

Department of Electronics & Communication Engineering

Dr. Abhay S. Gandhi
Professor
Department of Electronics Engineering
VNIT NAGPUR 440010



Areas of Specialization

- ▶ Analog and Digital Communication
- ▶ RF Circuit Design
- ▶ Computer networks
- ▶ Wireless Mobile Communication

Teaching & Learning

- ▶ Consistently positive feedback from the students.
- ▶ Some of the innovations
 - Incorporation of audio-visual approach in lab equipment demonstration.
 - Development of 5D theme for courses.
 - Core, R&D, T&M, Socio economic, IT
- ▶ Innovative assignments and demos like
 - “Selling” Software assignments to teacher acting as a customer.
 - Demonstration of computer network concepts through games “Routers and packets”, “ Planets’ group discussion”
 - Poster preparation and exhibition.
 - Institute LAN design contest.
- ▶ Consistently positive feedback from the students.
- ▶ Some of the innovations
 - Incorporation of audio-visual approach in lab equipment demonstration.
 - Development of 5D theme for courses.
 - Core, R&D, T&M, Socio economic, IT
- ▶ Organized 2 day workshop on RF IC design and testing (Jan 12-13, 2008) under SMDP-II.

- ▶ Conducted one session on RF IC test and measurement techniques in the same workshop.
- ▶ Organized 14 days part-time course on VoIP technology under TEQIP. Conducted many sessions in the course.
- ▶ The course was in collaboration with industry. Persistent Systems Pvt. Ltd., Info-spectrum (I) Ltd. and Siemens Ltd.
- ▶ Overwhelming response. About 100 registrants from VNIT and other institutes.

Research

Highlights of the doctoral research

- Developed generalized successive approximation algorithms for analog to multi-valued digital conversion.
- Twelve algorithms for uniform quantization and **four** algorithms for non-uniform quantization are developed.
- Two circuits based on the algorithms are designed, built and tested.
- Analysis of all the algorithms from the information theory point of view is presented. Generalized architectures of the A/D converters are identified.
- Mathematical theory of error analysis is developed and its applications to digital correction are suggested.

Publications based on PhD work (National Journal)

- A. S. Gandhi, A. M. Dighe, "Algorithms for Analog to Multi-Valued Digital Conversion", IETE Journal of Research, Vol. 49, No. 1, Jan-Feb 2003, pp.13-25
- A. S. Gandhi, A. M. Dighe, "Performance and Error Analysis of the Algorithms for Analog to Multi-Valued Digital Conversion", IETE Journal of Research, Vol. 52, No. 1, Jan-Feb 2006, pp.53-64.

Publications based on PhD work (International Journal)

- S. Gandhi, A. M. Dighe, "An Algorithm for Fast Quaternary ADCs", Proceedings of International Symposium on Signals Systems and Electronics, San Francisco, October 25-27 1995 (ISSSE'95), pp. 223-226.
- A. M. Dighe, A. S. Gandhi, "A Generalised Successive Approximation Algorithm for A/D conversion", Proceedings of 7th International Symposium on IC Technology, Systems and Applications, 10-12 September 1997, Singapore (ISIC-97), pp.109-112.

PhD completed

- ▶ Rohini Asamwar, "Corelation between human vision and discrete wavelet transform"
- ▶ Mahendra Gaikwad, "Network-on-chip architecture using Perfect Difference Network Topology" (Co-guide; Prof. R. M. Patrikar)

- ▶ Abhijit Bapat, "Some novel topologies for analog to digital converters"

PhD ongoing

- ▶ Anagha Rathkanthiwar, "Synchronization issues in OFDM systems"
- ▶ Mridula Korde, "Synchronization issues in WCDMA systems"
- ▶ Gauri Halde, "Synchronization issues in Chaotic communication systems"

M.Tech. (By Research) students

- ▶ Sangita Rajankar, "Web service based network management technique for IP networks" (Completed)
- ▶ Vivek Jain, "Synchronization issues in core networks" (Ongoing)
- ▶ Gaurav Mhaisalkar, "Synchronization issues in enterprise networks" (Ongoing)

Publications till date

- ▶ International Journal: 7
- ▶ National Journal: 2
- ▶ International Conference: 17
- ▶ National Conference: 2
- ▶ **Total: 28**

Publications (int. jrnl. only)

