NOTICE OF
UNIVERSITY ORAL
GEODESY AND GEOMATICS ENGINEERING
Master of Science in Engineering

Mazhar Rafiq

June 23, 2005
2:30 pm
Room E-11 - Head Hall

Board of Examiners:	**Co-Supervisors:**	**Dr. Marcelo Santos, GGE**
		Dr. Peter Dare, GGE
	Examining Board:	**Dr. Richard Langley, GGE**
		Dr. Karl Butler, Dept. of Geology
		Dr. Spiros Pagiatakis, York University
	Chair:	**Dr. Don Kim, GGE**

STUDY OF EASTERN CANADIAN COASTAL SITE DISPLACEMENT DUE TO TIDAL LOADING USING A GPS NETWORK IN ATLANTIC CANADA

ABSTRACT

Since its launch in 1978, Global positioning system has undergone incessant advancement. There has been a consistent endeavor on part of the both scientists and commercial organizations to reduce systematic errors related to GPS. The systematic errors, induced due to temporal tidal loading of the earth surface, contribute significantly to the scatter in the geodetic measurements derived from the GPS system. This thesis focuses on ascertaining and reducing tidal induced errors, due to ocean tide loading and body tides, at two GPS sites, namely CGSJ and DRHS, established under the Princess of Acadia project in Saint John, New Brunswick and in Digby, Nova Scotia respectively. A total of 1 year of GPS data was collected at the aforementioned sites. Baseline solutions were obtained by processing 3 and 24 hourly GPS data, using differential positioning software DIPOP and its client end GUI, FACE v2.0. The observed differential variations of GPS sites were compared to the modeled differential variations along the baselines for statistical analysis. The predictive differential tidal variations of the baselines were modeled with global ocean tide model FES 95.2 (0.5^0 by 0.5^0 resolution) supplemented with a higher resolution regional tide model by Pagiatakis (0.25^0 by 0.25^0 resolution). The body tide effects were subtracted from the ocean tide loading effects. The solutions for both the height component and baseline length show daily repeatability better than 1.5 mm for baselines ranging from 87.5 km to 170 km. The tidal models used in investigation explain the observed motion considerably well, with correlation coefficients of greater than 0.70 between modeled and observed curves. Elimination of tidal effects has resulted in reduction of rms better than 80 percent.

Faculty Members and Graduate Students are invited to attend this presentation.