UNIVERSITY OF CALICUT
Academic & Administrative Audit of Teaching Departments (2016 -2021)
Report

Name of the Department: NANOSCIENCE AND TECHNOLOGY

Sl. No.	Item	Grade **A** - Excellent, **B** - Good **C** - Average **D** - Poor	Comments	Suggestions for improvement	Action Taken
I	Programmes Offered	B	Currently, the Department is offering only one academic program which is M.Tech. in Nanoscience & Technology.		We have now started two new PG programmes, MSc Physics (Nanoscience) and MSc Chemistry (Nanoscience) from 2022-23 AY onwards.
1	Relevance, adequacy, innovativeness etc. (3-8)	A	The topic is relevant, adequate and very innovative.	Industrial partnership and topics relevant for industry could be included.	Scientists from SCTIMST Trivandrum have agreed to teach a special course on “Materials in Medicine” for the MSc students and have also agreed to provide internship opportunity at their institute. In addition to that we have initiated steps to include an industry person as a member of our BoS for getting suggestions on improving the syllabus relevant to industry.
2	Demand ratio of courses (33,35,36)	B	Though the total number is seats is 10 up to year 2019 and 12 in year 2020, the total seats have not been filled fully.	Wide publicity through national newspapers should be given so as to attract more students to the program.	We have taken proper measures in this regard for providing wide publicity to our new programs and have successfully

					admitted 10 M.Sc. Chemistry (Nanoscience) and 10+1 M.Sc. Physics (Nanoscience) students from AY 2022-23.
3	Syllabus & curriculum (10,11, 46)	B	The syllabi is revised from time to time and currently following the OBE pattern. The course is having thrust on energy and bio- applications.	Few more electives in the context of water, environment securities could also be considered in future.	In our new M.Sc. program, more elective courses are offered in which a course titled “Nanomaterials for Photocatalysis and Solar Fuel Generation” majorly focuses on finding solutions to freshwater conservation, wastewater treatment and environmental remediation by converting CO2 to useful fuel.
4	Examination & Results (9, 34, 37)	A	Very good scheme is being followed. 100% pass of students is commendable.	NIL	We are happy to note this comment. Thank you.
II	**Faculty**				
1	Strength (12, 14, 15)	C	The faculty strength is very poor. The posts are not filled yet which is a major drawback towards the progress of such an innovative course. Most of the faculty are guest/ad-hoc and the courses could be taught. In the context of sustainability of such an innovative academic program, more faculty members should be appointed.	Appointment of the sanctioned positions should be done and the faculty strength should also be increased in the subsequent years.	We have requested our University for considering the appointment of more permanent faculty for the growth of our department.
2	Student teacher ratio (16)	B	With the present in take of students, the ratio is acceptable.	If the total number of seats is full, the ratio should be addressed for which appointment of faculty members towards the sanctioned positions should be met	Our university has been asked to consider the appointment of more permanent faculty so as to meet the shortfalls in our department as soon as possible

				immediately.	
3	Qualification, experience diversity, performance etc. (13, 41, 48)	B	The permanent faculty members are having excellent academic and research background.	The guest faculty members could contribute significantly to the teaching of the courses but their contributions to overall research have limitations.	This is an unfortunate situation, but our guest faculty are encouraged to pursue research and are given the responsibility to guide student projects.
4	Participation of faculty in Professional development programmes, Seminars, Workshops etc. (26-27)	A	The permanent faculty members are very vibrant.	More national and international programs need to be organized by the faculty on a regular basis. This will help them for international networking and thereby joint research proposals and mobility of students particularly with international research community.	We are working towards this goal.
5	Recognitions received by faculty from notable institutions (state, national or international) (28-30)	A	The faculty members have received both national and international recognitions.	The faculty members are very young and they will have more recognitions in the coming years.	We thank you for the support. Recently, our faculty Dr. Kishore Sridharan was recognized as a Member of International Scientific Committee: The 3rd International Workshop Advances on Photocatalysis (AdvPhotoCat-EE2021).
III	Research				

