Administrative and Academic Audit (AAA) Report

Name of Department	**:**	Electronics and Communication Engineering
Program Name	**:**	B. Tech. in Electronics and Communication Engineering
Academic Year	**:**	2019-20, 2020-21, 2021-22, 2022-23
Date of Assessment	**:**	**January 2023**

Department Commitment: The ECE department is committed to ensure quality assurance in both administrative and academic functionalities.This internal Audit report presents the salient features of both for guaranteeing administrative outlook and efficiency.

- **Vision & Mission-**
  https://drive.google.com/file/d/1HrmM082TAFHX5uviM9MdqcwBQfIHPx3Q/view?usp=share_link
- **Programme Educational Objective (PEO)-**
  https://drive.google.com/file/d/1LnYk9Yr5ehO71B2XB9hAo0b6JkgTByyf/view?usp=share_link
- **Programme Outcome (PO)-**
  https://drive.google.com/file/d/1n5iI8sxkgQbtjTQIUQLkdDeeQF9LIfQA/view?usp=share_link
- **Programme Specific Outcome (PSO)-** https://drive.google.com/file/d/1uopvkPN7D6-SAKPdH9pUUW4x3iEfLoUP/view?usp=share_link

A. Department Administrative Audit

A.1 Administrative Structure: it consists of the following essential arms (Please refer Annexure-I)

1. Head of the Department (HoD): Dr. Nikhil Sharma
2. Board of Studies (BoS)
3. Department Leadership Advisory Team (DLAT)
4. Department Leadership Team (DLT)
5. Department Quality Assurance in Research Committee (DQARC)
6. Class Committees
7. Course Coordinators

A.2 Functionalities

1. Annual departmental budget planning, secured grant, monitoring and fund utilization. (Please refer Annexure-II - A)
2. Curriculum development and execution of programs. (Refer Section B)
3. Enablement of research, research collaboration, entrepreneurship, and outreach (Refer Section B)

A.2.1 Department Specific Budget Allocation, Utilization

Total Budget at program level: For CFY, CFYm1, CFYm2 & CFYm3

CFY: Current Financial Year – CFYm1 (Current Financial Year minus 1) CFYm2 (Current Financial Year minus 2) CFYm3 (Current Financial Year minus 3) **(Values in INR)**

		CFY (22-23)	CFYm1 (21-22)	CFYm2 (20-21)	CFYm3 (19 - 20)
Allocated Budget	Non-recurring	53,50,000	61,10,000	80,99,000	67,00,000
	Recurring	14,25,000	13,00,000	14,25,000	12,00,000
Actual Expenses	Non-recurring	NA	37,62,315	40,81,641	44,60,004
	Recurring	NA	3,84,510	2,89,109	3,64,083

(Please refer Annexure-II - B(Table-I) for more details**)**

A- Exceed Expectation
B- Satisfactory
C-Needs Improvement

Department Budget and Utilization (Evaluation by the Audit team)

	Self Assessment (A/B/C)
Expenditure excluding salary component	A
Adequacy of budget allocation	A
Utilization of allocated funds	B

A.2.2 Library Facilities (Data for only ECE department)

Type	2022-23	2021-22	2020-21	2019-20	2018-19
Total No of Book	3946	3888	3836	3827	3774
Printed Books added	58	34	5	53	118
e-books added	0	18	4	0	0
Web resources	2	2	2	2	2

(Please refer Annexure-II - C for more details**)**

Evaluation by the Audit team

S. No.	Item	SA (A/B/C)
1	Number of Book	**B**
2	e-book	**C**
3	Web resources	**C**

A.2.3 Infrastructure Equipment and Software

Items	2022-23	2021-22	2020-21	2019-20
Number of Physical Laboratory spaces	8	8	6	6
Number of Lab Courses	14	14	14	14
New Equipment added	30	56	63	114
Licensed Software freely and open source	33	33	33	14
Computing facility for Faculty members	46	49	35	19
Computing facility for Students	547	547	547	538

(For More Computing device details, Please refer Annexure-III)

Evaluation by the Audit team

S. No.	Item	SA(A/B/C)
1	Laboratory Equipment added	**A**
2	Software for lab and research added	**A**
3	Computing facility added	**A**

A.2.4 Various functional activities of the Department with the Evaluation by the Audit team

Items	2022-23	2021-22	2020-21	2019-20	SA (A/B/C)
MoUs Signed	14	17	19	22	**B**
Consultancy	2	1	0	1	**C**
Newsletters/ Magazine	4	4	0	0	**B**

(Please refer Annexure-IV)

B. Department Academic Audit

B.1 Human Resources

B.1.1 Faculty

S. No.	Designation	Number of Faculty in the Department for both UG and PG			
		CAY (2022-23)	CAYm1 (2021-22)	CAYm2 (2020-21)	CAYm3 (2019-20)
		Original Department	Original Department	Original Department	Original Department
1	Professor	**4**	**3**	**3**	**3**
2	Associate Professor	**4**	**3**	**2**	**2**
3	Assistant Professor	**21**	**25**	**26**	**15**
4	**Total**	**29**	**31**	**31**	**20**

