

## **ABSTRACT**

*Dense Wavelength Division Multiplexing (DWDM) is a transmission technique that utilizes light with different wavelengths which is then multiplexed so that it is transmitted via optical fiber. DWDM uses a wavelength of 1500 nm - 1600 nm with minimum attenuation for transmission over long distances. So it can be said that DWDM technology is very good for application in long-distance telecommunication networks, as well as anticipating high traffic and large bandwidth requirements. In the DWDM transmission technique, there are effects, non-linear one of which is Four Wave Mixing (FWM). FWM is an effect non-linear that will affect the performance of the optical fiber communication system network with the addition of the signal that is also transmitted on the optical fiber. In this study, a DWDM system design was carried out using two scenarios, namely the first scenario EDFA-ROA and the second scenario without amplification using software Optisystem 7 to minimize the effects non-linear of FWM found in optical fiber transmission using the DWDM system design. System modeling is done using 16 DWDM system from 1552.52 - 1540.56 channel length nm with 1.6 nm spacing between channels with 100 km long transmission link. So that it can be analyzed the effect of laser power from the values Q-Factor and BER on the DWDM.*

**Keywords:** DWDM, FWM, EDFA, ROA, Q-factor, BER