



AVIT
AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY



**VINAYAKA MISSION'S
RESEARCH FOUNDATION**
(Deemed to be University under section 3 of the UGC Act 1956)



DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

**TWO WEEKS ATAL ACADEMY SPONSORED (HYBRID)
FACULTY DEVELOPMENT PROGRAM ON
“WEARABLE TECHNOLOGY IN HEALTHCARE”**

Department of Electronics and communication Engineering Organised **ATAL academy sponsored Two Weeks (Hybrid) Faculty Development Program on “Wearable Technology in Healthcare”** from September 05-10, 2022 in online mode in Zoom Platform (07.00 PM (IST) to 09.30 PM (IST) & September 12-16, 2022 in Offline mode at Aarupadai Veedu Institute of Technology, Paiyanoor. Total 41 Faculty members from other technical institutions were registered and participated in the faculty development Program.

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ATAL

**ATAL Academy Sponsored
Two Weeks (Hybrid)
Faculty Development Program on**

Wearable Technology in Healthcare

Online
September 05-10, 2022

Offline
September 12-16, 2022

Dr. G. Selvakumar
Principal

Coordinator
Dr. D. Vijendra Babu
Vice Principal & Prof. ECE

Co-coordinator
Dr. L.K. Hema
Prof. & Head, ECE

'A' Grade

Organised by : Department of Electronics and Communication Engineering, AVIT



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OFFLINE SESSIONS
September 05-10, 2022



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ATAL Academy Sponsored
Two Weeks (Hybrid)
Faculty Development Program on



Wearable Technology in Healthcare

Online Sessions  zoom



05 SEP 2022 to **10 SEP 2022**



7.00-9.30 P.M. IST

Resource Persons



Dr. T. Eshwar
Senior Scientist, Semiconductor Device
Fabrication Group, CSR-CEERI, Pilani,
Ministry of Science and Technology, Govt. of India, Rajasthan



Shri. Senthilkumar Murugesan
CEO, JioVio Healthcare,
Madurai,
Tamil Nadu



Dr. Soumya Jyoti Ray
Department of Physics
Indian Institute of Technology Patna (IITP),
Bihar



Dr. S. Sivanantham
Dean & Professor,
School of Electronics Engineering,
Vellore Institute of Technology, Vellore



Dr. T. Shanmuganantham
Prof. & Head Dept. of Electronics Engineering
Pondicherry, Central University,
Pondicherry



Dr. Shiram K V
Project Manager
L&T Technology Services
Bengaluru



'A' Grade

Dr. G. Selvakumar
Principal

Coordinator
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Vice Principal & Prof. ECE

Co-coordinator
Dr. L.K. Hema
Prof. & Head, ECE

Organised by : Department of Electronics and Communication Engineering, AVIT

Day - 1 (05-09-2022)

Even started at 07.00 PM (IST) During the Inaugural online session Dr. D. Vijendra Babu, Vice Principal (Part Time Studies), Professor, ECE & coordinator of ATAL FDP delivered the welcome address and gave the insights about the FDP & Dr. G. Selvakumar, Principal, AVIT, delivered the Presidential address. Mr. R. Karthikeyan, Assistant Professor (Gr-II), ECE introduced the Resource Person, Dr.T.Eshwar, Senior Scientist, Semiconductor Device Fabrication Group, CSIR-Central Electronics Engineering Research Institute (CEERI), Pilani, Ministry of Science and Technology, Govt. of India, Rajasthan – 333 031.India.



Dr.T.Eshwar, delivered the session on “Robust Flexible Tactile Sensor for Health Care Application”.



Mr. R. Karthikeyan, Assistant Professor (Gr-II), ECE given the vote of thanks.



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Day – 2 (06-09-2022)

Even started at 07.00 PM (IST) During the Inaugural online session Dr. D. Vijendra Babu, Vice Principal (Part Time Studies), Professor, ECE & coordinator of ATAL FDP welcomed the participants. Ms. B. Lakshmi Sree, Assistant Professor, BME, introduced the Resource Person, Shri. Senthilkumar Murugesan, CEO, JioVio Healthcare, Madurai – 625 004 Tamil Nadu, India..