(Please refer Annexure-V-A)

B.1.2 Technical Staff

S. No.	Designation	Number of Technical Staff in the Department for both UG and PG			
		CAY (2022-23)	CAYm1 (2021-22)	CAYm2 (2020-21)	CAYm3 (2019-20)
1	Technical Superintendent	4	2	2	2
2	Jr. Technical Superintendent	2	4	4	4
3	**Total**	**6**	**6**	**6**	**6**

(Please refer Annexure-V-B)

B.2 Student Enrollment Ratio (Program specific): -

B. Tech in ECE

Item		CAY (2022-23)	CAYm1 (2021-22)	CAYm2 (2020-21)	Total
Sanctioned intake of the program (*N*)		150	150	150	450
Number of students admitted		133	150	150	433
	Percentage of Students Admitted over the previous three academic years including the current academic year (Total Admitted/Sanctioned Intake)				96.22%

B.Tech - M.Tech Dual Degree in ECE

Item		CAY (2022-23)	CAYm1 (2021-22)	CAYm2 (2020-21)	Total
Sanctioned Intake of the program (*N*)		10	10	10	30
Number of students admitted		7	10	10	27
	% of Students Admitted over the previous three academic years including the current academic year (Total Admitted/Sanctioned Intake)				90.00%

B.3 Faculty - Student Ratio (FSR) (No. of faculty members as per the sanctioned intake): -

- **Average FSR for Ist Year - 1:17.5**
- **Average FSR (Excluding 1st Year) - 1:18.64**

FSR calculation details- https://drive.google.com/file/d/1paW-gCiC2ZuRp6KQsr4z5PIqpJEiXwqM/view?usp=share_link

B.4 Curriculum

Table 1: Curriculum Composition (B.Tech-ECE)

Course Component	**Curriculum Content** (% of total number of credits of the program)	**Total number of contact hours per week**	**Total number of credits**
Basic Sciences	13.6	23	20
Engineering Sciences	10.2	17	15
Humanities and Social Sciences	8.16	12	12
Program Core	43.54	73	64
Program Electives	12.24	18	18
Open Electives	8.16	12	12
Projects(s)	4.08	9	6
Internships/Seminars	0	0	0
Any other (Please specify)	NA	NA	NA

Table 2: Curriculum Composition (B.Tech-M.Tech. Integrated (ECE))

Course Component	**Curriculum Content** (% of total number of credits of the program)	**Total number of contact hours per week**	**Total number of credits**
Basic Sciences	8.94	16	16
Engineering Sciences	8.38	18	15
Humanities and Social Sciences	8.38	15	15
Program Core	36.31	74	65
Program Electives	10.05	18	18
Open Electives	6.7	12	12
Projects(s)	10.05	36	18
Internships/Seminars	0	0	0
Research Field Elective	6.7	12	12

a) **B.Tech ECE curriculum link**

https://drive.google.com/file/d/1JmR7meyQK0Ess8zoutf4bSKGh-WTQpP1/view?usp=share_link

b) **B.Tech-M.Tech. Integrated (ECE) curriculum link**

https://drive.google.com/file/d/1Ts_7ixC4RbVCIRsER1coiC5zm9ZX06rn/view?usp=share_link

c) **M.Tech. ECE curriculum link**

https://drive.google.com/file/d/1J1G-5vj1uzuFJqlcttXDJamiKhMhR79z/view?usp=share_link

B.4.1 Curriculum Compliance Evaluation by the Audit team

S. No.	Process	SA (A/B/C)
1	Choice Based Credit System (CBCS)	**A**
2	Modular Course Structure	**A**
3	Project/Assignment based learning	**A**
4	Percentage of Courses related to skill development	**A**
5	Percentage of Courses related to Entrepreneurship	**C**
6	Percentage of Courses related to Employability	**A**
7	Curriculum aligned with Program Specific Criteria of the leading Professional body (e.g. IEEE, ACM etc.)	**A**
8	Curriculum Aligned with regulatory requirement AICTE	**B**
9	Curriculum Aligned with Institute of National Importance	**B**
10	Curriculum compared with reputed institutes around the world	**B**

B.4.2 Teaching-Learning Process

**** Sample course files from each semester have been attached with the hard copy of the audit report.***

Teaching-Learning Process (TLP):

- Innovative pedagogy focusing on sound theoretical foundation, excellent hands-on and peer learning and interpersonal communication.
- Extensive use of LMS and communication platforms such as Moodle, G Suite modules etc.
- MOOCs with a proctored exam.
- Enablement of teachers with MS Surface tablets and Graphics Pen tablets for efficient exploitation of ICT during Covid-19 pandemic.

