SELF STUDY REPORT

FOR

2nd CYCLE OF ACCREDITATION

CHENNAI MATHEMATICAL INSTITUTE

HI SIPCOT IT PARK, SIRUSERI, KELAMBAKKAM
603103
www.cmi.ac.in

Submitted To

NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

BANGALORE

(Draft)

1. EXECUTIVE SUMMARY

1.1 INTRODUCTION

Chennai Mathematical Institute (CMI) is a deemed university with a difference. For over twenty years, CMI has been running high quality undergraduate and postgraduate programmes taught by faculty who are active researchers of international repute, comparable to those in the best research institutes in the country.

As a consequence, the BSc and MSc programmes in Mathematics, Computer Science and Physics at CMI have always had a strong research focus. An overwhelming majority of CMI students go on to complete PhDs at the best institutions across the world, including Berkeley, Caltech, Harvard, MIT and Princeton in USA, ENS Paris in France, and the Max Planck Institutes and Humboldt University in Germany. In India, CMI alumni are prominent among the ranks of graduate students in the IITs, IMSc, ISI and TIFR, not to mention CMI itself.

CMI has had an active PhD programme from its inception in 1989. CMI faculty are engaged in research of the highest international standards in mathematics, computer science and physics. They have strong academic collaborations, both within India and abroad. CMI faculty have received national recognition such as the Bhatnagar Award, Ramanujan Fellowship and JC Bose Fellowship. They are represented in editorial boards, scientific programme committees and influential decision making scientific bodies, both at the national and international level.

CMI has made significant contributions to India's scientific manpower. CMI graduates are now faculty members at institutions such as IITs, IIMs, IISc, IISERs, IMSc, ISI, TIFR and CMI, as well as researchers in organizations such as Microsoft Research India. In addition, CMI students have begun to take up careers in sectors such as finance, insurance and data analytics that require a strong background in mathematics, statistics and computing.

Several CMI alumni are also present in the faculty of international universities in USA and Europe, as well as in leading technology companies like Facebook and Google.

Vision

CMI's vision is to develop into an institution that emulates the great universities of the world, where first-rate teaching and excellent research coexist across a number of disciplines.

Mission

The mission of CMI is to combine excellence in research and teaching; to expand the frontiers of fundamental and applied research while, at the same time, training students to think analytically and be pioneers who can compete with the best in the world.

1.2 Strength, Weakness, Opportunity and Challenges(SWOC)

Institutional Strength

CMI's main strength is the high quality of its people, both faculty and students. This results in everyone treating each other with mutual respect and leads to a very open and healthy atmosphere for academic activity, both research and teaching.

CMI has a very efficient and committed administration. The number of administrative staff is relatively small compared to the size of the institution, but each of the staff plays multiple roles and together they ensure that everything runs smoothly and with minimum bureaucracy.

The architecture of the CMI campus is another major asset. The buildings are designed with plenty of open corridors so that all rooms have ample light and cross ventilation. The open spaces have a variety of trees and plants that are carefully nurtured to maintain a soothing green ambience.

Institutional Weakness

CMI's main weakness is the fact that it is not tied to a fixed source of funding. CMI is an excellent example of public-private partnership in academia in the Indian context and the Institute has been able to raise a substantial corpus from non-governmental funding. However over the years, the sources and composition of CMI's funding have evolved quite a bit, leading to a perception that CMI's funding situation is "unstable". This raises challenges when recruiting junior faculty, some of whom are unsure whether to make a long term commitment in the face of what they perceive as uncertain funding.

Institutional Opportunity

Over the last decade, data driven decision making has gained prominence both in industry and in the delivery of government services. CMI was among the first institutes in India to offer an MSc in Data Science, in 2018, and this programme has rapidly earned a strong reputation in industry. With its core strengths in mathematics and computer science, CMI is uniquely poised to play a leadership role in furthering data science in the country.

A number of frontier areas like machine learning and artificial intelligence, cryptography and quantum computing are built on deep mathematical foundations. Once again, CMI can exploit its existing expertise in mathematics, computing and physics to be among India's leaders in these emerging areas.

Institutional Challenge

As mentioned earlier, a continuing challenge at CMI is to raise resources from both governmental and private sources to sustain its growth.

Another important issue is attracting talent, both at the faculty level and at the student level.

At the faculty level, CMI has to compete with other leading academic institutions for a relatively small pool of talent that is available to hire. Most of these competing institutions are much larger than CMI and can offer

infrastructural support such as campus housing which are beyond the reach of CMI.

At the student level, though there is plenty of mathematical talent in the country, there is a societal prejudice against joining programmes in mathematics (or pure sciences). The vast majority of students with an aptitude for mathematics are encouraged to look at engineering as their only viable career option. Though the increasing importance of data across all business is creating more interest in taking up courses in mathematics, there is a still a big gap between the demand and supply.

1.3 CRITERIA WISE SUMMARY

Curricular Aspects

CMI has two BSc programmes, in Mathematics and Computer Science, and in Mathematics and Physics. Admissions is through a national test administered at over 35 locations across the country. Talented students who have excelled in the national Olympiads in Mathematics, Informatics and Physics are offered direct admission.

CMI conducts MSc programmes in Mathematics, Computer Science and Data Science. Admission to these programmes is also through a national test.

CMI has PhD programmes in Mathematics, Computer Science and Physics. Admission to these programmes is also through a national test followed by an interview. CMI also recognizes performance in national examinations such as NBHM and JEST to direct qualify for the interview.

The teaching programmes are overseen by the Academic Council, which has senior faculty from CMI as well as highly reputed external members from leading academic institutions across the country. Individual Boards of Studies actively monitor the programmes in different subject areas and propose periodic revisions in the curriculum to be ratified by the Academic Council.

The BSc programmes consist of six semesters across three years, while the MSc programmes consist of four semesters across two years. PhD students typically undergo one year of advanced courses, after which they write a qualifying examination.

Teaching-learning and Evaluation

Courses at CMI are taught by active researchers in the field. All full time faculty at CMI have PhDs and are evaluated based on their research. In addition, a number of distinguished adjunct and visiting faculty teach at CMI.

The class strength in BSc ranges from 50 to 60. MSc classes range from 10 to 50, depending on the discipline. Class sizes are kept small to allow instructors and students to interact at an individual level. This greatly facilitates the transfer of knowledge, as instructors can fine tune their course offerings to match the level of the students.

CMI follows a semester system. All courses have continuous evaluation and a final exam. Continuous evaluation includes quizzes, assignments, projects and a midsemester exam.

Graduation requirements are based on credits. A full semester course typically runs for 17 weeks, including examinations, with over 40 contact hours and counts for 4 credits. CMI has half semester courses that count for 2 credits. BSc students need to complete 112 credits to graduate while MSc students need to complete 64 credits.

All programmes offer students flexibility to choose from a wide variety of electives. In the BSc programme about 2/3 of the total credits come from core courses and 1/3 come from electives. The ratio of electives to core courses in MSc courses varies from programme to programme

CMI follows a 10 point grading scale with letter grades A, AB, B, BC, C, CD and D with corresponding grade points 10, 9, 8, 7, 6, 5 and 4, respectively. All exams are set and corrected by the instructors teaching the course. CMI has a Grade Monitoring Committee that ratifies the grades after checking for anomalies.

Research, Innovations and Extension

The primary charter of CMI is research. All full time faculty are evaluated purely based on their research output. The PhD programmes are designed to train students to undertake fundamental research at an international level. CMI faculty and students publish in top quality journals and conferences.

In addition to research in foundational areas of mathematics, computer science and physics, CMI has also consciously expanded its focus to thrust areas such as verification, security, machine learning and artificial intelligence, in line with the needs of the country.

In 2015, CMI set up a separate society called Algolabs to promote interaction with industry and external agencies. Through Algolabs, CMI faculty and students engage in projects of practical and societal relevance that can benefit from sophisticated mathematical insights.

In 2020, CMI announced the creation of the Dr FC Kohli Centre of Excellence in the mathematical sciences. Named after the founding father of the IT industry in India, the aim of the Kohli Centre is to expand the research horizons of CMI by organizing thematic programmes in emerging areas driven by visiting experts. The Centre will also provide further opportunities for industry-academia research interaction.

CMI faculty actively collaborate with colleagues at leading institutions in India and abroad. CMI has been a partner in numerous bilateral research projects with researchers in countries such as Denmark, France, Germany, Japan, Sweden and USA. CMI hosts an international research laboratory in Computer Science set up by the French National Centre for Scientific Research (CNRS), where the other academic partners are IMSc, Chennai from India and ENS Paris-Saclay and the University of Bordeaux in France. In Mathematics, CMI is part of the Indo-French Program in Mathematics (IFPM), another international research laboratory under CNRS. In Physics, CMI faculty are part of the international LIGO consortium working on gravitational waves.

Infrastructure and Learning Resources

Though mathematics is most effectively taught using traditional chalk and blackboards, CMI has been an earlier adopter of modern technology. All classrooms have long been equipped with projectors and screens. Course material is archived on the learning management system (LMS) Moodle,

CMI has a Seminar Hall with capacity 100 and 12 other classrooms of sizes varying from 40 to 100. The Institute has a 220 seat auditorium with professional quality stage, lighting and acoustics that can be used both for academic events such as conferences as well as to host cultural programmes such as dance performances, music programmes and plays.

Every corridor in CMI has open areas equipped with blackboards that can accommodate 8-10 participants. These are used for research discussions as well as for small classes on specialized topics.

CMI has two parallel high capacity dedicated internet connections, for redundancy. The entire campus is covered by a wireless network that is available to all faculty and students.

The library has a carefully curated collection of high quality books in the mathematical sciences, supplemented by books on diverse topics. The institute subscribes to a number of leading journals, some in print form and others online. The library has a spacious, air-conditioned reading room that is open 24 hours a day and 7 days a week for students to use for study and research.

CMI runs its own IT infrastructure, including mail and web servers, entirely based on open source software. There is a well equipped computer lab for students to use. In addition, CMI has a high capacity computational server and three GPU servers available to both faculty and students for resource intensive computational tasks.

Most students stay in the hostel on campus. There are outdoor playgrounds as well as an indoor gym and other recreational facilities. Since the size of the campus is limited, CMI has also made arrangements for students to use external sports facilities nearby.

Student Support and Progression

Each batch of students is assigned one or more faculty advisors. Faculty advisors guide students in their choice of electives and keep a watch for students who may be facing academic difficulties and need special attention.

CMI also has a counselor who is available for consultation by students and faculty to discuss any issue that they may be facing, either personal or academic.

There is a Placement Cell coordinated by two faculty members that interfaces with the industry to arrange internships and campus placements. The Placement Cell uses an online portal to record information about students seeking placement as well as job offers made by industry that enables students to efficiently search for opportunities that suit their background.

Traditionally, a large fraction of students from CMI have gone on to pursue further studies at the best academic institutions in India and abroad. These include Berkeley, Caltech, Chicago, Cornell, Harvard, MIT, Penn, Princeton, Stanford and Yale in USA, ENS-Paris, Univ Paris-Sud and Univ Bordeaux in France, the Max Planck Institutes and Humboldt University in Germany and IITs, IISc, IMSc, ISI and TIFR in India.

After the introduction of the MSc Data Science programme, there has been a sharp increase in the number of students seeking industry jobs. Normally, all students who register for campus placement get at least one offer before graduating. About 40% of the students graduating in 2022 will be joining industry and the median salary package is Rs 18 lakhs per annum.

Governance, Leadership and Management

CMI is a public charitable trust. The Board of Trustees serves as the overall board of management for the institute, providing leadership and guidance in terms of raising resources and strategic long term planning. The Board of Trustees is includes senior industry executives as well as leading figures from public service. The current Chair of the Board of Trustees is Mr N Lakshmi Narayanan, former Vice-President of Cognizant.

The Governing Council frames the rules and policies by which the Institute operates. The Governing Council includes senior faculty members from CMI as well as external academic members and representatives of funding and regulatory bodies. The current Chair of the Governing Council is Prof R Balasubramanian, former Director of the Institute Mathematical Sciences, Chennai.

CMI is headed by the Director, Prof Madhavan Mukund. The Dean of Studies, Prof K V Subrahmanyam oversees all the academic programmes, and with the support of two Assistant Deans, Prof Krishna Hanumanthu and Prof Manoj Kummini. The Registrar, Mr Sripathy, oversees the administration of the Institute.

Institutional Values and Best Practices

Academic integrity is the cornerstone of CMI's research and teaching. The research output of CMI is published in the best journals and conferences. Originality is the key quality expected and derivative research is highly deprecated. CMI has a zero-tolerance policy towards cheating in exams and students quickly learn that they should put forward their best efforts on their own rather than copying from others.

CMI has always prided itself on its self-reliance and innovation. The IT infrastructure on campus is entirely configured and managed by CMI faculty and staff. CMI has been a pioneer in automating office processes and has systems developed in-house for managing course registration, grade submission and other administrative activities associated with teaching. The hostel mess uses an RFID system to distinguish different categories of students, those who pay for the full semester in advance, and those who pay on the spot. Issue and return of books in the library is also automated using an RFID system.

CMI believes in treating students as equal partners. Many resources like the computer laboratory and the library are available 24 hours a day, 7 days a week on a trust basis, with minimal supervision. Students are encouraged to contribute ideas to improve systems on campus.

CMI strives to maintain an eco-friendly green campus. Solar panels have been installed in many places to generate electricity. CMI has two natural effluent treatment plants that use silting tanks and reed beds to treat waste water. All water discharged from the hostel is recycled through these effluent treatment plants and then reused for gardening.

