Notice of the Final Oral Examination for the Degree of Master of Applied Science of

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BE (Visvesvaraya Technological University, 2012)

“Hollow Fiber Coupler Sensor”

Department of Electrical and Computer Engineering

Wednesday, December 12, 2018
9:30 A.M.
Engineering Office Wing
Room 430

Supervisory Committee:
Dr. Tao Lu, Department of Electrical and Computer Engineering, University of Victoria (Supervisor)
Dr. Poman So, Department of Electrical and Computer Engineering, UVic (Member)

External Examiner:
Dr. Rustom Bhiladvala, Department of Mechanical Engineering, UVic

Chair of Oral Examination:
Dr. Steve Perlman, Department of Biology, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies
Abstract

This thesis presents a method to fabricate a robust optical directional coupler sensor using a solid core fiber (SCF) and a hollow core fiber (HCF). Through evanescent wave coupling mechanism, the optical power is exchanged between SCF and HCF. The hollow core of the HCF can be filled with liquid samples to alter the coupling ratio which imparts change in amount of light propagating through the SCF. Thus, it gives the coupler with ability of sensing refractive index of the sample with good sensitivity of 4.03±0.50 volts per refractive index units (V/RIU) for refractive indices ranging from 1.331±0.003 to 1.403±0.003 with a resolution of 3.5×10−3 refractive index units (RIU). The SCF-HCF coupler was also used to sense the temperature based on the concept of temperature dependence on refractive index of the sample inside the hollow core of HCF. Further, the packaging methods are described that protect coupler from ambient environments and improves the life span of sensor.