Indian Institute of Space Science and Technology

Thiruvananthapuram 695 547

Department of Chemistry

Academic Audit Report

2022-2023

Academic audit committee

Internal members

Sl.No.	Faculty Name	Role
1	**Dr. K. Y. Sandhya, Professor, Chemistry**	Chairman
2	**Dr. Nirmala R. James, Professor, Chemistry**	Convenor
3	**Dr. Sarita Vig, Professor, Earth & Space Sciences**	Member

External members

Sl. No.	Name	Designation	Email	Mobile	Name of the Institute	Role
1	**Dr. A Sujith**	Professor	sujith@nitc.ac.in		NIT Calicut	Member
2	**Dr.T.K.Manojkumar**	Professor and Dean	manojtk@duk.ac.in		Digital University,Trivandrum	Member

I Department profile

1	No. of Permanent Faculty Members	8
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)	4
9	No. of Project Fellows	3
10	No. of Research Associates	1
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	M.Tech.: Materials Science and Technology (Standalone)	I Year	0	4	0	4	100.00
2	M.Tech.: Materials Science and Technology (Standalone)	II Year	0	8	0	8	100.00
Total			0	12	0	12	

B. Details of Student Demand Ratio

Programme	No. of students applied	No. of students admitted	Comments	Suggestions
M.Tech.: Materials Science and Technology (Standalone)	0	0		

C. Doctoral Degree

PhD	During the academic year			Degree awarded
	Sanctioned seats	No. of students admitted	Current student strength	
PART TIME	0	0	12	1
FULL TIME	0	6	19	2

Total	0	6	31	3

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	CH311	Environmental Science and Engineering	Elective	2	NA
2	B.Tech.: Aerospace Engineering	CH111	Chemistry	Core	3	NA
3	B.Tech.: Aerospace Engineering	CH121	Materials Science and Metallurgy	Core	3	NA
4	B.Tech.: Aerospace Engineering	CH141	Chemistry Lab	Core	1	NA
5	B.Tech.: Electronics and Communication Engineering(Avionics)	CH311	Environmental Science and Engineering	Core	2	NA
6	B.Tech.: Electronics and Communication Engineering(Avionics)	CH111	Chemistry	Core	3	NA
7	B.Tech.: Electronics and Communication Engineering(Avionics)	CH121	Materials Science and Metallurgy	Core	3	NA
8	B.Tech.: Electronics and Communication Engineering(Avionics)	CH141	Chemistry Lab	Core	1	NA
9	Dual Degree: Engineering Physics	CH321	Environmental Science and Engineering	Core	2	NA
10	Dual Degree: Engineering Physics	CH111	Chemistry	Core	3	NA
11	Dual Degree: Engineering Physics	CH121	Materials Science and Metallurgy	Core	3	NA
12	Dual Degree: Engineering Physics	CH141	Chemistry Lab	Core	1	NA
13	M.Tech.: Structures and Design	CHM624	Aerospace Materials	Elective	3	NA
14	M.Tech.: Materials Science and Technology	CHM851	Project I	Core	10	Revised in May 2019

