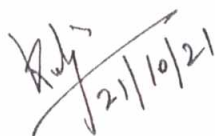# SANT LONGOWAL INSTITUTE OF ENGINEERING & TECHNOLOGY, LONGOWAL, DISTT. SANGRUR. DEEMED TO BE UNIVERSITY, ESTABLISHED BY : GOVT. OF INDIA

DEPARTMENT OF MATHEMATICS

Ref. No.: SLIET/Math/-271

Dated: 21/10/21

From	:	HOD (Mathematics)
To	:	Dean (Academic)
Subject	:	Assessment Report of Academic Audit (2019-2021)

Please find the enclosed copy of assessment report of academic audit (2019-21) of mathematics department.

HOD(Mathematics)

Sant Longowal Institute of Engineering & Technology, Longowal

ACADEMIC AUDIT (2019 - 2021)

ASSESSMENT REPORT

1. Name of the Department : Mathematics

2. Reviewer(s)
   1. Dr. A.S. Dhaliwal, Dean (R&C) - Member
   2. Dr. S.S. Dhaliwal, Prof (Mathematics) - Nominated Member
   3. Dr. A.S. Shahi, Prof (Mech Engg) - Member
   4. Dr. P.K. Khanna, Prof (M&H) - Member
   5. Dr. M.K. Sharma, TIET Patiala - External Expert
   6. Dr. V.K. Kukreja, HOD (Mathematics) - Convener
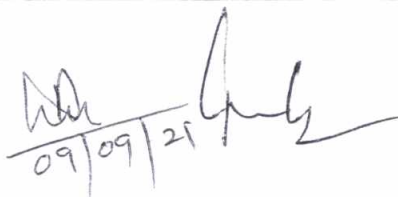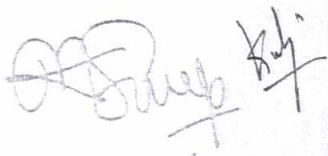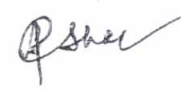
3. Date of Review: 09/09/2021

NOTE:

i. Please grade in the box provided for the following parameters in the range of 1-10 with 10 being the highest.

ii. Leave 'blank' for 'No Comment'.

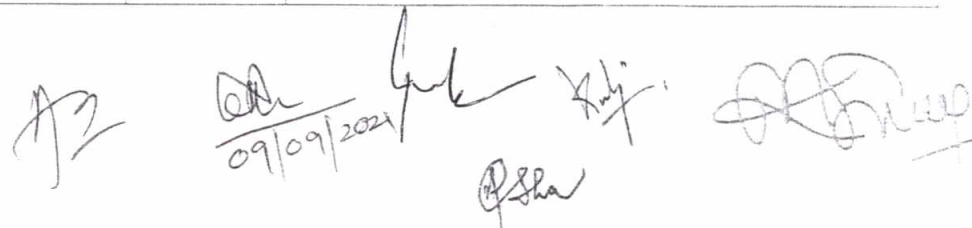iii. Kindly give your opinion on the strength and weakness of the Department and your suggestions for future growth.

