**Topic (Michelson’s interferometer)**
Tasks (for non-hands-on project):

The project involves ray design of an optical instrument (e.g. confocal microscope, spectrometer,
interferometer, polarization imaging, etc.) and writing a summary of the various biomedical applications
that employ this optical instrument. The following is required for the term project (Part-B), which is a
continuation of Part-A (submitted as a combined one big document)

1. A max 10-page paper with figures, that describe your topic and summarizes the literature in this chosen area. The summary should be your words based on what you have read in the area. The paper will be graded on quality and not quantity. Use the Applied Optics journal format for your project.
The paper format should include the following:

**a. Abstract** – Explains in a brief one paragraph what you intend to cover in the paper. (Note this is usually the last thing written, after the article).

 **b. Introduction** – In this section, you introduce the background and literature corresponding to your chosen optical instrument and the area of biomedical optics. Summarize all other biomedical applications (from Part-A) as a table. List all optical components used and the function of each component (as a table).

**c. Theory** – This section demonstrates the complete ray design for the optical instrument chosen and the assumptions made (Part-A

**d. Experimental Methods** – This is where you describe the various versions of this optical instrument that are currently used by various researchers for the chosen biomedical application of interest. You need to include block diagrams of the instrumental approach (from various research groups – atleast 5).

**e. Discussion** (1) –Pro’s and con’s of the optical instrument vs the ‘gold-standard’ approach for the chosen
biomedical application. Concise tabulation of pros and cons is required (not paragraphs). (2) Summarize
your thoughts for a re-design of the optical instrument. You typically try and answer questions such as;
“How well does the approach work in terms of specificity, accuracy, and precision?”, “Does or will the
approach really work in vivo?”, and “What should be the next step for this technology?” Describe what
you want to contribute as the potential re-design of your optical instrument in order to improve its
applicability or its features or performance for the chosen biomedical application. Include a schematic of your proposed re-design with theoretical justification of each new change/addition (schematic and justification required).
**f. Conclusions**: Brief conclusions of your paper, along with what you proposed and what aspect does it
help for the chosen biomedical application.
**Criteria for Success**:
1. Clear ray diagram including all components and how light travels (creativity from re-design)
2. Technical writing skills (in third person)
3. Listing 5 schematics of this instrument for the chosen biomedical application.
4. Presentation and final term paper in the format requested.
5. Concise tabulation as stated in the above tasks.
6. Citing your references in the actual write-up (via numbers) apart from listing at the end of the
document, and thorough literature search in the chosen biomedical application.
7. Formatting the paper as per the suggested journal guidelines.