Hello students, today we are going to study brightfield microscopy from unit 3 microscopy. In this module we are going to study introduction and history of bright field microscope. Simple and compound microscope, parts of compound, microscope and image formation in compound microscope. After studying this module, student will be able to understand different parts of compound microscope and explain working of compound microscope. Microscope is the most fundamental tool which has been used to study microorganisms by the microbiologists. The first known description of microorganisms was given by Robert Hooke. Micrographia was the first book which was devoted to microscopic observations. Robert Hooke, in his book Micrographia, illustrated many microscopic images, including the fruiting structures of mold. Later, Antonie van Leeuwenhoek gave the first known description of bacteria. He was actually a Dutch Draper, but was fond of grinding lenses. He is Antonie van Leeuwenhoek and in this picture we can see his microscope. This was a simple

microscope which consisted of a lens which was held between the two metal plates. This was the mounting pin for mounting of the specimen and focusing screw. So microscope is an optical instrument which consists of a lens or a combination of lenses for magnifying the images of minute objects. Bright field microscope forms a dark image against a brighter background, hence the name Bright field. Magnification is the degree of enlargement, whereas resolution of a microscope is the ability of a lens to separate or distinguish between small objects that are close together. In this picture we can see a simple microscope which consists of a single lens and we keep our specimen on the stage. This is a binocular compound microscope which is having two oculars. The magnification power of objectives differs and the total magnification of a microscope is the product of magnification of Objective and the magnification of ocular. So the magnification of low power is 10 X, giving a total magnification of 100 X. For high power, the magnification is 40 X, giving total magnification of 400 X. And for oil immersion, the magnification of objective is

100 X, giving a total magnification of 1000 X. So in this picture we can see objectives with different magnification power. Now oil immersion is named so because when we use this objective we place a drop of oil over the specimen and we dip the objective in this oil in order to improve the clarity of the image. Coming to the parts of a compound microscope, it consists of a sturdy metal body, which is composed of base and an arm to which remaining parts are attached. Light source in a microscope can either be an electric illuminator, as we can see in the picture, or a mirror which will gather natural sunlight and focus it on the specimen. Substage condenser focuses light on the slide so we can see the condenser which is positioned below the stage. So the light that is reflected by the mirror is gathered by the substage condenser and focused on the specimen. Coming to the other parts of a compound microscope. Stage will hold the slide with the help of clips. Control knobs are used to move slide during viewing. And the upper arm holds body assembly which has no space

and one or more ocular lenses that are attached. Nosepiece holds three to five objective lenses of different magnifying power, and this nosepiece can be rotated to position any objective lens beneath the body assembly. Two focusing knobs fine and coarse adjustments are used to get the clarity of the image. Coming to how image formation takes place in a compound microscope. So the light from the illuminated specimen is focused by the objective lens, creating an intermediate image, also called as primary image, and this is further magnified by the ocular lens. So we can see a magnified image of our specimen. Now we have seen that objective lens can be of 10X, 40X or 100X. The magnification power of ocular is 10 X, so the total magnification can be 100 X, 400X or thousand X depending upon what objective we are using. So in this module we have seen how bright microscopy came into existence. In this module we have seen how brightfield microscope came into existence. Then we have seen simple and compound microscope. Various parts of compound microscope and how

image formation takes place in a compound microscope.

These are the references for this unit.

Thank you.