1

A. ACADEMICS

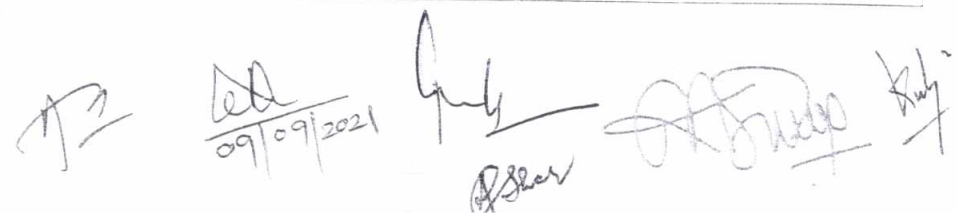| A.1	ICD Program	Score		Remarks
		Self assessment	Expert assessment	
1.	Curriculum (Structure, Course Syllabi, Flexibility), Theory/ practical (contents/ratio).	7	7	The curriculum is designed through BoS, comprising of two external subject experts. Meeting is held after every two years. There is limited flexibility in curriculum. No component of practical in ICD program.
2.	Equivalence and Relevance of curriculum at national level	8	8	Mathematics curriculum is matching with 'Model Curriculum for Diploma courses in Engineering & Technology 2019' of AICTE New Delhi.
3.	Formal Academic Load on Students [Teaching, Laboratory/ Practical, Projects (minor/major)]	8	8	L=4, T=1 and P=0 for both AM-111 and AM-121. L=3, T=1 and P=0 for AM-121 / AM-221.
4.	Evaluation Process (Continuing Evaluation, and End-Term Evaluation)	8	9	Yes, continuous evaluation process in the form of Minors (2), Major (1), Assignments (6), Quizzes (2) are followed for theory evaluations.
5.	Tour/Training/Industrial visits/Internship opportunities provided during the year	0	0	No Tour/Training/Industrial visits/Internship is organized for ICD students by the department.
6.	Effectiveness of Assisted Learning, Tutorial System for ICD Students/ Seminars (Refer Course File)	6	7	Tutorial system for ICD needs to be strengthened by dividing the classes into smaller groups.
7.	Faculty Mentoring/Faculty Advisor System for Students/Class of Students	7	7	Mentoring of students is done via Tutor Guardian Scheme running at the institute level.
8.	Practical activities, non-academic and totally related to a specific trade for skill development and developing expertise in a particular group of techniques.	5	6	No such activity for ICD students, however they are engaged for mathematics quizzes during science week.
9.	Linkage of ICD programs to outcome based vocational education (Industry linkage)	6	6	The students develop quantitative ability and logical reasoning.
10.	Availability of workshop type lab/laboratory for providing hand on training to the students for skill development	0	0	No workshop/lab/laboratory required for ICD students as per curiculam.
	Total Score (out of 100)	55	58	

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A.2	UG Program	Score		Remarks
		Self assessment	Expert assessment	
1.	Curriculum (Structure, Course Syllabi, Flexibility)	7	8	The course contents are common for all branches of engineering. It is revised time to time but has less flexibility. Few open elective courses are offered as per the requirement of engineering departments.
2.	Status of study material developed by faculty for students	8	8	The lab manuals are developed by the faculty for the students.
3.	Relevance of contents of courses taught to the students and scope of improvement (revision of syllabus, addition of new experiments)	7	7	The contents are relevant as per the requirements of the engineering disciplines. Also the contents are revised from time to time.
4.	Formal Academic Load on Students [Teaching, Laboratory/Practical, Projects(minor/major)]	8	8	3 – 1 – 0 for both BSMA-401 and 402. 3 – 0 – 0 for BSMA-501. 0 – 1 – 2 for BSMA-502.
5.	Modern teaching methods in practice other than the conventional methods E-Assisted Learning (i) Availability of Library Resources (ii) Multi-Media Assisted Teaching	7	8	Normally conventional teaching methods are followed but for online/offline classes, PPTs, Video lectures, Graphics Tablets, Smart boards are being used. Mobile apps for C/C++ software were also provided to the students.
6.	Evaluation Process (Continuing Evaluation, and End-Term Evaluation) (i) Theory and tutorial (ii) Practical (case studies)	7	8	Continuous evaluation process in the form of Minors (2), Major (1), Assignments (6), Quizzes (2) are followed for theory. During tutorials and practical student-teacher ratio is inadequate due to large group of students.
7.	Faculty–Student Interaction (Whether any slot is fixed for the students to interact with a teacher, after classes/labs	6	7	Particular slot exists for mentoring under Tutor Guardian Scheme under central time table. Individual teachers also interact with the students during classes.
8.	Tour/Training/Industrial visits/Internship opportunities	3	3	The department intends to provide internship on mathematical topics to the students.
9.	Effectiveness of Assisted Learning in Tutorial classes/seminars for Students	2.5	2	The effectiveness of tutorial classes is not so good because of large class size.
	Faculty Mentoring/Faculty Advisor System for Students/ Class of Students	3.5	3	From time to time the faculty interacts to strengthen the teaching-learning process
10.	Placement %age/higher studies options (last three years)	0	0	Data is available with parent Engineering departments.
	Total Score (out of 100)	59	62	

