Prof. (Dr.) Rajiv Kumar
Department of Electronics and Communication Engineering
Jaypee University of Information Technology, Waknaghat, Himachal Pradesh, India

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RESEARCH INTERESTS

Network Resilience and Reliability, Intelligent Transport System (ITS), Quality of Service (QoS), Service Level Agreement (SLA), Cyber-Physical Systems, Networked Control Systems, Internet of Things (IoT).

EDUCATION

1. **Ph.D.(2009),** National Institute of Technology, Kurukshetra

   Area: Reliability and Resilience of Computer Communication Network

   Thesis Title: A Conceptual Framework for the Continuity of Mission-Critical Network Services.

2. **M.Tech.(2001),** National Institute of Technology, Kurukshetra,

   Area: Control Systems (dissertation work on network reliability)

   Dissertation Title: Performance Indexes of Flow Networks

3. **B.Tech.(1994),** G.B. Pant University of Agriculture & Technology, Pant Nagar.

TEACHING EXPERIENCE

Total Teaching Experience: 28+ Years

1. Professor, Department of Electronics & Communication Engineering, Jaypee University of Information Technology, Solan, (H.P), April 2022 – Present
2. Professor and Head, Department of Electronics & Communication Engineering, Jaypee University of Information Technology, Solan, (H.P), April 2022 – January 2026
3. Associate Professor and Head, Department of Electronics & Communication Engineering, Jaypee University of Information Technology, Solan, (H.P), July 2020 – April 2022
4. Associate Professor, Department of Electronics & Communication Engineering, Jaypee University of Information Technology, Solan, (H.P), Oct. 2016 – June 2020.
5. Assistant Professor (senior grade), Department of Electronics & Communication Engineering, Jaypee University of InformationTechnology, Solan, (H.P), Nov. 2009 –Sept. 2016.
6. Senior Lecturer, Department of Electronics & Communication Engineering, Jaypee University of InformationTechnology, Solan,), Jan. 2005 – Oct. 2009.
7. Assistant Professor, Department of Electronics & Communication Engineering, Galgotias College of Engineering and Technology, Gr. Noida, Nov. 2003-Dec. 2004.

8. Assistant Professor, M.M. Engineering College, Mullana, Ambala (Presently M.M. University, Sept 2003-Nov. 2003).
9. Lecturer, M.M. Engineering College, Mullana, Ambala (Presently M.M. University), Aug. 1998-Aug 2003.
10. Lecturer (Ad-hoc), Regional Engineering College, Kurukshetra (Presently NIT Kurukshetra), Feb. 98 – June 98.

DATE OF BIRTH July 01, 1973

FUNDED PROJECTS, AWARDS AND GRANTS

- **Project Title:** *Reliability Modeling and Optimized Planning of Risk-Based Resilient Networks*
  Funding Agency: Department of Science and Technology (DST), Government of India, New Delhi (in collaboration with the Ministry of Science, Poland)
  Grant Amount: ₹18.08 Lakhs
  Duration: 2016–2019
- **Initiated and facilitated Memoranda of Understanding (MoUs)** between Jaypee University of Information Technology (JUIT), Waknaghat, Himachal Pradesh and the following organizations:
  ABVGIET, Pragati Nagar (2022); Mitsubishi Electric India Private Limited – Industrial Automation (2022); BSNL, Solan (2023); IIT Mandi (2023); Biomedical Instruments and Devices Hub: A Centre for Innovation, Design, and Clinical Validation, PGIMER, Chandigarh (2024); University of Castilla-La Mancha, Spain (2025); and Garuda Aerospace Pvt. Ltd., Chennai (2025).
- **Virtual Lab Nodal Coordinator (University Level)** since 2016.
  Project sponsored by the Ministry of Human Resource Development (MHRD), Government of India, under the **National Mission on Education through Information and Communication Technology (NMEICT)**.
- **Technology Incubation and Technology Development Cell Project Grant** awarded by the Government of Himachal Pradesh under the **Himachal Chief Minister Startup Scheme**.
  Duration: 2015–2017
- **Invited Dr. Veena B. Mendiratta**, Bell Labs, Naperville, Illinois, USA, to Jaypee University of Information Technology, Solan, India, as a **Fulbright Expert** during **2012–2013**.
- **Project Grant** awarded in **June 2012** by the **Indian Institute of Technology Bombay** under the **National Mission on Education through Information and Communication Technology (NMEICT)**, MHRD.

