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Indian Institute of Space Science and Technology

Thiruvananthapuram 695 547

Department of Mathematics

Academic Audit Report

2023-2024

Academic audit committee

Internal members

Sl.No.	Faculty Name	Role
1	Dr. C. V. Anil Kumar, Professor, Mathematics	Chairman
2	Dr. T. G. Deepak, Professor, Mathematics	Member
3	Dr. Kaushik Mukherjee, Associate Professor, Mathematics	Member
4	Dr. Sarvesh Kumar, Professor, Mathematics	Member

External members

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

I Department profile

1	No. of Permanent Faculty Members	11
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)	3
8	No. of JRFs/ SRF/ JPF (excluding PhD students)	0
9	No. of Project Fellows	0

10	No. of Research Associates	2
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	M.Tech.: Machine Learning and Computing (Standalone)	I Year	20	14	2	0	0.00
2	M.Tech.: Machine Learning and Computing (Standalone)	II Year	20	12	2	12	100.00
Total			40	26	4	12	

B. Details of Student Demand Ratio

Programme	No. of students applied	No. of students admitted	Comments	Suggestions
M.Tech.: Machine Learning and Computing (Standalone)	192	14		

C. Doctoral Degree

PhD	During the academic year			Degree awarded
	Sanctioned seats	No. of students admitted	Current student strength	
PART TIME	0	0	0	0
FULL TIME	15	7	29	2
Total	15	7	29	2

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	MA835	Nonlinear Dynamics and Methods	Institute Elective	3	
2	B.Tech.: Aerospace Engineering	MA311	Probability, Statistics and Numerical Methods	Core	3	
3	B.Tech.: Aerospace Engineering	MA211	Linear Algebra, Complex Analysis and Fourier Series	Core	3	

4	B.Tech.: Aerospace Engineering	MA221	Integral Transforms, PDE and Calculus of Variations	Core	3	
5	B.Tech.: Aerospace Engineering	MA111	Calculus	Core	4	
6	B.Tech.: Aerospace Engineering	MA112	Computer Programming and Applications	Core	3	
7	B.Tech.: Aerospace Engineering	MA121	Vector Calculus and Ordinary Differential Equations	Core	3	
8	B.Tech.: Electronics and Communication Engineering(Avionics)	MA311	Probability, Statistics and Numerical Methods	Core	3	
9	B.Tech.: Electronics and Communication Engineering(Avionics)	MA211	Linear Algebra, Complex Analysis and Fourier Series	Core	3	
10	B.Tech.: Electronics and Communication Engineering(Avionics)	MA221	Integral Transforms, PDE and Calculus of Variations	Core	3	
11	B.Tech.: Electronics and Communication Engineering(Avionics)	MA111	Calculus	Core	4	
12	B.Tech.: Electronics and Communication Engineering(Avionics)	MA112	Computer Programming and Applications	Core	3	
13	B.Tech.: Electronics and Communication Engineering(Avionics)	MA121	Vector Calculus and Ordinary Differential Equations	Core	3	
14	Dual Degree: Solid State Physics	MA835	Nonlinear Dynamics and Methods	Institute Elective	3	
15	Dual Degree: Engineering Physics	MA311	Probability, Statistics and Numerical Methods	Core	3	
16	Dual Degree: Engineering Physics	MA211	Linear Algebra, Complex Analysis and Fourier Series	Core	3	
17	Dual Degree: Engineering Physics	MA221	Integral Transforms, PDE and Calculus of Variations	Core	3	
18	Dual Degree: Engineering Physics	MA111	Calculus	Core	4	
19	Dual Degree: Engineering Physics	MA112	Computer Programming and Applications	Core	3	