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September 05-10, 2022 (Online)

Day 2 Health Innovation through Wearables

Resource Person
Shri. Senthilkumar Murugesan
CEO, JioVio Healthcare,
Madurai, Tamil Nadu.

06 SEP 2022 | 7.00-9.30 P.M. P.M. IST

Dr. G. Selvakumar, Principal, AVIT
Coordinator : Dr. D. Vijendra Babu
Vice Principal & Prof. ECE, AVIT

Organised by
Department of Electronics and
Communication Engineering, AVIT

Shri. Senthilkumar Murugesan, CEO, JioVio Healthcare, delivered the session on “Health Innovation through Wearables”.



Mr. R. Karthikeyan, Assistant Professor (Gr-II), ECE given the vote of thanks.

Day – 3 (07-09-2022)

Even started at 07.00 PM (IST) During the Inaugural online session Dr. D. Vijendra Babu, Vice Principal (Part Time Studies), Professor, ECE & coordinator of ATAL FDP welcomed the participants. Ms. R. Sandhiya, Assistant Professor, BME, introduced the Resource Person, Dr. Soumya Jyoti Ray, Department of Physics, Indian Institute of Technology Patna (IITP), Bihar – 801103, India.



Dr. Soumya Jyoti Ray, delivered the session on “Nano Electronic Devices for Smart Sensing”.



Ms. B. Lakshmi Sree, Assistant Professor (Gr-II), BME given the vote of thanks.



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Day - 4 (08-09-2022)

Even started at 07.00 PM (IST) During the Inaugural online session Dr. D. Vijendra Babu, Vice Principal (Part Time Studies), Professor, ECE & coordinator of ATAL FDP welcomed the participants. Ms. R. Sandhiya, Assistant Professor, BME, introduced the Resource Person, Dr.S.Sivanantham, Dean & Professor, School of Electronics Engineering, Vellore Institute of Technology, Vellore-632014, India.

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September 05-10, 2022 (Online)

Day 4 Tools for Writing Research Articles

Resource Person
Dr. S. Sivanantham
Dean & Professor,
School of Electronics Engineering,
Vellore Institute of Technology, Vellore.

08 SEP 2022 | 7.00-9.30 P.M. P.M. IST

Dr. G. Selvakumar, Principal, AVIT
Coordinator : Dr. D. Vijendra Babu
Vice Principal & Prof. ECE, AVIT

Organised by
Department of Electronics and
Communication Engineering, AVIT

Dr.S.Sivanantham, delivered the session on “Tools for Writing Research Articles”.

Why Citations Task?

- Research: Serving the information according to the requirements of the scholarly journal where research is published.
- They recognize the American and international scholars who have made a contribution.

What is anti-plagiarism software?

• Software for detecting plagiarism. It compares the submitted text with a large database of published works and identifies any similarities. It provides a report showing the percentage of similarity and the sources of the copied text.

Tools for Writing Research Articles

- Grammarly
- Turnitin
- iThenticate
- Copyscape
- Plagiarism Checker X
- Quetia
- Scribbr
- Grammarly
- Turnitin
- iThenticate
- Copyscape
- Plagiarism Checker X
- Quetia
- Scribbr

Scopus

Scopus is a leading research and citation database launched in 2004.

Scopus covers nearly 28,657 titles from approximately 11,800 publishers, encompassing 26 academic fields, including science, medicine, education and health sciences.

Custom not to be checked necessarily under the guidelines of UGC

Ms. B. Lakshmi Sree, Assistant Professor (Gr-II), BME given the vote of thanks.



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Day – 5 (09-09-2022)

Even started at 07.00 PM (IST) During the Inaugural online session Dr. D. Vijendra Babu, Vice Principal (Part Time Studies), Professor, ECE & coordinator of ATAL FDP welcomed the participants. Ms. B. Lakshmi Sree, Assistant Professor (Gr-II), BME, introduced the Resource Person, Dr.T.Shanmuganantham, Professor & Head, Department of Electronics Engineering, Pondicherry, Central University, Pondicherry-605 014, India.

