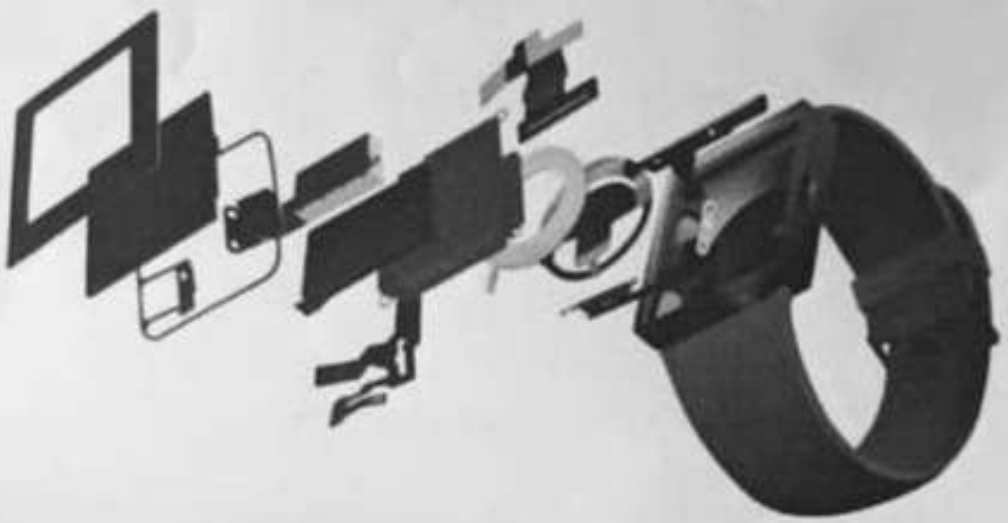
WEARABLE DEVICES

(CBM 370 - PROFESSIONAL ELECTIVE)

For B.E., CSE, ECE, EEE, EIE, ICE, Civil, Aeronatical, Automobile, Mechanical, and B.Tech., AIDS, IT, Branches

As per the Latest Syllabus of Anna University, Chennai

(REGULATIONS - 2021)



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Mr. C. SILAMBARASAN, M.E., MBA,
Assistant Professor,
Department of Information Technology
Ganesh College of Engineering, Salem.

Mr. R. SUNDARAM, M.E,
Assistant Professor,
Department of Computer Science and Engineering
Ganesh College of Engineering, Salem.

JEYAM PUBLICATIONS

No.201,Near State Bank of India,

Main Road, Vazhapadi, Salem – 636202, Tamil Nadu, INDIA.

Phone: 7708252505

E-mail: jeyampublications@gmail.com

Website: www. jeyampublications.in

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by Mr. C. Silambarasan, M.E., MBA,

Mr. R. Sundaram, M.E,

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PREFACE

This book, Wearable Devices has been written to serve the needs of under graduate Students to provide an adequate knowledge Wearable Technology used in real world environment. This book is designed to meet the requirement of revised syllabus prescribed by the Anna University, Chennai for engineering students of its affiliated colleges.

This book consists of 5 units as follows.

Unit I deals with Wearable Systems, Applications of Wearable Systems, Types of Wearable Systems, Components of wearable Systems and Sensors for wearable systems.

Unit II provides the knowledge of Wearability issues -physical shape and placement of sensor, Technical challenges sensor design, signal acquisition, sampling frequency for reduced energy consumption, Power Requirements and Thermopiles.

Unit III discussed about Need for wireless monitoring, Definition of Body area network, BAN and Healthcare, Technical Challenges- System security and reliability, BAN Architecture.

Unit IV deals with Introduction to smart textile- Passive smart textile, active smart textile. Fabrication Techniqucs Conductive Fibres, Treated Conductive Fibres, Conductive Fabrics, Conductive Inks. Case study

Unit V addresses the Medical Diagnostics, Medical Monitoring-Patients with chronic disease, Hospital patients, Elderly patients, neural recording, Gait analysis, Sports Medicine.

Finally this book also contains the unit wise important two mark questions with answers and some previous year university question papers with key answers.

Authors

MR. C. SILAMBARASAN

MR. R. SUNDARAM

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MR. C. SILAMBARASAN

MR. R. SUNDARAM

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UNIT 1

INTRODUCTION TO WEARABLE SYSTEMS AND SENSORS

Wearable Systems - Introduction, Need for Wearable Systems, Drawbacks of Conventional Systems for Wearable Monitoring, Applications of Wearable Systems, Types of Wearable Systems, Components of wearable Systems. Sensors for wearable systems -Inertia movement sensors, Respiration activity sensor, Inductive plethysmography, Impedance plethysmography, pneumography, Wearable ground reaction force sensor.

1. WEARABLE SYSTEMS - INTRODUCTION

- Wearable technology is any kind of electronic device designed to be worn on the user's body. Such devices can take many different forms, including jewelry, accessories, medical devices, and clothing or elements of clothing.
- The term wearable computing implies processing or communications capabilities, but in reality, the sophistication among wearables can vary.
- The most sophisticated examples of wearable technology include artificial intelligence (AI) hearing aids, Google Glass and Microsoft's HoloLens, and a holographic computer in the form of a virtual reality (VR) headset. An example of a less complex form of wearable technology is a disposable skin patch with sensors that transmit patient data wirelessly to a control device in a healthcare facility.

1.1. FEATURES OF WEARABLE DEVICES

1. Activity Monitoring.
2. Bluetooth Enabled.
3. Digital Display.
4. Health Monitoring.
5. Location Tracking.
6. Smart Watches.
7. Water Resistant / Outdoor Rated.
8. Wrist

1.2. OBJECTIVES OF WEARABLE TECHNOLOGY

The most common uses for wearable technology are for helping to monitor and alert the wearer about their personal health information or for social communication purposes – voice calling, texting, social media, etc.