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# Indian Institute of Space Science and Technology

Thiruvananthapuram 695 547

## Department of Avionics

Academic Audit Report

2018-2019

### Academic audit committee

#### Internal members

Sl.No.	Faculty Name	Role
1	Dr. N. Selvagesan, Professor, Avionics	Chairman
2	Dr. E. Natarajan, Professor, Mathematics	Member
3	Dr. Anoop C S, Associate Professor, Avionics	Convenor
4	Dr. Vineeth B. S., Assistant Professor, Avionics	Member

#### External members

Sl. No.	Name	Designation	Email	Mobile	Name of the Institute	Role
1	Dr. Sivakumaran N.	Professor	nsk@nitt.edu	919443745705	NIT Trichy	Member
2	Dr. Sneha Gajbhiye	Assistant Professor	snehagajbhiye@iitpkd.ac.in	919960727633	IIT Palakkad	Member

#### I Department profile

1	No. of Permanent Faculty Members	21
2	No. of Adjunct Faculty Members	1
3	No. of Contract Faculty Members	0

4	No. of Guest Faculty Members	0
5	No. of Emeritus Professors / Visiting Faculty Members	0
6	No. of Technical Staff / Tutors (Permanent)	3
7	No. of Technical Staff / Tutors (Contract)	6
8	No. of JRFs/ SRF/ JPF (excluding PhD students)	6
9	No. of Project Fellows	11
10	No. of Research Associates	0
11	No. of Post Doctoral Fellows	1

## II Details of academic programmes and student strength in numbers

### A .Undergraduate/ Dual Degree / Postgraduate programmes

Sl. No.	Programme	Year	Sanctioned strength in the academic year	Student strength in the academic year (At the start of even semester)	Female student strength in the academic year	No. of passed out Students	Pass Percentage
1	B.Tech.: Avionics	I Year	0	0	0	0	0.00
2	B.Tech.: Avionics	II Year	0	0	0	0	0.00
3	B.Tech.: Avionics	III Year	0	0	0	0	0.00
4	B.Tech.: Avionics	IV Year	0	0	0	0	0.00
5	B.Tech.: Electronics and Communication Engineering(Avionics)	I Year	60	60	2	0	0.00
6	B.Tech.: Electronics and Communication Engineering(Avionics)	II Year	0	60	9	0	0.00
7	B.Tech.: Electronics and Communication Engineering(Avionics)	III Year	0	60	17	0	0.00

8	B.Tech.: Electronics and Communication Engineering(Avionics)	IV Year	0	58	20	57	101.75
9	M.Tech.: Control Systems (Standalone)	I Year	10	7	2	0	0.00
10	M.Tech.: Control Systems (Standalone)	II Year	0	3	2	3	100.00
11	M.Tech.: Digital Signal Processing (Standalone)	I Year	10	5	1	0	0.00
12	M.Tech.: Digital Signal Processing (Standalone)	II Year	0	4	2	6	66.67
13	M.Tech.: Power Electronics (Standalone)	I Year	0	6	1	0	0.00
14	M.Tech.: Power Electronics (Standalone)	II Year	0	5	2	4	125.00
15	M.Tech.: RF and Microwave Engineering (Standalone)	I Year	10	3	1	0	0.00
16	M.Tech.: RF and Microwave Engineering (Standalone)	II Year	0	4	3	4	100.00
17	M.Tech.: VLSI and Microsystems (Standalone)	I Year	10	6	3	0	0.00
18	M.Tech.: VLSI and Microsystems (Standalone)	II Year	0	8	4	3	266.67
Total			100	289	69	77	

## B. Details of Student Demand Ratio

Programme	No. of students applied	No. of students admitted	Comments	Suggestions
B.Tech.: Avionics	0	0		
B.Tech.: Electronics and Communication Engineering(Avionics)	4140	60		
M.Tech.: Control Systems (Standalone)	294	7		
M.Tech.: Digital Signal Processing (Standalone)	163	5		
M.Tech.: Power Electronics (Standalone)	215	6		
M.Tech.: RF and Microwave Engineering (Standalone)	157	5		
M.Tech.: VLSI and Microsystems (Standalone)	162	6		

