Indian Institute of Space Science and Technology

Thiruvananthapuram 695 547

Department of Earth & Space Sciences

Academic Audit Report

2023-2024

Academic audit committee

Internal members

Sl.No.	Faculty Name	Role
1	Dr. Govindan Kutty M, Associate Professor, Earth & Space Sciences	Convenor
2	Dr. Rama Rao Nidamanuri, Professor, Earth & Space Sciences	Member
3	Dr. Deepak Mishra, Professor, Avionics	Member
4	Dr. Anand Narayanan, Professor, Earth & Space Sciences	Chairman

External members

Sl. No.	Name	Designation	Email	Mobile	Name of the Institute	Role

I Department profile

1	No. of Permanent Faculty Members	13
2	No. of Adjunct Faculty Members	0
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)	0
7	No. of Technical Staff / Tutors (Contract)	4
8	No. of JRFs/ SRF/ JPF (excluding PhD students)	6
9	No. of Project Fellows	0
10	No. of Research Associates	0
11	No. of Post Doctoral Fellows	0

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	Dual Degree: Eng. Physics (B.Tech.)+ Astronomy & Astrophysics(M.Tech.)	IV Year	7	7	0	7	100.00
2	Dual Degree: Eng. Physics (B.Tech.)+ Astronomy & Astrophysics(M.Tech.)	V Year	5	5	0	5	100.00
3	Dual Degree: Eng. Physics (B.Tech.)+ Earth System Science(M.Tech.)	IV Year	4	4	0	4	100.00
4	Dual Degree: Eng. Physics (B.Tech.)+ Earth System Science(M.Tech.)	V Year	4	4	0	4	100.00
5	Master of Science: Astronomy and Astrophysics (Standalone)	I Year	11	4	0	4	100.00
6	Master of Science: Astronomy and Astrophysics (Standalone)	II Year	11	5	2	4	80.00
7	M.Tech.: Earth System Science (Standalone)	I Year	11	4	3	4	100.00
8	M.Tech.: Earth System Science (Standalone)	II Year	11	4	1	3	75.00

9	M.Tech.: Geoinformatics (Standalone)	I Year	11	9	3	9	100.00
10	M.Tech.: Geoinformatics (Standalone)	II Year	11	9	2	9	100.00
Total			86	55	11	53	

B. Details of Student Demand Ratio

Programme	No. of students applied	No. of students admitted	Comments	Suggestions
Dual Degree: Eng. Physics (B.Tech.)+ Astronomy & Astrophysics (M.Tech.)	7	7		
Dual Degree: Eng. Physics (B.Tech.)+ Earth System Science (M.Tech.)	4	4		
Master of Science: Astronomy and Astrophysics (Standalone)	150	5		
M.Tech.: Earth System Science (Standalone)	229	4		
M.Tech.: Geoinformatics (Standalone)	215	9		

C. Doctoral Degree

PhD	During the academic year			Degree awarded
	Sanctioned seats	No. of students admitted	Current student strength	
PART TIME	4	4	0	2
FULL TIME	5	5	0	2
Total	9	9	0	4

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	Dual Degree: Earth System Science	ESE553	Project Phase II	Core	18	
2	Dual Degree: Earth System Science	ESE554	Comprehensive Viva-Voce II	Core	2	
3	Dual Degree: Earth System Science	ESE552	Project Phase I	Core	14	

4	Dual Degree: Earth System Science	ESE411	Dynamics of Atmosphere	Core	3	
5	Dual Degree: Earth System Science	ESE412	Physical and Dynamical Oceanography	Core	3	
6	Dual Degree: Earth System Science	ESE413	Earth Resources and Tectonic Systems	Core	3	
7	Dual Degree: Earth System Science	ESE414	Radiation Processes in Atmosphere	Core	3	
8	Dual Degree: Earth System Science	ESE415	Atmospheric Thermodynamics and Cloud Physics	Core	3	
9	Dual Degree: Earth System Science	ESE431	Obeservational Techniques Lab	Core	1	
10	Dual Degree: Earth System Science	ESE432	Geology Lab	Core	1	
11	Dual Degree: Earth System Science	ESE461	Planetary Atmospheres	Core	3	
12	Dual Degree: Earth System Science	ESE462	Numerical Weather Prediction	Core	3	
13	Dual Degree: Earth System Science	ESE463	Planetary Geosciences	Core	3	
14	Dual Degree: Earth System Science	ESE467	Boundary Layer Meteorology	Core	3	
15	Dual Degree: Earth System Science	ESE472	Atmospheric and Oceanic Instrumentation and Measurement Techniques	Core	3	
16	Dual Degree: Earth System Science	ESE441	Elective Lab - I	Elective	1	
17	Dual Degree: Earth System Science	ESE442	Elective Lab II	Elective	1	
18	Dual Degree: Earth System Science	ESE451	Seminar	Core	2	