15	M.Tech.: Materials Science and Technology	CHM854	Summer Internship	Core	2	Revised in May 2019
16	M.Tech.: Materials Science and Technology	CHM855	Seminar	Core	1	Revised in May 2019
17	M.Tech.: Materials Science and Technology	CHM852	Project II	Core	16	Revised in May 2019
18	M.Tech.: Materials Science and Technology	CHM853	Comprehensive Viva	Core	2	Revised in May 2019
19	M.Tech.: Materials Science and Technology	CHM611	Fundamentals of Materials Science	Core	3	Revised in May 2019
20	M.Tech.: Materials Science and Technology	CHM612	Applied Mathematics and Process Modelling	Core	3	Revised in May 2019
21	M.Tech.: Materials Science and Technology	CHM614	Materials Characterization Techniques	Core	3	Revised in May 2019
22	M.Tech.: Materials Science and Technology	CHM615	Nanoscience and Technology	Core	3	Revised in May 2019
23	M.Tech.: Materials Science and Technology	CHM863	Computational Materials Science	Elective	3	Revised in May 2019
24	M.Tech.: Materials Science and Technology	CHM872	Fundamentals of Polymer Science	Elective	3	Revised in May 2019
25	M.Tech.: Materials Science and Technology	CHM631	Applied Mathematics and Process Modelling Lab	Core	1	Revised in May 2019
26	M.Tech.: Materials Science and Technology	CHM633	Materials Synthesis and Characterization Lab	Core	1	Revised in May 2019
27	M.Tech.: Materials Science and Technology	CHM621	Processing and Design of Materials	Core	3	Revised in May 2019
28	M.Tech.: Materials Science and Technology	CHM623	Composites Science and Technology	Core	3	Revised in May 2019
29	M.Tech.: Materials Science and Technology	CHM624	Aerospace Materials	Core	3	Revised in May 2019

30	M.Tech.: Materials Science and Technology	CHM865	Thin Films and Surface Engineering	Elective	3	Revised in May 2019
31	M.Tech.: Materials Science and Technology	CHM868	Advanced Characterization Techniques	Elective	3	Revised in May 2019
32	M.Tech.: Materials Science and Technology	CHM877	Electrochemical Energy Storage Systems	Elective	3	Revised in May 2019
33	M.Tech.: Materials Science and Technology	CHM641	Composite and Processing Lab	Core	1	Revised in May 2019
34	M.Tech.: Materials Science and Technology	CHM644	Aerospace Materials Lab	Core	1	Revised in May 2019
35	Ph.D.: Course Work - January	CHM621	Processing & Design of Materials	Credited	3	Revised in May 2019
36	Ph.D.: Course Work - January	CHM623	Composite Science & Technology	Credited	3	Revised in May 2019
37	Ph.D.: Course Work - January	CHM624	Aerospace Materials	Credited	3	Revised in May 2019
38	Ph.D.: Course Work - January	CHM868	Advanced Characterization Techniques	Credited	3	Revised in May 2019
39	Ph.D.: Course Work - January	CHM877	Electrochemical Energy Storage Systems	Credited	3	Revised in May 2019
40	Ph.D.: Course Work - January	CHM872	Fundamentals of Polymer Science	Credited	3	Revised in May 2019
41	Ph.D.: Course Work - July	CHM611	Fundamentals of Materials Science	Credited	0	Revised in May 2019
42	Ph.D.: Course Work - July	CHM612	Applied Mathematics & Process Modelling	Credited	0	Revised in May 2019
43	Ph.D.: Course Work - July	CHM614	Materials Characterization Techniques	Credited	0	Revised in May 2019
44	Ph.D.: Course Work - July	CHM615	Nanoscience and Technology	Credited	0	Revised in May 2019
45	Ph.D.: Course Work - July	CHM872	Fundamentals of Polymer Science	Credited	0	Revised in May 2019
46	Ph.D.: Course Work - July	CHM863	Computational Materials Science	Credited	0	Revised in May 2019

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		yes	In May 2019 the complete curriculum of M.Tech in materials Science and Technology was revised	

V Review on Teaching, Learning and Evaluation

Sl. No.	Criteria	Response based on criteria	Comments	Suggestions
1	Any innovative teaching methods/ aids adopted?	Yes For all the post graduate courses, students are required to conduct seminars on the assigned topics. This would help them to improve their understanding of the topic as well as presentation skills. Post graduate students perform th	Students are well exposed to different aspects of the curriculum.	
2	Is any e-learning modules developed?			
3	**Student evaluation procedure**			