## C. Doctoral Degree

PhD	During the academic year			Degree awarded
	Sanctioned seats	No. of students admitted	Current student strength	
PART TIME	2	2	0	3
FULL TIME	15	15	39	2

Total	17	17	39	5
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### III Details of core courses and electives in each programme

Sl. No.	Programme Name	Course code	Course name	Core/ Elective	Credits assigned	As per curriculum revision/ newly added elective course/ syllabus revised
1	B.Tech.: Aerospace Engineering	AV489	Image and Video Processing	Institute Elective	3	
2	B.Tech.: Aerospace Engineering	AV435	Instrumentation and Control Systems Lab	Core	2	
3	B.Tech.: Aerospace Engineering	AV315	Automatic Control	Core	3	
4	B.Tech.: Aerospace Engineering	AV489	Pattern Recognition and Machine Learning	Institute Elective	3	
5	B.Tech.: Aerospace Engineering	AV499	Applied Markov Decision Processes and Reinforcement Learning	Institute Elective	3	
6	B.Tech.: Aerospace Engineering	AV500	Modelling and Control of Robotic Systems	Institute Elective	3	
7	B.Tech.: Aerospace Engineering	AV111	Basic Electrical Engineering	Core	3	
8	B.Tech.: Aerospace Engineering	AV121	Basic Electronics Engineering	Core	3	
9	B.Tech.: Aerospace Engineering	AV141	Basic Electrical and Electronics Engineering Lab	Core	1	
10	B.Tech.: Avionics	AV411	Navigation Systems and Sensors	Core	4	
11	B.Tech.: Avionics	AV468	Digital Control System	Elective	3	
12	B.Tech.: Avionics	AV484	Wireless Mesh Networks	Elective	3	
13	B.Tech.: Avionics	AV489	Image and Video Processing	Institute Elective	3	
14	B.Tech.: Avionics	AV491	Control of Electric Drives	Elective	3	

15	B.Tech.: Avionics	AV494	Deep Learning for Computational Data Science	Elective	3	
16	B.Tech.: Avionics	AV495	Modelling of Launch Vehicle and Spacecraft Dynamics	Elective	3	
17	B.Tech.: Avionics	AV496	Advanced Sensors and Interface Electronics	Elective	3	
18	B.Tech.: Avionics	AV431	Navigation Systems and Sensors Lab	Core	1	
19	B.Tech.: Avionics	AV451	Summer Internship and Training	Core	3	
20	B.Tech.: Avionics	AV452	Comprehensive Viva-Voce I	Core	2	
21	B.Tech.: Avionics	AV453	Comprehensive Viva-Voce II	Core	3	
22	B.Tech.: Avionics	AV454	Project Work	Core	12	
23	B.Tech.: Avionics	AV311	Digital Signal Processing	Core	3	
24	B.Tech.: Avionics	AV312	Computer Architecture and Organization	Core	3	
25	B.Tech.: Avionics	AV313	RF and Microwave Communication	Core	3	
26	B.Tech.: Avionics	AV314	Communication System I	Core	3	
27	B.Tech.: Avionics	AV331	Digital Signal Processing Lab	Core	1	
28	B.Tech.: Avionics	AV332	Microprocessor and Microcontroller Lab	Core	2	
29	B.Tech.: Avionics	AV333	RF and Microwave Communication Lab	Core	1	
30	B.Tech.: Avionics	AV321	Computer Networks	Core	3	
31	B.Tech.: Avionics	AV322	Power Electronics	Core	3	
32	B.Tech.: Avionics	AV323	VLSI Technology	Core	3	