19	Dual Degree: Astronomy & Astrophysics	ESA553	Thesis Phase II	Core	17	
20	Dual Degree: Astronomy & Astrophysics	ESA551	Seminar II	Core	2	
21	Dual Degree: Astronomy & Astrophysics	ESA552	Thesis Phase I	Core	16	
22	Dual Degree: Astronomy & Astrophysics	ESA411	Astronomical Techniques	Core	3	
23	Dual Degree: Astronomy & Astrophysics	ESA412	Radiation Processes in Astrophysics	Core	3	
24	Dual Degree: Astronomy & Astrophysics	ESA413	Planetary Sciences	Core	3	
25	Dual Degree: Astronomy & Astrophysics	ESA414	Introduction to Programming and Data Handling	Core	3	
26	Dual Degree: Astronomy & Astrophysics	ESA431	Data Analysis Astronomy Lab	Core	1	
27	Dual Degree: Astronomy & Astrophysics	ESA421	Structure and Evolution of Stars	Core	3	
28	Dual Degree: Astronomy & Astrophysics	ESA422	Galaxies (Structure, Dynamics and Evolution)	Core	3	
29	Dual Degree: Astronomy & Astrophysics	ESA423	Cosmology	Core	3	
30	Dual Degree: Astronomy & Astrophysics	ESA463	High Energy Astrophysics	Core	3	
31	Dual Degree: Astronomy & Astrophysics	ESA441	Observational Astronomy Lab	Core	2	
32	Dual Degree: Astronomy & Astrophysics	ESA451	Seminar I	Core	2	
33	Dual Degree: Astronomy & Astrophysics	ESA452	Comprehensive Viva -Voce II	Core	2	

34	Dual Degree: Engineering Physics	ES322	Introduction to Earth, Atmosphere and Ocean Sciences	Core	3	
35	Dual Degree: Engineering Physics	ES323	Astrophysical Concepts	Core	3	
36	Master of Science: Astronomy and Astrophysics	ESA653	Seminar II	Core	2	
37	Master of Science: Astronomy and Astrophysics	ESA654	Thesis Phase I	Core	16	
38	Master of Science: Astronomy and Astrophysics	ESA655	Thesis Phase II	Core	17	
39	Master of Science: Astronomy and Astrophysics	ESA611	Introduction to Astronomy and Astrophysics	Core	3	
40	Master of Science: Astronomy and Astrophysics	ESA612	Astronomical Techniques	Core	3	
41	Master of Science: Astronomy and Astrophysics	ESA613	Radiation Processes in Astrophysics	Core	3	
42	Master of Science: Astronomy and Astrophysics	ESA614	Introduction to Programming and Data Handling	Core	3	
43	Master of Science: Astronomy and Astrophysics	ESA615	Planetary Sciences	Core	3	
44	Master of Science: Astronomy and Astrophysics	ESA631	Data Analysis Lab	Core	1	
45	Master of Science: Astronomy and Astrophysics	ESA621	Structure and Evolution of Stars	Core	3	
46	Master of Science: Astronomy and Astrophysics	ESA622	Galaxies (Structure, Dynamics and Evolution)	Core	3	
47	Master of Science: Astronomy and Astrophysics	ESA623	Cosmology	Core	3	
48	Master of Science: Astronomy and Astrophysics	ESA663	High Energy Astrophysics	Core	3	

