This protocol contains a list of the experiments that will be performed each lab period. The experiments are designed to provide students with the best possible opportunity to have a successful learning experience. The protocols may not follow the procedures outlined in the lab manual some substitutions for organisms may be made. That information will be provided by the lab instructor. Students will be responsible for understanding the principles set forth in each experiment. In addition text book readings from *Microbiology A Human Perspective* by Nester 4th edition are listed which will further explain and help you understand the principles in these experiments.

Laboratory Instructor: __________________________________
Office/Laboratory: __________________________________
Office phone: __________________________________
Office hours: __________________________________
E-mail address: __________________________________

June 25
Lab 1  Lab safety protocol
Aseptic Technique
Pure culture technique
Bacterial Distribution
Discuss: Genus and species; and morphology

Textbook readings:
Pg 83-4 Section 4.1 Obtaining a Pure Culture read through The Streak-Plate Method
Pg 111-2 Microbiology Laboratories
Pg 250-1 Culture Characteristics
Pg 11 Nomenclature
Pg. 246-7 Taxonomic Hierarchies
Pg A-4 Appendix III Pronunciation Key
Pg G1-18 Glossary

June 26
Lab 2  Complete aseptic technique; pure culture technique; bacterial distribution
Bright-field Microscopy
Making a Smear
Simple stain
Gram stain

Textbook readings:
Pg 40-1 Section 3.1 Microscopic Techniques: The Instruments read through Contrast
Pg 282 The Genus Corynebacterium
Pg 45-7 Microscopic Techniques: Dyes and Staining read up to Acid-Fast Stain
Pg 49-51 Section 3.3 Morphology of Prokaryotic Cells
June 28
Lab 3
Complete simple stain and gram stain
Capsule stain
Spore stain: Schaeffer-Fulton method
Acid-fast stain: Ziehl-Neelsen method
******* streak plate and gram stain practice

Textbook readings:
Pg 249 Special Stains
Pg 63 Section 3.7 Surface Layers External to the Cell Wall
Pg 47 Capsule Stain
Pg 470 Avoiding Recognition and Attachment (Capsules)
Pg 48 Endospore Stain
Pg 67-9 Endospores read up through Microcheck 3.9
Pg 283 Endospore-Formers
Pg 698-703 Lockjaw and Gas Gangrene
Pg 47 Acid-Fast Stain
Pg 670-2 Hansen’s Disease (Leprosy)

July 2
Lab 4
Quiz 1 (Labs 1-3)
Complete capsule stain, spore stain, and acid-fast stain
Effect of Temperature, pH, and Salt concentration on bacterial growth
Effect of Ultraviolet light on cell viability
******* Streak plate for a grade

Textbook readings:
Pg 86 Section 4.3 Environmental Factors that Influence Microbial Growth
Pg 23-4 pH
Pg 99 Measuring Biomass (Turbidity)
Pg 54 Permeability of the Cytoplasmic Membrane
Pg 293-4 Section 11.9 Archaea that Thrive in Extreme Conditions
Pg 122-3 Section 5.6 Using Radiation to Destroy Microorganisms and Viruses
Pg 196 Section 8.4 Repair of Damaged DNA
Lab 5  Hand in Laboratory Reports (Labs 1-3)
Complete temperature, pH, and salt concentration
Complete ultraviolet light
Atmospheric Growth Requirement testing
Bacterial population counts (Spread and Pour Plates Methods)

******
Gram stain for a grade

Textbook readings:
Pg 98-9 Plate Counts
Pg A-1 Appendix I Microbial Mathematics
Pg 88-9 Oxygen (O2) Requirements
Pg 94-5 Providing Appropriate Atmospheric Conditions
Pg 268-276 Section 11.1 Anaerobic Chemotrophs
Pg 281-2 Section 11.5 Aerobic Chemoorganotrophs

July 5
Lab 6  Complete spread and pour plates; atmospheric growth
Differential and selective media
Staphylococci
Streptococci

Textbook readings:
Pg 93-4 Section 4.5 Cultivating Prokaryotes in the Laboratory read up Providing Appropriate Atmospheric Conditions
Pg 290 Section 11.8 Bacteria that Inhabit the Skin
Pg 372-6 Section 15.1 Overview of the Innate Defenses and Section15.2 First-Line Defenses
Chapter 22 Skin Infections and Chapter 23 Respiratory System
Pg 641-3 Staphylococcal Toxic Shock
Pg 693-6 Section 27.2 Common Bacterial Wound Infections

July 9
Lab 7  Quiz 2 (Labs 4-5)
Complete Staphylococci; Streptococci
Continue differential and selective media
Dental Caries
Preparation and care of stock cultures
Gram Positive Cocci Unknowns
Catalase production
Coagulase production
Novobiocin sensitivity

Textbook readings:
Pg 601-4 Section 24.3 Bacterial Diseases of the Upper Alimentary System
Pg. 84 Maintaining Stock Cultures

July 10
Lab 8 Continue identification of Gram Positive Cocci Unknown
Bacitracin, CAMP, SXT, Enterococcosel, 6.5% NaCl, and Optochin