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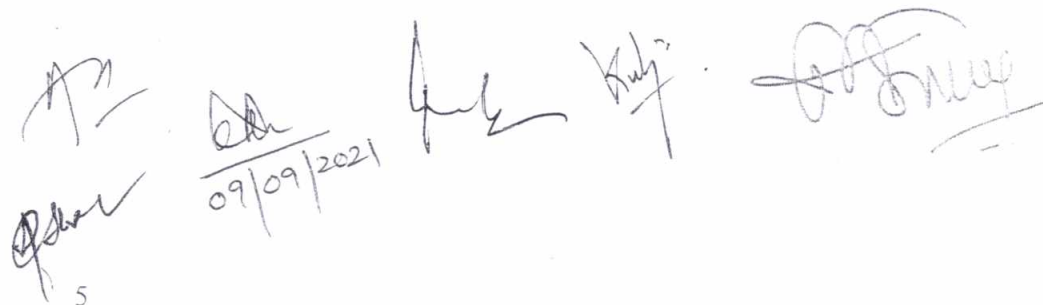| A.3	PG Program (Separate for each program)	Score		Remarks
		Self assessment	Expert assessment	
1.	Curriculum (Structure, Course Syllabi, Flexibility)	8	8	Course contents are according to UGC. A number of elective courses are available. Enough flexibility to modify the courses through BoS.
2.	Formal Academic Load on Students [Teaching, Laboratory/Practical, Projects(minor/major)]	7	8	Weekly load is L=20, T=5 and P=3. In revised curriculum, project work is included.
3.	Evaluation Process (Continuing Evaluation, and End-Term Evaluation)	8	8	Continuous evaluation in the form of Minors (2), Major (1), Assignments (6), Quizzes (2) is followed.
4.	Relevance of contents of courses taught to the students and scope of improvement	8	9	Course contents are according to UGC and covers the syllabi of NET/GATE. Yes, scope for improvement exists. The course contents are revised every two years through BoS meeting.
5.	Modern teaching methods in practice other than the conventional method E-Assisted Learning i. Availability of Library Resources and Major Search Engines (like Scopus, Web of Science) ii. Multi-Media Assisted Teaching	8	8	Mainly conventional teaching methods are followed but for online classes, PPTs, Video lectures, Graphics Tablets, Smart boards are being used. Information for e-resources like Swayam lectures, MOOCs, NPTEL, Scopus, Web of Science is provided. Mobile apps for software like C/C++ and Mathematica were provided during online classes.
6.	Technical Societies/ Colloquium for Students i. Departmental Society ii. Student Chapter(s) of Professional Societies	6	5	Events are organized under Science Club. The department is soon going to establish a Mathematics society.
7.	Tour/Training/Industrial visits/Internship opportunities	5	5	Students visited Science city, Kapurthala. Tour to IIT Ropar was planned but could not materialize due to COVID 19. Coaching for NET exam was given by Mr. Yogesh Kapil, A.P., voluntarily.
8.	Collaboration with other departments (within institute)	5	5	Yes, With Chemistry and Chemical Engineering department for teaching their one PG course.
9.	Faculty Mentoring/Faculty Advisor System for Students/Class of Students	6	6	Class counsellors / teachers motivate the students to opt for higher studies / other competitive exams.
10.	Monitoring and continuous evaluation of the project work assigned to the students (mechanism)	7	6	The students give weekly presentations under problem solving classes.
	Total Score (out of 100)	68	68	