49	Master of Science: Astronomy and Astrophysics	ESA641	Observational Astronomy Lab	Core	2	
50	Master of Science: Astronomy and Astrophysics	ESA651	Seminar I	Core	2	
51	Master of Science: Astronomy and Astrophysics	ESA652	Comprehensive Viva	Core	2	
52	M.Tech.: Thermal and Propulsion	ESA663	High Energy Astrophysics	Elective	3	
53	M.Tech.: Earth System Science	ESE654	Project	Core	14	
54	M.Tech.: Earth System Science	ESE655	Project (Midterm + Phase II + Thesis)	Core	18	
55	M.Tech.: Earth System Science	ESE611	Dynamics of Atmosphere	Core	3	
56	M.Tech.: Earth System Science	ESE612	Physical and Dynamical Oceanography	Core	3	
57	M.Tech.: Earth System Science	ESE613	Earth Resources and Tectonic Systems	Core	3	
58	M.Tech.: Earth System Science	ESE614	Radiation Processes in Atmosphere	Core	3	
59	M.Tech.: Earth System Science	ESE615	Atmospheric Thermodynamics and Cloud Physics	Core	3	
60	M.Tech.: Earth System Science	ESE631	Observational Techniques Lab	Core	1	
61	M.Tech.: Earth System Science	ESE632	Geology Lab	Core	1	
62	M.Tech.: Earth System Science	ESE661	Planetary Atmospheres	Core	3	
63	M.Tech.: Earth System Science	ESE662	Numerical Weather Prediction	Core	3	
64	M.Tech.: Earth System Science	ESE663	Planetary Geosciences	Core	3	
65	M.Tech.: Earth System Science	ESE667	Boundary Layer Meteorology	Core	3	
66	M.Tech.: Earth System Science	ESE672	Atmospheric and Oceanic Instrumentation and Measurement Techniques	Core	3	

67	M.Tech.: Earth System Science	ESE641	Elective Lab I	Elective	1	
68	M.Tech.: Earth System Science	ESE642	Elective Lab II	Elective	1	
69	M.Tech.: Earth System Science	ESE651	Seminar	Core	2	
70	M.Tech.: Earth System Science	ESE652	Comprehensive Viva-Voce	Core	2	
71	M.Tech.: Geoinformatics	ESG651	Dissertation - Phase I	Core	12	
72	M.Tech.: Geoinformatics	ESG655	Geospatial Outreach	Core	2	
73	M.Tech.: Geoinformatics	ESG656	Mini Project and Scientific Report Writing	Core	3	
74	M.Tech.: Geoinformatics	ESG657	Comprehensive Viva	Core	2	
75	M.Tech.: Geoinformatics	ESG652	Dissertation - Phase II	Core	15	
76	M.Tech.: Geoinformatics	ESG611	Introduction to Remote Sensing and Image Analysis	Core	3	
77	M.Tech.: Geoinformatics	ESG612	Geographic Information System	Core	3	
78	M.Tech.: Geoinformatics	ESG616	Scientific Computing for Geospatial Data Analysis	Core	2	
79	M.Tech.: Geoinformatics	ESG664	Photogrammetry	Core	3	
80	M.Tech.: Geoinformatics	ESG631	Remote Sensing and Image Analysis Lab	Core	1	
81	M.Tech.: Geoinformatics	ESG632	Geographic Information System Lab	Core	1	
82	M.Tech.: Geoinformatics	ESG633	Photogrammetry Lab	Core	1	
83	M.Tech.: Geoinformatics	ESG634	Scientific Computing for Geospatial Data Analysis Lab	Core	1	
84	M.Tech.: Geoinformatics	ESG623	Microwave Remote Sensing	Elective	3	

85	M.Tech.: Geoinformatics	ESG624	Pattern Recognition and Machine Learning	Core	3	
86	M.Tech.: Geoinformatics	ESG625	Analysis and Modelling of Geospatial Data	Core	3	
87	M.Tech.: Geoinformatics	ESE663	Planetary Geosciences	Elective	3	
88	M.Tech.: Geoinformatics	ESG665	Hyperspectral Image Processing and Analysis	Elective	3	
89	M.Tech.: Geoinformatics	ESG666	Satellite Based Positioning and LIDAR Remote Sensing	Elective	3	
90	M.Tech.: Geoinformatics	ESG667	Computer vision and Advanced Image Processing	Elective	3	
91	M.Tech.: Geoinformatics	ESG669	Remote Sensing and GIS for Atmospheric Science and Ocean Studies	Elective	3	
92	M.Tech.: Geoinformatics	ESG643	Pattern Recognition and Machine Learning Lab	Core	1	
93	M.Tech.: Geoinformatics	ESG644	Analysis and Modelling of Geospatial Data Lab	Core	1	
94	M.Tech.: Geoinformatics	ESG645	Hyperspectral Image Processing and Analysis Lab	Core	1	
95	Ph.D.: Course Work - January	ESG624	Pattern Recognition and Machine Learning	Credited	3	
96	Ph.D.: Course Work - January	ESE661	PLANETORY ATMOSPHERE	Credited	3	
97	Ph.D.: Course Work - January	ESA663	HIGH ENERGY ASTROPHYSICS	Credited	3	
98	Ph.D.: Course Work - January	ESA621	Structure and Evolution of Stars	Credited	3	
99	Ph.D.: Course Work - January	ES323	Astronomical Concepts	Institute Elective	3	