Teacher Profile and Quality:

- Faculty members with Ph. D. degrees from premier institutions: 96.66% (majority with post-doctoral research experience); pursuing PhD: 3.34%;
- Internationally recognized distinguished faculty on rolls

Evaluation Process and Reforms:

- Continuous internal evaluation duly aided by ICT and with a commitment to full transparency.
- Openness to using innovative evaluation methods.
- Good exposure to ICT helps quick switching to secure online examinations during the Covid-19 pandemic.
- MIS module for marks and grade entry enabling a quick publication of marks and grades to student portals.
- Review of answer scripts or online evaluation components enabled for students prior to submission of Grades.

Grievance Redressal:

- Review of all evaluation components prior to submission of grades making formal revaluation process redundant.
- Redressal of grievances at the level of course-instructor with a provision of escalation to HoD or Dean, Academic.

Student Performance and Learning Outcomes:

- Program outcomes, Program-specific outcomes and course outcomes are stated and mapping is worked out.
- Attainment of learning outcomes is measured through student feedback, pass percentage, job placements, progression to higher studies etc.

Evaluation by the Audit team

S. No.	Process	SA (A/B/C)
	Course Delivery	
1	Lecture delivered Vs Allotted as per curriculum	**A**
2	Remedial Class/ semester	**B**
3	Tutorial Class/ semester	**B**
4	Pedagogical initiatives	**A**
5	Collaborative learning	**A**
6	Project/Assignment based Learning	**A**
7	Adoption of Innovative teaching methods	**B**
	Assessment	
8	Continuous Evaluation	**A**
9	Online/software-based evaluation	**A**
10	Scope of for fast learners in curriculum/ assessment methods	**A**
	ICT and e-content	
11	New age Teaching including ICT	**A**
12	e-content developed (YouTube/Institute LMS etc.)	**B**
14	MOOC/ Edx/Coursera/Udemy/Swayam	**C**
15	Availability of course file	**A**

B.5 Laboratory Data

B.5.1 Laboratories, area budget, facility, maintenance, overall ambience

Laboratory data on Area, room no, sharing status, lighting, Air conditioning, Flooring, ICT facility, budget, Safety measures in laboratories etc. (Please refer Annexure- VI *)*

Sr. No.	Name of the Laboratory	Physical Location	No of faculty members, Staff, TA per session	No. of students per session (Batch Size)	No of session/ week
1	Basic Electronics Laboratory	1095	2(F)+1(S)+4(T)=7	Approx 74 Students	8
2	Analog Electronics Laboratory	1095	2(F)+1(S)+2(T)=5	Approx 74 Students	2
3	Microprocessor and Interface Laboratory	1073	1(F)+1(S)+1(T)=3	Approx 30 Students	5
4	Internet of Things Lab (IOT)	1073	1(F)+1(S)+1(T)=3	Approx 30 Students	4
5	DSP Lab	2081	1(F)+1(S)+2(T)=4	Approx 33 Students	8
6	SSC Lab Software	2081	1(F)+1(S)+2(T)=4	Approx 33 Students	4
7	PG Lab 1	2081	1(F)+1(S)+1(T)=3	Approx 4	1
8	PG Lab 2	2081	1(F)+1(S)+1(T)=3	Approx 4	1
9	DCS Lab	2083	1(F)+1(S)+1(T)=3	Approx 35 Students	8
10	Design Lab II	2083	1(F)+1(S)+1(T)=3	Approx 35 Students	4
11	Microwave Engineering Lab	2095	1(F)+1(S)+1(T)=3	Around 36	5
12	Design Lab 1	2095	1(F)+1(S)+1(T)=3	Around 36	4
13	Digital Communication	2093	1(F)+1(S)+2(T)=4	Around 40	7
14	SSC Lab Hardware	2093	1(F)+1(S)+2(T)=4	Around 40	4

Evaluation by the Audit team

S. No.	Item	SA (A/B/C)
1	Lab Experiments designed are relevant and contemporary	**B**
2	Availability of adequate Lab components and equipment	**A**
3	Availability of lab Manual, instrument instruction manual	**A**
4	Quality of Laboratory reports	**A**
5	Laboratory evaluation methods	**A**
6	Laboratory space and student numbers	**A**

B.6 Students' Performance

B.6.1 Successful graduation

B. Tech in ECE

Year of entry	N_{adm}	Number of students who have successfully graduated			
		1 Year	II Year	III Year	IV Year
CAY-Y22	150				
CAY m1– Y21	160	140			
CAYm2 – Y20	157	152	150		
CAYm3 – Y19	135	128	127	123	
CAYm4 (LYG) – Y18	131	128	123	122	122
CAYm5 (LYGm1) – Y17	148	145	142	142	142
CAYm6 (LYGm2) – Y16	131	130	129	127	127

B.Tech-M.Tech. Integrated (ECE)

Year of entry	N_{adm}	Number of students who have successfully graduated				
		1 Year	II Year	III Year	IV Year	V Year
CAY-Y22	7					
CAY m1– Y21	10	8				
CAYm2 – Y20	10	10	10			
CAYm3 – Y19	7	6	6	6		
CAYm4 – Y18	2	2	2	2	2	
CAYm5 (LYGm1) – Y17	7	7	7	7	7	7