Publication(s):

Journal Publications

[1] M. Kapoor, B. K. Pathak, and R. Kumar, "Enhanced NSGA-II algorithm for solving real-world multi-objective optimization problems," *Int. J. Intelligent Systems and Applications*, vol. 17, no. 6, pp. 105–117, 2025, doi: 10.5815/ijisa.2025.06.08.

https://www.mecs-press.org/ijisa/ijisa-v17-n6/v17n6-8.html

[2] M. Kapoor, B. K. Pathak, and R. Kumar, "Modeling construction project uncertainty using fuzzy inference and nature-inspired metaheuristic knowledge-based algorithms," *Applications and Applied Mathematics: An Int. J.*, vol. 20, no. 4, pp. 1–22, 2025.

https://digitalcommons.pvamu.edu/aam/vol20/iss4/3/

[3] M. Kapoor, B. K. Pathak, and R. Kumar, “Lagrange’s interpolation embedded multi-objective genetic algorithm to solve non-linear multi-objective optimization problems,” *Informatica*, vol. 48, no. 4, pp. 699–706, 2024, doi: 10.31449/inf.v48i4.8494.

https://www.informatica.si/index.php/informatica/article/view/4894

[4] S. Sharma, B. K. Pathak, and R. Kumar, “Multi-objective service composition optimization problem in IoT for agriculture 4.0,” *Computing*, 2024, doi: 10.1007/s00607-024-01346-2. [IF 3.2]

https://link.springer.com/article/10.1007/s00607-024-01346-2

[5] S. Sharma, B. K. Pathak, and R. Kumar, “A non-linear multi-objective service composition optimization for smart agriculture with Lagrange’s interpolation-based evolutionary algorithm,” *Electrica*, vol. 1, no. 1, 2024, doi: 10.5152/electrica.2024.24076.

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https://www.mecs-press.org/ijem/ijem-v14-n4/v14n4-3.html

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https://link.springer.com/article/10.1007/s43069-024-00319-7

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https://link.springer.com/article/10.1007/s10665-023-10304-4

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Conference Publications:

[50] M. Patial, R. Kumar, and M. J. Nigam, "Unmanned Aerial Vehicle (UAV) Types, Sensors, Control & Applications: A Review," in *Proc. Int. Conf. Signal Processing and Communication (ICSC)*, 10th, JIIT, Noida, 20–22 Feb. 2025, pp. 932830–940840. [SCOPUS]

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Books

[79] R. Kumar, H. Sohal, and S. Pandit, *Signal Processing, Computing and Control*, Proc. IEEE Int. Conf., Conf. Rec. no. 66872. Piscataway, NJ, USA: IEEE, 2025, ISBN: 979-8-3315-3892-7.

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Patent

[1] M. Modi, Vridhi, and R. Kumar, "A system and method for remote door lock automation with advanced security features," *Indian Patent Application* IN 202411073049, filed Oct. 11, 2024.

M.Tech. and Ph.D. Thesis

***PhD* Supervisor**:
(Sole Guidance)
1) Ashutosh Sharma(Enrollment No.166001), titled "Risk-Aware Communication Network Architecture and Planning" (*August, 2019*)

(Joint Guidance)
1) Dinesh Sharma (Enrollment No. 176009), titled, "Proactive Connection Recovery Strategy for a Survivable Elastic Optical networks" (*April, 2021*)
2) Ratish Kumar (Enrollment No. 186001), titled, "Productive Controller Based Delay Compensation Approaches in Networked Control System" (*November, 2021*)
3) Shalni Sharma (Enrollment No. 216005), titled, "Quality of Service-Based Service Composition Optimization in Smart Agriculture" (*December, 2024*)

Current Doctoral Students:
1) Munish Patial (Enrollment No. 196004)
2) Vandana Devi (Enrollment No. 206001)
3) Aakanksha Sharma (Enrollment No. 206002)

***M.Tech.* Supervisor:**
(Sole Guidance)
1) Ashutosh Sharma (Enrollment No.142006), titled "A Tuning based Multiconstrained Link weight Assignment for Optimized Data Transmission", 2016.
2) Poonam Koundal (Enrollment No. 142011), titled "Analysis of round trip delay and path, and routing protocol in wireless sensor network" , 2016.
3) Ashit Chander (Enrollment No.152008), titled, "Adaptation to Non-Critical Failure and Performance Analysis of Optical WDM Networks", 2017.

