**CHAPTER 1: INTRODUCTION**

**CHAPTER 2: REVIEW OF LITERATURE**

**CHAPTER 3: REVIEW OF TECHNOLOGY**

The tools, technology and components used in the project are listed below:

1. Hardware Components
2. ESP 32 WROVER TYPE B
3. MAX30100
4. AD8232
5. 10K NTC Thermistor temperature sensor
6. Resistor
7. Push Button
8. OLED display
9. Backend
10. Operating System
11. Windows 11
12. Language, framework and Libraries
13. C/C++
14. Dart
15. Flutter
16. ESP32-SDK
17. Adafruit GFX & Adafruit SSD1306
18. Wire.h
19. WiFi.h
20. Version Control
21. Documentation
22. MS Word
23. MS Project
24. MS PowerPoint
25. Web Browser
26. Google Chrome

**CHAPTER 4: METHODOLOGY**

Agile methodology has been used for Smart Vitals project. Agile method allows scalability and adaptability which enables to handle technical error effortlessly at early stages without interrupting other components. The flexibility, in Agile methodology allows developers to include new features or components in later stages based on the evolving requirements. Constant feedback is provided which ensures the progression of the project to meet the end goal the expectations. Additionally, the agile method offers iterative process enabling to build and improve the project piece by piece rather than following a linear or firm plan.

The Agile process has different stages each stage contributing for the progressive development of the Smart Vitals project. Research and Specification Collection is the first stage where the essential modules like ESP32, MAX30100 SpO₂ sensor, ECG sensor, Temperature sensor, are examined with the help of the datasheets. The next stage is Planning and Circuit Designing where the sensor connections were validated with the help of Wokwi for circuit diagram layout. After the successful circuit design, the main focus was integration of MAX30100, ECG and Temperature sensor with ESP32 for processing sensor data and with OLED for data monitoring. Then, 3D models and PCB design was developed and designed in TinkerCAD during Designing and Prototyping stage. In the Development stage, the microcontroller was programmed to analyze sensor data to communicate wirelessly with the mobile app. After the system being functional, in the Testing phase the product was regularly tested ensuring precision, stability and working of hardware and software components. Lastly, in deployment and maintenance stage, improvement of the product was done where the product was updated based on user feedback.

The waterfall method is a conventional and sequential approach where each stage must conclude before beginning with the next stage following stable workflow used for project that has well-defined end goal. The project Smart Vitals project has different hardware and software integration which needs to be tested continuously for precision and improvement, in waterfall method testing is conducted following the development stage. Any issue in the project might not be identified until the very end which will be very risky making the process time consuming and complex which is the reason for Agile methodology being used as it offers constant testing and evaluation throughout the product development. RAD focuses on prompt development of the prototypes and user reviews. The Smart Vitals project focuses on providing accurate, dependable and secure data which are essential for health care, RAD focuses on quick deployment which could result in patchy testing and disparity between hardware and software. Therefore, Agile methodology is used as it provides iterative feedback which assures the product is tested thoroughly and reliable medically. The Spiral Model mainly focuses on risk management and developing the project in an iterative manner which can help the developers eliminate or avoid the risks completely during the initial phase. It focuses on thorough reports, planning which is suitable for large-scale project with peak risks which is why agile method is used as it is suitable for small to medium scale projects like Smart Vital with risks like data reliability which can be avoided with regular evaluation.

**CHAPTER 5: PRODUCT DESIGN**

**CHAPTER 6: SOFTWARE REQUIREMENT ANALYSIS**

**CHAPTER 7: IMPLEMENTATION AND TESTING**

**CHAPTER 8: PRODUCT EVALUATION**

**CHAPTER 9: PROJECT EVALUATION**

**Task Sheet**

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The above figure represents the complete flow of how the project was successfully concluded by following a planned task sheet.

**Gnatt Chart**

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**Timeline**

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Key stages of the project are shown in the MS Project Timeline, with initiation phase starting at 12/17/2024, followed by Planning phase, Research phase, Training and implementation phase, Testing and Evaluation phase with Closing phase marking the end of the project at 05/11/2025.

**Resource Sheet**

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**CHAPTER 10: SUMMARY AND CONCLUSION**