B.6.2 Success rate at the end of graduation for UG programs in ECE

Item	LYG (Y-18)	LYGm1 (Y-17)	LYGm2 (Y-16)
Number of students admitted in the corresponding First Year + admitted in 2nd year via lateral entry and separate division, if applicable	131	140	127
Number of students who have graduated in the stipulated period	117	134	122
Success Index (SI)	89.31%	95.71%	96.06%
Average Success Index	93.69%		

B.6.3 Success rate at the end of graduation for Dual degree programs in ECE

Item	LYGm1 (Y-17)
Number of students admitted in the corresponding First Year + admitted in 2nd year via lateral entry and separate division, if applicable	8
Number of students who have graduated in the stipulated period	5
Success Index (SI)	62.5%
Average Success Index	62.5%

Evaluation by the Audit team

S. No.	Item	SA(A/B/C)
1	First Year student academic progression (SGPA/CGPA)	A
2	Other year students' academic progression (SGPA/CGPA)	A
3	Overall Academic Progression	A

B.7 Graduation Outcome

B.7.1 Placement, Higher Studies, and Entrepreneurship

Electronics and Communication Engineering

Item	CAY (2021-22)	CAYm1 (2020-21)	CAYm2 (2019-20)	CAYm3 (2018-19)
Total No. of Final Year Students (N)	121	136	127	76
No. of students placed in companies or Government Sector (x)	104	119	98	55
No. of students admitted to higher studies with valid qualifying scores (GATE or equivalent State or National Level Tests, GRE, GMAT etc.) (y)	2	4	6	6
No. of students turned entrepreneur in engineering/ technology (z)	1	2	1	0
x + y + z =	107	125	105	61
Placement Index: (x + y + z)/N	88.42%	91.91%	82.67%	80.26%
Average placement = (P1 + P2 + P3)/3	85.81%			

Evaluation by the Audit team

S. No.	Item	SA (A/B/C)
1	Graduation Outcome (Placement, Higher Studies, and Entrepreneurship)	A

B.7.2 Student Achievement (Co-Curricular & Extra Curricular)

Type of events	Inter-institute/state level/national level/international level			
	CAY (2022-23)	CAYm1 (2021-22)	CAYm2 (2020-21)	CAYm3 (2019-20)
Sports	02	00	00	00
Cultural	00	02	01	00
Science and Tech.	03	05	04	03
Social	01	00	00	00

(Please refer to Annexure- VII)

Evaluation by the Audit team

S. No.	Item	SA(A/B/C)
1	Sports Achievement	C
2	Cultural Achievement	C
3	Science and Tech Achievement	A
4	Social Achievement	C

B.8 Faculty Publication, Project, Patent:

B.8.1 Publications article/ Paper:

Type		2023	2022	2021	2020	2019
Journal	National	0	0	0	0	0
	International	03*	26	49	74	47
Conference	National	0	0	0	0	0
	International	1*	16	17	35	38

(Please refer to Annexure- VIII-A)

Item	Overall	Average per faculty
Citations	5626	200.93
h-index	175	6.25
i10-index	159	5.68

*Still in progress

B.8.2 FDP/ OC/ Training Program/ Seminar/ Conference/ Workshop attended

Type of events	2023	2022	2021	2020	2019
FDP	00	10	18	19	02
Orientation Course/ STTP	00	04	00	00	00
Training Program	00	01	07	03	00
Workshop/conferences/seminars/webinars	01	18	21	45	41

(Please refer to Annexure- VIII-B)

B.8.3 Book/ Book Chapter/ Proceedings

Type	2023	2022	2021	2020	2019
Book/Book chapter	00	07	09	07	03
Proceedings	01	16	17	35	38

(Please refer to Annexure- VIII-C)

B.8.4 Patent(s) files/granted/published

Type	2023	2022	2021	2020	2019
Patent(s)	00	02	06	01	04

(Please refer to Annexure- VIII-D)

B.8.5 Status of Ph.D. Student:

Type	2022-23	2021-22	2020-21	2019-20	2018-19
Admitted	05	03	06	03	02
Ongoing	27	22	19	13	08
Completed	01	01	00	01	01

B.8.6 Status of M. Tech Students:

Type	2022-23	2021-22	2020-21	2019-20	2018-19
Ongoing	00	03	01	01	06
Awarded	00	00	01	01	05

B.8.7 Sponsored Projects:

Number of Projects

Type	2022-23	2021-22	2020-21	2019-20	2018-19
Completed	01	00	00	01	00
Applied	07	17	13	02	04
Sanctioned	01	00	00	01	02
Ongoing	03	03	03	03	04

Details of Projects

Title	PI and Co-PI	Agency Name	Duration	Sanctioned Amount	Present Status
Development of a High data rate Visible Light	Dr. Nikhil Sharma (PI)	DSIR (DST)	2023-2025	18,00,000/-	Ongoing

