The laboratory exam will consist of an open book portion to be given first and a practical portion (closed book) to be given in the lab (INST 2016). You will have 45 minutes to complete the open book portion and the remaining time will be for the practical portion. You will not need a Scantron.

For the open book portion, be sure to bring any resources you may need including your lab manual, lab notebook, safety guidelines and handouts. For the practical portion there will be 28 stations set up in the laboratory with something to observe and 1 or more questions at each station. You will have 1 minute per station after which you will need to move to the next station. In preparation, be sure to understand and be able to recognize and/or interpret the following:

**Microscope (Exercise 1)**  
Basic microscope parts/functions

**Stains (Exercises 5-7)**  
Gram stain, Capsule stain, Endospore stain, Acid Fast stain

**Biochemical Tests (Exercises 13-18)**  
Starch hydrolysis  
OF Glucose  
Sugar fermentation (acid and/or gas)  
MR (methyl red) & VP (Voges-Proskauer)  
Gelatin hydrolysis  
Urease test  
Phenylalanine deamination  
Hydrogen sulfide (H₂S) production  
MIO: Indole production, Ornithine decarboxylation  
Nitrate reduction  
Catalase  
Oxidase  
Identification of bacterial species using results from Enterotube II

**Eukaryotic Microbes (Exercises 34, 35 & 37)**  
Methylene blue stain of Saccharomyces (yeast) cells  
Sporangiospores of Rhizopus, Conidiospores of Penicillium  
Paramaecium, Plasmodium, Trypanosoma, Euglena

**Water Testing (Exercise 52)**  
Determine the most probable number (MPN) of bacteria  
EMB agar (only Gram-negative cells grow on it; know how coliform bacteria appear)

**Antibiotic Testing (Exercise 25)**  
Measure diameter of zone of inhibition, use chart to determine susceptibility  
Mueller-Hinton agar (standard agar for use in the Kirby-Bauer test)

**Skills**  
Calculate concentration of bacteria in original culture or food source  
Perform a quadrant streak and generate isolated colonies  
Perform and interpret a Gram stain or Capsule stain