (p. 196)
- Prescott Chapter 17 (pp. 385-388); Sec 3.1, 4.1 and esp. Sec. 4.8 (pages 79-80); Table 4.2; Inside front cover
- Slonczewski Chapter 1 (pp 29-31), Chapter 17 (pp 656-661), inside back cover
- Tortora Chapter 10 (pp. 272-280)
- Wessner Chapter 1 (pp. 8-15); Table 1.3; Appendix C, E
- Swanson Chapter 14 (pp. 290-418)

Microbial Nutrition & Metabolism: Energy, Enzymes & Regulation; Coursepack 89--97

- Brock Chapter 4 (pp. 92-94, 111-115)
- Prescott pp. 169-183
- Slonczewski pp. 473-475
- Tortora pp. 113-119
- Wessner pp. 403-404, 418
- Swanson Chapters 5 & 6 (pp 114-162)

Microbial Metabolism: Catabolism: Energy Release & Conservation (including Glycolysis, Citric Acid Cycle, Fermentation & Electron Transport) Coursepack 98-108

- Brock Chapter 4, Sec. 4.4-4.16 (pp 92-114); Chapter 14 (pp. 373-383)
- Prescott Chapter 10, Sec 10.1-10.10 (pp. 188-208); Appendix 2
- Slonczewski Chapter 13 (pp. 458-482, 482-496); pp 506-507, 525-529
- Tortora pp. 122-135
- Wessner pp. 400-433
- Leboffe & Pierce Lab Manual Appendix A Biochemical Pathways
- Swanson Chapters 5 & 6 (pp 114-162)

Microbial Metabolism: Metabolic Diversity: Phototrophy, Chemolithotrophy, Anaerobic Respiration**Microbial Metabolism: Anabolism; The Use of Energy in Biosynthesis** Coursepack 98-108

- Brock Chapter 4. Secs. 4.13-4.16 (pp. 108-114)
- Prescott Sec. 11.1-11.2 (pp. 219-222)
- Slonczewski Chapter 15, Sec. 15.1 (pp. 547-550)
- Tortora Chapter 5, Sec. 5.24-5.25 (pp. 144-147)
- Wessner Sec 13.8 (pp. 447-453)
- Swanson Chapters 5 & 6 & 7 (pp 114-205)

Microbial Nutrition Coursepack 109-113

There will be little or no lecture on this topic but it will be on a test.

- Brock Sec. 2.8; Chapter 4 (pp. 86-90); Sec. 13.6
- Prescott Chapter 6 (pp. 109-125)
- Slonczewski Sec. 4.1
- Tortora pp. 140-143, 158-166
- Wessner Chapter 6 (Sec 6.1-6.3; pp. 165-184); Sec 13.4 (pp. 428-429)
- Swanson scattered

Culture, Enumeration, Growth & Development of Microorganisms Coursepack 114-124

- Brock Chapter 5 (pp. 128-132) Fig. 5.14-5.17
- Prescott Sec. 7.3 (pp. 134-137)
- Slonczewski Sec. 4.4
- Tortora pp. 171-177
- Wessner Sec. 6.4 (pp. 184-187)
- Leboffe & Pierce Lab Manual Ex. 7-5 & 7-6
- Swanson Chapter 4 (pp. 82-112)

Biofilms Coursepack 125-127

- Brock Chapter 5-sidebar (page 133); Chapter 8 (Sec. 8.9), Chapter 23 (Sec. 23.4)
- Prescott Chapter 7 (Sec. 7.6); Chapter 30 (Sec. 30.5, Figs. 3.9-3.10)
- Slonczewski Chapter 4 (Sec. 4.6), Chapter 17 (Special Topic 17.2)
- Tortora Fig. 1.8; page 56—Slime; pages 160-161, 432-433; Fig. 6.5
- Wessner Page 67; Chapter 15 (pages 488-490)
- Swanson Chapters 12 & 13 (pages 352-368)

Effects of Environmental Conditions on Growth & Survival of Microorganisms Coursepack 128—140

- Brock Chapter 5 Part IV & V (pages 132-149); Chapter 19 (pages 557-583, 1022-1029)
- Prescott Chapter 8 Sec. 8.4 (pages 157-160, 810-816)
- Slonczewski Chapter 5 (pages 149-180)
- Tortora Chapter 7 (pp. 181-189); pages 800-806
- Wessner pages 119-125, 170-172, 525-534
- Swanson Chapters 19 (pp 516-555) & 21 (pp 584-619)

DNA; Replication Coursepack 141--157

- Brock Chapter 6, Secs. 6.1-6.7 (pp.151-168)
- Prescott Chapter 12, Sec. 12.1-12.5 (pp. 240-255)
- Slonczewski Chapter 7, Sec. 7.1-7.2-7.3 (pp. 221-242)
- Tortora Chapter 8 (pp. 207-214)
- Wessner Chapter 7 (pp. 203-216)
- Swanson Chapter 8 (pp 206-240)

RNA & Protein Synthesis: Transcription, Translation; Metabolic Regulation Coursepack 141-157