33	B.Tech.: Avionics	AV324	Communication System II	Core	3	
34	B.Tech.: Avionics	AV461	Advanced Control Theory	Elective	3	
35	B.Tech.: Avionics	AV489	Pattern Recognition and Machine Learning	Institute Elective	3	
36	B.Tech.: Avionics	AV499	Applied Markov Decision Processes and Reinforcement Learning	Institute Elective	3	
37	B.Tech.: Avionics	AV500	Modelling and Control of Robotic Systems	Institute Elective	3	
38	B.Tech.: Avionics	AV341	Computer Networks Lab	Core	1	
39	B.Tech.: Avionics	AV342	Power Electronics Lab	Core	1	
40	B.Tech.: Avionics	AV343	Communication System Lab	Core	1	
41	B.Tech.: Avionics	AV211	Analog Electronic Circuits	Core	3	
42	B.Tech.: Avionics	AV212	Semi Conductor Devices	Core	3	
43	B.Tech.: Avionics	AV213	Network Analysis	Core	3	
44	B.Tech.: Avionics	AV214	Electromagnetic and Wave Propagation	Core	4	
45	B.Tech.: Avionics	AV231	Analog Electronic Circuit Lab	Core	1	
46	B.Tech.: Avionics	AV232	E-CAD Lab	Core	1	
47	B.Tech.: Avionics	AV221	Digital Electronics and VLSI Design	Core	3	
48	B.Tech.: Avionics	AV222	Instrumentation and Measurement	Core	3	
49	B.Tech.: Avionics	AV223	Signals and Systems	Core	4	
50	B.Tech.: Avionics	AV224	Control System	Core	3	
51	B.Tech.: Avionics	AV241	Digital Electronics and VLSI Lab	Core	1	
52	B.Tech.: Avionics	AV242	Instrumentation and Measurement Lab	Core	1	

53	B.Tech.: Avionics	AV243	Control System Lab	Core	1	
54	B.Tech.: Electronics and Communication Engineering(Avionics)	AV111	Basic Electrical Engineering	Core	3	
55	B.Tech.: Electronics and Communication Engineering(Avionics)	AV121	Basic Electronics Engineering	Core	3	
56	B.Tech.: Electronics and Communication Engineering(Avionics)	AV141	Basic Electrical and Electronics Engineering Lab	Core	1	
57	Dual Degree: Engineering Physics	AV316	Digital Signal Processing	Core	3	
58	Dual Degree: Engineering Physics	AV317	Instrumentation and Measurement	Core	3	
59	Dual Degree: Engineering Physics	AV336	Digital Signal Processing Lab	Core	1	
60	Dual Degree: Engineering Physics	AV337	Instrumentation and Measurement Lab	Core	1	
61	Dual Degree: Engineering Physics	AV489	Pattern Recognition and Machine Learning	Institute Elective	3	
62	Dual Degree: Engineering Physics	AV499	Applied Markov Decision Processes and Reinforcement Learning	Institute Elective	3	
63	Dual Degree: Engineering Physics	AV215	Signals and Systems	Core	4	
64	Dual Degree: Engineering Physics	AV225	Analog and Digital Circuits	Core	3	
65	Dual Degree: Engineering Physics	AV111	Basic Electrical Engineering	Core	3	
66	Dual Degree: Engineering Physics	AV121	Basic Electronics Engineering	Core	3	
67	Dual Degree: Engineering Physics	AV141	Basic Electrical and Electronics Engineering Lab	Core	1	
68	M.Tech.: RF and Microwave Engineering	AVR865	Phased Array Antennas	Elective	3	
69	M.Tech.: RF and Microwave Engineering	AVR852	Project Work Phase I	Core	12	