2. PROFILE

2.1 BASIC INFORMATION

Name and Address of the University	
Name	Chennai Mathematical Institute
Address	HI SIPCOT IT Park, Siruseri, Kelambakkam
City	Chennai
State	Tamil Nadu
Pin	603103
Website	www.cmi.ac.in

Contacts for Communication					
Designation	**Name**	**Telephone with STD Code**	**Mobile**	**Fax**	**Email**
Director	Madhavan Mukund	044-71961000	9444992990	044-27470225	director@cmi.ac.in
IQAC / CIQA coordinator	K V Subrahmanyam	044-71961028	9445390492	044-27470225	kv@cmi.ac.in

Nature of University	
Nature of University	Deemed University

Type of University	
Type of University	Unitary

Establishment Details	
Establishment Date of the University	01-11-1989
Status Prior to Establishment,If applicable	

Recognition Details		
Date of Recognition as a University by UGC or Any Other National Agency :		
Under Section	**Date**	**View Document**
2f of UGC		
12B of UGC		

University with Potential for Excellence	
Is the University Recognised as a University with Potential for Excellence (UPE) by the UGC?	No

Location, Area and Activity of Campus							
Campus Type	**Address**	**Location***	**Campus Area in Acres**	**Built up Area in sq.mts.**	**Programmes Offered**	**Date of Establishment**	**Date of Recognition by UGC/MHRD**
Main campus	HI SIPCOT IT Park, Siruseri, Kelambakkam	Semi-urban	5.35	13462.05	BSc, MSc, PhD		

2.2 ACADEMIC INFORMATION

Furnish the Details of Colleges of University

Type Of Colleges	Numbers
Constituent Colleges	0
Affiliated Colleges	0
Colleges Under 2(f)	0
Colleges Under 2(f) and 12B	0
NAAC Accredited Colleges	0
Colleges with Potential for Excellence(UGC)	0
Autonomous Colleges	0
Colleges with Postgraduate Departments	0
Colleges with Research Departments	0
University Recognized Research Institutes/Centers	0

Is the University Offering any Programmes Recognised by any Statutory Regulatory Authority (SRA)	: No

Details Of Teaching & Non-Teaching Staff Of University

Teaching Faculty												
	Professor				Associate Professor				Assistant Professor			
	Male	Female	Others	Total	Male	Female	Others	Total	Male	Female	Others	Total
Sanctioned				20				20				15
Recruited	17	1	0	18	12	3	0	15	2	1	0	3
Yet to Recruit				2				5				12
On Contract	0	0	0	0	0	0	0	0	0	0	0	0

Non-Teaching Staff				
	Male	Female	Others	Total
Sanctioned				10
Recruited	3	4	0	7
Yet to Recruit				3
On Contract	0	0	0	0

Technical Staff				
	Male	**Female**	**Others**	**Total**
Sanctioned				5
Recruited	3	0	0	3
Yet to Recruit				2
On Contract	0	0	0	0

Qualification Details of the Teaching Staff

Permanent Teachers										
Highest Qualification	**Professor**			**Associate Professor**			**Assistant Professor**			
	Male	Female	Others	Male	Female	Others	Male	Female	Others	Total
D.sc/D.Litt/ LLD/DM/MCH	0	0	0	0	0	0	0	0	0	0
Ph.D.	17	1	0	12	3	0	2	2	0	37
M.Phil.	0	0	0	0	0	0	0	0	0	0
PG	0	0	0	0	0	0	0	0	0	0

Temporary Teachers										
Highest Qualification	**Professor**			**Associate Professor**			**Assistant Professor**			
	Male	Female	Others	Male	Female	Others	Male	Female	Others	Total
D.sc/D.Litt/ LLD/DM/MCH	0	0	0	0	0	0	0	0	0	0
Ph.D.	0	0	0	0	0	0	0	0	0	0
M.Phil.	0	0	0	0	0	0	0	0	0	0
PG	0	0	0	0	0	0	0	0	0	0

Part Time Teachers										
Highest Qualification	**Professor**			**Associate Professor**			**Assistant Professor**			
	Male	Female	Others	Male	Female	Others	Male	Female	Others	Total
D.sc/D.Litt/ LLD/DM/MCH	0	0	0	0	0	0	0	0	0	0
Ph.D.	8	1	0	0	0	0	1	1	0	11
M.Phil.	0	0	0	0	0	0	0	0	0	0
PG	0	0	0	0	0	0	0	0	0	0

Distinguished Academicians Appointed As

	Male	**Female**	**Others**	**Total**
Emeritus Professor	2	0	0	2
Adjunct Professor	8	3	0	11
Visiting Professor	0	0	0	0

Chairs Instituted by the University

Sl.No	**Name of the Department**	**Name of the Chair**	**Name of the Sponsor Organisation/Agency**
1	none	none	none

Provide the Following Details of Students Enrolled in the University During the Current Academic Year

Programme		From the State Where University is Located	From Other States of India	NRI Students	Foreign Students	Total
UG	Male	14	130	0	0	144
	Female	1	13	0	0	14
	Others	0	0	0	0	0
PG	Male	8	98	0	0	106
	Female	2	36	0	0	38
	Others	0	1	0	0	1
Doctoral (Ph.D)	Male	5	37	0	0	42
	Female	1	6	0	0	7
	Others	0	0	0	0	0

Does the University offer any Integrated Programmes?	No

Details of UGC Human Resource Development Centre, If applicable

Year of Establishment	Nill
Number of UGC Orientation Programmes	0
Number of UGC Refresher Course	0
Number of University's own Programmes	0
Total Number of Programmes Conducted (last five years)	0

Accreditation Details

Cycle Info	Accreditation	Grade	CGPA	Upload Peer Team Report
Cycle 1	Accreditation	A	3.15	peer-review-2016.pdf

2.3 EVALUATIVE REPORT OF THE DEPARTMENTS

Department Name	Upload Report
Cmi	View Document

Institutional preparedness for NEP

1. Multidisciplinary/interdisciplinary:	From its inception CMI programmes have been structured to be interdisciplinary. Undergraduate students receive degrees in Mathematics and Physics or Mathematics and Computer Science. Our core strengths are in the mathematical sciences and the undergraduate and postgraduate courses are designed to exploit those strengths. Several electives are offered, and students can choose from a wide basket of courses. Students can credit courses taken at other institutions such as the Institute of Mathematical Sciences, IIT Madras and IIT Kanpur. Some of our students who have taken courses in Mathematics, Physics and Computer are now pursuing interdisciplinary subjects such as quantum computing and quantum information theory. Students can also take elective courses in the Humanities. We have offered courses such as Creative Writing, Economics, Developmental Studies, Art in Context, and Values through Literature. Some students also take courses in the Humanities Department of IIT Madras. We would like to expand the scope of humanities courses we offer to include sociology and psychology. We are also curating a course on "Hands on Environmental Sciences" in collaboration with an external organization based in Chennai. The plan is to introduce students to gardening, composting, and vermiculture by actually taking part in the process by growing plants and vegetables. Most batches of students have undertaken voluntary service in orphanages. We are exploring the possibility of formalizing such activties as courses where students can work with NGOs through the semester on weekends and earn credits.
2. Academic bank of credits (ABC):	CMI has been using the National Academic Depository to upload course grades and degree certificates. CMI students take courses in other institutes such as IIT Madras, IIT Kanpur, TIFR and IISc. With the rapid increase in online and hybrid learning across HEIs, such activities are bound to increase. CMI will initiate more active participation in the Academic Bank of Credits shortly.

3. Skill development:	CMI conducts research-oriented B.Sc and M.Sc programmes. These are very selective, with cohorts kept intentionally small to enhance student-faculty interaction. The two B.Sc programmes, one combining Mathematics and Computer Science, and the other in Mathematics and Physics, make CMI unique. A very large number of CMI students go on to complete PhDs at the best institutions across the world, including Berkeley, Caltech, CMU, Harvard, MIT, Princeton and Stanford in USA, ENS Paris in France, and the Max Planck Institutes in Germany. CMI alumni are also prominent among the ranks of graduate students in the premier Indian institutions - IITs, IMSc, IISc, ISI and TIFR, as well as CMI. CMI has made significant contributions to India's scientific manpower. CMI graduates are now faculty members at institutions such as IITs, IIMs, IISc, IISERs, IMSc, ISI, TIFR and CMI, and researchers in organisations such as Microsoft Research India. CMI alumni are also among the faculty of international universities in USA and Europe, as well as in leading technology companies like Amazon, Facebook and Google. In addition, CMI students also join companies in sectors such as finance, insurance and data analytics that require a strong background in Mathematics, Statistics and Computing. There is a large demand for students well trained in Data Sciences and ML. We were the first to start a 2 year MSc in Data Sciences, in 2018. The response from industry to this programme has been very enthusiastic. From the very first cohort, students have got attractive job offers, and this has also led to a stronger engagement between CMI and industry partners. Since 2010, CMI's faculty size has almost doubled while the student body has multiplied three-fold. This growth has been organic, with no compromise in quality. The Institute expects to expand in a sustainable manner over the next decade, both in research and teaching. There will also be a conscious effort to increase the level of engagement with the industry by taking on collaborative R&D projects that pose significant mathematical challenges. CMI has identified data science and quantum computing as two areas it would like to grow in and make a mark. Over the next five years, CMI is targeting to increase the size of the faculty by 50% and raise the student strength from 325 to 450. Another goal is to develop a vibrant centre that hosts a rotating pool of visiting scientists

	and organizes thematic research programmes on a regular basis. Towards this, in December 2020, CMI announced the formation of the Dr F C Kohli Centre of Excellence, named after the pioneer who built up the information technology (IT) industry in India. Through the events organized by the Centre, CMI hopes to attract potential faculty members, especially in areas not represented in CMI, who could be offered extended positions to organise thematic events around their research, attract students to work with them, and strengthen collaborations.
4. Appropriate integration of Indian Knowledge system (teaching in Indian Language, culture, using online course):	CMI has had multiple talks, workshops, and lecture series on the history of Indian mathematics. Prof Kim Plofker organized a 3 day workshop on Reading Manuscripts in Sanskrit Mathematical Sciences in 2013. In 2015 as part of the celebrations of Prof R Sridharan's 75th birthday, CMI hosted an International Conference on Algebra, Geometry and the History of Mathematics. Via such conferences and workshops students are exposed to Indian knowledge systems. However we have not offered courses for credit in these subjects yet. Via the CMI Arts Initiative we have offered a space for faculty, students and professionals interested in the humanities and arts to interact with experts and learn from them. These programmes are open to anyone who is interested in them. The weekend modules of the Arts Initiative have offered students a chance to learn and enhance their knowledge of Indian music, Indian dance, temple architecture, and Islamic heritage of Tamil Nadu, to name a few. CMI has hosted music and dance performances by reputed artists such as Priyadarshini Govind, T M Krishna, Malavika Sarukkai and Sanjay Subrahmanyam. T M Krishna curated a course, Indian Art in Context which was offered during August-November 2017 for credit. The aim of the course was to sensitise students to the interplay of aesthetics and perception with geography, class, gender and caste. Through the pandemic the CMI Arts Initiative offered a bouquet of well curated programmes on poetry, fiction and non-fiction inviting poets, artists and writers from across the globe to share their work. We has been in discussions before the pandemic with local experts to make more such courses available for credit for our students. We will pursue this again.
5. Focus on Outcome based education (OBE):	Most courses in CMI are designed to train students to

think. Each course has an end-semester exam with weightage between 30% and 70%. The rest is for internal assessment - assignments, presentations, quizzes and internal exams. Critical thinking and problem solving are the hallmark of all courses offered at CMI. When we set out to establish CMI, our charter was to impart mathematical skills to students and train them for independent thinking. CMI was already doing this with PhD students, the challenge was to do this successfully with students just out of school. Mathematics and Theoretical Computer Science are both abstract subjects and the best way to learn them is by solving problems. Physics is more intuitive, but the theory is built on abstract concepts and becoming comfortable with these abstractions requires strong mathematical skills. Each course, be it in Mathematics, Computer Science or Physics, has specific outcomes and goals. Since courses are interlinked, it is essential that the stated outcomes of each course are achieved. In Mathematics courses these outcomes involve a clear understanding of the concepts involved - why things are defined the way they are, what would happen if the definitions are modified, understanding key ideas in proofs, where exactly the hypothesis in theorems are used in the proof. These are issues we stress and ask students to become aware of. Most computer science courses lay an emphasis on abstraction and modeling. Physics courses stress the importance of rigour but at the same time students are taught how to design good experiments. More than 70% of CMI BSc students end up joining PhD programmes. Almost all MSc Mathematics students and about 60% of MSc Computer Science students end up pursuing PhDs. We believe this is a reflection of the success of outcome based teaching. CMI students have also won international recognition. Arul Shankar (BSc 2007) moved to Princeton for his PhD in number theory to work with Manjul Bharghava. The citation for the Fields Medal awarded to Manjul Bharghava at ICM 2014 explicitly acknowledges Arul's contribution. Ramprasad Saptharishi (BSc 2007, MSc 2009, PhD 2013) won the ACM India Doctoral Dissertation award in 2013 for his PhD thesis. Shiladitya Banerjee (BSc 2008) moved to Syracuse for his PhD; he won the American Physical Society Award for Outstanding PhD Thesis in Biological Physics for 2013. Recently in 2021, another CMI BSC alumnus,

	Ananth Shankar was a coauthor of a paper in which the Andre Oort conjecture was settled. Pranjal Datta (BSc 2013, MSc 2016, PhD 2018) was awarded the best paper award and the best student paper award in the prestigious Computer Science Symposium in Russia (CSR) in 2021. Many CMI students working in the industry have multiple patents against their names. They acknowledge that the training they received in CMI has played an important role in their success.
6. Distance education/online education:	During the pandemic all CMI courses moved online very quickly, and there were few glitches. CMI faculty were provided with iPads to facilitate online instruction. All CMI faculty are now comfortable with online teaching. CMI conducted 5 online lecture series and 6 conferences during the pandemic (see https://www.cmi.ac.in/activities/series.php, https://www.cmi.ac.in/activities/conferences.php) CMI also equipped its seminar room with new technology to be able to conduct events in hybrid mode. Since the beginning of this year all our faculty meetings are held in hybrid mode, and multiple seminars have been held in hybrid mode. At CMI we are convinced that the online mode of learning is here to stay, and it is one mode by which we can scale our reach. We plan to use this facility to reach out to subject experts across the globe and offer our students a bigger choice of electives. One of the issues with online long-distance education is evaluation. While online education scales, the issue of holding exams and proctoring them to prevent possible malpractice still remains a bottleneck. CMI faculty have created several courses in Mathematics and Computer Science for NPTEL, which are hosted regularly on SWAYAM. The CMI course on Programming and Data Structures Using Python is regularly one of the courses with the highest registration among the courses offered by NPTEL. Prof Madhavan Mukund, Director CMI, has been involved in the revolutionary online BSc Data science programme being offered by IIT Madras. He has been part of the core team that designed the programme and has created several courses for this programme, including an innovative course on Computational Thinking. One of CMI's goals is to develop a vibrant centre that hosts a rotating pool of visiting scientists and organizes thematic research

	programmes on a regular basis. Towards this, in December 2020, CMI announced the formation of the Dr. F. C. Kohli Centre of Excellence, named after the pioneer who built up the information technology (IT) industry in India. The advisory board for the Kohli Centre includes eminent academicians who have experience with running similar centres, including Kurt Mehlhorn (MPI, Saarbrucken), V Kumar Murthy (Fields Institute, Toronto), David Eisenbud (MSRI/Simons Institute, Berkeley), Rajesh Gopakumar (ICTS, Bangalore), and Umesh Vazirani (BQIC, Berkeley). The Kohli Centre would give scientists working in the mathematical sciences in India an opportunity to interact with their peers across the globe, to keep abreast of the latest developments. It would be a place where people engaged in the mathematical sciences meet, exchange ideas and forge collaborations. This can be achieved by running such events in hybrid mode where many participants are on campus and many can join online. CMI was a pioneer in combining excellence in research with high quality undergraduate programmes when we started in 1998. Our cohorts are intentionally kept small to enhance student-faculty interaction. We hope to become pioneers in offering top quality programmes in mathematical sciences on a large scale by making effective use of online teaching.

Extended Profile

1 Program

1.1

Number of programs offered year-wise for last five years

2020-21	2019-20	2018-19	2017-18	2016-17
8	8	8	8	8

File Description	Document
Institutional data in prescribed format	View Document

1.2

Number of departments offering academic programmes

Response: 3

2 Students

2.1

Number of students year-wise during last five years

2020-21	2019-20	2018-19	2017-18	2016-17
312	287	226	216	215

File Description	Document
Institutional data in prescribed format	View Document

2.2

Number of outgoing / final year students year-wise during last five years

2020-21	2019-20	2018-19	2017-18	2016-17
87	101	57	85	58

File Description	Document
Institutional data in prescribed format	View Document

2.3

Number of students appeared in the University examination year-wise during the last five years

2020-21	2019-20	2018-19	2017-18	2016-17
274	246	182	177	163

File Description	Document
Institutional data in prescribed format	View Document

2.4

Number of revaluation applications year-wise during the last 5 years

2020-21	2019-20	2018-19	2017-18	2016-17
4	11	10	3	10

3 Teachers

3.1

Number of courses in all programs year-wise during last five years

2020-21	2019-20	2018-19	2017-18	2016-17
147	141	144	135	150

File Description	Document
Institutional data in prescribed format	View Document

3.2

Number of full time teachers year-wise during the last five years

2020-21	2019-20	2018-19	2017-18	2016-17
32	36	37	37	36

File Description	Document
Institutional data in prescribed format	View Document

3.3

Number of sanctioned posts year-wise during last five years

2020-21	2019-20	2018-19	2017-18	2016-17
50	50	45	45	45

File Description	Document
Institutional data in prescribed format	View Document

4 Institution

4.1

Number of eligible applications received for admissions to all the programs year-wise during last five years

2020-21	2019-20	2018-19	2017-18	2016-17
6510	6792	7406	7767	7094

File Description	Document
Institutional data in prescribed format	View Document

4.2

Number of seats earmarked for reserved category as per GOI/State Govt rule year-wise during last five years

2020-21	2019-20	2018-19	2017-18	2016-17
40	40	30	25	25

File Description	Document
Institutional data in prescribed format	View Document

4.3

Total number of classrooms and seminar halls

Response: 13

4.4

Total number of computers in the campus for academic purpose

Response: 281

4.5

Total Expenditure excluding salary year-wise during last five years (INR in Lakhs)

2020-21	2019-20	2018-19	2017-18	2016-17
1124	1258	1148	1057	1075

4. Quality Indicator Framework(QIF)

Criterion 1 - Curricular Aspects

1.1 Curriculum Design and Development

1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which is reflected in Programme outcomes (POs), Programme Specific Outcomes(PSOs) and Course Outcomes(COs) of the Programmes offered by the Institution.