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B. RESEARCH

		Score		Remarks
		Self assessment	Expert assessment	
1.	Research Ambience in the Department	7	7	Latest versions of software are available. But high end computers / workstations are essentially required.
2.	Research Awareness among Doctoral Students	7	7	Students actively participate in international and national conferences. They make good use of e-resources like Scopus, Web of Science etc.
3.	Thrust areas of research in the department	8	7	Department offers research in areas like: Complex Analysis, Matrix Theory, Numerical Analysis, History of Mathematics, Mathematical Modelling, Cosmology
4.	Quality of Research	8	8	Research papers are published in quality international and national journals having good impact factor.
5.	Collaborations with other departments (within the institute) and at National, and International levels.	8	9	With-in institute: Nil National level: NIT Jalandhar, IIITM Gwalior, IPS Academy, Indore, PU Patiala, International level: UKZN South Africa, University of Victoria, Canada, Uninettuno University Italy, Cameron University, USA, Technical University of Cluj-Napoca Romania, Universidad de La Rioja Spain
6.	Impact and Quality of Publications	8	8	Research papers have good citations. Ph.D. students are well placed in academic and research institutes.
7.	Relevance of Research to Knowledge Generation and Social Relevance	8	7	Research work is beneficial to society and focused on thrust areas of mathematics like the new algorithms are giving better results in less computational time.
8.	Student Exposure for Attending Quality Conferences / Symposia	8	8	Students actively participate in international and national conferences and workshops etc.
9.	Inter departmental collaborations	5	5	Collaboration with department of Computer Science and Engineering exists.
10.	Industry/externally funded sponsored research (Numbers and amount)	4	4	Presently: Nil Submitted: 3 (SERB, NBHM, DST)
	Total Score (out of 100)	71	70	

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A.4	Doctoral (Ph.D.) Programmes	Score		Remarks
		Self assessment	Expert assessment	
1.	Intake of Ph.D. Students	6	6	Ph.D. admission during 2019-20: Nil Ph.D. admission during 2020-21: 4
2.	Admission Process	7	8	Only NET/GATE/SET-V qualified candidates are selected based on their performance in the Interview.
3.	Pre-Ph.D. Courses and Evaluation Process	8	8	Two pre-Ph.D. courses are essential, one is Research Methodology and another course is research subject related. Continuous evaluation as per UGC/institute norms.
4.	Breadth and Depth of Knowledge of Students	7	7	The breadth and depth of knowledge is checked via test / interview held before offering the admission.
5.	Seminar/ Presentations and Technical Communication	7	7	Two seminars are compulsory during the pre-Ph.D. course. Thereafter annual progress presentation of students is mandatory.
6.	Research Facilities available in the Department	7	6	Latest versions of software are available. But high end computers / workstations are essentially required.
7.	Average No. of Research Students/Faculty	7	7	Two students per faculty.
8.	Average No. of Research Papers of Ph.D. Students (Indexed Journals)	7	6	2
9.	Average Duration to Complete Ph.D. (years)	8	7	For full time students: 4.5 years (approx.) For part time students: 6.5 years (approx.)
10.	Participation of Research Scholars in Conferences / Workshops	7	7	Yes, the research scholars are allowed to participate in conferences and TA/DA, registration fee are reimbursed, as per institute norms.
	Total Score (out of 100)	71	69	

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General Comments on,

1. Plan of action of the department for the next five years (in view of NEP 2020)
   I. The M.Sc. syllabus has been strengthened by including latest subjects like Cryptography, Introduction to Python, Data Analytics with Python, Graph Theory, Approximation Theory, Mathematical Modelling and Numerical Linear Algebra.
   II. Proposal for start of 5 year integrated BSc (Hons) + MSc Program course has been submitted.
   III. The department is planning to introduce the NPTEL/MOOCs courses for elective subjects for the PG students.