70	M.Tech.: RF and Microwave Engineering	AVR853	Project Work Phase II	Core	20	
71	M.Tech.: RF and Microwave Engineering	AVR611	Advanced Electromagnetic Engineering	Core	4	
72	M.Tech.: RF and Microwave Engineering	AVR612	Microwave Circuits and Systems	Core	4	
73	M.Tech.: RF and Microwave Engineering	AVR613	Microwave Semiconductor Devices	Core	4	
74	M.Tech.: RF and Microwave Engineering	AVR631	Microwave Circuit Lab	Core	1	
75	M.Tech.: RF and Microwave Engineering	AVR621	Antenna Theory and Design	Core	4	
76	M.Tech.: RF and Microwave Engineering	AVR622	Computational Methods for Electromagnetics	Core	4	
77	M.Tech.: RF and Microwave Engineering	AVR867	Optoelectronics and Fiber Optic Communication	Elective	3	
78	M.Tech.: RF and Microwave Engineering	AVR871	Electromagnetic and Microwave Application of Metamaterials	Elective	3	
79	M.Tech.: RF and Microwave Engineering	AVR641	Antenna Design Lab	Core	1	
80	M.Tech.: RF and Microwave Engineering	AVR851	Seminar	Core	3	
81	M.Tech.: Digital Signal Processing	AVD852	Project Work Phase I	Core	17	
82	M.Tech.: Digital Signal Processing	AVD853	Project Work Phase II	Core	18	
83	M.Tech.: Digital Signal Processing	AVD611	Advanced Signal Analysis and Process	Core	3	
84	M.Tech.: Digital Signal Processing	AVD612	Mathematical Methods for Signal Processing	Core	3	
85	M.Tech.: Digital Signal Processing	AVD613	Communication Systems-I	Core	3	

86	M.Tech.: Digital Signal Processing	AVD614	Image and Video Processing	Core	3	
87	M.Tech.: Digital Signal Processing	AVD870	Deep Learning for Computational Data Science	Core	3	
88	M.Tech.: Digital Signal Processing	AVD631	Mathematical Methods for Signal Processing Lab	Core	1	
89	M.Tech.: Digital Signal Processing	AVD632	Image and Video Processing Lab	Core	1	
90	M.Tech.: Digital Signal Processing	AVD621	Statistical Signal Processing	Core	3	
91	M.Tech.: Digital Signal Processing	AVD622	Digital Signal Processors for Real Time Applications	Core	3	
92	M.Tech.: Digital Signal Processing	AVD623	Communication Systems - II	Core	3	
93	M.Tech.: Digital Signal Processing	AVD864	Computer Vision	Elective	3	
94	M.Tech.: Digital Signal Processing	AVD871	Applied Markov Decision Processes and Reinforcement Learning	Elective	3	
95	M.Tech.: Digital Signal Processing	AVD641	DSP Hardware Lab	Core	1	
96	M.Tech.: Digital Signal Processing	AVD851	Seminar	Core	2	
97	M.Tech.: VLSI and Microsystems	AVM868	Sensors and Actuators	Elective	3	
98	M.Tech.: VLSI and Microsystems	AVM853	Project Phase - I	Core	15	
99	M.Tech.: VLSI and Microsystems	AVM854	Project Phase - II	Core	18	
100	M.Tech.: VLSI and Microsystems	AVM611	Physics of Micro and Nanoelectronic Devices	Core	4	
101	M.Tech.: VLSI and Microsystems	AVM612	Introduction to Micro Electro Mechanical Systems (MEMS)	Core	4	
102	M.Tech.: VLSI and Microsystems	AVM613	Analog VLSI Circuits	Core	4	

