

VISVESVARAYA TECHNOLOGICAL UNIVERSITY
BELGAUM 590 014



A REPORT ON PROJECT WORK

**“PHOTOPLETHYSMOGRAPH FOR CARDIOVASCULAR
MEASUREMENT AND ASSESSMENT”**

(Sponsored by KSCST)

Submitted in the partial fulfillment of the requirements for the award of the degree of

BACHELOR OF ENGINEERING
In
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ABSTRACT

The photoplethysmograph (PPG) is a non-invasive device for detecting heart rate by the blood volume changes by optical means. Heart rate and arterial blood pressure variability signals constitute unique probe for the assessment of the cardiovascular control mechanisms in both physiological and clinical conditions. Qualitative assessment of the overall and clinical status of the subject and characterization of complex cardiovascular dynamics from the digital blood volume pulsations can be measured non-invasively using PPG.

The objective of the present work is to design and develop a PPG device in transmission mode, which can be used to determine heart rate using a volume measurement of blood in the arteries and capillaries. This can be done by using Ultra Red light to detect small changes in blood content in the tissues with each heart rate. An Ultra Red light-emitting diode is used to transmit light radiation into the index finger. Based on the heart rate and volume of the blood in the region of interest, a receiver (LDR) then detects the transmitted light. This information is processed and amplified to provide the pulse waveform. The data is also acquired simultaneously into a computer through a suitable data acquisition system for further analysis. Suitable software is developed to determine heart rate.

The developed PPG device can be used in many application such as: diagnosing arterial diseases in fingers and toes, diagnosing functional disturbances of blood flow (Reynolds syndrome, death finger, fib ration syndrome), diagnosing thoracic outlet syndrome, and measuring peripheral blood pressure even on digits.