Homework 2 **PLANAR WAVEGUIDES**

Referring to the **asymmetric waveguide** of page 309 in the book of Yeh:

(a) starting from the wave equation, derive equations 11.2-5 and 11.2-11, filling in all important steps that are omitted in the book. (40%)
(b) take the case where $n_1=1$, $n_2=2.6$, και $n_3=2.4$, which corresponds to a waveguide air/GaN/AlGaN. If the thickness of GaN is 500nm, solve graphically equation 11.2-5 and find the propagation constants β_m for all TE modes that the waveguide can support for $\lambda=350$nm. (40%)
(c) What is the minimum thickness of GaN for which exists at least one TE mode at $\lambda=350$nm? (10%)
(d) prove orthogonality of modes equation 11.6-10 (10%).

Deadline: 3rd of November.