Communication System for Green Wireless Technology and Healthcare					
Sign Language to Regional Language Converter (SLRC)	Dr. Abhishek Sharma (PI), Dr. Sandeep Saini, Prof. Raghuvir Singh Tomar (Co-PI)	DST, Govt. of India	2018-2021	42,88,161/-	Completed
Multimodal user interface for assisting elderly people in indoor environment	Dr. Joyeeta Singha (PI)	DST, Govt. of India	2019-2022	23,83,686/-	Completed
Energy Efficient RF/VLC Networks for IoT Applications	Dr. Nikhil Sharma (Co-PI)	DST, Govt. of India	2019-2022	35,17,096/-	Completed
Mobile Broadband Service Support Over Cognitive Radio Networks	Prof. Ranjan Gangopadhyay	ITRA, MeitY, Govt. of India	2013-2018	1,02,96,000/-	Completed

B.9 Outreach Activities by the Faculty

B.9.1 Faculty member as resource persons

Type	2022-23	2021-22	2020-21	2019-20	2018-19
FDP	0	0	2	2	1
Keynote Speaker	0	0	0	0	0
Invited Talk	3	1	0	1	0
Session Chair	1	2	0	0	0
Member of editorial board	0	0	0	0	0
Editor of Book/ Journal	0	0	0	0	0
Others	0	0	5	4	6

(Please refer Annexure- IX-A)

B.9.2 Achievements of faculty members

Type	2022-23	2021-22	2020-21	2019-20	2018-19
No of Fellowship awarded		1	0	1	3
No of Travel Grant awarded					
National/ International award		1	4	3	1
Member of Professional body	3		9	6	14
Member of Industry Body			2	1	1
Member of Educational Body					

(Please refer Annexure-IX-B)

B.9.3 Workshop / Conference / Seminar / Webinar talk from renowned Speakers

Sr. No.	Title of Talk	Expert Detail	Academi Year
1	Distinguished Talk "Recent Investigations in Machine Learning and Edge Computing"	Dr. Rajeev Shorey, CEO, The University of Queensland - IIT Delhi Academy of Research (UQIDAR).	2022-23

2	Webinar on "Tackling Imperfect SIC in Dual-Polarized Massive MIMO-RSMA Networks"	Prof. Daniel B. Da Costa, Technology Innovation Institute, UAE.	2022-23
3	Delay-Doppler Plane Multi-Carrier Modulation: A Promising Signal Waveform for Integrated Sensing and Communications	Prof. Jinhong Yuan, UNSW, Australia	2022-23
4	AI-based Machine-to-Machine Communications in 6G	Prof. Sinem Coleri, Koc University, Turkey	2022-23
5	Integrated Sensing and Communication with Cooperation: Fundamental Limits and Algorithm Design	Prof. An Liu, Zhejiang University, China	2022-23
6	Integrated Sensing and Communications: Toward Dual-Functional Wireless Networks for 6G and Beyond	Prof. Christos Masouros, University Colg. London, England	2022-23
7	Webinar on "Optimization methods for large-scale massive MIMO"	Dr. Nam Tran, Assistant Professor in the School of Electrical and Electronic Engineering, University College Dublin, Ireland.	2021-22
8	Webinar on "Silicon-On-Insulator (SOI) MOSFETs -An Overview"	Dr. A. K. Gupta, Professor (Retd.) NIT Kurukshetra	2021-22
9	Webinar on"Automated diagnosis of glaucoma using retinal fundus images"	Dr. Shishir Maheshwari, Associated with School of Electronics Engineering (SENSE) VIT as an Assistant Professor.	2021-22
10	Webinar on "Vehicular Communication and Sensing: Requisites and Fulfilment"	Dr. Rohit Singh (Member, IEEE)	2021-22
11	OTFS Modulation and Machine Learning	Prof. A. Chockalingam, IISc Bangalore, India	2021-22
12	Waveform Design Principles for Next Generation Communication Systems	Dr. Shashank Tiwari, Nokia Networks, India	2021-22
13	Deep Reinforcement Learning-based Resource Allocation in Cooperative UAV-assisted Wireless Networks	Prof. Le-Nam Tran, University College Dublin, Ireland	2021-22