20	Dual Degree: Engineering Physics	MA121	Vector Calculus and Ordinary Differential Equations	Core	3	
21	M.Tech.: RF and Microwave Engineering	MA615	Advanced Engineering Mathematics	Core	3	
22	M.Tech.: Digital Signal Processing	MA619	Advanced Mathematics	Core	4	
23	M.Tech.: Digital Signal Processing	MA873	Graphical Models and Deep learning	Elective	3	
24	M.Tech.: Control Systems	MA619	Advanced Mathematics	Core	4	
25	M.Tech.: Power Electronics	MA619	Advanced Mathematics	Core	4	
26	M.Tech.: Geoinformatics	MA812	Mathematical Methods	Core	3	
27	M.Tech.: Machine Learning and Computing	MA851	Seminar	Core	1	
28	M.Tech.: Machine Learning and Computing	MA852	Project Work - Phase I	Core	14	
29	M.Tech.: Machine Learning and Computing	MA853	Project Work – Phase II	Core	17	
30	M.Tech.: Machine Learning and Computing	MA611	Optimization Techniques	Core	3	
31	M.Tech.: Machine Learning and Computing	MA613	Data Mining	Core	3	
32	M.Tech.: Machine Learning and Computing	MA617	Numerical Linear Algebra	Core	3	
33	M.Tech.: Machine Learning and Computing	MA618	Foundations of Machine Learning	Core	3	
34	M.Tech.: Machine Learning and Computing	MA632	Data Modelling Lab I	Core	2	
35	M.Tech.: Machine Learning and Computing	MA633	Data Mining Lab	Core	1	
36	M.Tech.: Machine Learning and Computing	MA634	Foundations of Machine Learning Lab	Core	1	
37	M.Tech.: Machine Learning and Computing	MA625	Statistical Models & Analysis	Core	3	
38	M.Tech.: Machine Learning and Computing	MA873	Graphical Models and Deep learning	Elective	3	
39	M.Tech.: Machine Learning and Computing	MA642	Data Modelling Lab II	Core	2	
40	M.Tech.: Machine Learning and Computing	MA643	Statistical Modelling Lab	Core	1	
41	M.Tech.: Machine Learning and Computing	MA644	Advanced Machine Learning Lab	Core	1	
42	M.Tech.: Machine Learning and Computing	MA872	Advanced Optimization	Elective	3	
43	Ph.D.: Course Work - January	MA624	Advanced Machine Learning	Elective	3	No Registration

44	Ph.D.: Course Work - January	MA873	Graphical and Deep Learning Models	Elective	3	No Registration
45	Ph.D.: Course Work - January	MA812	Mathematical Methods	Elective	3	No Registration
46	Ph.D.: Course Work - July	MA611	Optimization Techniques	Elective	3	No Registration
47	Ph.D.: Course Work - July	MA613	Data Mining	Elective	3	No Registration
48	Ph.D.: Course Work - July	MA617	Numerical Linear Algebra	Elective	3	No Registration
49	Ph.D.: Course Work - July	MA618	Foundations of Machine Learning	Elective	3	No Registration
50	Ph.D.: Course Work - July	MA619	Advanced Mathematics	Elective	3	No Registration
51	Ph.D.: Course Work - July	MA812	Mathematical Methods	Elective	3	No Registration

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	no		

V Review on Teaching, Learning and Evaluation

Sl. No.	Criteria	Response based on criteria	Comments	Suggestions
1	Any innovative teaching methods/aids adopted?	No		
2	Is any e-learning modules developed?	Yes New techniques implemented. Lecture notes were prepared and uploaded in website.		
3	**Student evaluation procedure**			

Criteria	Response	Comments	Suggestions
Course evaluation	Internal		
Project evaluation	Internal External		

4	**Evaluation components**

Criteria	Response	Comments	Suggestions
Theory	Continuous assesment and end semester exam, Continuous assesment and course project	50% weightage for quizes, assignments etc., and 50% weightage for end semester examination.	
Lab	Continuous assesment and end semester exam		
Project/ Internship/ Seminar	Mid term evaluaion and final evaluation Final evaluation	30% supervisor evaluation, 20% mid semester evaluation and 50% end semester evaluation	

5	**Continuous Assessment Components**

	Theory	Quiz I Quiz II Others - assignment, surprise test and mini project		
	Lab	Class exercise evaluation End Semester Examination		
6	Is there any remedial coaching to support weak performers?	Yes	In summer three weeks remedial coaching for backlog students were conducted	
7	Is academic feedback from students taken regularly?	Yes	Feedback for each course is taken.	
8	What are the steps taken based on student's feedback?	Proper action were taken by individual faculty members against critical comments.		
9	Is Class committee meetings conducted?	Yes Class committee meetings were conducted by departments, which are offering the programme and the faculty handled the courses were attended.		

VI Department faculty credentials

Sl. No.	Criteria	Response	Comments	Suggestions
1	Percentage of faculty with PhD	100		
2	No. of journal articles published	21		
3	No. of books published	1		
4	No. of book chapters published	1		
5	No. of invited talks/ conferences/ workshops attended	37		
6	No. of research projects funded by IIST	0		
7	No. of research projects funded through ASRG/IIST-ISRO/DoS	1		
8	No. of externally funded research projects like CSIR, DST, DRDO etc.	1		
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	3		
13	No. of conference paper published	7		
14	No. of visits made by the faculty/ student for research collaborations/ invited talks/conferences abroad	2		
15	No. of Industry collaborative projects	0		
16	No. of ISRO mission related projects/ activities	0		
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		
Whether students are doing internship abroad?	No		
Whether students are doing internship at national academic institutes / universities?	Yes IIST funded Externally sponsored Self sponsored		
Whether students are doing internship at ISRO/ Industries/ R&D institutes?	Yes IIST funded Externally sponsored Self sponsored		
Whether the department conducts outreach programs?	Yes YTN-2024	Young Talent Nurture (YTN) is an outreach programme for B.Sc final year students. 40 participants were selected from all over India.	
Whether department has alumni activities?	Yes Mentoring and helping in placement.		