2. Significant achievements of the department (faculty/Staff/Students)
   I. The faculty members and research scholars are publishing good research papers in reputed journals.
   II. Organized online Webinar on Introduction to Maple on June 29, 2020 in collaboration with Binary Semantics. Total number of participants: 584.
   III. Organized online Webinar on MATLAB, July 23, 2020 in collaboration with MathWorks. Total number of participants: 92.
   IV. Organized online Workshop on Mathematical Modeling and MATLAB Applications, under twinning activity with NIT Uttarakhand, 24-25 August, 2020. Total number of participants: 188.
   V. Prof. R.K. Mishra organized online 26th International Conference of International Academy of Physical Sciences (CONIAPS XXVI) on "Advances in Relativistic Astrophysics & Cosmology (ARAC-2020)" during 18-20 December, 2020. Total number of participants: 50+.
   VI. SLIET Quality Publication Award (SQPA) has been received by the following Research Scholars of the department: Dr. Deepak, Dr. Sunil Kumar, Ms. Heena Dua.
   VII. The details of the pass out M.Sc. students is given below:

Pass out Batch	2019	2020	2021
Students Qualified NET/GATE/TET	5	5	6
Placed / Higher Studies	7	7	8

3. Placement record of the department (Last three years)
   I. M.Sc. students are placed in Infosys, Chegg, Udaan, Samsung, Freelancing Mathematical Content writer and other organizations.
   II. Ph.D. students are placed in GNDU, PAU, PU Patiala, DAV University, Amrita University, DAVIET, WGGSU and other colleges.

4. Scope for training of faculty/staff for further strengthening the teaching-learning process for strengthening the curriculum with the addition of new courses having relevance at National and International levels.
   Newly joined faculty members are attending MOOCs courses for the latest effective teaching and learning process.

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5. Effective/Continuous monitoring of faculty/staff in delivery the course contents (at departmental level) for enhancing the teaching-learning process.
   I. From time to time, HOD (Mathematics) interacts with faculty/technical staff to enhance the teaching–learning process.
   II. Monitoring is also done through the feedback forms by students.

6. Technical Societies/ Colloquium for Students
   I. Departmental Society: Science Club is functional at institute level. Proposed to start a departmental society.
   II. Student Chapter(s) of Professional Societies: Nil

7. Scope of improvement in the presenting teaching-learning process
   I. Permanent faculty and technical staff is required in the department.
   II. High end desktop computers are required.
   III. One advance computational lab is required.
   IV. For improving teaching-learning process, research scholars and faculty must deliver one lecture per month.

8. The skill and expertise of the faculty/Technical staff in the department (specific)

SN	Name of Faculty Member	Area of Expertise
1.	Prof. S.S. Dhaliwal	Complex Analysis
2.	Prof. Mandeep Singh	Matrix / Operator Theory
3.	Prof. V. Mishra	History of Mathematics, Wavelet Analysis
4.	Prof. Sushma Gupta	Complex Analysis
5.	Prof. V.K. Kukreja	Numerical Analysis, Mathematical Modelling
6.	Prof. J.R. Sharma	Numerical Analysis
7.	Prof. R.K. Mishra	Cosmology / Relativity, Mathematical Modelling
8.	Prof. R.K. Guha	Numerical Analysis, Mathematical Modelling
9.	Mr. R.K. Goyal	Statistics
10.	Mr. Yogesh Kapil	Matrix / Operator Theory
11.	Dr. Sudhir Kumar	Numerical Analysis

9. Strengthening laboratory infrastructure (adding of new equipment's and use of present facility for optimum use)
   Every year new equipment are added in the Lab.

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10. Any other point:
    I.   Video lectures prepared by Prof. R.K Mishra for UG/PG students are available on YouTube.
    II. Remedial classes of ICD students were taken by four students of M.Sc.-2018 batch.
    III. Remedial classes of UG students were taken by faculty members of the department.
    IV. Mr. Yogesh Kapil, A.P., gave NET coaching to PG students, voluntarily.
    V.   Prof. V. Mishra published a book entitled, Theory of Transforms with Applications, Ane Books, during 2017.