103	M.Tech.: VLSI and Microsystems	AVM614	Digital VLSI Circuits	Core	3	
104	M.Tech.: VLSI and Microsystems	AVM631	VLSI Design Lab	Core	1	
105	M.Tech.: VLSI and Microsystems	AVM621	Mixed Signal VLSI Design	Core	3	
106	M.Tech.: VLSI and Microsystems	AVM622	Micro/Nano Fabrication Technology	Core	3	
107	M.Tech.: VLSI and Microsystems	AVM863	Photonic Integrated Circuits	Elective	3	
108	M.Tech.: VLSI and Microsystems	AVM868	Compound Semiconductor and Technology	Elective	3	
109	M.Tech.: VLSI and Microsystems	AVM641	MEMS Lab	Core	1	
110	M.Tech.: VLSI and Microsystems	AVM642	Microelectronics Lab	Core	1	
111	M.Tech.: VLSI and Microsystems	AVM851	Seminar	Core	2	
112	M.Tech.: VLSI and Microsystems	AVM852	Comprehensive Viva	Core	2	
113	M.Tech.: Control Systems	AVC851	Design Project	Core	3	
114	M.Tech.: Control Systems	AVC852	Seminar	Core	3	
115	M.Tech.: Control Systems	AVC853	Project Work Phase I	Core	15	
116	M.Tech.: Control Systems	AVC854	Project Work Phase II	Core	18	
117	M.Tech.: Control Systems	AVC611	Mathematics for Control	Core	3	
118	M.Tech.: Control Systems	AVC612	Linear Control System	Core	3	
119	M.Tech.: Control Systems	AVC613	Digital Control and Embedded Systems	Core	3	
120	M.Tech.: Control Systems	AVC614	Principles of Feedback Control	Core	3	
121	M.Tech.: Control Systems	AVC864	Modelling of Launch Vehicles and Spacecraft Dynamics	Core	3	
122	M.Tech.: Control Systems	AVC867	Optimization	Core	3	

123	M.Tech.: Control Systems	AVC631	Digital Control and Embedded Systems Lab	Core	1	
124	M.Tech.: Control Systems	AVC621	Optimal Control Systems	Core	3	
125	M.Tech.: Control Systems	AVC622	Non Linear Dynamical Systems	Core	3	

### IV Review on Curriculum

Criteria	Reponse	Revision made during this academic year	Comments on curriculum, if any	Suggestions for improvement
Qualitative comment on the content of the curriculum	VERYGOOD			

### V Review on Teaching, Learning and Evaluation

Sl. No.	Criteria	Response based on criteria	Comments	Suggestions
1	Any innovative teaching methods/aids adopted?	Yes Course webpages were started for a few courses, for easy dissemination of information/assignments/ continuous assessment, etc. Prof. Manoj has published a book on "Multi-Track Modular Teaching: An Advanced Teaching-Learning Method," Amazon		
2	Is any e-learning modules developed?	Yes Few courses have recorded lectures. One of the faculty members (Prof. Manoj B. S.) of Avionics Dept. published a book on "Multi-Track Modular Teaching: An Advanced Teaching-Learning Method," Amazon KDP Paperback, June 2019,		
3	<b>Student evaluation procedure</b>			
	<b>Criteria</b>	<b>Response</b>	<b>Comments</b>	<b>Suggestions</b>
	Course evaluation			
	Project evaluation			
4	<b>Evaluation components</b>			

Criteria	Response	Comments	Suggestions
Theory	Continuous assesment and end semester exam		
Lab	Continuous assesment and end semester exam Continuous assesment and end semester exam, Continuous assesment and course project		
Project/ Internship/ Seminar	Mid term evaluaion and final evaluation		
5	<b>Continuous Assessment Components</b>		
Theory	Quiz I Quiz II Others - Includes assignments, class tests, term projects, technical report submission, etc.		
Lab	Class exercise evaluation & End Semester Examination lab exercise evaluation, Attendance, Daily performance viva, report evaluation, mini projects, final exam and viva.		
6	Is there any remedial coaching to support weak performers? Yes	Additional class sessions and/or tutorial classes were taken for many of the difficult theory subjects. Compensation lab sessions were also held, in case students were not able to complete the lab within the stipulated time frame. Quiz-3 was conducted for first year students, in case they did not perform well in quiz 1 and 2.	
7	Is academic feedback from students taken regularly? Yes	Yes, academic feedback is taken at the end of every semester, for each course. Students give anonymous feedback on the courses they have attended at the end of each semester.	

8	What are the steps taken based on student's feedback?	Feedback at IIST is taken based on several important parameters that assess the teaching skills. The same is used to improve the instruction, course content, source material preparation, etc, in the forthcoming semesters.		
9	Is Class committee meetings conducted?	Yes Class committee meetings are conducted every semester, for all courses at UG and PG level. The meetings are attended by course instructors and a representative set of students, and minutes are recorded, and adequate corrective actions are taken.		