Criteria	Response	Comments	Suggestions
Course evaluation			
Project evaluation			

4	**Evaluation components**			
Criteria		**Response**	**Comments**	**Suggestions**
Theory		Continuous assesment and end semester exam	Second Year M. Tech projects are being evaluated four times, ie two mid term evaluations and two end semester evaluations. During the mid-term evaluations, students are given suggestions to improve the quality and quantity of the work.	
Lab		Continuous assesment and end semester exam		

Project/ Internship/ Seminar		Mid term evaluaion and final evaluation		
5	**Continuous Assessment Components**			
	Theory	Quiz I Quiz II Others - Assignments, mini projects, seminars	two quizzes are conducted in the mid of the semesters for 1 hr duration. Depending upon the courses, students are given assignments, mini projects etc. For some of the courses, especially, for M. Tech courses, all students are given opportunity to present individual seminars. For B. tech courses, group seminar and presentations are arranged.	
	Lab	Class exercise evaluation End Semester Examination	B. Tech course (Chemistry Lab): Students are divided into four groups consisting of 35-40 students. Details of the experiment (lab manual) and schedule is shared with the students at the start of the semester. Lab tutors and Ph.D students demonstrate and explain the experiments to the students. After the completion of each experiment, students are evaluated for their performance, knowledge and the accuracy of the results obtained. They are awarded marks for each of the experiment. For the end semester examination, they have to perform an experiment and explain the theory and principle of another experiment. A short viva voce also is conducted. Final grade is decided based on the continuous assessment (30 %) and performance during the end semester examination.	

6	Is there any remedial coaching to support weak performers?	Yes	Institute assigns mentors for all the 1st year B. Tech students. They are in constant touch with the respective mentors. Weak students are given special care and the mentors contact the faculty members handling the courses and take appropriate actions.	
7	Is academic feedback from students taken regularly?	Yes	Institute take the feed back through online portal and the results and analysis is shared with the faculty members.	
8	What are the steps taken based on student's feedback?		Institute assigns mentors for all the 1st year B. Tech students. They are in constant touch with the respective mentors. Weak students are given special care and the mentors contact the faculty members handling the courses and take appropriate actions.	
9	Is Class committee meetings conducted?	Yes	For B.Tech courses, institute conducts the class committee meetings twice a semester with the concerned faculty members and student representatives. For M. Tech courses, the M. Tech coordinator convenes the meeting with all the students once in a semester.	

VI Department faculty credentials

Sl. No.	Criteria	Response	Comments	Suggestions
1	Percentage of faculty with PhD	100		
2	No. of journal articles published	41		
3	No. of books published	0		
4	No. of book chapters published	2		
5	No. of invited talks/ conferences/ workshops attended	8		
6	No. of research projects funded by IIST	0		
7	No. of research projects funded through ASRG/IIST-ISRO/DoS	5		

8	No. of externally funded research projects like CSIR, DST, DRDO etc.	5		
9	No. of patents published/ awarded	0		
10	No. of patents filed	1		
11	No. of faculty/student awards received	3		
12	No. of conferences/ Workshops/seminars/ Colloquium Organized	1	Department in collaboration with MRSI Trivandrum Chapter, organised NCMST,National conference on Recent Trends in Materials Science and Technology (NCMST-2022) during December 28-30-2022.	
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 Post graduate and Ph.D students take part in all the institute activities. They also assist in conduction of B. Tech practicals. All the students actively support organisation of ICMST/NCMST. This make them able to work harmoniously in team and instill in them the ability to organize and manage scientific events efficiently.		
Whether students are doing internship abroad?	No IIST funded	Australian National University July -August, 2023	

Whether students are doing internship at national academic institutes / universities?	No		
Whether students are doing internship at ISRO/ Industries/ R&D institutes?	Yes Self sponsored	M. Tech students carried out summer internship in the following institutes/industry TVS Hosur Hind High vacuum company pvt Ltd IIT varanasi	
Whether the department conducts outreach programs?	Yes	International conference on Materials Science and Technology was organised. Five students from other institutes were given opportunity to do internship in the department.	
Whether department has alumni activities?	Yes	Alumini activities initiated	