**NOTE** Any student that wants to bring in a water sample to test please collect sampling bottle from instructor.

July 12
Lab 9 Quiz 3 (Labs 6-8)
Hand in Laboratory Reports (Labs 4-6)
Continue identification of Gram Positive Cocci Unknown
Detecting Coliform bacteria in water: Multiple tube method
Bacterial analysis of food
Motility

Textbook readings:
Pg 791 Section 31.2 Drinking Water Treatment and Testing
Pg 99 Most Probable Number (MPN)
Pg 112 Foods and Food Production Facilities
Pg 114-5 Read Pasteurization through The Commercial Canning Process
Pg 123-4 Section 5.7 Preservation of Perishable Products
Pg 474 Superantigens
Pg 610-621 Section 24.5 Bacterial Diseases of the Lower Alimentary System up to Hepatitis A
Pg 672-4 Botulism
Pg Chapter 32 Food Microbiology
Pg 63-6 Section 3.8 Filamentous Protein Appendages
Pg 74 Flagella and Cilia

July 16
Lab 10 Complete motility experiment
Complete identification of Gram Positive Cocci Unknown
Continue water experiment
Complete food experiment
Biochemical tests
Identification of Gram negative unknown

**NOTE** Hand out vials for students to bring in mouth wash for next period

Textbook readings:
Pg. 251 Biochemical Tests
Pg 29-31 Section 2.5 Carbohydrates
Pg 25 Section 2.4 Proteins and Their Functions

The media in these experiments have been pre-inoculated to provide both a positive and negative test result. Students are to observe and record the reactions and where appropriate will perform certain tests
with the reagents provided. Tests will be available for observation over the next lab period. 1 set-up/3 students. Also: See Biochemical charts 1-8 in laboratory manual and the color pictures in the illustration binders.

**Carbohydrate fermentation:**
phenol red lactose blank  
*E. coli* in phenol red lactose  
*P. vulgaris* in phenol red lactose

**Methyl red test (Mixed acid fermentation):**  
*students will perform test with methyl red reagent*  
MRVP broth blank  
*E. coli* in MRVP broth  
*E. aerogenes* in MRVP broth

**Voges-Proskauer test (Butanediol fermentation):**  
*students will perform test with Voges-Proskauer reagents*  
MRVP broth blank  
*E. aerogenes* in MRVP broth  
*E. coli* in MRVP broth

**Indole (Tryptophan hydrolysis):**  
tryptone broth blank  
*E. coli* in tryptone broth  
*E. aerogenes* in tryptone broth  
*students will perform test with Kovac's reagent*

**Urea hydrolysis:**  
urea broth blank  
*P. vulgaris* in urea broth  
*E. coli* in urea broth

**Triple Sugar Iron Agar:**  
Triple sugar iron agar slant  
*P. vulgaris* on Triple sugar iron agar slant  
*E. aerogenes* on Triple sugar iron agar slant  
*E. aerogenes* on Triple sugar iron agar slant  
*E. coli* on Simmon's citrate slant

**Citrate utilization:**  
Simmon's citrate slant  
*E. aerogenes* on Simmon's citrate slant  
*E. coli* on Simmon's citrate slant

**Phenylalanine deamination:**  
*P. vulgaris* on phenylalanine slant  
*E. coli* on phenylalanine slant  
*dropping bottle of 10% ferric chloride*

**Decarboxylase**  
lysine decarboxylase blank  
*E. aerogenes* in lysine broth  
*P. vulgaris* in lysine broth
Hand in Laboratory Reports (Labs 7-10)
Gram Positive Cocci unknown report due
Continue identification of Gram negative unknowns
Complete water experiment
Antiseptics Chemical Agents of Control: The Filter Paper Disk Method

Textbook readings:
Pg 110 Disinfection
Pg 112-3 Section 5.2 Selection of an Antimicrobial Procedure
Pg 116-121 Section 5.4 Using Chemicals to Destroy Microorganisms and Viruses

July 19
Lab 12 Continue identification of Gram negative unknowns
Complete antiseptics experiment
Isolation and Enumeration of Bacteriophages
Textbook readings:
Pg 323-9 Viruses of Bacteria Section 13.1 General Characteristics of Viruses and
Section 13.2 Virus Interactions with Host Cells

July 23
Lab 13 Continue identification of Gram negative unknowns
Complete virus experiment
Antibiotic Sensitivity Testing: A. Kirby-Bauer test B. Synergistic effects
Determination of penicillin sensitivity

Textbook readings:
Chapter 21 Antimicrobial Medications

July 24
Lab 14 Quiz 5 (Labs 11-12)
Continue identification of Gram negative unknowns
Complete Antibiotics experiment; penicillin experiment
Slide agglutination test: Sure-Vue Select
Synthetic epidemic

Textbook readings:
Pg 372 3rd paragraph In addition.. read up to Section 15.1Overview of Innate Defenses
Pg 397-6 Section 16.3 and 16.4 The Nature of Antigens and The Nature of Antibodies
Pg 432 Section 17.5 Agglutination Reactions
Pg 6-8 Medical Microbiology
Chapter 20 Epidemiology

July 26
Lab 15 Lab Exam (Labs 13, 14, and comprehensive)
Gram negative unknown report due
Hand in Laboratory Reports (Labs 11-14)