

DOI: <https://doi.org/10.33103/uot.ijccce.20.4.1>

# The Design and Simulation of FBG Sensors for Medical Application

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**Abstract**— Fiber Bragg Grating sensors have a wide range of applications, ranging from their use for health monitoring, in medical applications and also as biomedical sensors, among others. Moreover, since fiber Bragg gratings have many advantages that qualify them to be of great benefit, of course, the most important of these applications are vital signs of human health condition Such as blood pressure, heart rate (pulse rate), and body temperature. The Vital-signs are noticeable variables. The temperature and blood pressure are changed according to the physical, involuntary, nervous and psychological state of the person. Therefore, the measurement of vital signs is very necessary, In this work, fiber Bragg grating sensor has been designed and simulated to study the performance of fiber Bragg grating sensor as a Body temperature of human beings ranged from (35°C to 40°C, which is from hypothermia to hyperthermia) and blood pressure that ranged between lower and higher extremities (40 to 190 mmHg ) from hypotension to hypertension, using optigrating and optisystem simulation softwar. The designed sensor was very sensitive to human temperature and blood pressure ranges which were 13.632 pm/oC and 15.75 pm/mmHg, respectively.

**Index Terms**— fiber Bragg grating, fiber optic temperature sensor, optical wavelength, modulation, high accuracy sensors, health monitoring system.

Received 10 February 2020; Accepted 9 July 2020