Response:

All programs in CMI have these common outcomes - train students to think analytically, be able to compete with the best in the world and be pioneers. All courses have well defined outcomes, to help them take the next step to pursue the subject deeper or to broaden their base. Students see a natural progression in how they acquire skills.

The UG programs are designed to train students by offering them a wide basket of choices, so by the time they finish the program they know what their interests are and they can pursue Masters in those areas and either take up jobs or pursue academics and research. Almost all CMI UG students go on to study further. Those pursuing a Computer Science and/or a Data science masters either join the industry or continue further in academia. Those pursuing Math and Physics take up academics and some have joined the finance industry. Almost 60% of our students have ended up doing PhDs.

The primary charter of CMI is research. Our PhD programmes are designed to train students to do fundamental research. Students go through some intense coursework to get them to speed with the background required to pursue high quality research. PhD students publish in top quality journals and conferences to make the cut. Our thrust areas in applied sciences are in line with the needs of the country, Verification, Security, Machine learning and AI.

The MSc Data science programme was started in 2018. We were the first in India to start an MSc in Data Science after we realized the manpower needs in India. To ensure quality and keeping in mind the size of CMI our intake is limited to about 50-60. Courses are designed to have a theoretical content but in all the courses students have to program, build models and run experiments. We consult top leaders in the industry about their needs in this area and tweak the programme to meet those requirements. We have been running a very successful Data Science seminar where experts from the industry present case studies from their company to the students. From such interactions, students appreciate better how their courses have practical relevance.

Our undergraduate programmes in Mathematics and Computer Science and Mathematics and Physics are targeted at students who have shown a spark early on in these subjects. The objective there is to offer top quality teaching by experts doing research in these area. The emphasis is on conceptual learning and imparting sophisticated technical skills, so important to pursuing research in these areas.

CMI students have gone on to the top universities in the world and performed very well, even though they have had only three years of UG studies. They have done some outstanding research. CMI alumni are faculty members in top institutions in India and abroad. The training imparted to them with emphasis on honing problem solving skills helps those who join the industry move up the corporate ladder.

File Description	Document
Upload Additional information	View Document
Link for Additional information	View Document

1.1.2 Percentage of Programmes where syllabus revision was carried out during the last five years.

Response: 50

1.1.2.1 **How many Programmes were revised out of total number of Programmes offered during the last five years**

Response: 4

1.1.2.2 **Number of all Programmes offered by the institution during the last five years.**

Response: 8

File Description	Document
Minutes of relevant Academic Council/BOS meeting	View Document
Institutional data in prescribed format	View Document
Details of Programme syllabus revision in last 5 years	View Document

1.1.3 Average percentage of courses having focus on employability/ entrepreneurship/ skill development offered by the institution during the last five years

Response: 12.28

1.1.3.1 Number of courses having focus on employability/ entrepreneurship/ skill development year-wise during the last five years

2020-21	2019-20	2018-19	2017-18	2016-17
22	29	13	11	13

File Description	Document
Programme/ Curriculum/ Syllabus of the courses	View Document
Institutional data in prescribed format	View Document

1.2 Academic Flexibility

1.2.1 Percentage of new courses introduced of the total number of courses across all programs offered during the last five years.

Response: 19.53

1.2.1.1 **How many new courses were introduced within the last five years.**

Response: 140

1.2.1.2 **Number of courses offered by the institution across all programmes during the last five years.**

Response: 717

File Description	Document
Minutes of relevant Academic Council/BOS meeting	View Document
Institutional data in prescribed format	View Document

1.2.2 Percentage of Programmes in which Choice Based Credit System (CBCS) / elective course system has been implemented (Data for the latest completed academic year).

Response: 100

1.2.2.1 **Number of Programmes in which CBCS / Elective course system implemented.**

Response: 8

File Description	Document
Minutes of relevant Academic Council/BOS meetings	View Document
Institutional data in prescribed format	View Document

1.3 Curriculum Enrichment

1.3.1 Institution integrates crosscutting issues relevant to Professional Ethics ,Gender, Human Values ,Environment and Sustainability into the Curriculum

Response:

The core English course in CMI which all first year students take has values woven into the syllabus. The syllabus is not constant, but every time it is offered values are emphasized. The same texts are also used to improve communication skills. In the English course, compulsory for all first year undergraduates, values

against discrimination have been discussed via pieces written by Martin Luther King, a discussion on faith used Mathew Arnold's "Dover Beach", the horrors of war were discussed through Hemmingway's "Old Man at the bridge", leadership was discussed using A A Milne's, "The Boy Comes Home".

CMI offers two courses as electives where this is integrated into the curriculum. One of the courses is called Values through Literature and the other course is called The Art of Fiction.

Values through Literature has included readings on professional ethics (Gandhi's experiences at the bar), fundamental human values including patriotism, integrity, Buddhist economics as practised in Bhutan, compassion, and sensitivity towards animals. The readings also include Ambedkar's writings on caste. The early environmentalists, including Rachel Carson, are also discussed.

The Art of Fiction has included readings on gender issues, mental health issues, and individual liberty. In 2020-21 it was offered online. As part of the CMI Arts Initiative, in February 2021 there was an interview with D W Gibson where he spoke about his research interviewing people who had lost jobs, which resulted his books "Not Working" and also his latest book "14 miles". This was attended by all the students and they had an assignment based on the interview.

CMI has had talks on ethics in AI. In a recent talk on quantum computing, we had discussions on ethics centered around the enormous expense involved in building quantum computers and how, as a result, very few countries can afford them. The speaker, a distinguished international expert in quantum information theory, asked how ethical it would be for one or two nations to monopolise the research in this area and have access to such computing devices.

File Description	Document
Upload the list and description of the courses which address the Gender, Environment and Sustainability, Human Values and Professional Ethics into the Curriculum	View Document

1.3.2 Number of value-added courses for imparting transferable and life skills offered during last five years.

Response: 18

1.3.2.1 **How many new value-added courses are added within the last five years.**

Response: 18

File Description	Document
Institutional data in prescribed format	View Document
Brochure or any other document relating to value added courses	View Document

1.3.3 Average Percentage of students enrolled in the courses under 1.3.2 above.

Response: 29.07

1.3.3.1 **Number of students enrolled in value-added courses imparting transferable and life skills offered year-wise during the last five years.**

2020-21	2019-20	2018-19	2017-18	2016-17
95	92	94	55	34

1.3.4 Percentage of students undertaking field projects / research projects / internships (Data for the latest completed academic year).

Response: 20.51

1.3.4.1 **Number of students undertaking field projects or research projects or internships.**

Response: 64

File Description	Document
List of Programmes and number of students undertaking field projects research projects/ / internships (Data Template)	View Document
Link for additional information	View Document

1.4 Feedback System

1.4.1 Structured feedback for design and review of syllabus – semester-wise / year-wise is received from 1) Students, 2) Teachers, 3) Employers, 4) Alumni

Response: A. All 4 of the above

File Description	Document
URL for stakeholder feedback report	View Document
Institutional data in prescribed format	View Document
Action taken report of the University on feedback report as stated in the minutes of the Governing Council, Syndicate, Board of Management (Upload)	View Document

1.4.2 Feedback processes of the institution may be classified as follows:

Response: A. Feedback collected, analysed and action taken and feedback available on website

File Description	Document
URL for feedback report	View Document
Upload any additional information	View Document
Institutional data in prescribed format	View Document

Criterion 2 - Teaching-learning and Evaluation

2.1 Student Enrollment and Profile

2.1.1 Demand Ratio (Average of last five years)

Response: 50.87

2.1.1.1 **Number of seats available year wise during the last five years**

2020-21	2019-20	2018-19	2017-18	2016-17
165	165	135	125	125

File Description	Document
Demand Ratio (Average of Last five years) based on Data Template upload the document	View Document

2.1.2 Average percentage of seats filled against reserved categories (SC, ST, OBC, Divyangjan, etc.) as per applicable reservation policy during the last five years (Excluding Supernumerary Seats)

Response: 25.53

2.1.2.1 **Number of actual students admitted from the reserved categories year wise during last five years**

2020-21	2019-20	2018-19	2017-18	2016-17
10	8	14	5	4

File Description	Document
Average percentage of seats filled against seats reserved (Data Template)	View Document

2.2 Catering to Student Diversity

2.2.1 The institution assesses the learning levels of the students and organises special Programmes for advanced learners and slow learners

Response:

CMI has a well defined policy for slow tracking of students. When students join CMI, each batch is

assigned one or two faculty advisors. These faculty advisors remain with the batch till they graduate. The rapport they establish during the students' first year enables them to understand the issues any student may have, be they academic issues or issues related to personality. At the end of every semester the faculty advisor contacts students who are struggling academically to find out if they need help and understand why their performance is below par.

After the first year of BSc, or during the second year, if the faculty advisor and the student feel that the student would perform better by taking a reduced course load in future semesters, this is communicated to the Dean and to the Director. The student is then permitted to take upto 4 courses in each semester and graduate in four years, instead of the usual three for BSc, by postponing some courses. A similar option is available for MSc students who can complete the requiremetns in three years, tahter than the usual two. In slow tracking, the grades in courses a student has passed are unchanged. The expectation is that the grades in the courses the student has yet to take will improve naturally by reducing the course load. This has been enormously helpful for about 6 BSc students so far, and 1 MSc student.

Because of the pandemic and having online classes, in 2020-2021 and 2012-2022 we have additionally offered first year BSc students who have been struggling the option to rejoin the programme instead of slow tracking, so that they can make a fresh start. A few students have opted for this.

Students who are high achievers are allowed to take one course extra per semester and in very exceptional cases two. This is enabled after their first semester grades are known. We usually discourage students to take more courses in their first year. Students can take more courses than the basic minimum required for the degree and these additional courses are documented in their transcripts.

File Description	Document
Upload Any additional information	View Document
Paste link for additional information	View Document

2.2.2 Student - Full time teacher ratio (Data for the latest completed academic year)

Response: 10:1

2.3 Teaching- Learning Process

2.3.1 Student centric methods, such as experiential learning, participative learning and problem solving methodologies are used for enhancing learning experiences

Response:

Students participate enthusiastically in most classes. This was certainly the case when classes were held in person. But this has suffered during the pandemic with multiple issues because of classes being online.

From the time students join CMI students they are encouraged to interact, both during class and outside class hours. This is a habit they inculcate early on duing their stay at CMI. It is quite common to see students enthusiastically completeting proofs of statements during class.

All teachers believe that Mathematics, Physics and Computer Science can only be learned by solving problems. Almost all courses have a significant component of evaluation based on assignments. Most of these assignments are problem solving based exercises given every week, or once in two weeks. Students are expected to understand the concepts involved. Students are expected to abide by an honour code and work independently. Students are encouraged to discuss with each other but are expected to write all solutions by themselves.

Many Computer Science courses have a mix of programming exercises and theory problems which students solve in assignments. Again this practice begins early, with all first year BSc students and MSc Computer Science students having a course in programming in their first semester.

Tutorials are conducted in many courses. And again it is expected that students come prepared to a tutorial after having spent time thinking about the problems to be discussed.

Many courses have a seminar component. This is true of a number of electives where student numbers are smaller. In larger classes, students form groups and are expected to read research papers or foundational material that they then present in detail.

PhD students and MSc students in CMI have been running a very successful seminar series. Each student picks up a research paper of their choice and presents it to the entire group, including faculty. Students are expected to organise the presentations so that even somebody who is not an expert in the area can understand the problem, the assumptions made and the solution or theorem proposed. Students are also expected to present details of proofs so that a more nuanced evaluation can be made.

File Description	Document
Upload any additional information	View Document

2.3.2 Teachers use ICT enabled tools including online resources for effective teaching and learning process.

Response:

ICT clearly enables new ways of learning and helps in constant interaction between students and faculty. CMI has excellent wifi connectivity all over the campus. When they join, students are assigned a username to log into the CMI network. All internal communication is by email, including announcements of seminars and events. All classrooms have LCD projectors. These days it is quite common for teachers to write on tablets and project the material on the screen rather than using a conventional blackboard. One advantage of this style of lecturing is that an electronic copy of the material presented in lecture is available after the class. Of course, some teachers still prefer the traditional chalk and board. The Moodle LMS is used by instructors to disseminate course related information such as lecture notes and reading material as well as announcements about exams and assignments. Moodle is also used to collect assignment submissions and send back feedback after grading. The use of ICT is particularly relevant for courses in subjects such as programming and machine learning (ML). IInstructors can teach the theory and at the same time demonstrate running code. In ML, for instance, this is a good way to introduce students to ML packages that are already available in languages like Python. This way the instructor can demonstrate the

various kinds of ML models side-by-side with their theoretical aspects. Student evaluation forms indicate that students are very happy when such an approach is followed.

File Description	Document
Upload any additional information	View Document
Provide link for webpage describing the " LMS/ Academic management system"	View Document

2.3.3 Ratio of students to mentor for academic and other related issues (Data for the latest completed academic year)

Response: 15:1

2.3.3.1 **Number of mentors**

Response: 21

File Description	Document
Upload year wise, number of students enrolled and full time teachers on roll.	View Document
mentor/mentee ratio	View Document
Circulars pertaining to assigning mentors to mentees	View Document

2.4 Teacher Profile and Quality

2.4.1 Average percentage of full time teachers against sanctioned posts during the last five years

Response: 76.09

File Description	Document
Year wise full time teachers and sanctioned posts for 5 years	View Document
List of the faculty members authenticated by the Head of HEI	View Document

2.4.2 Average percentage of full time teachers with Ph.D./D.M/M.Ch./D.N.B Superspeciality/D.Sc./D'Lit. year-wise during the last five years

Response: 100.31

2.4.2.1 **Number of full time teachers with *Ph. D. / D.M. / M.Ch. / D.N.B Superspeciality / D.Sc. /***

D.Litt. **year wise during the last five years**

2020-21	2019-20	2018-19	2017-18	2016-17
36	37	37	35	33

File Description	Document
List of number of full time teachers with Ph D/D M/M Ch/D N B Superspeciality/DSc/D Lit and number of full time teachers for 5 years	View Document

2.4.3 Average teaching experience of full time teachers in the same institution (Data for the latest completed academic year in number of years)

Response: 13.38

2.4.3.1 **Total experience of full-time teachers**

Response: 428

File Description	Document
List of Teachers including their PAN, designation, dept and experience details	View Document

2.4.4 Average percentage of full time teachers who received awards, recognition, fellowships at State, National, International level from Government/Govt. recognised bodies during the last five years

Response: 44.94

2.4.4.1 **Number of full time teachers receiving awards from state /national /international level from Government/Govt. recognized bodies year wise during the last five years**

2020-21	2019-20	2018-19	2017-18	2016-17
5	4	4	1	2

File Description	Document
Institutional data in prescribed format	View Document
e-copies of award letters (scanned or soft copy)	View Document

2.5 Evaluation Process and Reforms

2.5.1 Average number of days from the date of last semester-end/ year- end examination till the declaration of results year-wise during the last five years

Response: 42

2.5.1.1 **Number of days from the date of last semester-end/ year- end examination till the declaration of results year wise during the last five years**

2020-21	2019-20	2018-19	2017-18	2016-17
34	35	45	48	48

File Description	Document
List of Programmes and date of last semester and date of declaration of results	View Document

2.5.2 Average percentage of student complaints/grievances about evaluation against total number appeared in the examinations during the last five years

Response: 3.85

2.5.2.1 **Number of complaints/grievances about evaluation year wise during the last five years**

2020-21	2019-20	2018-19	2017-18	2016-17
4	11	10	3	10

File Description	Document
Number of complaints and total number of students appeared year wise	View Document

2.5.3 IT integration and reforms in the examination procedures and processes (continuous internal assessment and end-semester assessment) have brought in considerable improvement in examination management system of the institution

Response:

CMI has been an early advocate of the online Learning Management System (LMS) Moodle. Online LMSs are specifically designed to supplement classroom instruction. There are mechanisms to distribute notes, add short quizzes, collect assignments and keep track of students' grades. This also results in a tremendous reduction in the use of paper.

