# Analysis of PhDs awarded by Indian Institute of Technology (IITs) and Electronic Thesis available in Shodhganga Repository

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# Introduction

- Electronic theses and dissertations (ETDs) have gained significant attention in the academic landscape.

- ETD enhances the accessibility and visibility of research work.

- The Indian Institutes of Technology (IITs) are a group of top engineering and technology institutions.

- IITs in India conduct extensive research in various areas.

- It's important understanding the trends and patterns in PhD degree awards, and thesis contributions to the Shodhganga repository.

# Objective of the study

- Analyze and compare the trends in Ph.D. degrees awarded by different IITs.

- To identify the top IITs that have awarded the highest number of PhDs and determine the growth rate of PhD degrees across different institutions in India.

- Evaluate the contribution of each IIT's theses to the Shodhganga repository and identify the leading IITs in terms of their contributions.

# Data source and Methodology

- The study has been conducted with a comprehensive analysis across 23 IITs, with a sample size spanning a decade from 2012 to 2022 from more than 200 annual reports, websites.

- Observational and case study approach were used.

- IITs Thesis submission data collected from Shodhganga Repository.

# Challenges of getting Data

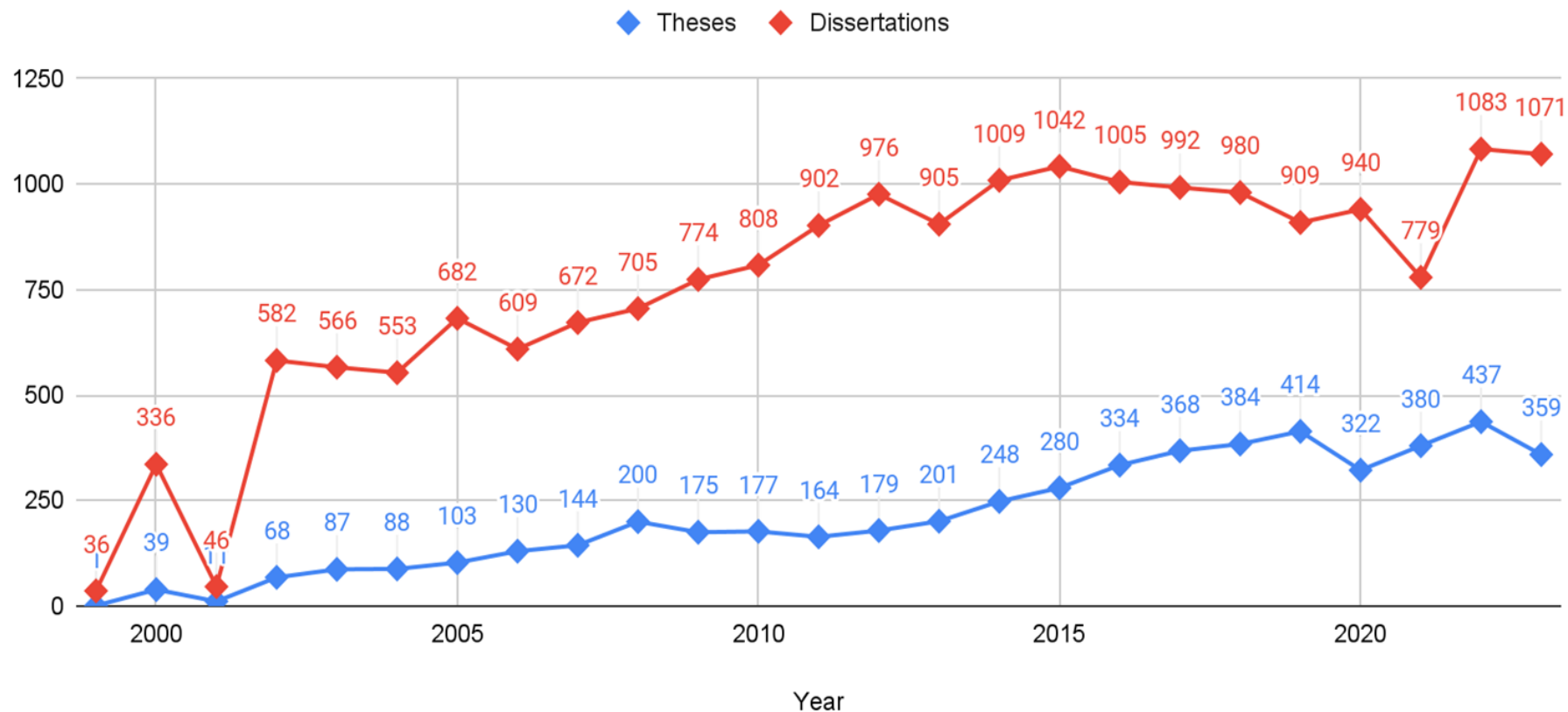# Expectation

# ETD at IIT Bombay

- IIT Bombay has implemented ETD in the year 1999, this was the first such initiative in India to make compulsory submission of ETD by all masters and research scholars at IIT Bombay.

- It facilitates students to submit their ETD and take supervisor's approval and finally to get online ETD submission certificate from Central Library.

- Turnitin web-based tool is being used to check plagiarism.

- As on October 2023 IIT Bombay ETD holds 24,000 full text records in PDF format.

- We have been working continuously to enhance ETD more user-friendly to submit and discovery ETD collections for users to enrich their scientific knowledge.
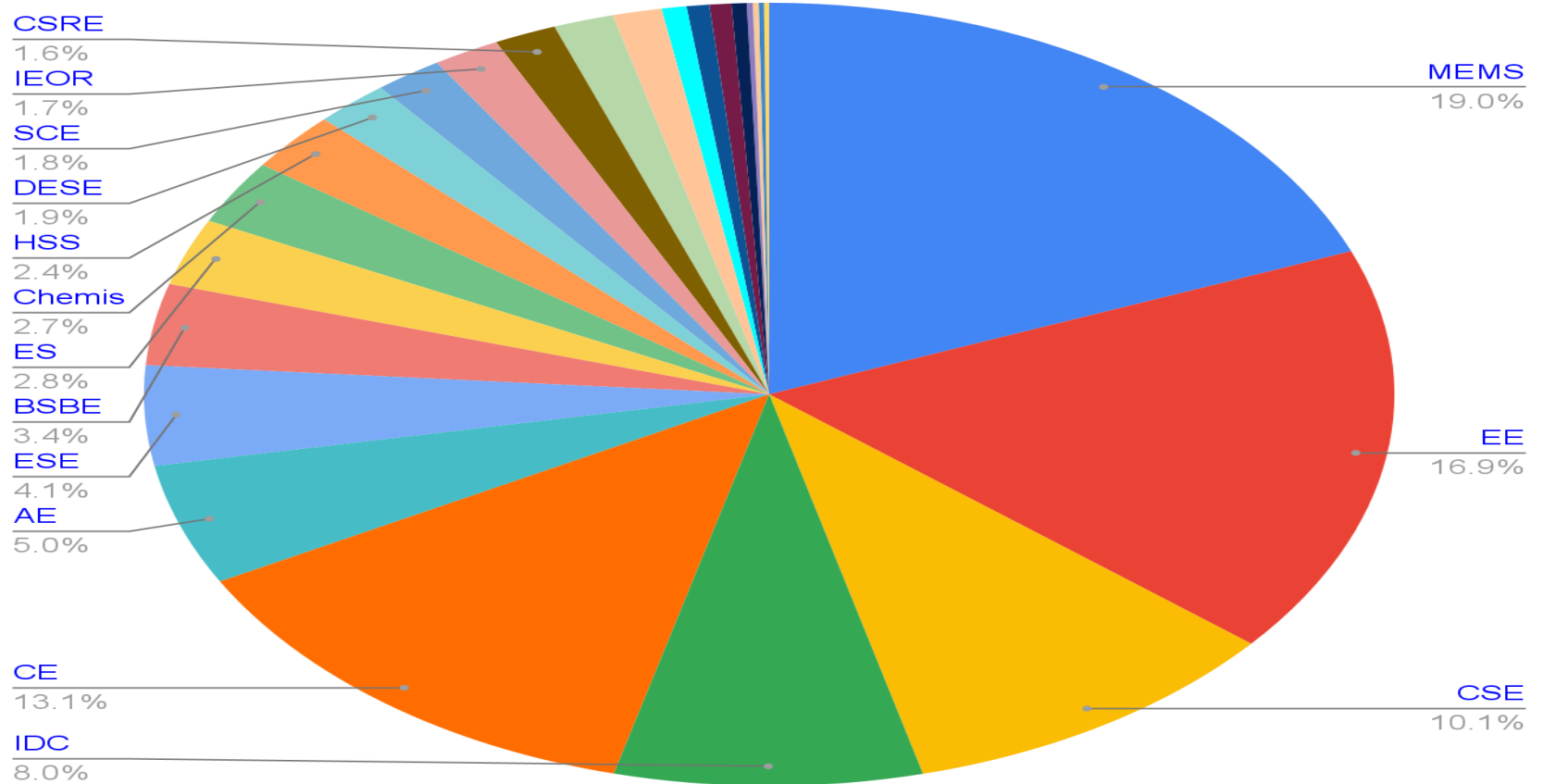
# ETD at IIT Bombay