C. Departmental Infrastructure

		Score		Remarks
		Self assessment	Expert assessment	
1	Adequacy of Class Rooms and Multi-Media Facility	6	7	Class-rooms are adequate whereas multimedia facility is available only to M.Sc. students
2	Availability of Laboratories	7	7	Computational lab for UG students is available.
3	Availability of Conference/Seminar Room, etc.	6	5	No independent conference/seminar room is available. For this purpose, generally ISTE hall / Computer auditorium / Training placement hall are used.
4	Availability of Seating Space for Faculty and Research Students	6	6	Seating space for regular faculty is sufficient, whereas for research scholars and guest faculty it is inadequate.
5	Availability of Internet Services in Research Labs and Class Rooms	8	7	Internet service is available in lab and smart class rooms but not available in other class rooms.
6	Departmental Library and E-Resources	7	8	Departmental library is well equipped. Sufficient E-resources are available through central library.
7	Computing Facilities and Software	7	8	Computational lab exist for UG students. For PG and Research purpose a lab is required.
8	Adequacy of Offices and Furnishing for Faculty	6	6	More rooms are required to accommodate the guest faculty in the department.
9	Faculty- Student Ratio	4	5	As per the load allocated for the year 2020-21, average Faculty-Student ratio is 1:50, higher than AICTE norms.
10	Support Staff (Technical/Administrative) Adequacy	5	5	Trained staff is required in lab as well as department office.
	Total Score (out of 100)	62	64	

SWOT Analysis by the Department

Strengths:

- Well-equipped Numerical Methods and Computational Lab for carrying out lab experiments to UG students.
- Good collection of books is available in departmental library.
- Faculty has published good number of research papers in reputed national and international journals.
- Licensed software such as MATLAB, Mathematica, WinEdt are available in lab.
- Workshops organized by the department attracted good number of participants from all over India.
- M.Sc. students have got admission for higher studies in IITs at Chennai, Kharagpur, Patna, Jodhpur, IIITM Gwalior and SLIET.
- Ph.D. students are placed in GNDU, PAU, Punjabi University, DAV University, Amrita University, DAVIET, WGGSU and different reputed colleges.
- Students belonging to different states take admission in M.Sc. / Ph.D. program.

Weaknesses:

- Inadequate number of regular faculty.
- Inadequate number of technical staff in lab.
- For PG and Research scholars, a high end computational lab is required.
- More rooms are required for guest faculty and research scholars.

Opportunities:

- Faculty members as well as students can enhance their knowledge through available e-resources.
- Submission of integrated B.Sc.(Hons) - M.Sc. program proposal.
- Focus on inter-disciplinary research approach.
- Preparation of study material for ICD classes.

Threats:

- Serious shortage of faculty (because of retirements in coming years) and permanent lab technician.
- Inadequate high end computational lab for Ph.D. students in hampering research work.

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Suggestions for improvement:

- More permanent faculty members are required to handle the tutorials and labs effectively. Then more choice based courses will be offered in M.Sc. (Mathematics) program more optional elective subjects will be floated to UG students as well.
- Adequate number of technical staff is desired in lab for better functioning of lab for the students.
- Tutorial should be held in a group of 20-30 students to increase problem solving ability of the students.
- To accommodate the guest faculty as well as research scholars more office rooms are required.
- One computational laboratory is required for M.Sc. (Mathematics) and Ph.D. students.
- Faculty members must submit research projects to external funding agencies.
- Ways should be evolved to attract a good number of bright students for Ph.D. as well as for M.Sc. (Mathematics) program.
- The OBE based scheme needs a bit more improvement and understanding by the faculty.
- ICD load is required to be increased (4–2–0 instead of 4–1–0) to complete the syllabus with optimum tutorial classes.
- There should be 20 students per tutorial/Lab class for effective delivery of contents.
- For repeat classes of ICD/UG students, there should be a provision of separate classes to avoid overlapping between their actual class and repeat class.
- The faculty should not be engaged in non-teaching activities.
- The structure of SET-V for Ph.D. may be reviewed to enhance number of Ph.D. admissions.
- The Ph.D. students selected through SET-V should be offered some amount of fellowship to pursue their research.