IX Details of placement/ higher studies of students

Criteria	UG	PG	PhD	Comments	Suggestions
No. of students placed	0	12	0	No UG programme under Mathematics. MTech students placed in various companies.	
No. of students opted for higher studies	0	0	0		
No. of students cleared GATE/ SLET/ NET/ CSIR/ UGC/ Others etc.	0	0	0	Not Applicable	

X Infrastructure in the Department

Sl. No.	Criteria	Response	Comments	Suggestions
1	No. of classrooms	1		
2	No. of seminar/ conference rooms	1		
3	No. of instruction labs	2		
4	No. of research labs	1		
5	No. of full-fledged e-learning classrooms	1		
6	No. of computing labs	1		
7	Is there any lab with potential for centre of excellence?	No		
8	Is there any labs sponsored by external agency?	No		
9	Inter-disciplinary research facility	No		
10	Is there any common amenities like restroom, recreation club, etc.?	Department is having a room for conducting Maths club activities.		
11	Is there any facilities for differently abled?	Lift, Ramp and Toilet		

12	Is there any Department library?	No		

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.	Implemented
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 Alumni Employers Academic Peers
7.	The list of extension programmes conducted by the department	Young Talent Nurture (YTN) programme is an outreach programme in Mathematics for B.Sc final year students.
8.	List Faculty Development Programme conducted (any programme aiming at updating the knowledge of faculty of the department).	NIL
9.	Does students take projects involving Field work/Survey. If yes, give the list.	No
10.	The List of MoU and MoAs, that are currently operational during the year.	NIL
11.	Detail the mechanism adopted to help academically disadvantaged students to cope with academic requirements	Academically disadvantaged students are identified by the the concerned faculty members and they extended support by supplying the extra study materials for improving their learning
12.	Detail the mechanism adopted to help students who perform very much below the class averages	We advice such students to have personal interaction with the faculty members and encourage them to solve more problems
13.	The total grant/revenue generated/received from different agencies by the department conducting research projects/consultancy services during the year.	INR 319480(IDST Indo_Russion Project) INR 1320000 (SERB)
14.	The suggestions to improve the efficiency and effectiveness of the IIST system.	To plan the academic activities in the beginning of the academic session

XIII Strength of the Department (maximum 150 words)

Faculty members are having Research collaborations with reputed National and International institutions such as Monash University, University of Chile, etc. Moreover faculty members are having externally funded projects from NBHM, Geodesy, etc. Courses offered for B.Tech and M.Tech students are aligned with the requirement of space related activities. M.Tech Machine Learning and Computing students are all getting placed.

XIV Weakness of the Department (maximum 150 words)

Limited Computational Facility. Number of external projects were not adequate. Research collaboration with reputed institutes is lacking. Less number of Ph.D students.

XV Challenges (maximum 150 words)

Generating Research related avenues for getting jobs in academic and other fields. Publishing papers with good impact factor.

XVI Opportunities (maximum 150 words)

Faculty members encouraged to submit Research proposal to ISRO. Student exchange programs.

XVII Any other details relevant to the department

Department invites External Expert for delivering lectures. Faculty Members used to give lectures in FDP workshops and Conferences. Departments is having a Mathematics Club with Students and faculties, and this club organize monthly talks.

Final Recommendations

Teaching and research activities of the Department during this period is good. The facilities and opportunities available are adequate. However there are scope for improvement. * Department should be strengthened with addition of faculties and programs. * Computational facility need to be improved. * Institutional support for conducting Workshops and training programs in Department. * integrated BS-MS program in Mathematics and Computing may be started. * Department Library may be established. * Lab as well as activity space may be increased. * Number of Ph.D students may be increased.

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. C. V. Anil Kumar**, Professor, Mathematics: .....

2 **Dr. T. G. Deepak**, Professor, Mathematics: .....

3 **Dr. Kaushik Mukherjee**, Associate Professor, Mathematics: .....

4 **Dr. Sarvesh Kumar**, Professor, Mathematics: .....

20/01/2025

डॉ. दीपक टी जी/Dr. Deepak T G
आचार्य/Professor
गणित विभाग/Department of Mathematics
भारतीय अंतरिक्ष विज्ञान एवं प्रौद्योगिकी संस्थान
Indian Institute of Space Science and Technology
अंतरिक्ष विभाग, भारत सरकार
Department of Space, Government of India
तिरुवनंतपुरम/Thiruvananthapuram - 695 547

Approved by,

23 JAN 2025

Dean Academics,
IIST

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