- It holds Masters Dissertations and PhD Theses.

- Accept ETDs only in PDF format and supporting files in many file format.

- Embargoes being used wherever necessary for prospective Patent/license work.

- Till 2011 institute used to accept both print and electronic version of Theses and Dissertations, 2012 onwards institute discontinued the practice of Print Dissertations submissions and 2020 onwards Print thesis submissions.

- At the end of every academic year expert committee will review recently added ETD collection to identify prospective patent/license.

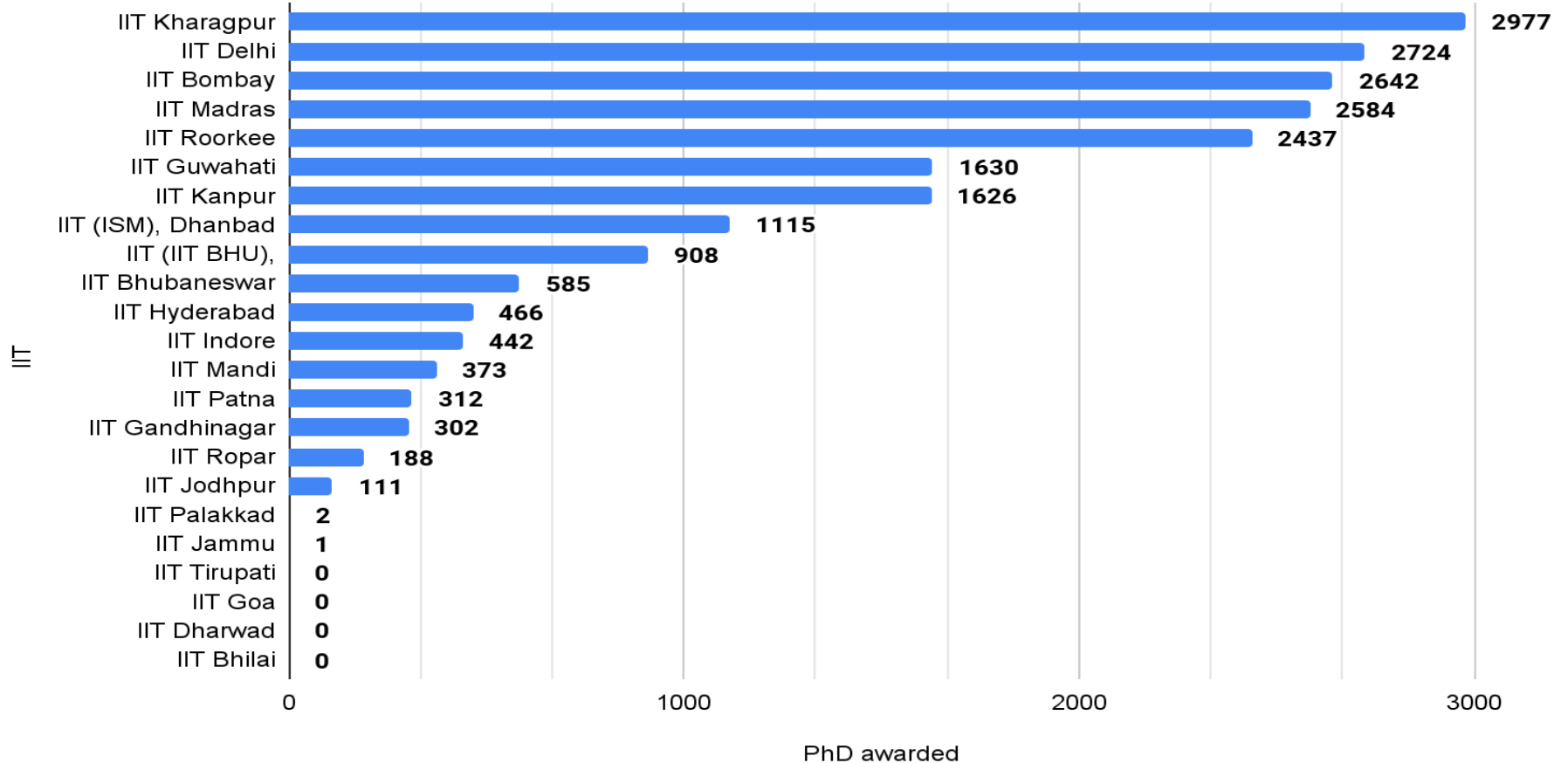# IITB ETD Growth: Yearwise submission statistics
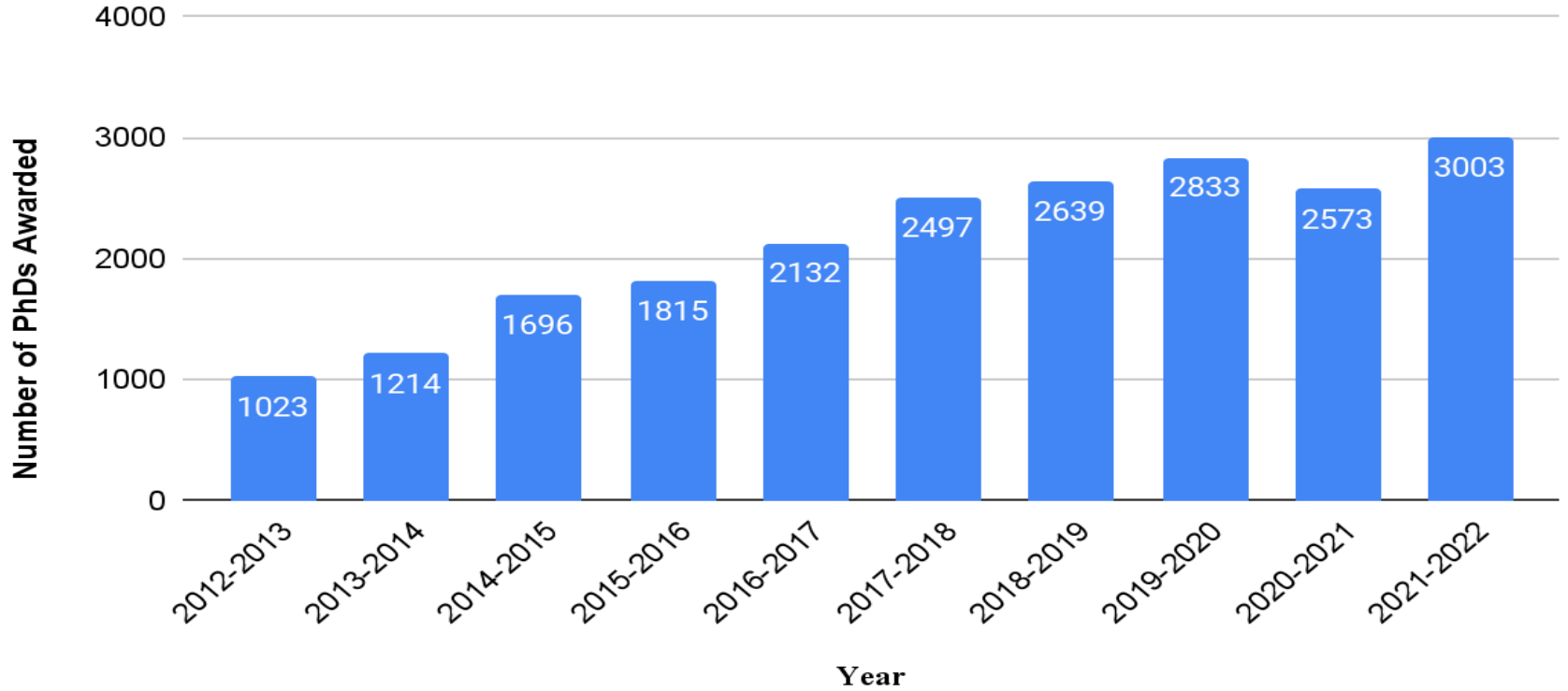
# ETD Department-wise