## VI Department faculty credentials

Sl. No.	Criteria	Response	Comments	Suggestions
1	Percentage of faculty with PhD	95		
2	No. of journal articles published	34		
3	No. of books published	2		
4	No. of book chapters published	2		
5	No. of invited talks/ conferences/ workshops attended	4		
6	No. of research projects funded by IIST	7		
7	No. of research projects funded through ASRG/IIST-ISRO/DoS	3		
8	No. of externally funded research projects like CSIR, DST, DRDO etc.	3		
9	No. of patents published/ awarded	0		
10	No. of patents filed	0		
11	No. of faculty/student awards received	4		
12	No. of conferences/Workshops/ seminars/Colloquium Organized	4		
13	No. of conference paper published	67		

14	No. of visits made by the faculty/student for research collaborations/invited talks/conferences abroad	5		
15	No. of Industry collaborative projects	0		
16	No. of ISRO mission related projects/ activities	1		
17	No. of consultancy services entertained	0		

### VIII Details of student co-curricular activities

Criteria	Response	Comments	Suggestions
Whether students are involved in extra-curricular & co-curricular activities?	Yes Computer club organized more than six student-driven events for the benefit of IIST students. Robotics club organized various student events including robotics prototype building, projects on control systems development for robotics, and unmanned aerial vehicle development.		
Whether students are doing internship abroad?	Yes Externally sponsored	Srinika Selvam - Jet Propulsion Laboratory (JPL), CALTECH, USA	
Whether students are doing internship at national academic institutes universities?	Yes Self sponsored		
Whether students are doing internship at ISRO/ Industries/ R&D institutes?	Yes Externally sponsored	Pragati Agarwal - INTEL Ajeet Kumar - Mercedes Benz Sanjay G - Alpha ICS (I) Pvt Ltd Sanjuktha Ganguly - ST Microelectronics Gokul P N - KPIT Technologies Ashwathy S Ashok - VSSC, TVM Mallika Somanath - SAC, Ahmadabad Vaibhav Adhikari - SCL, Chandigarh	

Whether the department conducts outreach programs?	Yes All Departments and Various Clubs in IIST organized experiments, demonstrations, poster presentations, robotics, etc. for the school children of 8th to 12th standards on 14th September 2018. Dept of Avionics conducted Awareness Programme on IEEE and Activities of IEEE AP-Society on 14th September, 2018 IEEE-INAE Workshop on Electromagnetics (IIWE 2018) from 6 to 8 December 2018 IEEE Technical Poster Competition on Antennas for Space Application on 12th November, 2018		
Whether department has alumni activities?	No IIST has active alumni activities at the institute level.		

### IX Details of placement/ higher studies of students

Criteria	UG	PG	PhD	Comments	Suggestions
No. of students placed	45	25	0		
No. of students opted for higher studies	0	15	0		
No. of students cleared GATE/ SLET/ NET/ CSIR/ UGC/ Others etc.	5	0	0		

### X Infrastructure in the Department

Sl. No.	Criteria	Response	Comments	Suggestions
1	No. of classrooms	7		
2	No. of seminar/ conference rooms	1		
3	No. of instruction labs	14		
4	No. of research labs	16		
5	No. of full-fledged e-learning classrooms	1		
6	No. of computing labs	0		

7	Is there any lab with potential for centre of excellence?	Computer Vision and Virtual Reality Lab (CVVR lab)		
8	Is there any labs sponsored by external agency?	No		
9	Inter-disciplinary research facility	Biosensor and Gas sensor lab, Small-spacecraft Systems and PAlod CEnter (SSPACE)		
10	Is there any common amenities like restroom, recreation club, etc.?	Yes, two restrooms on each floor of the department is available. A Badminton court and a Table tennis table are also present		
11	Is there any facilities for differently abled?	Lift elevator facility and a separate restroom for differently abled is available in the department		
12	Is there any Department library?	No, but the institute has an excellent library facility which houses all major books and resources related to Electrical, Electronics, Avionics, and Computer science fields.		