(Joint Guidance)
1) Swati Bhalaik (Enrollment No. 162006), titled, "Performance Analysis of Optical WDM Networks Using MATPLAN WDM", 2018
2) Aman Sharma (Enrollment No. 16200), titled, "Some Performance Aspects of Wavelength Division Multiplexing" , 2018
3) Sanjay K. Singh (212055), titled, "Orion – Interactive optical Network, May 2023.

EXTERNAL THESIS EVALUATION

- 2024 – "*Perovskite Solar Cell Design Considerations to Enhance Its Efficacy Parameters"*, Aditi Thakur, Department of Electronics & Telecommunication Engineering, Eternal University, PhD Thesis. **External Evaluator:** Dr. Rajiv Kumar.
- 2020 – "*Generalized Fuzzy Information Measure in Soft Computing and its Applications in Decision Making"*, Namita Saini, Shoolni University, PhD Thesis. **External Evaluator:** Dr. Rajiv Kumar.
- Apr. 2018 – "*Improved Copy-Move Forensics Techniques for Digital Video"*, Gurvinder Singh, Department of Electronics & Communication Engineering, Thapar Institute of Engineering and Technology, PhD Thesis. **External Evaluator:** Dr. Rajiv Kumar.
- Apr. 2018 – "*New Identities of Fractional S-Transform with its Applications"*, Rajieev Ranjan, Department of Electronics & Communication Engineering, Thapar Institute of Engineering and Technology, PhD Thesis. **External Evaluator:** Dr. Rajiv Kumar.
- Dec. 2018 – "*Developing Electroencephalogram Signal Processing Techniques for Brain-Computer Interface"*, Komal Jindal, Department of Electronics & Communication Engineering, Thapar Institute of Engineering and Technology, PhD Thesis. **External Evaluator:** Dr. Rajiv Kumar.

Synergistic activities:
Dr. Rajiv Kumar currently focused on two fields that complement each other excellently: IoT and Networked Control Systems. The research projects in the above two fields are a result of my interest in Networks and Systems. He specializes in mission-critical activities, modeling disaster recovery and intelligent transportation.

University Service

International Conferences & Symposiums

- 7th Int. Conf. on Signal Processing, Computing and Control (ISPCC 2025), 06–08 Mar., 2025.
- 3rd Int. Conf. on Emergent Converging Technologies and Biomedical Systems (ETBS 2023), 15–17 May, 2023.
- 2nd Int. Conf. on Emergent Converging Technologies and Biomedical Systems (ETBS 2022), 23–24 Sep., 2022.
- 6th Int. Conf. on Signal Processing, Computing and Control (ISPCC 2021), 07–09 Oct., 2021.
- 5th Int. Conf. on Signal Processing, Computing and Control (ISPCC 2019), 10–12 Oct., 2019.
- 4th IEEE Int. Conf. on Signal Processing, Computing and Control (ISPCC 2017), 21–23 Sep., 2017.
- 2015 Int. Conf. on Signal Processing, Computing and Control (ISPCC 2015), 24–26 Sep., 2015.
- 2013 IEEE Int. Conf. on Signal Processing, Computing and Control (ISPCC 2013), 26–28 Sep., 2013.
- 2012 IEEE Int. Conf. on Signal Processing, Computing and Control (ISPCC 2012), 15–17 Mar., 2012.

Faculty Development Programs (FDPs)

- One-week FDP on *VLSI Design: Bridging Theory and Practice*, 09–13 Jun., 2025.
- *MATLAB for Image Analysis and Pattern Recognition: From Fundamentals to Advanced Applications*, 02–06 Sep., 2024.
- Online FDP on *Computational Genomics and Proteomics* (E&ICT Academy, IIITDM Jabalpur), 28 Aug.–10 Sep., 2022.
- FDP on *NEP 2020 Implementation in Higher Education Institutes*, 09–13 May, 2022.
- *Recent Advances in Computational Intelligence for Signal Processing (RACISP-2020)*, 10–15 Aug., 2020.
- FDP on *Recent Trends on Machine Learning for Signal Processing (RTMLS)*, 20–25 May, 2019.
- 10-day FDP on *Emerging Trends in VLSI and Communication (ETVC)*, 09–18 Jun., 2018.
- FDP on *Signal Processing and its Applications*, 13–18 Jan., 2016.