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D. Outcomes

		Score		Remarks
		Self assessment	Expert assessment	
1	i. Placements for ICD ii. Placement of B.Tech. iii. Placement of Masters Student iv. Placement of Ph.D. Students	2.5 (5) 5 (5)	3 5	Not related Not related Data at page 7 (under General Comments) 100% of Ph.D. Students are placed
2	Average No. of Ph.D.'s Awarded per Year	6	5	2 (Based upon data of last 3 years)
3	Publications per Faculty in Indexed Journals/Year (Average of last three years)	7	6	2
4	Average Citations per Faculty/Year (Last-Three Years) (Web of Science/Scopus)	6	7	10
5	Recognitions; Awards (National/International) to Faculty/Students	6	7	Member BoS of different universities / college, Member Advisory Committee: DST (State Level), Conferences. Keynote Lectures
6	Consultancy and Externally Funded Projects	4	5	Entrepreneurship Development Project worth 94.5 Lakhs to Prof. R.K. Mishra from DBT, New Delhi
7	No. of Ph.D. graduates who took Academics as Career (Last 5 Years)	8.5	9	8 out of 8
8	Students offered for higher studies	7	7	40%
9	No. of qualified students NET/GATE/CAT etc. (State/Central Civil Services)	6	6	25%
10	Entrepreneurship	0	0	NIL
	Total Score (out of 100)	58	60	

Comments & Suggestions for Improvement:
- Focus should be on more tutorial classes for ICD students to enhance their problem solving skills.
- Under mathematics society, the activities for UG students should be organized by the departmental M.Sc. and Ph.D. students.
- Faculty members should be encouraged to submit research projects to external funding agencies.
- Mock test series for M.Sc. students may be started to increase their pass percentage in NET/GATE/CAT/Other exams etc.
- Research scholars to be encouraged for quality research work and present the same at different platforms.
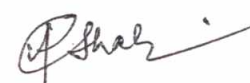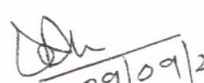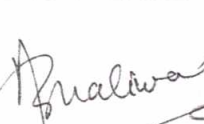
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SANT LONGOWAL INSTITUTE OF ENGINEERING & TECHNOLOGY
ACADEMIC AUDIT (2019 - 2021)
SUMMARY SHEET

1.	Name of the Department	Mathematics
2.	Name of Reviewer Designation & Address	**From Academia**
		1. Dr. A.S. Dhaliwal, Dean (R&C) - Member
		2. Dr. S.S. Dhaliwal, Prof (Mathematics) - Nominated Member
		3. Dr. A.S. Shahi, Prof (Mech Engg) - Member
		4. Dr. P.K. Khanna, Prof (M&H) - Member
		5. Dr. M.K. Sharma, TIET Patiala - External Expert
		6. Dr. V.K. Kukreja, HOD (Mathematics) – Convener
3.	Date of Meeting	09/09/2021

Score Summary							
Academic				Research	Departmental Infrastructure	Outcome	**Total Score**
ICD Program	UG Program	PG Programs (Max Score 100)	Doctoral Program				
(Max Score 100)	(Max Score 100)	(Average of all PG programs)	(Max Score 100)	(Max Score 100)	(Max Score 100)	(Max Score 100)	**(700)**
56.5	60.5	68	70	70.5	63	59	**447.5**

Note: 1. Marks mentioned above is the average of the marks given by the experts.
2. If marks have not been allotted for some attributes by the experts, total score can be scaled to maximum marks.

Prof. A.S. Shahi,   Prof. P.K. Khanna,   Prof. S.S. Dhaliwal,   Prof. A.S. Dhaliwal,   Prof. M.K. Sharma,   Prof. V.K. Kukreja
Member   Member   Nominated Member   Dean (R&C)   External Expert   HOD (Mathematics)

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