Proposal of the lecture for PhD students from the Chemical Faculty of the Gdańsk University of Technology

1. **Subject**: Introduction to liquid crystals: chemistry, physics and applications
2. **Lecturer**: prof. Stanisław Kłosowicz, DSc, Eng., Faculty of Advanced Materials and Chemistry, Military University of Technology, 00-908 Warsaw, Kaliskiego 2.
3. **Abstract**:

1. **Liquid crystals** (45 min) – exotic state of matter,
    a. Some history with respective anecdotes.
    b. Essential differences between solids, liquids and liquid crystals.
2. **Classification of liquid crystalline phases**, briefly of course (45 min),
    a. Thermotropic LC (over 30 of them),
    b. Lyotropic LC (over 40 of them).
3. **Molecular structure and synthesis** (2x45 min),
    a. Anisometric molecules: elongated an flat, why?
    b. Basic preparation methods for mesogenic materials, are they special?
4. **Thermodynamics** (2x45 min)
    a. Phase transitions and phase identification,
    b. Are LCs need special thermodynamics?
5. **Essential physical properties and methods of their measurement** (3x45 min)
    a. How to describe LC medium?
    b. Elastic properties; some higher mathematics ☺.
    c. Anisotropy of physical properties.
    d. Electrooptics of LCs
6. **Few words about applications** (3x45 min)
    a. General reason for LCs application.
    b. Electrooptics including: LCDs, different optical modulators and lasing media.
    c. Photonics – the new field of interest.
    d. Thermology – old but still interesting, all of us will be patients...
    e. What about lyotropic LCs?
7. **Concluding seminar discussion** (3x45 min)