There was a challenge initially to get instructors to adopt the LMS to supplement their classroom interaction and to get students use it. From 14 courses that used moodle in the initial year (2010-2011), it grew to 71 courses in 2019-20 (pre-pandemic). Once instruction become online in 2020-21, 125 courses used moodle.

Independent of the pandemic, there is a clear growth in the number of courses and the ways in which Moodle is used within CMI. In fact, when classes moved entirely online due to the pandemic, we decided to continue with Moodle, instead of shifting to Google Classroom and similar external services.

CMI has maintained its grades in a database for over a decade. In 2019, CMI created an in-house system for instructors to enter their grades directly, online, instead of manually entering these into the database from printed gradesheets. This has considerably reduced paperwork and eliminated potential typographical errors during transcription. Each faculty member receives the list of students enrolled in their course in a single form, neatly grouped by the degree and programme that the students are enrolled for. This makes it very easy to enter the grades online, from where they are automatically added to the database and communicated to the office. When all the grades are available, a different software application, again built in-house, is used to prepare grade sheets, programwise, yearwise and studentwise.

File Description	Document
Year wise number of applications, students and revaluation cases	View Document

2.5.4 Status of automation of Examination division along with approved Examination Manual

Response: 100% automation of entire division & implementation of Examination Management System (EMS)

File Description	Document
Current manual of examination automation system and Annual reports of examination including the present status of automation	View Document
Current Manual of examination automation system	View Document

2.6 Student Performance and Learning Outcomes

2.6.1 The institution has stated learning outcomes (generic and programme specific)/graduate attributes which are integrated into the assessment process and widely publicized through the website and other documents

Response:

Each course has a syllabus that defines the learning outcomes. The syllabus for core courses is fixed to the

extent of 85%. The instructor has the freedom to decide optional topics to include in the remaining part of the syllabus. Since some courses are prerequisits for future courses, the outcome of each course has to be well defined. In each course the concepts which need to be understood are clearly stated and indicated in the course outcomes. Every instructor is told to explain in the first class what they expects of the students in the course, what concepts need to be remembered well, going into the future, and how a student can acquire those concepts. Instructors convey without fail that problem solving is the only real means to understanding concepts and remembering them. At the beginning of the course, the instructor clearly spells out the assessment pattern. Most courses have an internal assessment component consisting of assignments, quizzes and tests, followed by end-term exam. It is suggested to insructors that assessments should test students on definitions, concepts, problem solving and numeracy. So most assignments, be it in Mathematics, Physics or Computer Science courses, are designed so that definitions get reinforced, students become comfortable with solving problems based on the concepts taught and students see a connectiong between the different concepts that they learn. All students go through at least one introductory course in programming where they see both functional and declaritive styles of programmning. Students are advised to try and code concepts they learn so that they understand how these are calculated. All Data Science courses have a large component of programming as part of the assessment. This exposes students to different packages in Python or R that they can use to reinforce concepts and see how to compute with them. Model building is encouraged side by side with learning theoretical concepts. Most of the faculty believe, as Vapnik said famously, that nothing is as practical as good theory. So theoretical foundations and a sound grounding in theory is a common thread that runs through all courses.

File Description	Document
Upload COs for all courses (exemplars from Glossary)	View Document
Paste link for Additional Information	View Document

2.6.2 Attainment of Programme outcomes, Programme specific outcomes and course outcomes are evaluated by the institution

Response:

The faculty regularly analyse how effective courses have been, and whether there is a need for minor adjusments in the syllabus. This is usually done when the faculty of each department meet to discuss course allocation. Since this happens every semester, there is a regular review of what each course set out to achieve and what it has actually achieved. Suggestions are given on the topics that need additional emphasis and those can be dropped. Feedback from students who have taken similar courses earlier is also useful when debating these changes. If a course needs a major revision, the faculty members propose an alternate syllabus which is then looked at by the appropriate Board of Studies and forwarded to the Academic Council for discussion and ratification.

Even informal student feedback is taken seriously. We are open to student suggestions on what courses they could like to see in programmes. For example Machine Learning courses in CMI began in 2015 in response to a request from students who felt that the BSc Mathematics and Computer Science programme as well as the MSc Computer Science programme could benefit from introducing basic courses in this

emerging area.

In 2016-17, the faculty reviewed the MSc Applications in Mathematics programme which was not attracting many applicants and was also not fulfilling its original goal of providing well trained talent for the industry. As a result of this discussion, it was decided to suspend the MSc Applications in Mathematics programme and start, instead, an MSc in Data Science from 2018.

Since the faculty are typically also active researchers in the subjects they teach, even foundational courses have seen a drastic change in the syllabus. For example it was quite common to emphasize structural complexity theory in a first course in Computational Complexity Theory in the years 2000-2012. Now, increasingly, the emphasis of the course has shifted to aspects of complexity theory that are relevant to current day research, as dictated by recent publications in these areas in the best conferences.

One of the programme outcomes of MSc Computer Science is to train some students to take up research. This has, for example, led to the introduction of a number of advanced electives in algorithms such as Fixed Parameter Tractable Algorithms, Sublinear-time Algorithms, and Property Testing - areas that have gained traction in current international research. By offering such courses, we ensure that our students can compete at a global level. They are ready to take up research problems in these areas after a few such courses.

2.6.3 Pass Percentage of students(Data for the latest completed academic year)

Response: 91.58

2.6.3.1 Total number of final year students who passed the examination conducted by Institution.

Response: 87

2.6.3.2 **Total number of final year students who appeared for the examination conducted by the Institution.**

Response: 95

File Description	Document
Upload list of Programmes and number of students passed and appeared in the final year examination	View Document
Paste link for the annual report	View Document

2.7 Student Satisfaction Survey

2.7.1 Online student satisfaction survey regarding teaching learning process

Response:

File Description	Document
Upload database of all currently enrolled students	View Document

Criterion 3 - Research, Innovations and Extension

3.1 Promotion of Research and Facilities

3.1.1 The institution's Research facilities are frequently updated and there is a well defined policy for promotion of research which is uploaded on the institutional website and implemented

Response:

CMI faculty are evaluated for promotion based on their research. They are strongly encouraged to publish in leading journals and conferences. CMI provides generous funding for faculty to travel to conferences as well as for academic visits to interact with collaborators so that they continue to do cutting edge research on which their promotions are based. CMI also encourages faculty to apply for research grants. The Institute has a healthy corpus which is used for travel grants and conference registration fees.

Workshops and conferences in various areas are held iat CMI on a regular basis. This enables our students to interact with researchers at a global level and forge contacts and collaborations. CMI also has an active visitors programme and faculty are encouraged to invite their collaborators and students from other institutes to pursue their research goals.

If needed, younger faculty are permitted to take lighter teaching loads for a semester or two to focus more on research. Younger faculty are also mentored on how to apply for grants.

CMI is part of ReLaX, an Indo-French joint laboratory dedicated to research in theoretical computer science, its applications, and its interactions with mathematics. As a result CMI faculty visit premier research labs in France. There have even been a few joint PhD students co-guided by a faculty member in CMI and a faculty member from a partner institute in France.

File Description	Document
Minutes of the Governing Council/ Syndicate/Board of Management related to research promotion policy adoption	View Document
URL of Policy document on promotion of research uploaded on website	View Document

3.1.2 The institution provides seed money to its teachers for research (average per year, INR in Lakhs)

Response: 0

3.1.2.1 **The amount of seed money provided by institution to its faculty year-wise during the last five years (INR in lakhs).**

2020-21	2019-20	2018-19	2017-18	2016-17
0	0	0	0	0

File Description	Document
Institutional data in prescribed format	View Document

3.1.3 Percentage of teachers receiving national / international fellowship / financial support by various agencies for advanced studies / research during the last five years.

Response: 84.83

3.1.3.1 **The number of teachers who received national / international fellowship / financial support by various agencies for advanced studies / research year-wise during the last five years.**

2020-21	2019-20	2018-19	2017-18	2016-17
28	48	43	20	12

File Description	Document
Institutional data in prescribed format	View Document
e-copies of the award letters of the teachers	View Document

3.1.4 Number of JRFs, SRFs, Post Doctoral Fellows, Research Associates and other research fellows enrolled in the institution during the last five years.

Response: 382

3.1.4.1 **The Number of JRFs, SRFs, Post Doctoral Fellows, Research Associates and other research fellows enrolled in the institution year-wise during the last five years.**

2020-21	2019-20	2018-19	2017-18	2016-17
85	84	76	71	66

File Description	Document
Institutional data in prescribed format	View Document
Any additional information	View Document

3.1.5 Institution has the following facilities to support research

1. **Central Instrumentation Centre**
2. **Animal House/Green House**
3. **Museum**
4. **Media laboratory/Studios**
5. **Business Lab**
6. **Research/Statistical Databases**
7. **Mootcourt**
8. **Theatre**
9. **Art Gallery**
10. **Any other facility to support research**

Response: C. 2 of the above

File Description	Document
Upload the list of facilities provided by the university and their year of establishment	View Document
Paste link of videos and geotagged photographs	View Document

3.1.6 Percentage of departments with UGC-SAP, CAS, DST-FIST, DBT, ICSSR and other recognitions by national and international agencies (Data for the latest completed academic year)

Response: 100

3.1.6.1 **The Number of departments with UGC-SAP, CAS, DST-FIST , DBT, ICSSR and other similar recognitions by national and international agencies.**

Response: 3

File Description	Document
Institutional data in prescribed format	View Document
e-version of departmental recognition award letters	View Document

3.2 Resource Mobilization for Research

3.2.1 Extramural funding for Research (Grants sponsored by the non-government sources such as industry, corporate houses, international bodies for research projects) endowments, Chairs in the University during the last five years (INR in Lakhs).

Response: 464.32

3.2.1.1 **Total Grants for research projects sponsored by the non-government sources such as industry, corporate houses, international bodies, endowments, Chairs in the institution year-wise**

during the last five years (INR in Lakhs).

2020-21	2019-20	2018-19	2017-18	2016-17
7.04	375.64	26.14	36.95	18.55

File Description	Document
Institutional data in prescribed format	View Document
e-copies of the grant award letters for research projects sponsored by non-government	View Document

3.2.2 Grants for research projects sponsored by the government agencies during the last five years (INR in Lakhs).

Response: 59.06

3.2.2.1 **Total Grants for research projects sponsored by the government agencies year-wise during the last five years (INR in Lakhs).**

2020-21	2019-20	2018-19	2017-18	2016-17
38.86	0	17.7	2.5	0

File Description	Document
Institutional data in prescribed format	View Document
e-copies of the grant award letters for research projects sponsored by government	View Document

3.2.3 Number of research projects per teacher funded by government and non-government agencies during the last five years

Response: 3.13

3.2.3.1 **Number of research projects funded by government and non-government agencies during the last five years.**

Response: 25

3.2.3.2 **Number of full time teachers worked in the institution year-wise during the last five years..**

Response: 40

File Description	Document
Supporting document from Funding Agency	View Document
Institutional data in prescribed format	View Document
Paste Link for the funding agency website	View Document

3.3 Innovation Ecosystem

3.3.1 Institution has created an eco system for innovations including Incubation centre and other initiatives for creation and transfer of knowledge.

Response:

CMI faculty are encouraged to attend workshops, conferences and collaborate with researchers from other institutions in order to create new knowledge. They are encouraged to publish in leading conferences and journals. CMI also holds regular workshops and conferences on campus to foster research. Since both faculty and students need to keep abreast of the latest developmennt, workshops are organized regularly on emerging topics to acquire new expertise which will be useful for research.

CMI encourages faculty to register patents but does not have a separate incubation center for innovation. CMI has set up society called AlgoLabs to foster interaction with industry. The idea is to take up projects whose solutions would involve sophisticated mathematical and computational skills. CMI believes that such interaction is vital for faculty so that they become aware of what the industry needs and uses from the subjects of their expertise. Through this, academic researchers can also identify new research directions. Furthermore, by acting as consultants, faculty are naturally involved in transfer of knwledge. One of the goals of this interaction with the industry is to encourage faculty to think about building products that can be patented and monetized.

The newly launched Centre of Excellence named after Dr F C Kohli will also have programmes for industry to present and discuss challenging problems to academic researchers with the aim of initiating collaborative research projects between academia and industry.

File Description	Document
Paste link for additional information	View Document

3.3.2 Number of workshops/seminars conducted on Research methodology, Intellectual Property Rights (IPR),entrepreneurship, skill development during the last five years.

Response: 40

3.3.2.1 **Total number of workshops/seminars conducted on Research methodology, Intellectual**

Property Rights (IPR),entrepreneurship, skill development year-wise during the last five years.

2020-21	2019-20	2018-19	2017-18	2016-17
4	6	10	8	12

File Description	Document
Report of the event	View Document
Institutional data in prescribed format	View Document

3.3.3 Number of awards / recognitions received for research/innovations by the institution / teachers / research scholars / students during the last five years.

Response: 7

3.3.3.1 **Total number of awards / recognitions received for *research* / innovations won by institution / teachers / research scholars / students year-wise during the last five years.**

2020-21	2019-20	2018-19	2017-18	2016-17
1	2	1	1	2

File Description	Document
Institutional data in prescribed format	View Document
e- copies of award letters	View Document

3.4 Research Publications and Awards

3.4.1 The Institution ensures implementation of its stated Code of Ethics for research through the following: 1. Inclusion of research ethics in the research methodology course work 2. Presence of Ethics committee 3. Plagiarism check through software 4. Research Advisory Committee

Response: C. 2 of the above

File Description	Document
Code of ethics for Research document, Research Advisory committee and ethics committee constitution and list of members on these committees, software used for Plagiarism check, link to Website	View Document

3.4.2 The institution provides incentives to teachers who receive state, national and international recognitions/awards 1.Commendation and monetary incentive at a University function 2.Commendation and medal at a University function 3. Certificate of honor 4.Announcement in the Newsletter / website

Response: D. 1 of the above

File Description	Document
Institutional data in prescribed format	View Document
e- copies of the letters of awards	View Document

3.4.3 Number of Patents published / awarded during the last five years.

Response: 0

3.4.3.1 **Total number of Patents published / awarded year-wise during the last five years.**

2020-21	2019-20	2018-19	2017-18	2016-17
0	0	0	0	0

File Description	Document
Institutional data in prescribed format	View Document

3.4.4 Number of Ph.D's awarded per teacher during the last five years.

Response: 0.85

3.4.4.1 **How many Ph.D's are awarded within last five years.**

Response: 34

3.4.4.2 **Number of teachers recognized as guides during the last five years**

Response: 40

File Description	Document
Institutional data in prescribed format	View Document
URL to the research page on HEI web site	View Document

3.4.5 Number of research papers per teachers in the Journals notified on UGC website during the

last five years

Response: 6.4

3.4.5.1 **Number of research papers in the Journals notified on UGC website during the last five years.**

2020-21	2019-20	2018-19	2017-18	2016-17
46	53	46	44	39

File Description	Document
Institutional data in prescribed format	View Document

3.4.6 Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during last five years

Response: 2.3

3.4.6.1 **Total number of books and chapters in edited volumes/books published and papers in national/ international conference proceedings year-wise during last five years**

2020-21	2019-20	2018-19	2017-18	2016-17
14	17	19	18	14

File Description	Document
Institutional data in prescribed format	View Document

3.4.7 E-content is developed by teachers :

1. **For e-PG-Pathshala**
2. **For CEC (Under Graduate)**
3. **For SWAYAM**
4. **For other MOOCs platform**
5. **Any other Government Initiatives**
6. **For Institutional LMS**

Response: C. Any 3 of the above

File Description	Document
Institutional data in prescribed format	View Document
Give links or upload document of e-content developed	View Document

3.4.8 Bibliometrics of the publications during the last five years based on average citation index in Scopus/ Web of Science or PubMed

Response:

File Description	Document
Bibliometrics of the publications during the last five years	View Document
Any additional information	View Document

3.4.9 Bibliometrics of the publications during the last five years based on Scopus/ Web of Science - h-index of the Institution

Response:

File Description	Document
Bibiliometrics of publications based on Scopus/ Web of Science - h-index of the Institution	View Document
Any additional information	View Document

3.5 Consultancy

3.5.1 Institution has a policy on consultancy including revenue sharing between the institution and the individual and encourages its faculty to undertake consultancy.

