

# ECE 6323 HW

## Part A

When optical signal is sent through a fiber, what can happen? Write a technical report on the physics of transmitting light for optical communication. Criteria:

- 1- Must cover all the most relevant topics on the technical performance aspects of optical communications. For example: dispersion effect: it is relevant. Fiber gets warm if the light is absorbed, or even burned if too much light power: irrelevant (relevant to practical operational aspects but not the communication engineering performance).
- 2- Must have technical calculation results to illustrate/support your argument. **Make the most use of the apps** on the course web site. For example: one cannot simply say “dispersion limits the distance x bandwidth product” without making a rigorous case with illustration. It is up to you how to present the evidences and explain.
- 3- Be thorough but do not include irrelevant stuffs such as “fiber is not susceptible to RF interference, or light signal can travel much further than RF signal in coax cables etc...” In other words, do not just download stuffs on the web and try to fill in.
- 4- You can use Mathematica to write the report, or submit in a pdf file after editing with other software. The limit is 10 pages including figures. References are not needed unless necessary and they don't count toward the page limit.

## Part B

Watch the suggested videos below about optical fiber manufacturing. Write a one-page (not counting the references) to report what you learn. Make sure there is a blank page between Part A and Part B, and each part must be clearly labeled.

Besides suggested videos: You can watch any other videos you find, but you are responsible for the accuracy and relevance of the videos you choose. The objective is for you to learn how people make optical fibers for communications. There is one video about fiber cables, as opposed to optical fibers. It is only for the sake of completeness but you are not required to write about it. Only the optical part of the fiber is of interest in this paper.

[https://www.youtube.com/watch?v=liKOYbgIC\\_c](https://www.youtube.com/watch?v=liKOYbgIC_c)

<https://www.youtube.com/watch?v=7FI-plS3u5s&list=PL516338BF64D50B6E>

[https://www.youtube.com/watch?v=N\\_kA8EpCUQo](https://www.youtube.com/watch?v=N_kA8EpCUQo)

<https://www.youtube.com/watch?v=7tsF3mSpqX8>

<https://www.youtube.com/watch?v=fjRqGKU9cUU>