- MEMS 19.0%
- EE 16.9%
- CSE 10.1%
- IDC 8.0%
- CE 13.1%
- AE 5.0%
- ESE 4.1%
- BSBE 3.4%
- ES 2.8%
- Chemis 2.7%
- HSS 2.4%
- DESE 1.9%
- SCE 1.8%
- IEOR 1.7%
- CSRE 1.6%

| SL No | IIT Name | Estb Year | Degree | 2021-2022 | 2020-2021 | 2019-2020 | 2018-2019 | 2017-2018 | 2016-2017 | 2015-2016 | 2014-2015 | 2013-2014 | 2012-2013 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | IIT Kharagpur | 1951 | PhD | 315 | 442 | 387 | 372 | 295 | 247 | 298 | 255 | 204 | 162 | 2977 |
| 2 | IIT Bombay | 1958 | PhD | 449 | 178 | 381 | 181 | 308 | 357 | 208 | 230 | 175 | 175 | 2642 |
| 3 | IIT Kanpur | 1959 | PhD | 126 | 185 | 221 | 208 | 186 | 160 | 151 | 136 | 121 | 132 | 1626 |
| 4 | IIT Madras | 1959 | PhD | 157 | 243 | 243 | 445 | 247 | 226 | 212 | 475 | 180 | 156 | 2584 |
| 5 | IIT Delhi | 1961 | PhD | 288 | 298 | 331 | 331 | 378 | 306 | 264 | 162 | 178 | 188 | 2724 |
| 6 | IIT Guwahati | 1995 | PhD | 175 | 172 | 285 | 230 | 230 | 115 | 128 | 124 | 106 | 65 | 1630 |
| 7 | IIT Roorkee | 2001 | PhD | 379 | 207 | 269 | 308 | 292 | 227 | 292 | 161 | 180 | 122 | 2437 |
| 8 | IIT Bhubaneswar | 2008 | PhD | 41 | 40 | 96 | 99 | 77 | 83 | 76 | 62 | 9 | 2 | 585 |
| 9 | IIT Gandhinagar | 2008 | PhD | 86 | 76 | 51 | 23 | 14 | 22 | 22 | 6 | 2 | 0 | 302 |
| 10 | IIT Hyderabad | 2008 | PhD | 119 | 96 | 69 | 58 | 40 | 42 | 34 | 5 | 3 | 0 | 466 |
| 11 | IIT Jodhpur | 2008 | PhD | 27 | 31 | 28 | 19 | NA | 6 | 0 | 0 | 0 | 0 | 111 |
| 12 | IIT Patna | 2008 | PhD | 102 | 54 | 40 | 41 | 14 | 28 | 25 | 5 | 3 | | 312 |
| 13 | IIT Ropar | 2008 | PhD | 52 | 32 | 32 | 28 | 15 | 9 | 18 | 2 | 0 | 0 | 188 |
| 14 | IIT Indore | 2009 | PhD | 109 | 58 | 83 | 83 | 33 | 32 | 20 | 18 | 6 | 0 | 442 |
| 15 | IIT Mandi | 2009 | PhD | 231 | 39 | 22 | 22 | 29 | 24 | 3 | 3 | 0 | 0 | 373 |
| 16 | IIT (BHU), Varanasi | 2012 | PhD | 95 | 192 | 153 | 84 | 119 | 81 | 64 | 52 | 47 | 21 | 908 |
| 17 | IIT Palakkad | 2015 | PhD | 1 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 2 |
| 18 | IIT Tirupati | 2015 | PhD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 0 |
| 19 | IIT (ISM), Dhanbad | 2016 | PhD | 250 | 229 | 142 | 107 | 220 | 167 | NA | NA | NA | NA | 1115 |
| 20 | IIT Bhilai | 2016 | PhD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 0 |
| 21 | IIT Dharwad | 2016 | PhD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 0 |
| 22 | IIT Goa | 2016 | PhD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 0 |
| 23 | IIT Jammu | 2016 | PhD | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 1 |
| | | Total | | 3003 | 2573 | 2833 | 2639 | 2497 | 2132 | 1815 | 1696 | 1214 | 1023 | 21425 |