Response:

CMI's consultancy rules were similar to rules in the IIT's and IISER's till 2015. In 2015 CMI set up Algo Labs as a soceity for consultation.

The details of AlgoLabs, the mentors and projects understaken are available at https://www.algolabs.org.in/index.php

AlgoLabs is the Consulting Society of Chennai Mathematical Institute chartered to foster engagement between the Industries and the Institute. Via AlgoLabs CMI faculty can engage in solving problems which lie at the intersection of computer science, mathematical statistics, and scientific domain application. CMI has chosen to operate via the AlgoLabs society since it offers a "single window" to showcase our range of

capabilities.

AlgoLabs offers two broad categories of services:

- Consulting: AlgoLabs offers consulting to organizations who wish to solve business problems in areas related to Data Science , Machine Learning , Artificial Intelligence and Big Data. This consultancy service is offered via an iterative methodology, working closely with clients to develop data based on business processes.

- Training in Machine Learning / Data Mining Disciplines

File Description	Document
Upload soft copy of the Consultancy Policy	View Document
Paste URL of the consultancy policy document	View Document

3.5.2 Revenue generated from consultancy and corporate training during the last five years (INR in Lakhs).

Response: 58268682

3.5.2.1 **Total amount generated from consultancy and corporate training year-wise during the last five years (INR in lakhs).**

2020-21	2019-20	2018-19	2017-18	2016-17
10789331	9861582	16466622	11900815	9250332

File Description	Document
Institutional data in prescribed format	View Document
Audited statements of accounts indicating the revenue generated through consultancy	View Document

3.6 Extension Activities

3.6.1 Extension activities in the neighbourhood community in terms of impact and sensitising students to social issues and holistic development during the last five years.

Response:

CMI has not conducted extension activities about these issues. However, ever since we moved into the

campus in 2006 CMI students have been engaged in activities of social services. This is mostly peer driven. At the institute we often talk to the students about social issues and such topics are often discuused in debates, which are held as part of the humanities courses in CMI. There are discussions pertaining to discrimination which exists in India and abroad on the basis of caste, gender, religion and individual preferences and why this is against the spirit of declaration of human rights.

CMi students have engaged in activities such a visiting orphanages, and also teaching students in local schools. In fact in 2020 just before the pandemic students wanted to scale their activities of mentoring of local students. For this they identified a space to rent and wanted to have CMI students take turns to teach students at the rented space. However all this had to be abandoned due to the pandemic. This is one activity CMI will help revive in the coming academic year. In the additional information part for 3.6.1 we have uploaded a few pictures from CMI students interactions with children from an orphanage and a picture of the students involved in this activity in 2018.

This activity is one of the focus activities of the IQAC for this year.

CMI students have been involved in gender sensitization workshops for the House keeping staff and the canteen staff. A workshop was held on the CMI campus in 2018 for gender sensitization. This was initiated by the IQAC on the recommendation of the student body.

File Description	Document
Upload any additional information	View Document

3.6.2 Number of awards received by the Institution, its teachers and students from Government /Government recognised bodies in recognition of the extension activities carried out during the last five years

Response: 0

3.6.2.1 **Total number of awards and recognition received for extension activities from Government/ Government recognised bodies year-wise during the last five years.**

2020-21	2019-20	2018-19	2017-18	2016-17
0	0	0	0	0

File Description	Document
Institutional data in prescribed format	View Document

3.6.3 Number of extension and outreach programs conducted by the institution through NSS/NCC,

Government and Government recognised bodies during the last five years

Response: 78

3.6.3.1 **Number of extension and outreach programs conducted by the institution those through NSS/NCC, Government and Government recognised bodies during the last five years**

2020-21	2019-20	2018-19	2017-18	2016-17
15	15	20	10	18

File Description	Document
Institutional data in prescribed format	View Document

3.6.4 Average percentage of students participating in extension activities listed at 3.6.3 above during the last five years

Response: 14.29

3.6.4.1 **Total number of students participating in extension activities listed at 3.6.3 above year-wise during the last five years.**

2020-21	2019-20	2018-19	2017-18	2016-17
108	21	28	29	8

File Description	Document
Institutional data in prescribed format	View Document

3.7 Collaboration

3.7.1 Number of Collaborative activities for research, Faculty exchange, Student exchange/ internship per year

Response: 23.6

3.7.1.1 **Total number of Collaborative activities with other institutions / research establishment / industry for research and academic development of faculty and students year-wise during the last five years.**

2020-21	2019-20	2018-19	2017-18	2016-17
0	27	39	23	29

File Description	Document
Institutional data in prescribed format	View Document

3.7.2 Number of functional MoUs with institutions/ industries in India and abroad for internship, on-the-job training, project work, student / faculty exchange and collaborative research during the last five years.

Response: 28

3.7.2.1 **Number of functional MoUs with institutions/ industries in India and abroad for internship, on-the-job training, project work, student / faculty exchange and collaborative research year-wise during the last five years.**

2020-21	2019-20	2018-19	2017-18	2016-17
6	6	6	6	4

File Description	Document
Institutional data in prescribed format	View Document
e-copies of the MoUs with institution/ industry	View Document
Any additional information	View Document

Criterion 4 - Infrastructure and Learning Resources

4.1 Physical Facilities

4.1.1 The institution has adequate facilities for teaching - learning. viz., classrooms, laboratories, computing equipment, etc.

Response:

CMI has a Seminar Hall equipped with audio visual equipment using which CMI is able to conduct classes in hybrid mode. This room can accommodate over 90 students. There is another class-room connected to the National Knowledge Network; this room can accommodate over 90 students. In addition, there are smaller classrooms that can accommodate 40-50 students. All of these rooms are equipped with projectors. Moreover, there are open discussion areas throughout the building for informal interactions between the faculty and students of the institute.

The Institute has a Physics Laboratory for the use of the BSc Mathematics and Physics students. The experiments to be performed by the students in each semester are chosen from a list spanning a wide range of topics: mechanics, optics, electromagnetism, heat and modern physics. A number of novel experimental setups have been added to the laboratory in the recent years. The laboratory is housed in two rooms. Upto twenty students can comfortably perform their experiments in this space. There are two solar telescopes in CMI.They have been used to perform some experiments on elementary properties of solar motion.

There is a computer lab for students. All CMI faculty, postdoctoral fellows ns research scholars are provided personal computers (laptops/desktops) by the Institute. To facilitate online teaching, CMI faculty have also been provided tablets with stylus.

File Description	Document
Upload any additional information	View Document

4.1.2 The institution has adequate facilities for cultural activities, yoga, games and sports (indoor & outdoor); (gymnasium, yoga centre, auditorium, etc.,)

Response:

The Institute has an auditorium designed to host cultural programmes. In addition, the Seminar Hall can be used for holding concerts or screening movies.

The CMI auditorium is one of the best in the city in terms of design and acoustics. It can has a seating capacity of 220. It is equipped with professional-grade audio-visual equipment, lighting and acoustic panelling. The stage and lights have been set up by Victor Paulraj, a well known stage designer based in Chennai. The acoustics consultant was the sound expert Dr S Rajagopalan from Nagpur.

We have regular music and dance performances at the auditorium. As part of our outreach to the local community we make the auditorium available for use by local cultural associations. This has resulted in our students being exposed to a variety of cultural programmes and music concerts in addition to what the institution organises.

The students hostel has a common area meant for indoor games. It has gym equipment, a table-tennis table, carrom boards and chess boards.

A volleyball court, a basketball court and a small football ground are attached to the students hostel. Since CMI is constrained for space, to expand the sports opportunites available to students, CMI has made arrangements from 2018 with local gyms and badminton courts. CMI students can use these facilities, with the fees being paid directly by CMI.

File Description	Document
Geotagged pictures	View Document

4.1.3 Availability of general campus facilities and overall ambience

Response:

The campus is designed so that all classrooms and office are well ventilated to let air through. The campus is very open with ample light. There is no central air conditioning and individual offices use air conditioners sparingly thanks to the design which allows for breeze. There are a number of open spaces with blackboards for faculty and students to discuss. This feature of the CMI campus is very much appreciated by all visitors. This space is meant for informal interaction among the faculty and the students. It helps create an ambience conducive to academic interaction and collaborative learning. The uploaded picture shows one of the many discussion areas.

The canteen is open late into the night for students. Close to the campus there are facilities to eat, grocery stores and malls. We have regular shuttles to the entrance of the IT park for students to go out and buy things if needed.

The campus is green. It was completely barren when we moved in. The faculty and staff took a lot of pride in greening the space. We have more than 800 trees on campus and most of these trees are hardy. Our lawns are watered with recycled water and so they are low maintenance. The ambience at CMI is one of openness.

File Description	Document
Upload any additional information	View Document

4.1.4 Average percentage of expenditure for infrastructure augmentation excluding salary during the last five years (INR in Lakhs)

Response: 4.06

4.1.4.1 **Expenditure for infrastructure augmentation, excluding salary during the last five years (INR in lakhs)**

2020-21	2019-20	2018-19	2017-18	2016-17
54	38	42	48	46

File Description	Document
Upload audited utilization statements	View Document
Institutional data in prescribed format	View Document

4.2 Library as a Learning Resource

4.2.1 Library is automated using Integrated Library Management System (ILMS) and has digitisation facility

Response:

T

To fully automate the library we had to invest in hardware and software. We invested in RFID library cards, RFID book tags, tagging machine, RFID gate, chech-out/check-in kiosk etc. This allows the library to be open 24/7. It is extensively used by students and faculty both for borrowing books and as a quiet place for reading and study.

The library catalogue is managed through KOHA library management system which is open-source software. Check-out and check-in of books and journals is managed using a user kiosk which is integrated with the KOHA system. Users can search the catalogue online to find the location of the books. At the kiosk, users can look up the list of books checked out in their name.

We do not have anybody manning the library counter. Faculty and students are expected to take books from the shelves, and responsibly register the books they are issuing. CMI identity cards double up as RFID library cards to be used at the check-out kiosks to issue books.

The system automatically checks if users have exceeded the limit on the number of books they can issue. If books are overdue, it prevents a user from issuing new books.

To enable the students to work in the library, it is wi-fi-enabled. We have invested in wi-fi access points and fixed power sockets on reading tables for charging laptops and other devices.

File Description	Document
Paste link for additional information	View Document

4.2.2 Institution has access to the following: 1. e-journals 2. e-ShodhSindhu 3. Shodhganga Membership 4. e-books 5. Databases 6. Remote access to e-resources

Response: D. Any 1 of the above

File Description	Document
Institutional data in prescribed format	View Document

4.2.3 Average annual expenditure for purchase of books/ e-books and subscription to journals/e-journals during the last five years (INR in Lakhs)

Response: 28.93

4.2.3.1 Annual expenditure for the purchase of books and journals including e-journals year-wise during last five years (INR in Lakhs)

2020-21	2019-20	2018-19	2017-18	2016-17
25.96	30.90	33.37	26.59	27.83

File Description	Document
Institutional data in prescribed format	View Document

4.2.4 Percentage per day usage of library by teachers and students (foot falls and login data for online access) during the latest completed academic year

Response: 0.29

4.2.4.1 **Number of teachers and students using library per day over last one year**

Response: 1

4.3 IT Infrastructure

4.3.1 Percentage of classrooms and seminar halls with ICT - enabled facilities such as LCD, smart board, Wi-Fi/LAN, audio video recording facilities. (Data for the latest completed academic year)

Response: 100

4.3.1.1 **Number of classrooms and seminar halls with ICT facilities**

Response: 13

File Description	Document
Institutional data in prescribed format	View Document

4.3.2 Institution has an IT policy, makes appropriate budgetary provision and updates its IT facilities including Wi-Fi facility

Response:

CMI has a computer committee that oversees the computer / network / software requirement of the institute. Salient features are:

a. use of free and open-source software. All the servers and the machines in the students lab run Debian operating system. The library catalogue is managed using KOHA. Institute uses Moodle learning management system.

b. tailor-made solutions: for managing student records the institute has developed solutions specific to its needs.

c. network connectivity: all the faculty offices and labs are connected on the LAN. Wifi access is available everywhere on campus.

d. The committee constantly considers various options to upgrade the network and computing infrastructure.

CMI uses the Eduroam network, so that visiting academics and CMI colleagues on academic visits to other institutions can access the network without interruption.

4.3.3 Student - Computer ratio (Data for the latest completed academic year)

Response: 1:1

4.3.4 Available bandwidth of internet connection in the Institution (Leased line)

Response: C. 250 MBPS - 500 MBPS

4.3.5 Institution has the following Facilities for e-content development

1. **Media centre**
2. **Audio visual centre**
3. **Lecture Capturing System(LCS)**
4. **Mixing equipments and softwares for editing**

Response: A. All of the above

File Description	Document
Institutional data in prescribed format	View Document
Links of photographs	View Document

4.4 Maintenance of Campus Infrastructure

4.4.1 Average percentage expenditure incurred on maintenance of physical facilities and academic support facilities excluding salary component during the last five years

Response: 5.45

4.4.1.1 **Expenditure incurred on maintenance of infrastructure (physical facilities and academic support facilities) excluding salary component year-wise during the last five years (INR in lakhs)**

2020-21	2019-20	2018-19	2017-18	2016-17
47	61	65	73	61

File Description	Document
Institutional data in prescribed format	View Document
Audited statements of accounts	View Document

4.4.2 There are established systems and procedures for maintaining and utilizing physical, academic and support facilities - laboratory, library, sports complex, computers, classrooms etc.

Response:

CMI has a very small set of permanent adminstrative staff. Cleaning, maintenance and security of the campus are contracted out to external agencies. In addition to supervisors from the contracting agency, CMI employs a Personnel Manager who oversees the contract staff. Likewise the kitchen and dining facilities are run through a contract, overseen by the Personnel Manager.

CMI has several committees to look after different facilities on campus. The Hostel Committee, with both faculty and student members, looks into facilities and infrastructure in the hostel. The Library Committee manages the library, including acquisition of books and maintenance of the OPAC software and technical matters related the library. The Computer Committee monitors computer infrastructure on campus, including the servers and network infrastructure, maintaining the database of computer users, managing the server, webserver and other servers as well as purchasing laptops and desktops for the computer lab and for faculty, staff and research scholars. The Physics Lab is maintained by a lab supervisor and a lab assistant.

In general, faculty, staff and students at CMI contribute in some way or another to upkeep of the facilities on campus and maintaining an atmosphere conducive to learning.

