SUNYANI TECHNICAL UNIVERSITY

FACAULTY OF ENGINEERING

ELECTRICAL/ELECTRONICS ENGINEERING



Proposal on

**DEVELOPMENT OF A PHOTOTHERAPY MACHINE FOR NEONATAL JUANDICE TREATEMENT**

Proposal by

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This proposal is submitted in partial fulfilment of the requirements for the award of Higher National Diploma in Electrical and Electronics Engineering Department

**Abstract:**

Treating neonatal jaundice through phototherapy requires a personalized approach that considers both effectiveness and potential side effects and is adaptable based on the infant’s physiological condition. However, there is a current lack of standardized measurement protocols for evaluating phototherapy’s effectiveness and side effects in clinical practice. This study developed a neonatal jaundice phototherapy system with integrated dynamic physiological monitoring capabilities to address this gap. A neonatal jaundice phototherapy system was designed and constructed based on previous research. The dynamic physiological monitoring component was based on established methodologies, and the phototherapy system utilized light-emitting diode arrays, undergoing thorough performance and functional testing. Furthermore, specialized software was developed to process and present physiological monitoring data and regulate phototherapy parameters. Performance testing confirmed the stability of the phototherapy system, its ability to achieve therapeutic light levels, and the precise control over light intensity through software adjustments. Functional testing demonstrated the system’s efficacy in promoting bilirubin degradation in an in vitro model and regulating the degradation rate by adjusting light intensity levels. The physiological monitoring component successfully tracked various physiological indicators (jaundice, body positioning, and skin condition). The innovative system developed in this study enables real-time monitoring of essential physiological parameters in neonates, offering a fresh perspective on standardized and personalized phototherapy for neonatal jaundice. This system holds promise for broad application in clinical settings.