100	Ph.D.: Course Work - July	ESE613	Earth Resourses and Tectonic Systems	Credited	3	
101	Ph.D.: Course Work - July	ESE614	Radiation Processes in Atmosphere	Credited	3	
102	Ph.D.: Course Work - July	ESE615	Atmospheric Thermodynamics and Cloud Physics	Credited	3	
103	Ph.D.: Course Work - July	ESG616	Scientific Computing for Geosptical Data Analysis	Credited	1	
104	Ph.D.: Course Work - July	ESA611	Introduction to Astronomy ad Astrophysics	Credited	3	
105	Ph.D.: Course Work - July	ESA613	Radiation Processes in Astrophysics	Credited	3	
106	Ph.D.: Course Work - July	ESA612	Astronomical Techniques	Credited	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	EXCELLENT	yes	The quantitative overview demonstrates the comprehensive and research-oriented nature of the curriculum, emphasizing a balanced approach between theoretical knowledge, practical skills, and computational techniques	No suggestions

V Review on Teaching, Learning and Evaluation

Sl. No.	Criteria	Response based on criteria	Comments	Suggestions
1	Any innovative teaching methods/aids adopted?	No	No comments	No suggestions
2	Is any e-learning modules developed?	Yes Virtual mineral identification lab, simulated geological field trips, and online weather monitoring stations	No comments	No suggestions
3	**Student evaluation procedure**			

Criteria	Response	Comments	Suggestions
Course evaluation	Internal	No comments	No suggestions
Project evaluation	Internal External	No comments	No suggestions

4	**Evaluation components**

Criteria	Response	Comments	Suggestions
Theory	Continuous assesment and end semester exam	No comments	No suggestions
Lab	Continuous assesment and end semester exam	No comments	No suggestions
Project/ Internship/ Seminar	Mid term evaluaion and final evaluation		

5	**Continuous Assessment Components**

Theory	Quiz I Quiz II -	No comments	No suggestions
Lab	Class exercise evaluation End Semester Examination	No comments	No suggestions

6	Is there any remedial coaching to support weak performers?	Yes	Individual Tutoring: Personalized one-on-one sessions with instructors or teaching assistants to address specific areas of difficulty. Peer Tutoring Programs: Pairing students with peers who excel in the subject to foster collaborative learning and peer support.	No suggestions

7	Is academic feedback from students taken regularly?	Yes	No comments	No suggestions
8	What are the steps taken based on student's feedback?	Develop detailed plans for addressing concerns or implementing suggestions, including timelines and resource allocation. Involve teachers, administrators, and students to ensure all perspectives are considered in the solution.	No comments	Provide professional development opportunities for faculty based on feedback may be implemented
9	Is Class committee meetings conducted?	Yes Follow up with the students to ensure they are satisfied with the resolution and that the issue has been fully addressed. Seek feedback on whether the actions implemented have effectively resolved the problem.	No comments	No suggestions

VI Department faculty credentials

Sl. No.	Criteria	Response	Comments	Suggestions
1	Percentage of faculty with PhD	100	No Comments	No suggestions
2	No. of journal articles published	47	No Comments	No suggestions
3	No. of books published	0	No Comments	No suggestions
4	No. of book chapters published	2	No Comments	No suggestions
5	No. of invited talks/ conferences/ workshops attended	43	No Comments	No suggestions
6	No. of research projects funded by IIST	0	No Comments	No suggestions
7	No. of research projects funded through ASRG/IIST-ISRO/DoS	5	No Comments	No suggestions
8	No. of externally funded research projects like CSIR, DST, DRDO etc.	5	No Comments	No suggestions
9	No. of patents published/ awarded	1	No Comments	No suggestions
10	No. of patents filed	0	No Comments	No suggestions

11	No. of faculty/student awards received	7	No Comments	No suggestions
12	No. of conferences/Workshops/ seminars/Colloquium Organized	4	No Comments	No suggestions
13	No. of conference paper published	26	No Comments	No suggestions
14	No. of visits made by the faculty/ student for research collaborations/invited talks/ conferences abroad	0	No Comments	No suggestions
15	No. of Industry collaborative projects	0	No Comments	No suggestions
16	No. of ISRO mission related projects/ activities	1	No Comments	No suggestions
17	No. of consultancy services entertained	0	No Comments	No suggestions