## XII Additional Information

1.	Does the curriculum of each programme offered by the department provide the Programme Educational Objectives (PEOs)/Programme Specific Outcomes (PSOs) and Programme Outcomes (POs)?	No
2.	Do the courses offered in each programme by the department provide the Course Objectives and Course Outcomes (COs) written in clear terms?	No
3.	Give the status of adopting Choice Based Credit System (CBCS) in the programmes offered by the department	Implemented
4.	Give the status of adopting Objective Based Education (OBE) in the programmes offered by the department.	Action Initiated
5.	Satisfaction level of support of academic, administrative, and other support units of the institution	Very good
6.	The status of taking feedback from stakeholders and expert groups for revision and design of curriculum of a programme.	Student Faculty Alumni Employers Academic Peers

7.	The list of extension programmes conducted by the department	All Departments and Various Clubs in IIST organized experiments, demonstrations, poster presentations, robotics, etc. for the school children of 8th to 12th standards on 14th September 2018 from 11: hrs to 16: 30 hrs Dept of Avionics conducted Awa
8.	List Faculty Development Programme conducted (any programme aiming at updating the knowledge of faculty of the department).	Control Systems Engineering Theory & Lab with MATLAB/SIMULINK; Awareness Programme on IEEE and Activities of IEEE AP-Society; IEEE-INAE Workshop on Electromagnetics (IWE 2018); Programming in Python
9.	Does students take projects involving Field work/Survey. If yes, give the list.	Yes. Many of the internship students have carried out internship/final-year project, involving field work and/or actual implementation

10.	The List of MoU and MoAs, that are currently operational during the year.	A MoU was signed between NTU and IIST on Nov. 2018, to discuss the possibility of internship and PhD for IIST students. MOUs with University of Colorado, Boulder and Caltech, USA and University of Surrey, UK are also operational during this year.
11.	Detail the mechanism adopted to help academically disadvantaged students to cope with academic requirements	Additional class sessions and/or tutorial classes were taken for many of the difficult theory subjects. Compensation lab sessions were also held, in case students were not able to complete the lab within the stipulated time frame.
12.	Detail the mechanism adopted to help students who perform very much below the class averages	Quiz-3 was conducted for first year students, in case they did not perform well in quiz 1 and 2. Supplementary exams were conducted in the summer timeframe for students who could not obtain pass grades.
13.	The total grant/revenue generated/received from different agencies by the department conducting research projects/consultancy services during the year.	175 lakhs
14.	The suggestions to improve the efficiency and effectiveness of the IIST system.	Kindly refer Section XIV and Section XV.

### XIII. Strength of the Department (maximum 150 words)

Avionics Department, IIST has highly qualified expert faculty members with diverse academic and research experience in niche fields of VLSI and microsystems, control and robotics, power electronic converters and electronic system design, digital processing and machine learning, antennae design and RF engineering. The department offered a B. Tech program in Avionics, postgraduate in five disciplines, and doctoral program. These programs attract students from diverse backgrounds across the country, which enriches in-class discussions and overall academic experience. The department has published its research outputs in reputed international journals and conference proceedings. The faculty has also secured numerous awards and recognitions for excellence in teaching and research. The department has initiated state-of-the-art laboratories, centres of excellence such as Computer Vision and Virtual Reality Lab and interdisciplinary research facility of Biosensor and Gas sensor lab. Overall, the department has strong commitment to academic excellence and to maintain high standards in teaching and research.

### XIV. Weakness of the Department (maximum 150 words)

The faculty members of the department have generally higher teaching load per semester, when compared to other Indian institutes. Despite this fact, the Avionics department has excelled well on teaching and research fronts. The department lacked faculty in some important areas, such as navigation and sensor systems and VLSI circuit design, for which recruitment procedures had been initiated. The department had some infrastructure constraints and steps were taken to initiate laboratories in the interdisciplinary block. It may be needed to strike a proper balance among fundamental research, applied research, and technology development, especially related to space science and other industry needs. The number of Ph. D. student intake and graduated Ph. D. in the Avionics department, in this year, was relatively on the lower side.

