# DEVELOPMENT OF TERNARY PHASE DIAGRAM: OPTICAL AND MECHANICAL CHARACTERIZATION OF WATER/TAPIOCA STARCH/TRITON X-100 LIQUID CRYSTAL

By
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of the requirement for the award of the degree of
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DEPARTMENT OF PHYSICAL SCIENCES
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**JABATAN SAINS FIZIK**
**FAKULTI SAINS DAN TEKNOLOGI**
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**PENGAKUAN DAN PENGESAHAN LAPORAN PENYELIDIKAN SFZ 4399A/B**

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: DEVELOPMENT OF TERNARY PHASE DIAGRAM: OPTICAL AND MECHANICAL CHARACTERIZATION OF WATER/TAPIOCA STARCH/TRITON X-100 LIQUID CRYSTAL oleh MUHD FAZREEL B MUHAMMAD ROSLI no. matrik: UK16780 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Fizik sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda Sains Gunaan (Fizik Elektronik & Instrumentasi), Fakulti Sains dan Teknologi, UMT.

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## DECLARATION

I hereby that this FYP research report entitled Development of Ternary Phase Diagram: Optical and mechanical Characterization of Water/Tapioca Starch/Triton X-100 Liquid Crystal is the result of my own research except as cited in the references.

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## ABBREVIATION

| **Abbreviation** | |
|---|---|
| LC | Liquid Crystal |
| LLC | Lyotropic Liquid Crystal |
| TLC | Thermotropic Liquid Crystal |
| MLC | Metallotropic Liquid Crystal |
| POM | Polarizing Optical Microscope |
| SWAXS | Simultaneous to Wide Angle X-Ray Scattering |
| STF | Shear Thickening Fluid |
| SEM | Scanning Electron Microscope |
| EDS | Energy Dispersive X-Ray Spectroscopy |
| UMP | Universiti Malaysia Pahang |
| UKM | Universiti Kebangsaan Malaysia |

## APPENDIX LIST