14	Radio Access Networks for Future Ultra-Dense Networks	Prof. Alister Burr, University of York, UK	2021-22
15	NOMA and Massive Machine type Communications (mMTC)	Prof. Shankar Prakriya, IIT Delhi	2021-22
16	Channel Modeling and Precoding for Wireless B5G/6G Communication Systems	Dr. Sumit Gautam, IIT Indore,	2021-22
17	Multi Carrier Modulations Over Sparse Channels: Communication, Channel Estimation, and Radar Sensing for Beyond5G Vehicular Scenarios	Prof. Giulio Colavolpe, University of Parma, Italy and Prof. Giuseppe Caire, TU Berlin	2021-22
18	Recent Advances in Non-Orthogonal MultipleAccess in 6G Wireless Networks	Prof. Zhiguo Ding, University of Manchester, UK	2021-22
19	Achievable Rate Maximization for Underlay Spectrum Sharing MIMO System with Intelligent Reflecting Surface	Dr. Vaibhav Kumar, University College Dublin, Ireland	2021-22
20	Application of AI in Healthcare and Data Analytics using Tensorflow	Jonathan Rajiv	2020-21
21	Webinar on "Photonics for 5G Wireless Communication and Surveillance"	Prof. Antonella Bogoni, Professor in Scuola Superiore Sant'Anna, Pisa, Italy, and the Director of National Inter-University Consortium for Telecommunications (CNIT).	2020-21
22	Some New Advances in Emerging Technologies for Beyond-5G Networks	Prof. Mark Flanagan Associate Professor School of Electrical and Electronic Engineering University College Dublin (UCD), Ireland	2019-20
23	Massive MIMO: Research & Challenges	Prof. A. Chockalingam, IISc Bangalore	2018-19
24	Energy Harvesting in 5G	Prof. Shankar Prakriya, IIT Delhi	2018-19
25	5G-The Connectivity Fabric for the Society	Mr. A. Nigam, Samsung Research	2018-19
26	Network Densification	Prof. A. Das Barman, IRPE Kolkata	2018-19

27	5G Network Security	Mr. N. Bykampadi, Nokia Bells Labs	2018-19
28	Performance Optimization for IoT Comm.	Prof. Swades De, IIT Delhi	2018-19
29	5G and IoT-A Vision Perspective	Prof. R. Gangopadhyay, LNMIIT	2018-19
30	National Policy and Initiatives for IoT	Dr. Somnath Chandra, DIT, New Delhi	2018-19
31	IoT for Healthcare	Dr. P. Rajalakshmi, IIT Hyderabad	2018-19

(Please refer Annexure-IX-C for the details)

Evaluation by the Audit team

S. No.	Item	SA (A/ B/ C)
1	Publication	**B**
2	FDP/ OC/ Training Program/ Seminar/ Conference/ Workshop attended	**B**
3	Book/ Book Chapter/ Proceedings	**B**
4	PhD student guided/ongoing	**B**
5	M. Tech Student guided/ongoing	**B**
6	Sponsored Project	**B**
7	Patent	**B**
8	Faculty member as resource persons	**C**
9	Faculty member Achievements	B

B. Special Remarks and observations by the Internal Audit team

1. The data pertaining to various aspects of AAA as presented are authentic and convincing.
2. Internal evaluation and assessment of each course has been done as per the prescribed rules and practices.
3. The feedback form for each faculty is maintained at the institute level.
4. The records of the internal audits for the years 2022-23, 2021-22, 2020-21 and 2019-20 are presented.
5. The department has a highly accomplished faculty engaged in research in the core domain of electronics and communication as well as other interdisciplinary areas.
6. Two research centers: C-NGCN and L-CST have been contributing to the R&D activites in a significant way.
7. Two ongoing sponsored projects are also contributing significant research outputs in the areas of gesture recognition and visible light communication.
8. The state-of-the-art curriculum is well supported by new courses and well-equipped laboratories.
9. Bridging the shortfall of the required number of qualified faculty.
10. Insufficient number of trained technical assistants for the advanced laboratories.

11. Lack of immediate availability of required physical space for setting up of advanced laboratories.
12. Research fund for individual faculty members to conduct personal as well as collaborative research.
13. Ongoing national and international collaborations with renowned universities and industries are beneficial for both faculty and students.
14. Possibilities for interdisciplinary academic as well as industrial research programs.

Special Remarks in context to the lab courses.

a) Microprocessor and Interface Lab

1. Comparison with other institute need to be made regarding experiments
2. A poster required for 8085 architectures, specification

b) **Basic Electronics Lab**

1. New experiments need to be included.
2. A comparison with another institute needs to be made regarding experiments.
3. Display of PIN configuration of IC in the form of poster required.
4. Inspiring posters related to the Application of Electronics is required.
5. Review of ICT infrastructure is needed for Lab execution.

c) Microwave Engineering Lab

1. New equipment like VNA 40 GHZ, MXA Signal Analyzer and VSA are procured. It can help in strengthening the research in the high frequency domain. Department should optimally utilize these high value research equipment.
2. Inclusion of experiment on current trends in Microwave circuits can be included Design evolution in terms of frequency.
3. Lab Staff need to be trained in newly procured instruments.

d) Design Lab I

1. The effort is praiseworthy.
2. Infrastructure needs to be updated.

e) Design Lab II

1. Some more experiments/projects can be included from diverse specializations in allied areas.

f) Digital communication Lab

1. Fundamental Facilities like spectrum Analyzer should be procured.
2. Students should be given circuit design parameters and circuit/ Block diagrams. They should come up with their own design.
3. Software defined radio based experiments should be included.

g) DCS Lab

1. Experiments designed in VHDL should be programmed into a FPGA boards and verified.
2. Experiments on the ALU and processor design are missing.
3. Experiment list needs to be updated.