IX Details of placement/ higher studies of students

Criteria	UG	PG	PhD	Comments	Suggestions
No. of students placed	0	0	0	seperate sheet attached	
No. of students opted for higher studies	0	1	1	seperate sheet attached	
No. of students cleared GATE/ SLET/ NET/ CSIR/ UGC/ Others etc.	0	3	0	seperate sheet attached	

X Infrastructure in the Department

Sl. No.	Criteria	Response	Comments	Suggestions
1	No. of classrooms	3		
2	No. of seminar/ conference rooms	0		
3	No. of instruction labs	1		
4	No. of research labs	7		
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?		Yes Department has established centre for Nano Technology	

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.?	No		
11	Is there any facilities for differently abled?		Lift and ramp facilities are available	
12	Is there any Department library?	NO	Only Central Library	

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.	Action Initiated
5.	Satisfaction level of support of academic, administrative, and other support units of the institution	
6.	The status of taking feedback from stakeholders and expert groups for revision and design of curriculum of a programme.	Student
7.	The list of extension programmes conducted by the department	Organised one International conference as already mentioned,Five students from other institutes were given Opoortunity to carryout Internship
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.	Yes
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 faculty member and they are provided special classes and counselling
12.	Detail the mechanism adopted to help students who perform very much below the class averages	Weak students are identified by the faculty members and they are gprovidec special classes and counselling
13.	The total grant/revenue generated/received from different agencies by the department conducting research projects/consultancy services during the year.	Fund sanctioned for projects 141.77 Lakhs
14.	The suggestions to improve the efficiency and effectiveness of the IIST system.	

XIII Strength of the Department (maximum 150 words)

Department has eight faculty members. All are engaged in active research. This help the faculty members to impart updated knowledge to students in the respective fields, especially for the prost-graduate program. Department is in the process of strengthening the research facilities. Faculty members and students get opportunity to work in collaboration with ISRO centers. Postgraduate students get knowledge in the fundamentals, properties, characterisation and different classes of materials. They get practical knowledge through summer internship, and final year projects. Thus they become well equipped to join any industry/ research organisation. Post graduate students get opportunity to closely interact with Ph.D students, attend research seminars and all these activities instill in them aspiration for a research career. Students are from diverse backgrounds, different disciplines of engineering and science. By interaction, the students get opportunity to look into the diverse aspects of their project/research problems.

XIV Weakness of the Department (maximum 150 words)

Only one postgraduate programme is offered by the department. All the required characterization facilities are not available in the institute. Hence, research scholars have to depend on the facilities in other institutes, which often cause delay in the research work and progress.

XV Challenges (maximum 150 words)

Most of the post graduate students are from mechanical engineering/chemical engineering back ground. Most of the faculty members are from Chemistry back ground. Hence at times, conveying and assimilating the technical content of the topics becomes challenging.

XVI Opportunities (maximum 150 words)

Postgraduate get ample opportunities to join industry/ R&D organisations. They can opt for higher studies in any premier academic/research organisation. Postgraduate get ample opportunities to join industry/ R&D organisations. They can opt for higher studies in any premier academic/research organisation.

XVII Any other details relevant to the department

Final Recommendations

Regarding curriculum, the department may look into the possibility of incorporating introductory level AI/ML course for postgraduate students.

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. K. Y. Sandhya**, Professor, Chemistry: .....

2 **Dr. Nirmala R. James**, Professor, Chemistry: .....

3 **Dr. Sarita Vig**, Professor, Earth & Space Sciences: .....

4 **Dr. A Sujith**, Professor, NIT Calicut: .....

5 **Dr.T.K.Manojkumar**, Professor and Dean, Digital University,Trivandrum: .....

Approved by,

Dean Academics,
IIST

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