VIII Details of student co-curricular activities

Criteria	Response	Comments	Suggestions
Whether students are involved in extra curricular & co-curricular activities?	Yes Astronomy Club, Field trips to geological sites, rock and mineral identification workshops, guest lectures from geologists, and participation in geological surveys	No Comments	No Suggestions
Whether students are doing internship abroad?	Yes Externally sponsored	ANU,Australia Niigata University, Japan	No Suggestions
Whether students are doing internship at national academic institutes / universities?	Yes IIST funded	NARL, NRSC, Aries, SPL	No Suggestions
Whether students are doing internship at ISRO/ Industries/ R&D institutes?	No	No comments	Industry involvement needs to be encouraged
Whether the department conducts outreach programs?	No	No comments	More outreach program needs
Whether department has alumni activities?	No	No comments	Alumni meeting needs to be conducted

IX Details of placement/ higher studies of students

Criteria	UG	PG	PhD	Comments	Suggestions
No. of students placed	0	16	4	No comments	No suggestions
No. of students opted for higher studies	0	6	0	No comments	No suggestions
No. of students cleared GATE/ SLET/ NET/ CSIR/ UGC/ Others etc.	0	0	0	No comments	No suggestions

X Infrastructure in the Department

Sl. No.	Criteria	Response	Comments	Suggestions
1	No. of classrooms	3	No comments	No suggestions
2	No. of seminar/ conference rooms	0	No comments	No suggestions
3	No. of instruction labs	4	No comments	No suggestions
4	No. of research labs	4	No comments	No suggestions
5	No. of full-fledged e-learning classrooms	0	No comments	No suggestions
6	No. of computing labs	0	No comments	No suggestions
7	Is there any lab with potential for centre of excellence?	Yes, Climate Observatory in Ponmudi	No comments	No suggestions
8	Is there any labs sponsored by external agency?	No	No comments	No suggestions
9	Inter-disciplinary research facility	No	No comments	No suggestions
10	Is there any common amenities like restroom, recreation club, etc.?	Yes, Restroom:2 Recreation club:1	No comments	No suggestions
11	Is there any facilities for differently abled?	Yes, Lift and Ramp	No comments	No suggestions
12	Is there any Department library?	No	No comments	No suggestions

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)?	Yes
2.	Do the courses offered in each programme by the department provide the Course Objectives and Course Outcomes (COs) written in clear terms?	Yes
3.	Give the status of adopting Choice Based Credit System (CBCS) in the programmes offered by the department	Action Initiated
4.	Give the status of adopting Objective Based Education (OBE) in the programmes offered by the department.	Not yet initiated
5.	Satisfaction level of support of academic, administrative, and other support units of the institution	Excellent
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	
8.	List Faculty Development Programme conducted (any programme aiming at updating the knowledge of faculty of the department).	
9.	Does students take projects involving Field work/Survey. If yes, give the list.	
10.	The List of MoU and MoAs, that are currently operational during the year.	

11.	Detail the mechanism adopted to help academically disadvantaged students to cope with academic requirements	Advisors guide students on course selection, study plans, and academic goals. For disadvantaged students, advisors can help with creating customized academic plans and recommending appropriate resources. Psychological and academic counseling helps students cope with stress, anxiety, or other issues that might hinder their academic performance. Mentoring programs provide role models and offer guidance on both academic and personal growth
12.	Detail the mechanism adopted to help students who perform very much below the class averages	Peer mentoring provides struggling students with guidance and support from more experienced students. Mentors can offer academic advice, study tips, and emotional support, helping mentees navigate their academic challenges.
13.	The total grant/revenue generated/received from different agencies by the department conducting research projects/consultancy services during the year.	
14.	The suggestions to improve the efficiency and effectiveness of the IIST system.	

XIII Strength of the Department (maximum 150 words)
XIV Weakness of the Department (maximum 150 words)
XV Challenges (maximum 150 words)
XVI Opportunities (maximum 150 words)
XVII Any other details relevant to the department
Final Recommendations

On the day of visit, 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:

Signature of Committee Members

1. **Dr. Govindan Kutty M**, Associate Professor, Earth & Space Sciences: .....
2. **Dr. Rama Rao Nidamanuri**, Professor, Earth & Space Sciences: .....
3. **Dr. Deepak Mishra**, Professor, Avionics: .....
4. **Dr. Anand Narayanan**, Professor, Earth & Space Sciences: .....

Approved by,

Dean Academics,

प्रोफ. कुरुविळा जोसफ़/Prof. Kuruvilla Joseph
डीन (शैक्षिणी), आईआईएसटी
Dean (Academics), IIST