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Wearable Technology in Healthcare
September 05-10, 2022 (Online)

Day 5
**Research Challenges in
Textile Antenna**

Resource Person
Dr. T. Shanmuganantham
Professor & Head,
Department of Electronics Engineering, Pondicherry,
Central University, Pondicherry.
'A' Grade

09 SEP 2022 | 7.00-9.30 P.M. P.M. IST

zoom

Dr. G. Selvakumar, Principal, AVIT
Coordinator : Dr. D. Vijendra Babu
Vice Principal & Prof. ECE, AVIT

Organised by
Department of Electronics and
Communication Engineering, AVIT

Dr.T.Shanmuganantham, delivered the session on “Research Challenges in Textile Antenna”.



Ms. R. Sandhiya, Assistant Professor, BME has given the vote of thanks.



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Day - 6 (10-09-2022)

Even started at 07.00 PM (IST) During the Inaugural online session Dr. D. Vijendra Babu, Vice Principal (Part Time Studies), Professor, ECE & coordinator of ATAL FDP welcomed the participants. Ms. B. Lakshmi Sree, Assistant Professor (Gr-II), BME, introduced the Resource Person, Dr. Shriram K V, Intel Software Innovator, Intel Champion Innovator, NVIDIA Jetson Specialist, NVIDIA Ambassador, NASSCOM Ambassador, ACM Distinguished Speaker Project Manager - L&T Technology Services, Bengaluru, India.

Dr. Shriram K V, delivered the session on “Research Challenges in Textile Antenna”.



Ms. R. Sandhiya, Assistant Professor, BME has given the vote of thanks.

OFFLINE SESSIONS

September 12-16, 2022

Five informative and interactive sessions along with Industrial visits to National Institutes, Research labs and Incubation centers were included. The Offline sessions of the FDP program began with an Inauguration. In the forum, Dr. D. Vijendra Babu, Vice Principal & Prof, ECE delivered the Welcome address. Dr.G.Selvakumar, Principal, AVIT, gave the Presidential address, followed by the Felicitation address by Dr.L.Prabhu, Vice Principal - Admin, AVIT. The participants registered and received their welcome kits.

Day 1 (12-09-2022)



The poster for the FDP program features the following details:

- Event:** ATAL Academy Sponsored Two Weeks (Hybrid) Faculty Development Program on **Wearable Technology in Healthcare**
- Dates:** September 12-16, 2022 (Offline)
- Session 1:** AI in Healthcare, presented by Dr. Y. Nancy Jane, Assistant Professor at MIT Campus, Department of Computer Technology, Anna Institute of Technology (AIT), Anna University, Chennai, India.
- Session 2:** Wearable Biomedical Sensors, presented by Dr. Pandiyarajan Veluswamy, Assistant Professor, Department of Information Technology, Design & Manufacturing (ITDM), Chennai, India.
- Session 3:** Industrial Visit to Smart and Innovative Laboratory for Energy Devices (SILEED) at Anna Institute of Information Technology Design & Manufacturing (AITDM), Chennai, India.
- Day 1:** 12 SEP 2022, 9.00-4.00 P.M. IST, Monday
- Organized by:** Department of Electronics and Communication Engineering, AVIT
- Coordinators:** Dr. G. Selvakumar, Principal, AVIT; Dr. D. Vijendra Babu, Vice Principal & Prof. ECE, AVIT

Day 1 Session 1: On 12.09.2022, the session on AI in Healthcare was handled by Dr. Y .Nancy Jane, Assistant professor MIT Campus. Session started with formal welcome address by Dr.L.K.Hema, Professor & HOD/ECE & BME and explained about the FDP to the participants. Ms. Sandhiya R, Assistant professor, BME introduced the Resource Person. Dr. Nancy Jane has starts a session basics of AI applications in healthcare industry. She briefed on Artificial intelligence in healthcare that involves NLP applications and can understand and classify clinical documentation. The session was explored on NLP systems that can analyze unstructured clinical notes on patients, giving incredible insight into understanding quality, improving methods, and better results for patients. Real time examples on robots that can perform menial and repetitive tasks like monitoring patients' blood pressure, heart rate, temperature, and respiratory rate was explained .Session covered various other topics like neural networks machine learning, classification, healthcare innovations, disease detection using machine learning.