Workshops and Trainings

- Workshop on *Connecting Students to the Semiconductor Industry*, 01 May, 2025.
- One-week hands-on workshop on *VLSI Design*, 04–09 Mar., 2024.
- Two-day workshop on *VLSI using Cadence Design Tools*, 05–06 Jun., 2023.
- Workshop on *Image Processing with Deep Learning*, 22–26 Mar., 2022.
- Workshop on *Industrial Revolution 4.0*, 03 Jul.–04 Sep., 2021.
- Workshop on *Emerging Areas of Research in Image Processing (ERIP-2020)*, 06–12 Jan., 2020.
- Three-day workshops on *Biomedical Signal Processing in Computer Vision* and *Computational Tools and Techniques for Biomedical Signal Processing*, 10–12 Oct., 2019.
- Short-term courses and workshops on VLSI, MATLAB, IoT, and Signal Processing (2014–2019). *(Detailed list available upon request.)*

Expert Lectures

- "MATLAB and its Industrial Applications," Mathworks Expert, 23 Aug., 2022.
- "Research and Innovation for Sustainable and Human-Centered Solutions," 09 Oct., 2021.
- "Artificial Intelligence for Industry," 09 Oct., 2021.
- "AI-Based Motion Control," 08 Oct., 2021.
- "Aspects of Time and Space in Wireless Connectivity beyond 5G," 08 Oct., 2021.
- "Intelligent Techniques for Autonomous Landing on Mars," 07 Oct., 2021.
- "Machine Learning in Communication Networks—Applying Neural Networks to Traffic Prediction and Control," 07 Oct., 2021.
- Additional lectures on *Wind Energy Systems, 5G & IoT Antenna Design, HDL-based System Design, Compressed Sensing, Biomedical Signal Processing*, 2014–2019.

Webinars

- *Drones and Emerging Technologies in Drones*, by Shivansh Sethi, CEO AIOTIZE, 18 Mar., 2023.
- *Robotics & Automation: Industry 4.0*, by Mukund Mitra, 21 Dec., 2022.
- Expert lectures repeated online on topics such as AI in Industry, Motion Control, Wireless Connectivity beyond 5G, and Autonomous Landing Techniques, 07–09 Oct., 2021.

Courses Taught:

1. Basic Electronics (25B11EC111)
2. Basic Electrical Engineering (24B11EC211)
3. Intelligent Control Systems (18B1WEC632)
4. Real-time Operating System (19B1WEC731)

5. Automatic Control Systems (18B11EC311)
6. Internet and Applications (20P11EC111)
7. Fault-Tolerant Comm. Networks (14M1WEC331)
8. Electrical Machines & Inst Lab (10B19EC791)
9. Signals and Systems (110B11EC301)
10. Real-Time Embedded Systems(12M1WEC232)
11. Non-Linear & Digital Control Systems (14B1WEC734)
12. Electrical Machine & Instruments (10B11EC311)
13. Power Electronics Lab (11B1WEC671)
14. Fault-Tolerant Systems (11M1WEC433)
15. Design of Dependable Systems (18B1WEC732)
16. Advanced Control Systems(16M1WEC231)
17. Networked Embedded Control Systems (18B1WEC834)
18. Digital Electronics Lab (10B17EC407)

Syllabi Developed:

1. IoT and Applications
2. Automatic Control Systems
3. Introduction to IoT
4. Networked Control Systems
5. Signals and Systems

Instructional Material Provided to Students:

1. Introduced problem and project based leaning
2. Outcome based learning
3. Syllabus modified for courses Application oriented topics were introduced.

Contribution in Extra & Co- Curricular activities of Students:

1. Student Club – Technovators and its Mentor
2. Motivated students in participating the following workshops/seminar
3. CV Making workshop Under TIED Cell, May 4th, 2017
4. One Day Seminar on Startups and Innovative Projects, May 16, 2017.
5. Involved in workshops Under TIED Cell
6. Conducting Virtual Lab workshops.
7. Coordinator for Conduction Committee for Ph.D. Students
8. Involved in Mentoring of students
9. Involved in the Virtual Lab awareness program for the JUIT students.