h) DSP lab

1. Experiment list needs to be updated.

C. Name and Signature of the Audit team members

Sr. No.	Members Name	Signature
1.	Prof. R. Gangopadhyay	
2.	Prof. R. Tomar	
3.	Dr. S. Debnath	
4.	Mr. Purnendu Karmakar	
5.	Dr. Nikhil Sharma	
6.	Dr. Harshvardhan Kumar	
7.	Dr. Akash Gupta	
8.	Dr. Chirag	

IQAC Coordinator IQAC Chairperson

Annexures

Annexure- I

(Administrative Structure: it consists of the following essential arms)

(a) Head of the Department (HoD): Dr. Nikhil Sharma

https://drive.google.com/file/d/1G0i9ql9v7F6naS7nmiEWXIIoPoRMzGO4/view?usp=share_link

(b) Board of Studies (BoS)

https://drive.google.com/file/d/1EDrVXcZV66mSm0dzBegDV_kak7j0kuaI/view?usp=share_link

(c) Department Leadership Advisory Team (DLAT)

https://drive.google.com/file/d/1Kh2FpRifst-A_2-VatuWaMXUEH5n5vzr/view?usp=share_link

(d) Department Leadership Team (DLT)

https://drive.google.com/file/d/1hfTWJhgQ3CChV14ylUJKxHwUJJqEOOvN/view?usp=share_link

(e) Department Quality Assurance in Research Committee (DQARC)

https://drive.google.com/file/d/1IjHIzMQ0QUSUdgrEHEwdOTB_jzUpZ_xM/view?usp=share_link

(f) Class Committees

https://drive.google.com/file/d/1R5IdzVxU6yIeu-2fdPGvRq65LcK4MkzF/view?usp=share_link

(g) Course Coordinators

https://docs.google.com/spreadsheets/d/1hLkTfwfFwYXGuHcmFJx9Sa_GFA_4yy9f/edit?usp=sharing&ouid=105353850696107477247&rtpof=true&sd=true

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Annexure- II - A

Annual departmental budget planning, secured grant, monitoring and fund utilization.

https://drive.google.com/file/d/1K2O3GhaEH7Fu166yErDSx7Yd7D4MTgfQ/view?usp=share_link (2022-23)

https://drive.google.com/file/d/1AQqWoFLpXpsKas00laNI6lP6bzJ9ceHn/view?usp=share_link (2021-22)

https://drive.google.com/file/d/1wVo2EeSJQXxysQRbMIJHIbp6VbsNgQ5R/view?usp=share_link (2020-21)

https://drive.google.com/file/d/1nKVGIi9KC0SCuktjIzUBdG60lfIKhceV/view?usp=share_link (2019-20)

Annexure- II - B

Table I: Details of allocated budget and actual expenditure financial-year wise

Items	Budgeted in CFY (22- 23)	Actual expenses in CFY (till Mar - 23)	Budgeted in CFYm1 (21- 22)	Actual expenses in CFY (till Mar - 22)	Budgeted in CFYm2 (20- 21)	Actual expenses in CFY (till Mar - 21)	Budgeted in CFYm3 (19 – 20)	Actual Expenses in CFYm3 Mar - 20	Budgeted in CFYm4 (18 – 19)	Actual Expenses in CFYm4 Mar - 19

Laboratory equipment	53,50,000	NA	61,10,000	37,62,315	62,99,000	22,85,903	53,50,000	31,91,504	63,98,000	62,37,329
Software*	NA	NA	NIL	NIL	18,00,000	17,95,738	13,50,000	12,68,500	7,00,000	6,67,757
Laboratory consumable	6,25,000	NA	5,00,000	3,84,510	7,75,000	2,89,109	5,60,000	3,64,083	4,25,000	3,96,004
Maintenance and spares	1,00,000	NA	1,00,000	NIL	1,00,000	NIL	50,000	22,000	1,00,000	31,388
R & D	@ 2,00,000 or 1,00,000 as per Institute policy	NA	@ 2,00,000 or 1,00,000 as per Institute policy	8,90,555	@ 2,00,000 or 1,00,000 as per Institute policy	8,54,430	@ 2,00,000 or 1,00,000 as per Institute policy	10,82,042	@ 2,00,000 or 1,00,000 as per Institute policy	7,20,901
Training and Travel/ UG Students TA Ship	2,00,000	NA	2,00,000	51,870	@35,000 per Student	92,807	@35,000 per Student	1,16,342	@35,000 per Student	1,70,620
Conference & Seminar/ Workshop Miscellaneous expenses*	5,00,000	NA	2,00,000	1,54,042	2,50,000	74,976	3,50,000	15,401	4,00,000	58,585

*Softwares available with shared basis at the institute level and the list of softwares available are given below:

- MATLAB
- Nvidia 1.x petaFLOPS Supercomputer
- HP Proliant Sl230s Gen 8 High-Performance Computing Platform
- HP PROLIANT DL380/G9(HPC) GPU SERVER