Criterion 5 - Student Support and Progression

5.1 Student Support

5.1.1 Average percentage of students benefited by scholarships and freeships provided by the institution, Government and non-government agencies (NGOs) during the last five years (other than the students receiving scholarships under the government schemes for reserved categories).

Response: 84.25

5.1.1.1 **Number of students benefited by scholarships and free ships provided by the institution, Government and non-government bodies, industries, individuals, philanthropists during the last five years (other than students receiving scholarships under the government schemes for reserved categories)**

2020-21	2019-20	2018-19	2017-18	2016-17
206	208	209	209	201

File Description	Document
Upload self attested letter with the list of students sanctioned scholarship	View Document
Institutional data in prescribed format	View Document

5.1.2 Average percentage of students benefited by career counseling and guidance for competitive examinations as offered by the Institution during the last five years.

Response: 4.42

5.1.2.1 **Number of students benefitted by guidance for competitive examinations and career counselling offered by the institution year wise during last five years**

2020-21	2019-20	2018-19	2017-18	2016-17
0	0	50	0	0

File Description	Document
Institutional data in prescribed format	View Document

5.1.3 Following Capacity development and skills enhancement activities are organised for improving students capability 1. Soft skills 2. Language and communication skills 3. Life skills (Yoga, physical fitness, health and hygiene) 4. Awareness of trends in technology

Response: C. 2 of the above

File Description	Document
Institutional data in prescribed format	View Document

5.1.4 The institution adopts the following for redressal of student grievances including sexual harassment and ragging cases 1. Implementation of guidelines of statutory/regulatory bodies 2. Organisation wide awareness and undertakings on policies with zero tolerance 3. Mechanisms for submission of online/offline students' grievances 4. Timely redressal of the grievances through appropriate committees

Response: A. All of the above

File Description	Document
Upload any additional information	View Document
Minutes of the meetings of student redressal committee, prevention of sexual harassment committee and Anti Ragging committee	View Document
Details of student grievances including sexual harassment and ragging cases	View Document
Link for additional information	View Document

5.2 Student Progression

5.2.1 Average percentage of students qualifying in state/national/ international level examinations during the last five years (eg: IIT-JAM/CLAT/ NET/SLET/GATE/ GMAT/CAT/GRE/ TOEFL/ Civil Services/State government examinations, etc.)

Response: 100

5.2.1.1 **Number of students qualifying in state/ national/ international level examinations (eg: IIT/JAM/ NET/ SLET/ GATE/ GMAT/CAT/GRE/ TOEFL/ Civil Services/ State government examinations, *etc.)*) year-wise during last five years**

2020-21	2019-20	2018-19	2017-18	2016-17
13	14	22	12	14

5.2.1.2 **Number of students appearing in state/ national/ international level examinations (eg: IIT/JAM/ NET / SLET/ GATE/ GMAT/CAT,GRE/ TOEFL/ Civil Services/ State government examinations) year-wise during last five years**

2020-21	2019-20	2018-19	2017-18	2016-17
13	14	22	12	14

File Description	Document
Institutional data in prescribed format	View Document

5.2.2 Average percentage of placement of outgoing students during the last five years

Response: 19.22

5.2.2.1 **Number of outgoing students placed year - wise during the last five years.**

2020-21	2019-20	2018-19	2017-18	2016-17
37	23	3	10	8

File Description	Document
Institutional data in prescribed format	View Document

5.2.3 Percentage of student progression to higher education (previous graduating batch).

Response: 44.83

5.2.3.1 **Number of outgoing student progressing to higher education.**

Response: 39

File Description	Document
Institutional data in prescribed format	View Document

5.3 Student Participation and Activities

5.3.1 Number of awards / medals won by students for outstanding performance in sports / cultural activities at inter-university / state / national / international events (award for a team event should be counted as one) during the last five years.

Response: 0

5.3.1.1 **Number of awards/medals won by students for outstanding performance in sports / cultural**

activities at inter-university / state / national / international events (award for a team event should be counted as one) year - wise during the last five years.

2020-21	2019-20	2018-19	2017-18	2016-17
0	0	0	0	0

File Description	Document
Institutional data in prescribed format	View Document

5.3.2 Presence of Student Council and its activities for institutional development and student welfare.

Response:

CMI actively involves students in decision making at various levels. The student body is small and there is no formal Student Council, but there is a Hostel Committee involving both faculty and students that oversees all arrangements involving the hostel. Student have separate commitees that organize academic, cultural and sports activities. There is an active drama club, a literary club, a chess club to mention a few. Students organize regular film screenings on environmental issues. CMI students organize an annual intercollegiate event Tessellate with academic competitions and cultural events.

5.3.3 Average number of sports and cultural events / competitions organised by the institution per year

Response: 3.8

5.3.3.1 **Number of sports and cultural events / competitions organised by the institution year - wise during the last five years.**

2020-21	2019-20	2018-19	2017-18	2016-17
2	7	6	1	3

File Description	Document
Institutional data in prescribed format	View Document

5.4 Alumni Engagement

5.4.1 The Alumni Association / Chapters (registered and functional) contributes significantly to the development of the institution through financial and other support services.

Response:

CMI alumni is a small community, but it is growing rapidly. CMI alumni are numerous among the ranks for graduate students and faculty members among most top Indian institutions and many universities across the world. CMI students have also taken up a variety of jobs in the industry and some have set up start ups. There is an active informal system where CMI alumni engage with CMI on a regular basis. They lend their support to current students in a variety of ways, financial and otherwise.

We have a CMI Alumni Association which has around 300 members. As of now, it is not registered. We plan to register it soon and make it more active in the near future. Active engagement with alumni is very important for the growth of the institute and we do hope that with increasing numbers we will have many fruitful interactions between the institute and the alumni association in the days to come.

Alumini who are in academics often visit us for extended periods of time and give talks. Our industry alumini help us in recruitment, and recenty they have been proactive in interacting with prospective students during our open house sessions. The suggestion to start courses with 2 credits was mooted by a few alumni members.

In 2020 during the pandemic a series of online talks was organized, given by CMI alumni, the link to which is given below.

File Description	Document
Link for additional information	View Document

5.4.2 Alumni contribution during the last five years (INR in Lakhs)

Response: D. 5 Lakhs - 20 Lakhs

Criterion 6 - Governance, Leadership and Management

6.1 Institutional Vision and Leadership

6.1.1 The institution has a clearly stated vision and mission which are reflected in its academic and administrative governance.

Response:

The Chennai Mathematical Institute began in 1989 as an institution with a purely research focus in mathematics and computer science, including a PhD programme. The vision of the the founding Director, Prof C S Seshadri, was to break down the barrier between research and teaching and embark on a high quality teaching programe where top flight researchers train talented young minds.

The Board of Trustees ensures that CMI complies with all statutory requirements of both the state and central government. Any major change in the structure of the organization has to be approved by this Board. This Board includes members from public and private institutions. Trustees also suggest avenues for fund-raising. The Governing Council is the executivee body that monitors the functioning of the institute and ensures that CMI maintains its academic standards. The Governing Council identifies thrust areas for CMI to focus on and suggests on how these can be incorporated into the academic activities in CMI. Decisions about academic programmes such as updates to the syllabus, introduction of new courses and evaluation schemes are decided by the Academic Council. The members of the Academic Council are acknowledged experts in mathematics, computer science and physics drawn from leading institutions across the country.

CMI has a very lean administrative staff with 6 members. All of them believe in the vision of creating a world class institute and so take up multiple responsibilities. They have trained themselves to do jobs that are out of their ambit of work, picking up multiple skills along the way.

Senior faculty encourage junior faculty members to make research their primary focus and so many times junior faculty are shielded from a lot of administrative work when they are still establishing themselves. Teaching is shared by all, and course allocation is very democratic. Members are told to take their teaching seriously even though promotion is almost entirely based on research publications. Students are encouraged to approach teachers if they would like to learn some new subjects. Faculty are open to such suggestions and many times a mix of interested students and faculty jointly organize a seminar series where new subjects and courses are learned. Such courses are then taken to the BoS and become formally inducted into the repertoire of electives.

File Description	Document
Link for additional information	View Document

6.1.2 The effective leadership is reflected in various institutional practices such as decentralization and participative management.

Response:

CMI has a very decentralized structure of governance. The Director sets up necessary committees in the institute for designing and implementing the programmes of the Institute.

Each discipline has its own Board of Studies (BoS). So there is a BoS for Mathematics, a BoS for Computer Science, a BoS for Physics and we recently established a BoS for Data Sciences. Each Board discusses changes and updates to the syllabus or to courses in the relevant programme and prepares a final proposal that is taken to the Academic Council for ratification. The Board of Studies also organizes internal discussions on candidates applying for postdoctoral faculty position and coordinates the evaluation of PhD theses. CMI has a separate Board of Studies for the BSc programme that coordinates with the subject-specific Boards to ensure a balance between courses across disciplines whenever the structure of undergraduate programme is revised.

The Board of Trustees and the Governing Council have been extremely encouraging when the faculty in CMI wish to embark on a new programme that is in line with CMI's original mission. So it is not surprising that we have been trendsetters of sorts in the country. We were the first to start an abmitious BSc Honours programme in Mathematics in 1998 with a relatively small faculty size. We were confident of pulling this off and so were our governing bodies. To this was added a BSc Honours programe in Physics and Master's programmes in Mathematics and Computer Science. In 2017 the UGC peer review committee encouraged CMI to start a Data Science program. We did an internal evaluation in CMI and were convinced that not only was this feasible, we were well equipped to start something unique. CMI's governing bodies backed us completely even though it meant charging a non trivial fee for the first time in CMI's history. Till that year fees per semester for all programmes were less than Rs 10000 per semester. Now the DS programe is one of the most sough after such programs in the country.

This decentralization of activities is also reflected in the set up of the IQAC. For all its activities CMI usually seeks voluntary participation and suggestions - be it in correcting entrance exam papers, offering courses or organizing workshops and conferences. Staff too drive initiatives for improving quality keeping in mind the overall vision. For example the suggestion of having a group medical inurance for staff, faculty and PhD students and the suggestion to have an infrastructure committee and do preventive maintenance were both mooted by staff members.

Given the increasing size of the student population in 2021 CMI decentralized its activities even further. To assist with academic administration the Dean of Studies is now assisted by two Associate Deans. The Director communicates with the deans on a daily basis over email seeking suggestions on various matters, academic and non academic. Options are openly discussed and a final decision is taken. We have regular faculty meetings chaired by the Director where information pertaining to the institute is shared and discussed.

6.2 Strategy Development and Deployment

6.2.1 The institutional Strategic plan is effectively deployed.

Response:

CMI deploys a well thought out strategy to achieve its vision for its BSc programmes, CMI offers direct admission to students who excel in the national olympiads in mathematics, computing and physics. In

addition to conducting its own entrance examination for this PhD programmes, CMI shortlists students for interviews based on strong performance in national examinations such as NBHM and JEST. The recruitment process for faculty to join CMI is similar to that of comparable institutions across the world. Evaluation is on the research credentials of the candidate, based on publication records. We get letters of rerefences from the list of referees of the candidate, but we also get reviews from independent subject experts in the field. This ensures that the quality of intake is comparable to leading institutions in the country. We are able to take decisions faster than most other places and this helps. CMI faculty keep a watch for possible faculty recruits and invite them to visit CMI to interact and give research talks. To make our offers attractive we top up the salary of new entrants with grants from our corpus. The curriculum at CMI is carefully tailored to address the needs of mathematically talented students. At the BSc level many core courses have been designed to combine different aspects of the subject. Students are able to complete their core requirements in the first four semesters and have two semesters worth of electives that they can choose freely subjects of their interest and focus. Likewise, the MSc programme is designed to be attractive to students with the same level of mathematical sophistication as our BSc graduates. Not only does this attract strong talented students from outside, it also ensures that an encouragingly large fraction of CMI students stay on after BSc for an MSc. Likewise, many MSc students stay on for PhD. Participative learning is encouraged and some courses and subjects are entirely driven by student interest. This helps strengthen bonds between students and teachers and between students and the institute, which we believe is most essential for meeting our long term vision. CMI is unique in the Indian context as a successful example of a public-private partnership in academia. For the first ten years, CMI was fully funded by Southern Petrochemical Industries Corporation (SPIC). In 1999, the National Board for Higher Mathematics (NBHM) under the Department of Atomic Energy (DAE) began supporting CMI and gradually took over the running expenses from SPIC. The new campus at Siruseri was set up through private contributions, but sizeable grants for construction have also come from the Ministry of Education. In recent years, the running expenses of the Institute have been met by a combination of grants from NBHM, corporate contributions and tuition fees. Over the past decade, the Institute has built up a reasonable corpus whose interest is used to fund research activities such as organising workshops and seminars and providing support to CMI faculty and students to travel for conferences and academic collaboration.

File Description	Document
Strategic Plan and deployment documents on the website	View Document

6.2.2 The functioning of the institutional bodies is effective and efficient as visible from policies, administrative setup, appointment, service rules and procedures, etc.

Response:

The functioning of all administrative and academic bodies in CMI is geared towards the fullfilment of CMI's vision. All the policies and rules are designed to ensure the core activities of research and teaching in the institute. The recruitment process for CMI faculty is similar to leading institutions across the world. Faculty candidates deliver a research seminar on their work and are encouraged to spend time interacting with the current faculty. Evaluation is based on the research credentials of the candidate, based on the publication recordas well as on reference letters from independent experts in the field. This ensures that the

quality of intake is comparable to leading institutions across the country. After joining CMI, faculty are provided an atmosphere that is conducive to academic research. The teaching load is very reasonable and students are extremely motivated and research oriented. CMI provides support to attend national and international conferences that meet the quality expectations of the Institute. CMI has very generous rules for academic leave and sabbaticals that permit faculty to freely interact with collaborators from other institutions. In addition to regular research seminars, CMI organizes a number of specialized workshops and conferences and has a steady stream of international visitors who are leading experts in their field. This greatly enhances the academic atmosphere on the campus. Faculty are encouraged to organize seminar, workshops and conferences, and to invite their collaborators and encoiurage them to offer short term courses which CMI students can credit. Via participation in such events students become interested in new subjects and they get organically included in research collaborations. It helps when organizing such events that the administrative staff is lean because breaucracy is naturally minimized. It is not surprising therefore that despite its small size CMI hosts at least 10 events every year with about 50-75 participants. CMI has about 200 students staying on campus. The in-house kitchen caters to their needs and also provide food for faculty and staff during the day. In the inital days of moving to the current campus our numbers were really small, of the order of 125. However a decision was taken to ensure that the kitchen is designed to cater to much large numbers. This foresight has helped because it is the same catering staff which typically provide lunches, coffee and snacks for all workshops, schools and conferences held on campus. There is a campus-wide wifi network that is connected to the Internet through two parallel high-speed links, for redundancy. CMI is connected to Eduroam, so visitors from institutions with Eduroam access can connect seamlessly to the local network. The library has a carefully curated collection of books and is open 24 hours, doubling up as a quiet reading space for students and faculty.

File Description	Document
Link to Organogram of the University webpage	View Document

6.2.3 Institution Implements e-governance covering following areas of operation

1. **Administration**
2. **Finance and Accounts**
3. **Student Admission and Support**
4. **Examination**

Response: A. All of the above

File Description	Document
Screen shots of user interfaces	View Document
ERP (Enterprise Resource Planning) Document	View Document
Details of implementation of e-governance in areas of operation, Administration etc (Data Template)	View Document

6.3 Faculty Empowerment Strategies

6.3.1 The institution has a performance appraisal system, promotional avenues and effective welfare measures for teaching and non-teaching staff .

Response:

CMI has a performance appraisal system for staff which adheres to standard norms followed in other leading institutions in India and abroad. All faculty submit quarterly reports on their teaching and research activities. In addition, all faculty members receive detailed student evaluation on courses that they teach. This evaluation is useful in ensuring that teaching in CMI maintains highest standards.