- Brock Chapter 7 Sec. 7.1-7.2 (pp 192-195); Chapter 6 Sec 6.16-6.21 (pp. 174-189)
- Prescott Chapter 12 pp. 255-270)
- Slonczewski Chapter 8 Sec. 8.1-8.4 (pages 258-285)
- Tortora Chapter 8: pp. 210-218 Figs. 8.7, 8.9
- Wessner Sec. 7.3-7.4 (pp. 216-228)
- Swanson Chapter 8 (pp 206-240)

Virology: History; Properties of Viruses; Growth & Quantification; Viral Replication; Viral Diversity; Viral Pathogenesis; Subviral Particles—Viroids, Prions Coursepack 158--175

- Brock Chapter 9 (pp. 236-262), Chapter 21 (pp 613-641); Chapter 33 (sec. 33.6-33.8, 33.11, 33.14)
- Prescott Chapter 5 (pages 87-108), Chapter 24 (pages 554-592)
- Slonczewski Chapter 6 (pages 181-217), Chapter 11 (pages 389-430), Sec. 25.8 (pages 971-978)
- Tortora Chapter 13 (pp. 369-400; Part 4 (pp. 626-631, 662-5, 685-6, 697-701, 727-734, 763-4)
- Wessner Chapter 5 (pages 130-201); Chapter 22 (pages 760-791)
- Swanson Chapters 17 & 18 (pages 460-514)

Bacterial Genetics: Gene Transfer, Mutation & Recombination, Genome Evolution Coursepack 176--194

- Brock pp. 157-162; pp. 273-279 (Figs. 10.9, 10.14, 10.15); pp. 270-290
- Prescott Chapter 14 (pp. 312-324) (pp. 324-327; Fig 14.28-14.29)
- Slonczewski Chapter 9 (pp. 303-344) (pp. 311-314; Fig. 9.7, 9.9)
- Tortora Chapter 8 (pp. 231-243, Fig 8.29); Chapter 13 (p. 384, Fig 13.13)
- Wessner pp. 203-207, 231-243; Chapter 9 (pp. 297-298)
- Swanson Chapter 10 (pp. 269—302) and Chapter 11 (pp. 304-331)

Antimicrobial Chemotherapy; Antibiotics Coursepack 196--200

- Brock Chapter 26 (pp. 767-786)
- Prescott Chapter 31
- Slonczewski Chapter 27
- Tortora Chapter 20
- Wessner Chapter 24, Sec. 24.1-24.3 (pp. 822-849) Perspectives 24.1-24.3
- Swanson pages 611, 662-664, scattered

For the following topics, we will cover selected examples as time permits and/or incorporate the topics into other parts of lecture

- Microbial Diversity & Ecology; Origins & Evolution
- Prokaryotic Diversity: Bacteria & Archaea

▪ **Food Microbiology**

- Brock Chapter 36 (pp. 1022-1043)
- Prescott Chapter 34 (pp. 809-830)
- Slonczewski Chapter 16 (pp. 589-615)
- Tortora Chapter 28 (pp. 799-810)
- Wessner Chapter 16 (pp. 522-543)
- Swanson specific organisms, see index

▪ **Water and Wastewater**

- Brock Chapter 35 (pp. 1004-1021)
- Prescott Chapter 35 (pp. 831-847)
- Slonczewski Chapter 22, Sec. 22.3 (pp. 839-842)
- Tortora Chapter 27 (pp. 782-796)
- Wessner Chapter 16 (pp. 541-559)
- Swanson Chapter 28 (pp. 754-757; p. 158)

- **Biotechnology, aka Genetic Engineering, Bioengineering, Molecular Technology, DNA Technology, Recombinant DNA Technology, Genetic Modification Technology**
 - Brock pp. 291-312
 - Prescott pp. 351-380
 - Slonczewski pp. 431-457
 - Tortora pp. 244-263
 - Wessner pp. 362-399
 - Swanson Chapter 28 (pp 748-771)

- Microbial Ecology
- Microbes and Biogeochemical Cycles
- Host Defenses; Immunology
- Microbial Pathogenesis
- Microbial Diseases
- Virulence Factors
- Genomics

- **Vaccines, Serology, Diagnostic Immunology**
 - Brock pp. 892-906
 - Prescott pp. 779-786
 - Slonczewski pp. 906-907
 - Tortora pp. 504-526
 - Wessner pp. 853-857
 - Swanson pp. 624-650

- **Diagnostic Microbiology & Immunology; Clinical Microbiology**
 - Brock pp. 879-912
 - Prescott pp. 768-786
 - Slonczewski pp. 1063-1096
 - Tortora pp. 281-198; Appendix C
 - Wessner pp. 164-180
 - Swanson none

S. Morrison

See pages 5 & 6 in the coursepack for information about the textbooks.

One additional book has been added to the list:

Swanson, Michele, Gemma Reguera, Moselio Schaechter, & Frederick Neidhardt. 2016. *Microbe* 2nd edition. American Society for Microbiology, 833 pages.