Annexure- II - C

Library Data:

https://docs.google.com/spreadsheets/d/1Fkm5S1I7Xirevgp5qKoaa9sdTBi-UBez/edit?usp=share_link&ouid=105353850696107477247&rtpof=true&sd=true

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Annexure- III

Infrastructure:

Lecture Hall and Faculty Rooms with Facilities

https://docs.google.com/document/d/1ggJYQgIcq-Yptwluj_8nrznEzJYZYXNEVA9sEYmFw3s/edit?usp=sharing

List of program specific labs and computing facilities·

https://docs.google.com/document/d/1WNbPsTzWhCOwA-eKAsoFEYvvbv6Ix5d2oBgTxDrxJBM/edit?usp=sharing

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Annexure- IV

MoUs:

https://drive.google.com/drive/folders/1nnMAo5p9B6zuH8GGdnyzaiZ71_9y7Uf7?usp=share_link

Consultancy:

https://drive.google.com/drive/folders/13ZyoDGR0Uf5woRBvqx8Jx0bvN4S4EyNn?usp=share_link

Department Newsletters

2021: https://drive.google.com/drive/folders/1ZmBs3vuseW0nVnYvnLNlziPvutASORLI?usp=share_link

2022: https://drive.google.com/drive/folders/1ka9hWJYC_MrZGB916J4b73hw4yxkVitO?usp=share_link

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Annexure- V-A

Faculty

- https://www.lnmiit.ac.in/Department/ECE/ece_FacultyList.aspx
- https://docs.google.com/spreadsheets/d/1rDDagQAdMYboANT4JSMJxW5RLl-Nnrh2/edit?usp=share_link&ouid=105353850696107477247&rtpof=true&sd=true

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Annexure- V-B

Technical Staff

- https://docs.google.com/document/d/1p02QeNVHjS6jX-YAxgKC5wxkQr0ObFG6TEOrtcOM42M/edit?usp=sharing
- https://www.lnmiit.ac.in/Department/ECE/ece_StaffList.aspx

Annexure- VI

Laboratory Data

- https://docs.google.com/document/d/1WNbPsTzWhCOwA-eKAsoFEYvvbv6Ix5d2oBgTxDrxJBM/edit?usp=sharing
- https://docs.google.com/spreadsheets/d/1cfRr-F4Ggig5ZOmQxC1IptYOiPXIX5JE/edit?usp=share_link&ouid=105353850696107477247&**rtpof=true&sd=true**

Annexure- VII

Student Achievement (Co-Curricular & Extra Curricular)

https://docs.google.com/spreadsheets/d/10Q52MuyeAO5eX7HRYwYnBtVnQrNzk06v0k9CxAL8eEg/edit?usp=sharing

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Annexure- VIII-A

Publications article/ Paper

- https://docs.google.com/spreadsheets/d/13oYdUJHnVeHFYsetKBP9xJr90K8Lt0oh/edit?usp=sharing&ouid=110875069109732488638&rtpof=true&sd=true
- https://docs.google.com/spreadsheets/d/18-ry1LqUbcamFXqYF45MH4-e4_VbM5zU/edit?usp=sharing&ouid=110875069109732488638&rtpof=true&sd=true

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Annexure- VIII-B

FDP/ OC/ Training Program/ Seminar/ Conference/ Workshop attended

- https://docs.google.com/spreadsheets/d/1YH8dNheV6YxEyOkeebjQ5sQACd0fnKOe/edit?usp=sharing&ouid=110875069109732488638&rtpof=true&sd=true

- https://docs.google.com/spreadsheets/d/18-ry1LqUbcamFXqYF45MH4-e4_VbM5zU/edit?usp=sharing&ouid=110875069109732488638&rtpof=true&sd=true

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Annexure- VIII-C

Book/ Book Chapter/ Proceedings

https://docs.google.com/spreadsheets/d/17QMgT0Lly0O2gTabXDMGbkuNV3su2XBv/edit?usp=sharing&ouid=110875069109732488638&rtpof=true&sd=true

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Annexure- VIII-D

Patent(s) files/granted/published

https://docs.google.com/spreadsheets/d/1swrNv1r82cyXpRjPVQjvJ7WV6UJLYpqs/edit?usp=sharing&ouid=110875069109732488638&rtpof=true&sd=true

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Annexure- IX-A

Faculty member as resource persons

https://docs.google.com/spreadsheets/d/1AOcU1e7M4RLXFhReFwaNultb9sUK_9eRMX6ES2clGwA/edit?usp=share_link

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Annexure- IX-B

Achievements of faculty members

https://docs.google.com/spreadsheets/d/1AOcU1e7M4RLXFhReFwaNultb9sUK_9eRMX6ES2clGwA/edit#gid=1016941648

Annexure- IX-C

Workshop / Conference / Seminar / Webinar talk from renowned Speakers

https://docs.google.com/spreadsheets/d/1SKU7TM26IV7Pp6HJlw_RzAAyyXNY7RF0/edit?usp=share_link&ouid=105353850696107477247&rtpof=true&sd=true