1	Thrust area (18)	A	The areas of research of the faculty members are relevant.	More interdisciplinary collaborative research topics should be taken up by the faculty members.	We have initiated more interdisciplinary research activity by promoting inter and intra-departmental collaboration. For instance, Dr. Kishore Sridharan is a joint guide of a Ph.D. student (Ms. Amritha M.S.) in the Dept. of Botany and has published a review article titled “Priming with Nanoscale Materials for Boosting Abiotic Stress Tolerance in Crop Plants” in the “*Journal of Agricultural and Food Chemistry*”. Similarly, a few more collaborated work has been initiated and the data is being collected.
2	Facilities (21, 22)	B	The basic facilities have been established. It is very difficult for the faculty members to establish high end facilities suddenly. More national and international projects should be submitted to tap funds to establish facilities.	The faculty members should be encouraged to use national facilities and collaborative research with institutions within the country and abroad.	We have initiated steps in this regard and are using the Central Instrumentation facilities located in various Universities and Institutes. Last year, we published three articles in collaboration with faculty from Institutes in Japan, UK, Brazil, and Hong Kong. Similarly, we have initiated some more collaborations with other Institutions and the data are being verified and validated for publications in the near future.

3	Publications (23)	B	With the limited resources, the faculty members are publishing research papers in peer reviewed journals of international repute.	NIL	We are happy to note this comment. Thank you.
4	Patents (24)	B	The attempts made by the faculty members to procure patents is appreciable.	The University should establish a Patent facilitating office to promote patent filing by the faculty	University has initiated action in this regard in collaboration with CUSAT.
5	Consultancy (25)	C	Though there are limitations for this, faculty can take up this as a challenge.		Department faculty members are already helping students from various colleges outside the university to complete their major or minor projects. Furthermore, we support students, teachers, and other scholars with experimental analyses using the department's facilities.
6	Projects (19)	B	Taping funds through national international projects is highly competitive. The sincere efforts of the faculty is really appreciable.	The University should encourage the faculty to submit proposals and the procedure should be facilitated through a 'Green Channel' mechanism. Though the research is encouraged, most of the time the efforts of faculty members may not be recognized. A note of appreciation to the faculty members who bring funds to the University will be improve the morale and enthusiasm.	All the faculty are striving hard to get funds and of course appreciation would definitely boost our morale.
7	External Funding (all funds secured by faculty other than normal grants received by the	B	The external funding is highly competitive, and the present number of projects received by the faculty members is highly	The hard work of faculty members is appreciable.	We are happy to note this comment. Thank you.

	University) (20)		commendable.		
IV	Students				
1	Student achievements (state, national, international) (31)	D	No mention about the participation of students in extra-curricular activities.		So far, our student strength was less. Now, the students who have joined for the newly inaugurated M.Sc. programmes are expected to actively participate in extra-curricular activities and sports.
2	Diversity (male female ratio, from within the state, outside the state and international) (33, 38)	C	The male-female ratio with the present number of students is alright.	Nationwide advertisement of the program will help to attract students from other states. Few seats could be reserved exclusively for them. For example, if we mention the total number of seats as 10+2 (*1 students from outside the state, *1 international students).	Our University has reserved two seats exclusively for other state students. In the future we will provide wide publicity through social media for attracting students to join the programme.
3	Student Progression (39, 40, 49)	D	NIL	Students with GATE score should be attracted for the program. For this wide interaction with the University departments of the state, colleges should be carried out.	We have started M.Sc. Physics (Nanoscience) and M.Sc. Chemistry (Nanoscience) in lieu of our M.Tech. programme such that good quality B.Sc. students who are admitted through an entrance examination can be motivated to pursue a career in research.