Technovatorz Club – Events Organized

Events in 2025–26

- *Raspberry Pi Workshop – Learn, Build, Lead!* – 23 Aug., 2025
- *Anti-Ragging Day/Week Observance* – ECE Department, JUIT, 12 Aug., 2025

Events in 2024–25

- *Alumni Interaction cum Motivational Talk* – 13 Aug., 2024

Events in 2022–23

- *Interaction with Alumni: Mr. Shailu Srivastava & Mr. Sparsh Mahajan* – 12 Sep., 2022
- *Interaction with Mr. Abhishek Sharma, HAS* – 03 Sep., 2022
- *Lecture on MATLAB and its Industrial Applications* (Expert from Mathworks) – 23 Aug., 2022

Events in 2021–22

- *Workshop on Image Processing with Deep Learning* – 22–26 Mar., 2022
- *Workshop on Industrial Revolution 4.0* – 03 Jul.–04 Sep., 2021
- *VICHARANA 3.0: Sustainable Development* – 09 Oct., 2021
- *Webinar on Acing the Interview* by Mr. Akhilesh Kumar, Software Engineer, QUINBAY – 18 Jul., 2021

Events in 2020–21

- *Lecture on Cloud Computing* – Date unspecified
- *Vicharana 2.0: Toy Innovation Challenge* – 16 Jan., 2021
- *Vicharana-2020* – 17 Oct., 2020

Contribution/ Participation in Departmental Activities & Development:

1. Ph.D. Coordinator for research scholars.
2. Worked as project in-charge for UG students.
3. Participated in Lab. Development of two courses: (i) Signals and Systems, (ii) Electrical Machines and Instruments, (ii) Control Systems
4. As a member of Organizing committee in ISPCC'17
5. DPMC member-1for five Ph.D. scholars.
6. Worked as project in-charge for UG students (Upto Dec 2017).
7. Participated in Lab. Development of two courses: (i) Signals and Systems, (ii) Electrical Machines and Instruments, (iii) Control Systems 2019
8. As a member of Organizing committee in ISPCC 2019
9. Organizing Committee of FDP, June 2018

Contribution/ Participation in Institute Activities & Development:

1. Coordinator of JUIT Virtual Lab Nodal Center
2. Founder Member of Technology and Incubation Development Cell
3. Participated in NAAC related activities
4. Organizer of Virtual Lab Workshops
5. Founder Member of Technology and Incubation Development Cell
6. Participated in NBA related activities
7. Participated in NAAC related activities

Special/ Extension/ Expert/Invited Lectures Delivered:

1. Special talk on Risk-aware Resilient Network Design at AGH University, Krakow, Poland during the Visit on DST Sponsored, India-Poland Research Grant, Sept 24-Oct, 2016.
2. Expert talk on TIED Cell inaugural Day, May 16,2017.
3. Expert Talk during Virtual Labs. During Oct. 2016 to May 2017.
4. Special talk on Risk-aware Resilient Network Design at AGH University, Krakow, Poland during the Visit on DST Sponsored, India-Poland Research Grant, Dec. 20-25, 2018.
5. Talks during the Virtual Lab Workshops
6. Invited as Keynote Speaker at IDC National Conference, Climate Change and Agriculture: Impacts, Resilience & Adaptations for Sustainable Food Security, 20-21 December, 2019.

Technical Reports:

1. DST Project Dec,16.

2. DST Project June 17.
3. On Workshop on virtual Labs (Hands-on Laboratory Experiments) by IIT Roorkee, Oct. 15 – 16, 2016
4. On Virtual Lab workshop by the team of experts from Indian Institute of Technology, Delhi, Sept. 24-25, 2016
5. On State Level Virtual Lab Workshop by IIT Delhi, Feb. 28, 2017
6. On Virtual Lab workshop for Lab. Staff by the team of experts from Indian Institute of Technology, Roorkee, April 28-29, 2017.
7. On Workshop on College Cloud Edition for Virtual Labs by IIIT Hyderabad, May 9-12, 2017
8. On One Day Seminar on Startups and Innovative Projects, May 16, 2017, report submitted to Dept. of Industry, H.P. Govt
9. DST Project Report in April 18.
10. Report Documentation of Virtual Labs (Hands-on Laboratory Experiments), 2019.
11. On Virtual Lab workshop by the team of experts from Indian Institute of Technology, Delhi., 2019
12. Report submitted to Dept. of Industry, H.P. Govt as a member of TIEDC, 2017.
13. Report on Ph.D. coordination, 2019.

