SES Microbial Methods
Readings 2021

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There are no required textbooks in this course, but *Brock Biology of Microorganisms*, 12th ed. by Madigan, Martinko, Dunlap and Clark (2009) is highly recommended (ISBN: 0-132-32460-1)

Source for Topic	Section	pp.
1: Introduction		
Brock Biology of Microorganisms, 12th Ed.	1.0-1.4 Introduction	2 - 7
	1.9-1.10 Microbial diversity and modern era	18 - 21
	2.5 Elements of cell and viral structure	33 - 35
	2.6 Arrangement of DNA	35 - 36
	2.7-2.8 Tree of life and diversity	37 - 40
	4.1-4.2 Cell shape and size	67 - 70
	5.1 Microbial nutrition	108 - 111
	14.1-14.4 Early Earth and life diversification	368 - 376
	14.5-14.9 Microbial evolution	377 - 385
	18.1 Eukaryotic cell	517 - 518
	20.1 Photosynthesis	579 - 579
	Winogradsky and chemolithoautotrophy	597 - 597
	21.1 Fermentation	613 - 614
	21.6 Anaerobic respiration	624 - 625
	22.1 Methods in microbial ecology	653 - 656
	Chap 23 Microbial ecosystems	673 - 692
	24.10 Rumen	714 - 716
2: Bacterial abundance		
Porter & Feig (1980) *Limnology and Oceanography* **25**	The use of DAPI for identifying and counting aquatic microflora	943 - 948
Brock Biology of Microorganisms, 12th Ed.	2.1-2.3 Seeing the very small	26 - 31
	5.3 Lab culture of microorganisms	113 - 114
	6.9-6.10 Cell couting	153 - 156
	22.2-22.3 Isolation and Staining Methods	657 - 661
	36.1 Public health and water qualityh	1026 - 1028
	36.4-36.8 Waterborne diseases	1033 - 1040
3: Bacterial production		
Brock Biology of Microorganisms, 12th Ed.	6.5-6.7 Growth of bacterial populations	147 - 150
	22.7 Measuring microbial activity	666 - 668
Simon&Azam (1989) *Marine Ecology Progress Series* **51**	Protein content and protein synthesis rates of planktonic marine bacteria	201 - 213
4: Extracellular Enzyme Assays		
Brock Biology of Microorganisms, 12th Ed.	3.7-3.8 Proteins and structure	61 - 64
	4.4 Cytoplasmic membranes	73 75
	4.7 Outer membrane of Gram-negative bacteria	82 - 84
	5.4-5.5 Energetics and enzymes	114 - 117

Lehninger (1979) *Biochemistry*	Ch 8. Enzymes: kinetics and inhibition	183 - 195
H.-G. Hoppe (1993) *Aquatic microbial ecology*	Ch 48 Use of fluorogenic model substrates for extracellular activity measurements of bacteria	423 - 431
5: Microbial food webs: Flagellate and ciliate grazing on bacteria		
Brock Biology of Microorganisms, 12th Ed.	18.9 Alveolates	528 - 530
Caron,D.A., et al. (2012) *Annu. Rev. Mar. Sci.* **4**	Marine Protistan Diversity	467 - 493
Azam et al. (1983) *Marine Ecology Progress Series* **10**	The ecological role of water-column microbes in the sea	257 - 263
6: Chemolithotrophy		
Brock Biology of Microorganisms, 12th Ed.	5.6 Oxidation-Reduction	118 - 119
	5.14 Catabolic diversity	131 - 133
	15.2-15.6 Photo-, chemolitho-, and methanotrophs	400 - 412
	15.8 Sulfate- and sulfur reducding proteobacteria	438 - 441
	16.15 Green sulfur bacteria	474 - 476
	16.18 Green nonsulfur bacteria	481 - 482
	17.4 Methanogenes	494 - 498
	20.8-20.13 Chemolithotrophy	595 - 604
	21.7 Nitrate reduction and denitrication	625 - 627
	21.8 Sulfate and sulfur reduction	627 - 629
	21.9 Acetogenesis	630 - 631
	21.10 Methanogenesis	631 - 635
	21.12 Other electron acceptors	636 - 639
	21.16 Methylo- and Methanotrophy	643 - 644
	24.1-24.2 Carbon cycle	695 - 699
	24.3 Nitrogen cycle	699 - 701
	24.4 Sulfur cycle	701 - 702
	24.5 Iron cycle	703 - 705
7: Molecular techniques		
Brock Biology of Microorganisms, 12th Ed.	Chap 13 Microbial Genomics	343 - 366
	22.4-22.6 Molecular methods	661 - 666
	22.8 Stable isotopes	669 - 671
Head, I.M., J.R. Saunders and R.W. Pickup (1998), *Microbial Ecology* **35**	Microbial Evolution, Diversity and Ecology: A Decade of Ribosomal RNA Analysis of Uncultivated microorganisms	1 - 21
MoBio: Soil DNA isolation kit	Instruction manuel	1 - 8
8: Microbial food webs: bacteria phytoplankton competition		
Caron et al. (1988) *Hydrobiologia* **159**	Experimental demonstration of the roles of bacteria and bacterivorous protozoa in plankton nutrient cycles.	27 - 40