1. Read Ghatak Ch. 15.11, 16.1-5, 17.1-4.

2. Ghatak 15.9: In the Michelson interferometer arrangement, if one of the mirrors is moved a distance of 0.08 mm, 250 fringes cross the field of view. What is the wavelength?

3. Ghatak 15.10: A Michelson interferometer experiment is performed with a source consisting of two wavelengths, 488.2 nm and 488.6 nm. Through what distance does the mirror have to be moved between two positions of the disappearance of the fringes?

4. Ghatak 15.11: In the Michelson interferometer experiment conducted with light of wavelength 500 nm, calculate the angles corresponding to bright rings for \( d = 0.05 \) mm, where \( d \) is the difference in lengths of the two arms of the interferometer. Show that if \( d \) is decreased to \( d' = 0.04997 \) mm, the fringe corresponding to \( m=200 \) disappears. What is the corresponding value of the angle?

5. Ghatak 16.2: Consider a Fabry-Perot interferometer constructed from two parallel partially reflecting mirrors of reflectivity 0.8 with air between the mirrors. Calculate the minimum spacing between the plates of the interferometer which will resolve light of two wavelengths, 600.0 nm and 600.01 nm.

6. Ghatak 16.5: Consider a monochromatic beam of light of wavelength, 600 nm, normally incident on a Fabry-Perot interferometer with air between the partially reflecting mirrors having a finesse factor of \( F=400 \). Write the distance between the two mirrors as \( h = h_0 + x \), with \( h_0 = 10 \) cm.
   a. Calculate the first three values of \( x \) for which the interferometer will have unit transmittivity and the corresponding values of \( m \).
   b. Calculate the full width at half maximum (FWHM), \( \Delta h \), for which the transmittivity will be 1/2.
   c. What is the value of \( \Delta h \) if \( F=200 \)?
   [Answers: a. \( x \approx 200 \) nm (\( m = 333,334 \)), 500 nm (\( m=333,335 \)); b. \( \Delta h \approx 9.5 \) nm]

7. Ghatak 17.7: Using his stellar interferometer (Fig. 17.9) with light from the star, Betelgeuse, Michelson observed that the fringes disappeared when the distance between the movable mirrors is 63.5 cm. Assuming a wavelength of 600 nm, estimate the angular diameter of Betelgeuse.