Any Other Information:

1. Awarded Project worth for 60 Lakhs (rupees) by Dept. of Industry, H.P. Govt under **Chief Minister's Startup/ Innovation Projects/ New Industries Scheme.** Rs 20 Lakhs has already been received as first installment on 27/06/2017.
2. Guest Editorial-ship of SCOPUS Indexed Journal – Recent Patents on Computer Science
3. R&D Member in the Steering Committee of TIEDC, JUIT.
4. Invited as visiting research at AGH University of Science and Technology, Krakow, Poland in Dec. 2018.
5. Ph.D. Examiner for two Scholars at Thapar University, Patiala, June, 2018

Membership of Professional Societies

1. Member, The Institute of Electrical and Electronics Engineers, IEEE
2. Corporate Member, The Institution of Electronics and Telecommunication Engineers, IETE
3. Life Member, Indian Society of Technical Education, ISTE
4. Life Member, System Society of India, SSI
5. Life Member, Forum of Interdisciplinary Mathematics

MAIN INITIATIVES AS A HEAD OF DEPARTMENT (JULY 2020 – JAN 2026)

Following main initiatives have been taken in the ECE Dept. after July 1, 2020:

1) Initiative for Curriculum Revision
2) Lab up gradations – Drobotics Lab and Mitsubishi FA Lab establishment
3) Dept-Industry linkage – worked for minimizing the gap
4) Connected and actively engaged the ECE Alumni with the department
5) Started Campus Ready Workforce Development – Internship campaign for UG/P students in department
6) Lead for MoU with industries and leading organizations
7) Activities with Robert Bosch Centre for Cyber Physical Systems (RBCCPS) in IISc Bangalore, 2022.
8) As a General Chair, Organized 7th International Conference on Computing, Signal Processing and Control, March 08 – 11, 2025.
9) As a General Chair, Organized 6th International Conference on Computing, Signal Processing and Control, Oct 07 – 08, 2021.

10) Started planning of 7th International Conference on Computing, Signal Processing and Control in year 2023.
11) Started new B.Tech. – Electronics and Computer Engineering, 2021.
12) Started new M.Tech. – Electronics and Communication Engineering with specialization IoT, 2021.
13) Revised course structure of M.Tech. in Electronics and Communication Engineering, 2021.
14) Started minor program of ECE for other branches, 2020.
15) Design and developed many courses as professional electives and open electives.
16) Reframed the ECE curriculum.
17) Started work on improving visibility of department
18) Revamped the Mentoring System in the ECE Department
19) Took initiative for MoU with H.P. Govt. Engineering College, Pragatinagar, Near Shimla, 2020.
20) Restructuring the laboratories
21) Started hardware lab services during pandemic period
22) Started work on the establishment of Robotic Lab
23) Started work on the establishment of IoT Lab
24) Involvement of JUIT-ECE Alumni for solving department problems
25) Revived the activities under Technovatorz Club
26) Scheduling of BoS
27) Initiated Skills Development Program
28) Steps towards the Institute Industry Program
29) Alumni database establish in the Dept.
30) One Day Workshop on Tinkercad for Hardware Design
31) Three Days Workshop for Labstaff on Network Analyzer
32) Training for faculty for Anydesk, Virtual Lab and Gsuit
33) Started Webinar Series by Alumni
34) Webinar on Strategy of Teaching Methodology by Prof. G.S. Hura, 2020
35) Took Initiatives for Admission in Minor Program in ECE
36) Initiative in Dept. for GATE preparation
37) Provided the Mentoring facility for B.Tech. students
38) Initiatives to Improve the B. Tech. Project
39) Introduced volunteer project facility in the dept for all the years students
40) Proposed a framework for placement and career

List of References (On demand)

Prof. Dr. Rajiv Kumar

05 Feb, 2026