4	Financial support to Students (45)	C	NIL		
V	Support Staff (Strength, Adequacy etc.)	NA	The details of support staff such as administrative staff, technical staff of the department are not available.	NIL	We have two support staff and have requested technical staff for conducting laboratory experiments.
VI	Teaching- learning & Evaluation (47)	B	Only the permanent faculty members are using ICT based teaching process. The details of guest faculty/ad-hoc faculty with regard to this are not available. Since the course is of interdisciplinary in nature, students with diversified academic background might be attending the courses (details are not available). In such cases, bridge courses are mandatory.	Apart from ICT, Flip classroom methods could also be tried out. In the present context of Covid 19 pandemic, institutions have moved to online teaching. Therefore, international faculty members could also be invited to deliver lectures in the online mode. If bridge courses are offered, it should be credited.	We have considered the suggestions and initiated suitable action. Recently, we conducted a Bridge Course for the newly joined M.Sc. students wherein eminent faculty from IITs, NITs and CISR/DST Institutes were invited as resource persons to deliver lectures.
VII	Feedback Mechnism (48)	C	It is mentioned that feedback from the students for each course is being done. But the details of the feedback questions are not available and whether the feedback information is graded on an average scale to assess the quality of teaching and thereby to make suggestion to improve their teaching.		Feedback was collected as a hard copy till the year 2019. Suggestions for improvement was discussed in the Department Council meetings and proper measures were taken.
	Activities of the Department (conduct of seminar, workshops, student enrichment			International conferences should be encouraged, and national funding will be available for the conduct of such programs. This will help to establish	The faculty strength in our department until last year was very poor. Now, we have planned to organize international conferences with the support from

VIII	programmes, extension activities and other beyond scholarly activities) (32, 50, 55)	C	Few seminars at the national level have been conducted.	international networking for joint projects and student mobility. An 'Open Campus' program as an annual event, inviting school and college students to the department will help us to inculcate a scientific temperament among the youngsters.	DST.
IX	Infrastructural facilities of the Department (52)	C	Specific detail with regard to this item is not available. More support from the University through annual budget and state plan will help the department to procure reasonably good infrastructure.	Adequate space with water and electricity are very important to run an innovative program in Nanoscience and Technology. Adequate measures with regard to safety, disposal of laboratory waste etc are very important and the University should make guidelines for the same.	University has made new guidelines for the safe disposal of laboratory waste and the same shall be followed.
X	Uniqueness of the Department & Innovative practices (53-55)	C	The students are of interdisciplinary in nature as the course is also interdisciplinary. No specific mention about the innovative practices with regard to curricula or conduct of the programs.	Participation of international faculty members should be encouraged through online platforms.	In order to involve national and international faculty members in the teaching learning process, we developed a syllabus with 5 hours for expert lectures, general seminars, and online seminars - webinars for each course.
XI	SWOC (56)				
1	Strength	B	Facts have been given	Appreciable	Thank you.

2	Weakness	NA	Facts have been given	The University should address the points particularly the faculty strength.	
3	Opportunity	B	Highlighted the opportunities	Industrial exposure to the students should be emphasized. The project works of the students should be promoted to carry out in industries and laboratories which have industrial partners.	The students are encouraged to pursue projects in National Institutes, CSIR laboratories and Industry. Some of our M.Tech students completed their project work in such institutes before Covid-19.
4	Challenges	NA	The major challenge of any new academic program will be the placement of students for job or higher education such as Ph. D. Other factors such as spacing, funds etc are common which need to be addressed in different ways over a period of time. The faculty members have clear vision and hopefully the department will evolve as one of the best in the state/country.	The faculty members should submit more proposals jointly to tap funding.	The department have submitted a 3 Crore project proposal to DST-FIST for the infrastructure development. In addition to this individual faculty members have submitted project proposals to funding programmes like SERB, SURE and KSCSTE etc.
XII	Future plans (57)	A	The department has clear vision about the future activities.	NIL	Provide high quality postgraduate education and inculcate research aptitude among students by creating a world-class centre of excellence in Nanoscience and Technology.

Overall remarks of the Auditor :

The Department of Nanoscience and Technology is running an academic program which is very innovative and relevant in the context of present academic pursuits. The faculty members are well qualified with great vision and the department will definitely evolve as one of the best in the state/country with adequate support from the University. The comments given cannot be addressed immediately but it is just to give a flavour how the drawbacks could be solved over a period. With limited resources, particularly the faculty strength, the department is trying to perform well. I wish all the very in the future endeavours of the Department of Nanoscience and Technology.

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