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Fig 1(a&b): Demonstration of AI based modules

Day 1 Session 2 : The session was on wearable biomedical Sensors by Dr.Pandiarasan Velusamy Assistant professor ECE, IIDM sir has conveyed various biomedical sensors in recent market products like screen printing techniques, wearable thermo electric generator, Energy device its applications etc... The session officially ended with the vote of thanks by Dr.D.Vijendra Babu Sir vice principal Part time studies

Day 1: Industrial Visit Report - IIITDM, Kandigai

On 12th September 2022, we visited the Indian Institute of Information Technology, Design and manufacturing IIITDM campus in Kandigai. Indian Institute of Information Technology, Design and Manufacturing is a public institution established in 2007 by the Ministry of Human Resource Development, Government of India to pursue design and manufacturing oriented engineering education, research and to promote the competitive advantage of Indian products in global markets. It was declared as an Institute of National Importance (INI). A session on Wearable biomedical sensors was handled by Dr.Pandiyarasan Velusamy . He explained about various wearable technology projects like Smart textiles, fitness trackers, ECG analysis through wearable patches and more. We visited "SMART AND INNOVATION LABORATORY FOR ENERGY DEVICES (SMILE) lab and demonstration of projects were done. At smile Lab we learnt about all necessary precision made prosthesis and retainers as per clinician's choice.



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Fig 2 (a&b) : Explanatory session on Wearable ongoing projects

They specialize in CAD CAM, Invisalign, retainers, ceramic crown and BPS dentures. The visit was completely empowering with all new technology in wearable domain and the practical concepts was well demonstrated in detail.



Fig 3: Demonstration of Smart Textiles



Fig 4 : Viist to SMILE LAB

Day 2 - (13-09-2022)


Day 2 Session 1: On 13.09.2022, Session on National educational policy 2020 implementation by Dr. G. Janarthanan Associate professor & Head NITTR. Session started with formal welcome address by Dr. L. K. Hema HOD/BME and Resource person introduction by Ms. Sandhiya R Assistant professor AVIT. Dr. G. Janarthanan has started a session on higher education, Online and Digital Education, Ensuring Equitable Use of Technology, Technology Use and Integration, Effective Governance and Leadership for Higher Education Institutions.



Fig 5 (a&b) : Session on NEP 2020 implementation on Chapters 9-19

Day 2 Session 2
Industrial Visit

IIT MADRAS RESEARCH PARK, HEALTH TECHNOLOGY INCUBATION CENTRE

On 13th September 2022, we visited HEALTH TECHNOLOGY INNOVATION CENTRE (HTIC), IIT MADRAS. Healthcare Technology Innovation Centre (HTIC), a multi-disciplinary R&D centre, is a joint initiative of Indian Institute of Technology Madras (IITM) and Department of Biotechnology (DBT), Government of India that brings together technologists, engineers, doctors and healthcare professionals, industry and government to develop healthcare technologies for the country



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Fig 6(a&b) : Project demonstrated in HTIC unit

The vision of HTIC is to develop technologies that create impact and drive innovation in healthcare and be a leader known for technical excellence and collaborative spirit. The campus had various new technology products that were developed and also the products were into the market. A startup project for assisting the disabled patients was demonstrated, wherein the product was able to make system usage with the head band. An automatic Thyroid monitoring system was demonstrated.



Fig 7 : Demo session on Thyroid monitoring device



Fig 8 : Visit to IIT Madras Research Park

Day 3 (14-09-2022)



Day 3 Session 1: On 14.09.2022, the session was handled by Dr. A. Athif Shah on Intelligent Edge based Wearable sensors. The session was completely interactive. Many concepts like Cloud based Artificial Intelligence, IOT, Machine Learning and Deep learning were explored with real time examples. The differences between ML and DL were explained. The participants were given activities to perform and many upcoming technologies, various problem statements was discussed. Introduction to EDGE based Wearable technology and its nuances were explained in detail. Many new coding platforms like Adaptive TNN, K fold matrix, tensor flow libraries and visual TNN were explained with examples. Adaptive self-learning and reinforcement techniques were discussed.