CMI hosts an International Research Laboratory (IRL) in Computer Science, ReLAX, set up by the French National Centre for Scientific Research (CNRS) in January 2017. The other Indian partner is IMSc, Chennai and the French partners are ENS Paris-Saclay and University of Bordeaux. Madhavan Mukund from CMI is the Director of the IRL. The creation of this IRL is recognition of the strong and high quality cooperation between CMI and French researchers over an extended period. CMI has also been a partner in the Virtual Institute in Mathematical and Statistical Sciences (VI-MSS) set up by the National Science Foundation (NSF), USA, and the Department of Science and Technology (DST), India, as part of the Science Across Virtual Institutes (SAVI) programme. As a result of these associations CMI has a steady stream of international and national visitors who are leading experts in their field. This greatly enhances the academic atmosphere

Since 2014, the faculty members and their family is covered under a group mediclaim insurance, the yearly premium for which is being paid through proceeds through interest from corpus donations. Teaching staff are provided with financial support to attend conferences /workshops and towards membership fees of professional bodies during the year.

CMI has a benefit fund to meet medical emergencies and other critical expenses of non-permanent staff for which voluntary contributions are received from faculty and staff.

6.3.2 Average percentage of teachers provided with financial support to attend conferences / workshops and towards membership fee of professional bodies during the last five years.

Response: 35.99

6.3.2.1 **Number of teachers provided with financial support to attend conferences/workshops and towards membership fee of professional bodies year wise during the last five years**

2020-21	2019-20	2018-19	2017-18	2016-17
5	18	27	4	11

File Description	Document
Details of teachers provided with financial support to attend conferences, workshops etc. during the last five years (Data Template)	View Document

6.3.3 Average number of professional development / administrative training Programmes organized by the institution for teaching and non-teaching staff during the last five years.

Response: 5.4

6.3.3.1 **Total number of professional development /administrative training Programmes organized by the institution for teaching and non teaching staff year-wise during the last five years**

2020-21	2019-20	2018-19	2017-18	2016-17
2	5	6	5	9

File Description	Document
Details of professional development / administrative training Programmes organized by the University for teaching and non teaching staff (Data Template)	View Document
Any additional information	View Document

6.3.4 Average percentage of teachers undergoing online/ face-to-face Faculty Development Programmes (FDP)during the last five years (Professional Development Programmes, Orientation / Induction Programmes, Refresher Course, Short Term Course).

Response: 0

6.3.4.1 **Total number of teachers attending professional development Programmes, viz., Orientation Programme, Refresher Course, Short Term Course, Faculty Development Programmes year wise during last five years**

2020-21	2019-20	2018-19	2017-18	2016-17
0	0	0	0	0

File Description	Document
Details of teachers attending professional development Programmes during the last five years (Data Template)	View Document

6.4 Financial Management and Resource Mobilization

6.4.1 Institutional strategies for mobilisation of funds and the optimal utilisation of resources

Response:

Since 2000, CMI has been receiving substantial annual grants from the Department of Atomic Energy through the National Board for Higher Mathematics to meet its running expenses. These have been supplemented by grants from other agencies from time to time, such as the Department of Science and Technology. CMI has also received infrastructual support from the Board for Reseach in Nuclear Sciences (BRNS) and the Ministry of Human Resource Development (now Ministry of Education). CMI continually strives to seek funding from government sources wherever possible.

A substantial portion of CMI's running expenses is currently met from corporate contributions through Corporate Social Responsibility (CSR) initiatives. Many of these contributions have come from existing contacts within the industry. CMI is in the process of setting up a formal cell for more systematic fund raising from corporate sources. CMI's consulting society Algolabs also provides useful contacts for philanthropic contributions from industry.

In 2018, CMI increased its tuition fees to levels comparable with institutions such as IITs. Though the student population is relatively small, CMI raises about 20% of its annual financial requirement through fees. Waivers are provided to all students with demonstrated financial need. Some students' fees are met through scholarships funded by companies such as Shriram General Insurance, Cognizant Foundation, Pfizer and Metamation.

Internally, CMI encourages faculty and staff to make optimum use of the resources available. The administration is lean and efficient and all staff play multiple roles. Campus maintenance, security and catering are contracted out. Many IT services are managed by faculty and several IT applications have been developed in house to assist in efficient administration of the institute's activities.

6.4.2 Funds / Grants received from government bodies during the last five years for development and maintenance of infrastructure (not covered under Criteria III and V) (INR in Lakhs).

Response: 6979

6.4.2.1 ***Total Funds / Grants received from government bodies for development and maintenance of infrastructure (not covered under Criteria III and V) year wise during the last five years (INR in Lakhs).***

2020-21	2019-20	2018-19	2017-18	2016-17
1000	1350	1750	1375	1504

File Description	Document
Details of Funds / Grants received from government bodies during the last five years (Data Template)	View Document
Annual statements of accounts	View Document

6.4.3 Funds / Grants received from non-government bodies, individuals, philanthropists during the last five years (not covered in Criterion III and V) (INR in Lakhs)

Response: 5423

6.4.3.1 Total Grants received from non-government bodies, individuals, Philanthropers year wise during the last five years (INR in Lakhs)

2020-21	2019-20	2018-19	2017-18	2016-17
2227	1782	956	152	306

File Description	Document
Institutional data in prescribed format	View Document
Annual statements of accounts	View Document

6.4.4 Institution conducts internal and external financial audits regularly

Response:

Chennai Mathematical Institute (CMI) conducts internal and external financial audit of accounts annually. Internal Audit evaluates the internal control process of organization in depth. Internal audit ensures all the supporting financial documents for the Income and Expenses are maintained properly. It also checks the utilisation of project grants / government grants / CSR Grants etc are done as per the sanction towards the specific purpose. External Audit is done as per the provisions of the Income Tax Act. External audit evaluates whether CMI is complying with all the statutory requirements. They also validates the reports of the Internal audit. It also evaluates whether there is any deviation from the objective mentioned in the trust deed. External Audit determines whether, in the auditors opinion, the statements presents true and fair picture in all material aspects such as the financial position, utilization of government grants, corpus funds etc. External Audit is done as per the provisions of the Income Tax Act. External audit evaluates whether CMI is complying with all the statutory requirements. They also validates the reports of the Internal audit.

It also evaluates whether there is any deviation from the objective mentioned in the trust deed. External Audit determines whether, in the auditors opinion, the statements presents true and fair picture in all material aspects such as the financial position, utilization of government grants, corpus funds etc.

6.5 Internal Quality Assurance System

6.5.1 Internal Quality Assurance Cell (IQAC) has contributed significantly for institutionalizing the quality assurance strategies and processes by constantly reviewing the teaching learning process, structures & methodologies of operations and learning outcomes at periodic intervals.

Response:

Academic activities in CMI have always been quality conscious. With the establishment of the IQAC attention is now given to attaining quality in multiple verticals. The IQAC has helped increase gender sensitivity on campus. The grievance committee now organizes more structured activity for increasing awareness about gender issues. The IQAC has put in place some measures to increase the number of girls on campus. From this year onwards once the academic time table is ready the IQAC will identify periods when activities centered around gender, environment, social outreach, interacting with the local community can be planned. The IQAC has given thrust to automation of a number of processes. Feedback is now collected online, grades are now entered online, there is a wider acceptance of LMS now thanks to the initiatives of the IQAC. More instructors now pay attention to teaching and learning outcomes - faculty were always aware of this, but having a feedback mechanism in place and receiving such feedback has certainly helped achieve this. Discussions by members of the IQAC resulted in the setting up of the infrastructure committee. Maintenance is much more streamlined now. Quality processes are in place - what to check, how to check, who to report to, what is to be done, all this is now streamlined for quality housekeeping and improved security A natural consequence of setting up such processes is preventive maintenance and this will result in resources being utilized efficiently and for longer. There is also a thrust from the IQAC for improving soft skills and communications skills. Activities which will help increase quality in these areas will be woven into the calendar.

6.5.2 Institution has adopted the following for Quality assurance 1. Academic Administrative Audit (AAA) and follow up action taken 2.Confernces, Seminars, Workshops on quality conducted 3. Collaborative quality initiatives with other institution(s) 4.Orientation programme on quality issues for teachers and students 5. Participation in NIRF 6.Any other quality audit recognized by state, national or international agencies (ISO Certification, NBA).

Response: E. 1 of the above

File Description	Document
Upload e-copies of the accreditations and certifications	View Document
Upload details of Quality assurance initiatives of the institution (Data Template)	View Document
Paste web link of Annual reports of University	View Document

6.5.3 Incremental improvements made for the preceding five years with regard to quality (in case of first cycle), Post accreditation quality initiatives (second and subsequent cycles).

Response:

The Institute has increased its formal linkages with national institutions to promote exchanges of students and faculty. New MoUs have been signed with IIT Madras and IIT Goa.

CMI has also initiated new international partnerships for research collaboration and exchange visits. The International Research Lab in Computer Science ReLaX has been set up through the French National Centre for Scientific Research (CNRS). In Mathematics, CMI is part of the Indo-French Program in Mathematics (IFPM), another International Research Laboratory under CNRS.

CMI is now a partner in the Future Research Talent programme of the Australian Ntional University in Canberra. This provides opportunities for CMI students to undertake summer internships with faculty from ANU.

CMI has introduced shorter duration courses of 2 credits (half semester) and 1 credt (1 month). This has enabled experts visiting CMI for shorter periods to offer formal courses in CMI's teaching programme.

CMI has started a new MSc programme in Data Science. This is more industry oriented than the other teaching programmes at CMI. This programme has generated a lot of interest in industry. A natural spinoff has been increased interaction with the industry. CMI runs a research seminar where industry experts present real life applications of data science and interact with students. Campus placement activity has also become more active.

Many processes which were earlier manual are now automated. Grades are now uploaded online by instructors. Course feedback is collected online. Feedback collection is more structured now. Almost every faculty member now uses Moodle LMS.

Faculty members are now comfortable with online teachine and this will allow us to experiment with hybrid teaching, and increase our reach.

Setting up the IQAC and giving it the mandate to improve quality in all areas.

Criterion 7 - Institutional Values and Best Practices

7.1 Institutional Values and Social Responsibilities

7.1.1 Measures initiated by the Institution for the promotion of gender equity during the last five years.

Response:

CMi has always strived to promote an environment in which there is no gender discrimination and where students are gender sensitive. In 2017 this was one of the focus areas of the IQAC. In Aug 2017, Swarna Rajagopalan from the Prajnya foundation gave a talk on Gender Sensitivity and during the discussion in the auditorium questions came up about sexual harassment and gender issues. Based on feedback from students that would be interested in having a workshop on Sexual Harassment, a workshop was held in November 2017 by Prajnya foundation. Even though students and staff were involved in the entire programme it was the student body which took the lead. The workshop had about 125 participants. The Handbook on Sexual Harassment by the Ministry of Women and Child Development was discussed in detailed. Students felt it would be good to have a similar document prepared for CMI. A Do's and Dont's manual was prepared by the students with the help of Prajnya Foundation members. This is now displayed on the CMI moodle page.

Since then the manual is being used to sentitize incoming students during their orientation. In 2018 as well as in 2019, representatives from the student body, faculty and staff address incoming students about gender sensitivity and students are made aware of the fact that CMI has a zero tolerance policy towards Gender discrimination and Sexual harrassment.

Following up on the workshop of 2017, inn 2018 a similar workshop was conducted for all the contract staff in CMI. The Do;s and Dont's manual was shared with the contractors of Security and Housekeeping staff and they were involved in the organization of this workshop. This workshop was held in Tamil. Close to 100 student and staff members particip[ated in this event.

A similar event was planned in 2020 February but had to be cancelled due to the pandemic.

Gender issues are also addressed in the Value through literatire course which has been offfered since 2017. The first course in English also addresses Gender sensitivity via debates and reading material.

File Description	Document
Specific facilities provided for women in terms of: a.Safety and security b. Counselling c. Common Rooms d. Day care center for young children e. Any other relevant information	View Document
Annual gender sensitization action plan	View Document

7.1.2 The Institution has facilities for alternate sources of energy and energy conservation measures

1. **Solar energy**
2. **Biogas plant**
3. **Wheeling to the Grid**
4. **Sensor-based energy conservation**
5. **Use of LED bulbs/ power efficient equipment**

Response: C. 2 of the above

File Description	Document
Geotagged Photographs	View Document
Any other relevant information	View Document

7.1.3 Describe the facilities in the Institution for the management of the following types of degradable and non-degradable waste (within 500 words)

- **Solid waste management**
- **Liquid waste management**
- **Biomedical waste management**
- **E-waste management**
- **Waste recycling system**
- **Hazardous chemicals and radioactive waste management**

Response:

Solid waste Management:

All sewage at CMI is treated and the recycled water is used for the plants. Soon after CMI moved to the campus, a 12 kilolitre per day (KLD) decentralized waste water treatment system (DTS) was set up. In 2014, this was augmented to 15 KLD by raising the sewer lines. Another plant with capacity 50 KLD was set upt, keeping in mind the expansion plans to house about 275 members

on campus with a floating population of 200. In both these water treatment plants, the primary treatment is based on settling tanks. This is followed by a large number of fluidized bed reactors and fixed film reactors and finally plant gravel filters. This water is collected in a sump and then pumped to all parts of the campus. The DTS was built using local construction material, uses zero power for treatment, requires no sophisticated maintenance. The sludge needs to be cleaned every two years, but experience shows that very little sludge is formed. The plant is inoculated with fresh cowdung once a year, which helps anaerobic bacteria to regenerate. This DTS has even featured in school textbooks on Environmental Sciences at the state level, as an example of a low maintenance, cost-effective solution to waste water management. The output of the DTS has been tested twice for its quality and it has been certified as useable for plant watering, in 2016, and 2019.

Waste recycling: Paper waste (from entrance exams) are made into little booklets and pads for use by

faculty and students. One sided paper is always available in the office for use as rough paper for calculations. We have stopped using paper cups since 2014. Treated water from sewage plant is used to water the lawns and trees around campus.

E-Waste Management: All Desktops are given back to the supplier on a buy back basis when we procure new desktops.

All plant waste and leaves are collected and spread across the campus to regenerate top soil. We do not burn this waste. Coconut waste from the canteen is kept near shrubs and plants to help keep the area around the plants moist.

File Description	Document
Relevant documents like agreements/MoUs with Government and other approved agencies	View Document
Geotagged photographs of the facilities	View Document
Any other relevant information	View Document

7.1.4 Water conservation facilities available in the Institution:

1. **Rain water harvesting**
2. **Borewell /Open well recharge**
3. **Construction of tanks and bunds**
4. **Waste water recycling**
5. **Maintenance of water bodies and distribution system in the campus**

Response: C. 2 of the above

File Description	Document
Geotagged photographs / videos of the facilities	View Document
Any other relevant information	View Document

7.1.5 Green campus initiatives include:

1. **Restricted entry of automobiles**
2. **Use of Bicycles/ Battery powered vehicles**
3. **Pedestrian Friendly pathways**
4. **Ban on use of Plastic**
5. **landscaping with trees and plants**

Response: A. Any 4 or All of the above

File Description	Document
Geotagged photos / videos of the facilities	View Document
Any other relevant documents	View Document

7.1.6 Quality audits on environment and energy are regularly undertaken by the Institution and any awards received for such green campus initiatives:

1. **Green audit**
2. **Energy audit**
3. **Environment audit**
4. **Clean and green campus recognitions / awards**
5. **Beyond the campus environmental promotion activities**

Response: E. None of the above

File Description	Document
Any other relevant information	View Document

7.1.7 The Institution has disabled-friendly, barrier free environment

1. **Built environment with ramps/lifts for easy access to classrooms.**
2. **Divyangjan friendly washrooms**
3. **Signage including tactile path, lights, display boards and signposts**
4. **Assistive technology and facilities for Divyangjan accessible website, screen-reading software, mechanized equipment**
5. **Provision for enquiry and information : Human assistance, reader, scribe, soft copies of reading material, screen reading**

Response: B. 3 of the above

File Description	Document
Geotagged photographs / videos of the facilities	View Document
Any other relevant information	View Document

7.1.8 Describe the Institutional efforts/initiatives in providing an inclusive environment i.e., tolerance and harmony towards cultural, regional, linguistic, communal socioeconomic and other diversities (within 500 words).

