

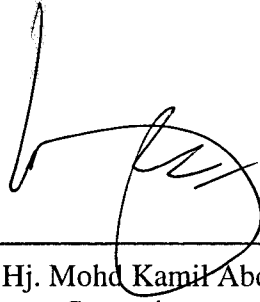
**MODELING AND EXPERIMENTAL INVESTIGATION ON
DOUBLE STAGE SINGLE PASS ERBIUM-DOPED FIBER AMPLIFIER**

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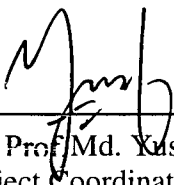
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This Final Year Project Report entitled “**Modeling And Experimental Investigation On Double Stage Single Pass Erbium-Doped Fiber Amplifier**” was submitted by Siti Nurmaisarah Binti Mohd Subri, in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Physics in the Faculty of Applied Science and was approved by



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ABSTRACT

MODELING AND EXPERIMENTAL INVESTIGATION ON DOUBLE STAGE SINGLE PASS ERBIUM-DOPED FIBER AMPLIFIER

Erbium-doped fiber amplifiers (EDFAs) which can amplify the light signal are by far the most important fiber amplifiers in the optical fiber communications. In between of transmission line, there are three different types of amplifiers which are power booster, in-line and preamplifier were designed differently. An EDFA need to be designed to get high gain with low noise figure that fulfill requirement of these three types simultaneously. In this project, the optical gain and noise figure of EDFA depend on various parameters like EDFA fiber length, input signal power and pump power. The focus of the study are EDFA performances and were simulated using Gain Master Software. This amplifier design software was intended to assist in the design of EDFA. The variations of gain with different parameters were obtained and the values of these parameters were optimized to achieve a maximum value of gain with lowest noise figure. The design of the amplifier will then be used to assemble and set-up an EDFA for experimental verification. These simulation values were used in experimental work and make comparison. A double stage single pass EDFA consisting of two EDFAs in series were also simulated. In the operating range of 1530-1570 nm, for the experimental single stage single pass EDFA, gain of 25 dB and noise figure of 4 dB were achieved. While for the experimental double stage single pass EDFA, gain of 40 dB and noise figure of 5 dB were achieved.

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