Fig 9 (a&b) : Intelligent Edge based Wearable sensors session

Day 3 Session 2: On 14.09.2022, the afternoon session was handled by Dr.Thulasi Bai on telemedicine. The session was overwhelming, where many new concepts and new projects related to telemedicine like E-tool for learning disability were discussed. Real time projects that were developed were given a brief detailing and most of the projects were on societal benefits. Case studies, Survey report and project implementation on mentally retarded kids in rural schools, portable heart rate monitors, telemedicine technology in ARMY base and many other projects were explained. A



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new implementation of telemedicine towards Psychiatry was discussed called as Tele-Psychiatry. The participants had a very good interactive session and a brief discussion session also took place.



Fig 10: Telemedicine session by Dr. Thulasi Bai



Fig 11: Interaction with the participants



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Day 4 (15-09-2022)

Day 4 Session 1: On 15.09.2022, the session was handled by Dr.K.Subramaniam, on Wearable sensors in Healthcare. The session had a brief introduction about the technology involved, its applications and the current innovations in the field. Sensor technology was briefed. LoRa and LoraWAN differences were briefed. Communicative technologies available like WAN, LAN, PAN, LPWAN were also given a brief introduction. Collaborative learning on theory and practical session took place. The concepts were explained and it was a brain storming session, were the participants discussed on real time execution of the projects shown.



Fig 12 a: Interaction with the participants



Fig 12 b: Live demonstration of PMS

Day 4 Session 2: The afternoon session was a experiential session that involved demonstration and practical training on Adria Patient monitor and IOT based kit. The speaker demonstrated the kits and showed live demo on its usage, purpose, Sensors involved in the kit, accessories, working and the output display. Later the participants were involved in the practical session and had a hands on training on the kits. Each and every participant had an opportunity to test the vital parameters and also know their own vital values. It was an intellectual and practical session were the participants learned about various types of sensors used in the kits. At last the Smart campus project implementation in colleges were explained.



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Fig 13: Group photo of the session

Day 5 (16-09-2022)

Day 5 Session 1: On 16.09.2022, the session on “Time and stress management” was handled by Shri.Syed Mohamed. The session briefed on real time examples about the types of stress, importance of time, time management in daily life and the connection between time and stress management. The session also briefed that it is important to learn time management techniques to stay healthy, happy, and productive even when you’re experiencing a lot of stress. The ultimate goal is work-life balance, stress relief under pressure, and overall mental well-being. The session had the connection between time and stress management , learning how to manage your time properly to be more productive to avoid feeling stressed and how to manage time correctly because of which the tasks seem to be easier and stress-free in the long run. The session was very lively and the participants were very much involved.



Fig 14 a: Stress management session interaction with participants
Fig 14 b: Memento of appreciation to the Speaker

Day 5 - Assessment Session

The participants were given online assessment session (combination of MCQ/short answers and reasoning based questions) and Offline assessment session (combination of MCQ/short answers and reasoning based questions). Later the participants were grouped into teams and were assigned research topics on emerging areas of wearable technology like Smart Textile, Home based telemedicine system, Identification of wearable devices with bluetooth and Prediction of harvestable energy. They presented the Journal article summary and also the outcome of the Industrial visit. Later individual reflection journals of the participants were presented, followed by the feedback session.



Fig 15: Journal article summary presentation by participants

Day 5 - Valedictory Session

The Faculty Development Program was concluded with a Valedictory Session. At the event, the gathering was welcomed by Dr.L.K.Hema, Head of ECE/BME department. A brief note on the session conducted was given by Dr.D.Vijendra Babu, Vice-Principal & Prof ECE. The Principal of AVIT, Dr.G.Selvakumar gave the presidential address followed by the feedback from the participants. Participants who were very much involved and interactive on the session were honored with a book. And the session ended with an official vote of Thanks and National Anthem.



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Fig 16: Appreciation gift to Participants



Fig 17: A group photo session with the ATAL participants
