Microscope Rental or Purchase

You WILL need a microscope for your first two years. I. Miller Precision Optical Instruments, Inc. offers rental microscopes, and they will be delivered to students during New Student Orientation. Please complete the Rental Reservation Form and return it to I. Miller directly. You WILL NOT need a microscope during your third and fourth year. Therefore, we suggest you rent a microscope rather than purchase one.

If you wish to rent a microscope from I. Miller Precision Optical Instruments, Inc., please complete the Microscope Rental Form and return it to I. Miller directly.

You will need a microscope on the first day of Class. You may:

1. Rent/Purchase a new microscope which meets our requirements;

2. If you have a microscope which is used and meets our requirements, you must bring it with you to student orientation for approval by faculty;

3. If you do not have a microscope, you may rent a microscope from I. The cost of new microscope may range from $800.00 - $1,000.

General Information Concerning a Required Microscope

One of the requirements of the Veterinary School is that each student provide himself or herself with a microscope of good quality

Two methods of procurement are commonly used by the student body: purchase or rental. The School has selected a vendor to help you rent a microscope.

In considering the purchase of the microscope, you should carefully avoid several categories. Very old microscopes are usually unsatisfactory because of wear and insufficient accessories. Very inexpensive microscopes are almost always of insufficient quality. Research microscopes are so complex as to be undesirable for routine practice. "Laboratory" microscopes or the "student" scopes of the larger manufacturers are generally of good quality and are usually acceptable. It may seem obvious, but you "get what you pay for." An inexpensive microscope is likely to cause you problems.

All microscopes for student use must be approved by faculty during the second day of New Student Orientation.

This may accomplished by purchasing a new instrument that meets our minimum requirements.

Alternatively, if you purchase a used model, you must offer your instrument for examination and approval at Orientation. To protect yourself, purchase of any used microscope should be made conditional, subject to acceptance by the faculty. An acceptable microscope is required on the very first
day of class and any student who has procured an unacceptable microscope will be required to replace it with an acceptable model.

During Orientation, the faculty assisting with microscopes will answer any questions that you ask concerning the use or purchase of microscopes.

Part I. Minimum Requirements:

1. Four good quality achromatic objectives with approximate magnifications as follows: 2.5-5X, 10X, 40X, 100X (oil immersion). All objectives should be parfocal within 10-20 microns. Spring-loaded 40X and 100X objectives are highly recommended.

2. Focusable condenser (numerical aperture of 1.0 or greater) equipped with an iris diaphragm. This should fully and evenly illuminate the field as seen through the 2.5-5X objective.

3. Binocular, preferably 10X, with a pointer.

4. Variable intensity substage illuminator (transformer controlled).

5. Sturdy microscope stand with focusing elements and fittings in good mechanical condition.

6. Mechanical stage, calibrated or uncalibrated. A mechanical stage can be attached to most used or old microscopes.

Part II. Optional Equipment:

1. Objectives more highly corrected that the standard achromats (e.g., flat or wide-field objectives) may be of interest to students on a liberal budget. Apochromats are very expensive and unnecessary except for photographic and research applications.

2. Wide field, high eye-point oculars, while worthwhile for all, are especially useful to those who normally wear glasses.

The following additional suggestions are offered to those students planning to buy new or used microscopes:

A. General:

1. When a new microscope is purchased, liberal arrangements should be made for the replacement of any defective parts and for refund of the purchase price if the instrument is generally unsatisfactory.

2. A surprising number of new microscopes and nearly all of the second-hand microscopes display defects that will require repair or replacement of parts.

3. Good microscopes are available at bargain prices to the buyer who is prepared to make careful optical tests and careful inspection of mechanical parts.
4. A student microscope should be rugged, portable, simple, convenient, and precise. Complicated stands, heavy cases, numerous accessories, and elaborate substages are of questionable value.

B. Mechanical Components:

1. The dovetails on the coarse focus, fine focus, and condenser focus, and mechanical stage adjustments should fit snugly and should run smoothly without binding or drifting.

2. All adjustments, particularly the fine focus adjustment, should be free of backlash.

3. Accurate centration and locking of rotary nosepieces are essential.

4. The condenser iris should be accurately centered. It should work smoothly and easily, otherwise it will wear quickly.

5. A slide clamp that will hold oversized slides securely is desirable for the 1-1/2 x 3 slides used in neuroanatomy.

6. Check that you see only 1 image (sufficient interpupillary distance).

7. Check that the microscope holds the slide in focus over time without slipping.

C. Testing of Optical Elements:

1. Look at all lens surfaces for cracks, nicks or abrasions, using a hand lens or other objectives. An inverted 10X ocular makes a good hand lens. Any objective or lens mount that has nicks, dents, scratches, on metal parts has suffered from rough handling and is probably defective.

2. Before selecting a microscope, compare the quality of images produced by several different microscopes. Use a sample slide with which you are familiar and the best possible conditions of illumination.

3. Simple Tests:

   a. Examine the rulings on a blood-counting chamber with all objective and ocular combinations. Lines should be crisp, parallel, absolutely free of color halo and simultaneously in best focus of the entire field. = 1-1/2 coverslips (0.175 mm thick) and, where appropriate, an immersion oil recommended by the manufacturer (usually refractive index = 1.515) should be used.

   b. Examine a slide containing small opaque particles. Such a slide can be made by shaving a small amount of carbon from a lead pencil into a drop of balsam and covering it with a good quality coverslip. The image of such particles should be jet black, should have sharp edges, should remain in best focus as the slide is moved across the field and should show no color halos at the edges of the field.