### XV. Challenges (maximum 150 words)

The Avionics Department had recently shifted to the new building of Avionics block. The shifting of laboratories and other infrastructure was a challenge. Most of the labs are now established in the new building, while few advanced are being instituted. The establishment of clean-room facility in the department is also under progress. It is also challenging to foster and strengthen collaborations with industry, including ISRO, for practical exposure, internships, and research partnerships for students and faculty members, given the heavy teaching load. Another challenge is in securing of adequate funding and grants for research projects and equipment upgrades, specific to avionics. Procurement of equipment related to some of niche areas can involve long-term processes. Increasing public awareness about the importance of avionics and electronics systems and allied fields and its impact on space missions is also crucial for attracting students and garnering support for research initiatives.

### XVI. Opportunities (maximum 150 words)

The Avionics Department, IIST is a unique department, which focusses not only on fundamental research on electronics and signal processing, but also on applied research and technology development related to satellite technology and payload development. Being closely associated with the Indian Space Research Organisation (ISRO), we can play a crucial

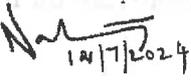
role in the pioneering activities of ISRO, including satellite launches, interplanetary missions, and technology transfers. Opportunities exist for securing research grants from national and international research agencies as well as Department of Space to advance research and technology. The department is also poised to form partnerships with global universities and research institutions can facilitate knowledge exchange, joint research projects, and participation in international conferences and workshops. Avionics involves interdisciplinary collaboration with fields like electronics, communication systems, and computer science. Leveraging these interdisciplinary connections can lead to holistic solutions and innovations.

### Final Recommendations:

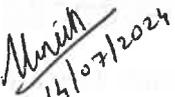
The committee felt that the department is performing well. Faculty members have published a number of research articles in reputed journals, conference proceedings, books, book chapters, etc. Department has secured research sponsored projects and also taken an active part in technology transfer activities. It was suggested to include industry-oriented modules in some of the courses. Our faculty can also be encouraged to Swayam/NPTEL courses. Students can be encouraged to participate more in Hackathons and similar events. The strength of tutors/staff seems to be in a lower side when compared to the number of instructional labs. Adequate steps may be taken in this regard.

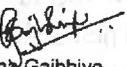
On the day of meeting, the team verified all the documents and records available in the department and evaluated the academic process. A detailed report of the audit is given above. The report is signed by the following:

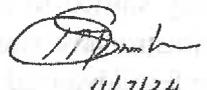
Date of meeting: 11<sup>th</sup> July, 2024

  
14/7/2024  
Dr. E. Natarajan,  
Professor, Department of Mathematics, IIST

  
14/07/24  
Dr. Anoop C.S.

  
14/07/2024  
Dr. Vivek B.S.

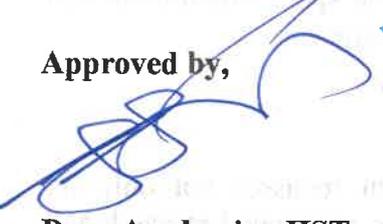
  
Dr. Sneha Gajbhiye  
Assistant Professor,  
Department of Electrical Engineering  
IIT Palakkad

  
11/7/24  
Dr. Sivakumaran N.  
Professor,  
NIT Trichy

### Signature of Committee members

Approved by,

Dean Academics, IIST

  
प्रो. कुरुविला जोसफ/Prof. Kuruvilla Joseph  
डीन (शैक्षिकी), आईआईएसटी  
Dean (Academics), IIST

  
Dr. N. Selvagesan  
आचार्य एवं अध्यक्ष / Professor & Head  
एविओनिकी विभाग / Department of Avionics  
भारतीय अंतरिक्ष विज्ञान एवं प्रौद्योगिकी संस्थान  
Indian Institute of Space Science and Technology  
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