Response:

Faculty at CMI come with diverse backgrounds. The same is true of our students. We have students from

all over the country studying oncampus. We have an orientation programme when students first join,where the importance of tolerance and respecting the individual is always emphasized. We believe very strongly in these principles and communicate so to our students. Such ideals are learned organically when faculty and staff practicethe same. In CMI one can hear many languges being spoken, Bangali, Tamil, Marathi, English, Hindi, Malayalam. Even though the student community is small it is diverse and one sees celebrations of Holi, Durga Pooja, Onam in addition to celebrations of Independence day and Republic day. CMI celebrate a number of festivals, holi, deepavali, vijaya dashami, onam, to name a few. Many students pick up speaking Tamil by talking to the security guards and canteen staff. Canteen staff from heartland Tamil Nadu can speak and understand Bengali and Hindi now thanks to conversing with students./ The attached pictures illustrate such inclusive activities.

At the undergraduate programme such ideals are integrated into the syllabus of both the compulsory humanities courses and the electives. CMI started an Arts initiative programme which will soon be in its 10th year. We engage in conversations with artists from a variety of backgrounds and cultures, we invite some of them to perform on campus and offer weekend modules, and we also run a writers residency programme. Via one such event we offered a course on Art inContext in 2016. This was curated by one of India's most eminent musician's T M Krishna. One of the main goals of the course was to sensitise students to the interplay of aesthetics and perception with geography, class, gender and caste. We have organized learning tospeak Tamil programmes on campus. CMI students have celebrated Hindi Divas in the last couple of years.

The attached pictures show CMI students at an orphanage in Chennai, celebrating Independence day withn them. Most students seen in this picture are non Tamil speaking students, who nevertheless manage to communicate with these predominantly Tamil speaking children and are able to cross language and culture barriers and spread joy and love.

File Description	Document
Supporting documents on the information provided (as reflected in the administrative and academic activities of the Institution)	View Document

7.1.9 Sensitization of students and employees of the Institution to the constitutional obligations: values, rights, duties and responsibilities of citizens (within 500 words).

Response:

When we first moved to campus in 2005, there was a lot of construction activity happening on campus. Children of migrant workers engaged in construction were roaming around the campus. Some students took it upon themselves to teach the older among these children. Batches that followed later naturally picked up such values from their seniors. So it is not uncommon to find CMI students taking the shuttle to go and spend time at orphanges, taking part in beach cleaning activities and other such social service activities. Reaching out to others who are less previleged than them is something many CMI students seem to hold dear to their hearts. That freedom and rights comes with responsibilities and so duties must be performed for the collective benefit of all, is something we try to inculcate via practise and it has been reasonably successful. As a result students have a wonderful rapport with the staff and faculty, and being

good learners they too understand the importance of volunteering to take up responsibilities and performingthe jobs expected of them with unfailing sincerity. The Environmental course film which happened every Friday afternoon for about 10 years till the pandemic hit us, is a good example of students taking up a responsibilty and carrying out their duties.

Values are taught via a number of courses by teachers involved in English. These ideals are woven in to the syllabus in the Values through literature courses offered every year and even in the first year English course.

The CMI library is open 24 hours. For many years we had nobody manning the library counter - students would issue books, sign and leave the library after issuing books and leaving the borrowing slips. The idea that freedom comes with responsibilities is something which was learned organically by such practises. We have almost never treated students as different from other adults on the campus. Students are allowed to use facilities on campus such as projectors and classrooms even when faculty and staff are absent from campus. They are only required to ensure that they will use such facilities responsibly. And the management has rarely been disappointed about allowing such free access.

CMI students are allowed to use the seminar hall and lecture rooms beyond class hours. They need to take permission for this, but it is always granted provided one student takes responibility of ensuring the premises are left clean, all lights and fans are turned off, windows are shut. Responsibilities and values are learned by osmosis by new students when they come to campus and observe seniors.

The atmosphere at CMI is friendly and this is something the staff, students and faculy cherish and so all of us make an effort to maintain this.

7.1.10 The Institution has a prescribed code of conduct for students, teachers, administrators and other staff and conducts periodic programmes in this regard.

1. **The Code of Conduct is displayed on the website**
2. **There is a committee to monitor adherence to the Code of Conduct**
3. **Institution organizes professional ethics programmes for students, teachers, administrators and other staff**
4. **Annual awareness programmes on Code of Conduct are organized**

Response: E. None of the above

File Description	Document
Details of the monitoring committee composition and minutes of the committee meeting, number of programmes organized, reports on the various programs etc., in support of the claims	View Document
Code of ethics policy document	View Document

7.1.11 Institution celebrates / organizes national and international commemorative days, events and festivals (within 500 words).

Response:

Ever since we moved to the campus in 2005, CMI students started the tradition of celebrating Independence day and the Republic day on camous. They invite members of the faculty and staff as chief guests for this event. The support staff is also actively involved in such events. Many support staff members in the security and the maintenance staff have been with CMI for long enough periods to feel a special bond with the institute. Dusshera and Vijay Dashami have been celebrated at CMI since it started in 1989. In fact, for many years the tradition was to buy packets of sweets and distribute it to faculty, staff and also students. But now that the student population has increased we have discontinued that tradition. During such festivals a small cultural festival is normally organized, with participation from students and faculty. A once a year serious cricket match between students and staff has also been the tradition for many years now.

File Description	Document
Geotagged photographs of some of the events	View Document

7.2 Best Practices

7.2.1 Describe two best practices successfully implemented by the Institution as per NAAC format provided in the Manual.

Response:

A)

1) Title of the Practice: Enabling effective use of online teaching via ZOOM platform and distribution of required devices.

2) Duration (Year of inception) Since 2020(continuing).

3) Objectives of the practise: Enable all faculty to teach online and interact with students without difficulty.

4) The Context: Since the current COVID-19 pandemic began in March2020, CMI, like other educational institutions, was forced to suspend in-person classes. As the pandemic continued and the institute continued to function without students on the campus, there was a need for convenient and efficient platform for online teaching. Apart from this, there was also a need to equip all faculty with the required techincal equipment to properly use the online platform.

5) The practise: CMI purchased several licenses on the ZOOM platformand gave them to CMI faculty. These licenses enabled classes to continue as long as they needed. Moreover, they also allowed recordingand live-streaming of the classes on various platforms such asYouTube. Several training sessions were conducted to help faculty get accustomed to the new set-up.

In order to ensure that an online setting allows for seamless teaching, it is important that teachers have

some kind of writingdevices. CMI provided iPads and writing instruments to every facultymember who asked for them.

6) Evidence of Success: After a few months of intiating these steps,there was siginificant increase in the comfort level of faculty in using online teaching format. By the end of one semester, most faculty members have become adept at online teaching. There is a large repository of recordings of courses which CMI faculty offered its students.

7) Problems Encountered: Intitally there were some problemsin ensuringthat everyone understands how to naviage the various technicaldifficultues. But over time, these problems were resolved.

B)

1) Title of the practise: Development of Software solutions tailored to Institute's Needs

2). Duration: Year of Inception: 2008. The practise is still on.

3) Objectives: Use open source software, and develop and maintain, in house, all necessary additional software and hardware to meet all the information technology needs of the Institute.

4) The context: The small size and structure of the Institute renders the use of standard commercial software expensive and incompatible with its needs. From inception we have developed software tailored to our needs. Developing full scale software would render such an effort far too enormous for our size. However taking into account the availability of a wide variety of free and open software in the linux environment, the ability of the members of the institut to use unix command line tools and their disposition to prefer simplicity we have built tools that are simple and yet meet the needs of the Institute, saving time and money.

5) The practise: CMI maintains all its services locally on its servers managed by its faculty as a group. We run our own mail servers, web servers, identity and authentication servers (radius), library management systems (koha), course management (Moodle) on our GNU Linux (Debian) servers. We have developed, in house, software that manages the entire admission process including receiving applications, generation of hall tickets, notifications etc. We have developed,in house, the system to manage the grading of courses (including generation of grade sheets and transcripts). We manage the security of the campus network through appropriate firewalls.We are part of the eduroam consortium that provides access to academics across the world to university campus networks. We have developed in house software to automate the generation of annual reports. The only place where we are forced to use commercial software is for various reports such as accounts since it requires us to interact with statutory agencies which deal only with commercial formats.

6) Evidence of success: Our mail and web servers have functioned without failure for years now. We have put in place dual internet lines since 2015/16 (when connectivity was affected due to several factors including floods and cyclones) and since then access to the campus IT infrastructure has been uninterrupted. We have saved immense amount of cost (and frustrating interaction with vendors who are unused to scale such as ours) through these developments.

7) Problems Encountered: It is difficult if not impossible to develop all this from scratch given our scale. Yet, the availability and quality of open source software that allows us to build such tools has improved

and continues to improve tremendously making the task easier. Given our size and the other commitments of the faculty there are limitations on how much time one can spare for such development and management. Here we have been saved by the ability of our staff to adapt to the use of command line tools, the ability to put together multiple small solutions and general open minded attitude towards using tools. We were also lucky to find one highly talented and young programmer, Badri, who has been instrumental in helping in the development of a wide variety of softwareduring his internships here. The fact that a number of faculty members play a hands on role in developing and maintaining this software has made all this possible.

7.3 Institutional Distinctiveness

7.3.1 Portray the performance of the Institution in one area distinctive to its priority and thrust within 1000 words

Response:

The Chennai Mathematical Institute began in 1989 as an institution with a purely research focus in mathematics and computer science, including a PhD programme. The vision of the the founding Director, Prof C S Seshadri, was to break down the barrier between research and teaching and embark on a high quality teaching programe where top flight researchers train talented young minds. This was achieved with the launching of CMIs undergraduate programme in 1998. CMI has always been a trendsetter in starting programmes taught by top class researchers. We did this first with our BSc programme, before institutes like ISI started their BMath prgram, or NISERs came into existence or the IISc started their undergraduate program. We continued that tradition of being trendsetters by starting an MSc in Data Sciences program in 2018 tuned to the needs of the industry thanks to the encouragement from our industry well wishers and members of statutory governing bodies who believe in us.

CMI is now a centre of excellence for research and teaching in the mathematical sciences, with internationally renowned research groups in mathematics, computer science and physics. Historically the PhD programmes in these areas have attracted very good students. CMI conducts research-oriented BSc and MSc programmes. These are very selective, with cohorts kept intentionally small to enhance student-faculty interaction. The two BSc programmes, one combining Mathematics and Computer Science, and the other in Mathematics and Physics, make CMI a unique environment. CMI has made significant contributions to India's scientific manpower. CMI graduates are now faculty members at institutions such as IITs, IIMs, IISc, IISERs, IMSc, ISI, TIFR and CMI, and researchers in organisations such as Microsoft Research India. CMI alumni are also present among the faculty of international universities in USA and Europe, as well as in leading technology companies like Amazon, Facebook and Google. In addition, CMI students also join companies in sectors such as finance, insurance and data analytics that require a strong background in Mathematics, Statistics and Computing.

CMI's strength has been to combine excellence in research with high quality teaching. Despite its modest size, CMI's impact in focus areas of research has been significant. The areas represented in mathematics are algebraic geometry, commutative algebra, number theory, probability theory, representation theory, C*-algebras, and topology. From its inception, CMI has been a major centre for research in algebraic geometry, particularly geometric invariant theory and moduli theory. In computer science, the formal verification group has matured into one of the most visible internationally. Today, almost all premier

conferences in verification feature papers either from current CMI faculty and students or from CMI alumni. There is an active group of researchers working in different aspects of algorithms; logspace and parallel algorithms, parameterized algorithms, property testing, and matching. The computational complexity group is focused on algebraic complexity theory and geometric complexity theory. A small group of researchers working in data science and machine learning has formed recently, with ambitious plans going forward. In physics the areas of research include string theory, mathematical general relativity, gravitational wave astrophysics, fluid dynamics, and quantum information theory. CMI faculty have strong academic collaborations, both within India and abroad. CMI faculty have received national recognitions such as the Bhatnagar Prize, the Ramanujan Fellowship and the JC Bose Fellowship and are members of national science academies. They are represented on editorial boards, scientific programme committees and influential decision making scientific bodies, both at the national and international level. Several faculty members have made notable contributions in their respective fields of specialisation. For instance, K G Arun from CMI is a member of the LIGO team that made the celebrated discovery of gravitational waves in February, 2016. CMI students have also won international recognition. Arul Shankar (BSc 2007) moved to Princeton for his PhD in number theory to work with Manjul Bharghava. The citation for the Fields Medal awarded to Manjul Bharghava at ICM 2014 explicitly acknowledges Arul's contribution. Ramprasad Saptharishi (BSc 2007, MSc 2009, PhD 2013) won the ACM India Doctoral Dissertation award in 2013 for his PhD thesis. Shiladitya Banerjee (BSc 2008) moved to Syracuse for his PhD. He won the American Physical Society Award for Outstanding PhD Thesis in Biological Physics for 2013. Recently another CMI BSc alumnus, Ananth Shankar, was a coauthor of a paper in which the Andre Oort conjecture was settled. Pranjal Dutta (BSc 2013, MSc 2016, PhD 2018) was awarded the best paper award and the best student paper award in the annual Computer Science Symposium Russia, in 2021.

The CMI Arts Initiative (see https://www.cmi.ac.in//activities/arts-initiative.php) was set up in 2011 to provide a space for students, professionals and anybody else keenly interested in the humanities and arts to interact and learn from experts in these areas. Under this banner CMI has invited many distinguished professionals and academicians from the arts and humanities to give a series of lectures and performances of about 15-20 hours, spread over two or three weekends, on a topic of their choice. Under this banner CMI has also been running a very prestigious and succesful writer's residency programme in collaboration with Sangam House, Bangalore since 2014.

Looking back, we beileve CMI's performance in the thrust areas it set out to make a mark in has been admirable.

In addition to consolidating its current research strengths, CMI has identified data science and quantum computing as two areas it would like to grow in and make a mark. Over the next five years, CMI is targeting to increase the size of the faculty by 50% and raise the student strength from to 500. Another goal is to develop a vibrant centre that hosts a rotating pool of visiting scientists and organizes thematic research programmes on a regular basis.

File Description	Document
Appropriate web in the Institutional website	View Document

5. CONCLUSION

Additional Information :

CMI was founded in 1989 by Prof C S Seshadri, FRS, and has developed into an important national centre for research and teaching in mathematical sciences. It moved into its present campus at SIPCOT IT Park, Siruseri in October, 2005.

Concluding Remarks :

Chennai Mathematical Institute (CMI) is a deemed university with a difference. For over twenty years, CMI has been running high quality undergraduate and postgraduate programmes taught by faculty who are active researchers of international repute, comparable to those in the best research institutes in the country.

CMI faculty are engaged in research of the highest international standards in mathematics, computer science and physics. CMI graduates have performed exceedingly well and have gone on for further students at the best institutions across the world. CMI has made significant contributions to India's scientific manpower. CMI graduates are now faculty members at institutions such as IITs, IIMs, IISc, IISERs, IMSc, ISI, TIFR and CMI.

CMI's traditional strengths are in theoretical aspects of mathematics, computer science and physics. In recent years, CMI has begun to focus more on applied research, and with engaging with industry as well as government agencies to use mathematical techniques to solve challenging applied problems. In this direction, CMI started an MSc programme in Data Science in 2018 that has been very successful. CMI has announced a new Centre of Excellence named after Dr F C Kohli whose aim is to expand the scope of CMI's research, including engaging in meaningful collaborations with industry.