1. Rohini S.Asamwar, Kishor Bhurchandi, Abhay Gandhi, "Interpolation of Images using Discrete Wavelet Transform to Simulate Image Resizing as in Human Vision" Selection of paper for International Journal of Automation and Computing, Vol. 7 No. 1 February 2010 pp. 9 - 16 (IJAC-V7N1-SS-10)
2. Rohini S. Asamwar, K.M. Bhurchandi, A. S. Gandhi, "Successive Image Interpolation using Lifting Scheme Approach", International Journal of Computer Science, Science Publications, Vol. 6 No. 9, June 2010 p.p. 969-978
3. A. V. Bapat, Dr. A. S. Gandhi, Dr. A. M. Dighe, "CMOS Implementation of Serial Flash Analog to Digital Converter", International Journal of Computer Applications, USA
4. Mahendra Gaikwad, Rajendra Patrikar and Abhay Gandhi, "Energy Performance of Rectangular PDN Topology for Network on Chip Architecture" Microelectronics Journal, Elsevier Publication, ISSN 0026-2692.
5. Mahendra Gaikwad, Rajendra Patrikar and Abhay Gandhi, "Latency Performance of Chordal Ring Perfect Difference Network Topology for Network on Chip Architecture using NS-2", International Journal of Computer Applications (ISSN 0975-8887), Volume 34, No. 10, November 2011, pp. 60-64.
6. Mridula S.Korde, Abhay S. Gandhi, "Effect of Synchronization on Capacity Enhancement in WCDMA", Journal of Information and Communication Technologies, Volume 3, Issue 3, March 2013, pp 7-12, ISSN : 2047-3168

7. Mridula S.Korde, Abhay S. Gandhi, “An Improved Method for Secondary Code Synchronization in WCDMA” International Journal of Scientific Research Engineering & Technology (IJSRET), Volume 1 Issue3 , pp 001-006 June 2012,ISSN 2278 - 0882

Best paper and thesis award

- ▶ Anagha P. Rathkanthiwar, A. S. Gandhi, “A New Timing Metric for Timing Error Estimation in OFDM”, GWS-13, an IEEE conference Atlantic city , New Jersey, USA organized by IEEE Denmark section, IEEE North Jersey section & Aalborg University. 24-27 June, 2013

Sponsored Research Projects

- ▶ Principal investigator of MHRD sponsored research project on “Protocol Validation System for Network on chip”. Amount Rs. 10.00 lakhs. Project is completed
- ▶ Co-investigator: Prof. R. M. Patrikar

Consultancy

- ▶ 2002: Developed Menu Display system for M/s Concretio India Pvt. Ltd. Nagpur. Revenue Generated: Rs. 40,000=00
- ▶ 2005: Corporate training of PSPL employees.
- ▶ 2006: RF circuits related consultancy to M/s RF Arrays Systems Pvt. Ltd.
- ▶ 2013: Wireless Surveillance System for Gondia Police (Revenue: Rs. 2.25 lakh)

Institutional development

- ▶ Development of communication network laboratory through Thrust Area Program (2000) Grant of Rs. 6.0 lakhs.
- ▶ Up-gradation of Communication Electronics Lab through Plan Grant and TEQIP-I.
- ▶ Contribution to Network Protocol Analysers procurement and RF Characterization Lab through TEQIP-I
- ▶ Installation and commissioning of Siemens HICOM 350E EPABX with about 200 lines (April 2000)
- ▶ Expansion to 450 lines, campus wide cabling, departmental wiring.(2004-05)
- ▶ ISDN-PRI line installed for direct inward dialing.(2004-05)
- ▶ Campus wide optical fiber laying. (2004-05)
- ▶ Co-chairman, Admissions Committee for BTech admissions through AIEEE, under Central Counselling Board (2007 and 2008)
- ▶ Member of technical committee for CCB 2010
- ▶ Expert member for NBA committees
- ▶ Chairman, Educational Technology and Library Services (2010 –12)
- ▶ Coordinator for research methodology course (2012-13)

Administrative Responsibilities

- ▶ Convener for webcasting of 13th convocation held in Sept. 2013.

- ▶ Member of academic discipline committee
- ▶ Convener for committee to enhance PA system facilities in class rooms

Future plans

- ▶ Strengthening M.Tech.(Communication System Engineering) course.
- ▶ Strengthening research in synchronization and tracking.
- ▶ Completion of book on Analog and Digital Communication
- ▶ Filing 2 patents (automobile engg.)