| SL No | IIT Name | Estb Year | Degree | 2021-2022 | 2020-2021 | 2019-2020 | 2018-2019 | 2017-2018 | 2016-2017 | 2015-2016 | 2014-2015 | 2013-2014 | 2012-2013 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | IIT Kharagpur | 1951 | PhD | 315 | 442 | 387 | 372 | 295 | 247 | 298 | 255 | 204 | 162 | 2977 |
| 2 | IIT Bombay | 1958 | PhD | 449 | 178 | 381 | 181 | 308 | 357 | 208 | 230 | 175 | 175 | 2642 |
| 3 | IIT Kanpur | 1959 | PhD | 126 | 185 | 221 | 208 | 186 | 160 | 151 | 136 | 121 | 132 | 1626 |
| 4 | IIT Madras | 1959 | PhD | 157 | 243 | 243 | 445 | 247 | 226 | 212 | 475 | 180 | 156 | 2584 |
| 5 | IIT Delhi | 1961 | PhD | 288 | 298 | 331 | 331 | 378 | 306 | 264 | 162 | 178 | 188 | 2724 |
| 6 | IIT Guwahati | 1995 | PhD | 175 | 172 | 285 | 230 | 230 | 115 | 128 | 124 | 106 | 65 | 1630 |
| 7 | IIT Roorkee | 2001 | PhD | 379 | 207 | 269 | 308 | 292 | 227 | 292 | 161 | 180 | 122 | 2437 |
| 8 | IIT Bhubaneswar | 2008 | PhD | 41 | 40 | 96 | 99 | 77 | 83 | 76 | 62 | 9 | 2 | 585 |
| 9 | IIT Gandhinagar | 2008 | PhD | 86 | 76 | 51 | 23 | 14 | 22 | 22 | 6 | 2 | 0 | 302 |
| 10 | IIT Hyderabad | 2008 | PhD | 119 | 96 | 69 | 58 | 40 | 42 | 34 | 5 | 3 | 0 | 466 |
| 11 | IIT Jodhpur | 2008 | PhD | 27 | 31 | 28 | 19 | NA | 6 | 0 | 0 | 0 | 0 | 111 |
| 12 | IIT Patna | 2008 | PhD | 102 | 54 | 40 | 41 | 14 | 28 | 25 | 5 | 3 | | 312 |

# PhD degree awarded by IITs from 2012-2022

| IIT | PhD awarded |
|-----|-------------|
| IIT Kharagpur | 2977 |
| IIT Delhi | 2724 |
| IIT Bombay | 2642 |
| IIT Madras | 2584 |
| IIT Roorkee | 2437 |
| IIT Guwahati | 1630 |
| IIT Kanpur | 1626 |
| IIT (ISM), Dhanbad | 1115 |
| IIT (IIT BHU), | 908 |
| IIT Bhubaneswar | 585 |
| IIT Hyderabad | 466 |
| IIT Indore | 442 |
| IIT Mandi | 373 |
| IIT Patna | 312 |
| IIT Gandhinagar | 302 |
| IIT Ropar | 188 |
| IIT Jodhpur | 111 |
| IIT Palakkad | 2 |
| IIT Jammu | 1 |
| IIT Tirupati | 0 |
| IIT Goa | 0 |
| IIT Dharwad | 0 |
| IIT Bhilai | 0 |

# Number of PhDs Awarded vs. Year

# Number of PhD awarded during 2012-2022 and Number of PhDs Submitted to Shodhganga Repository
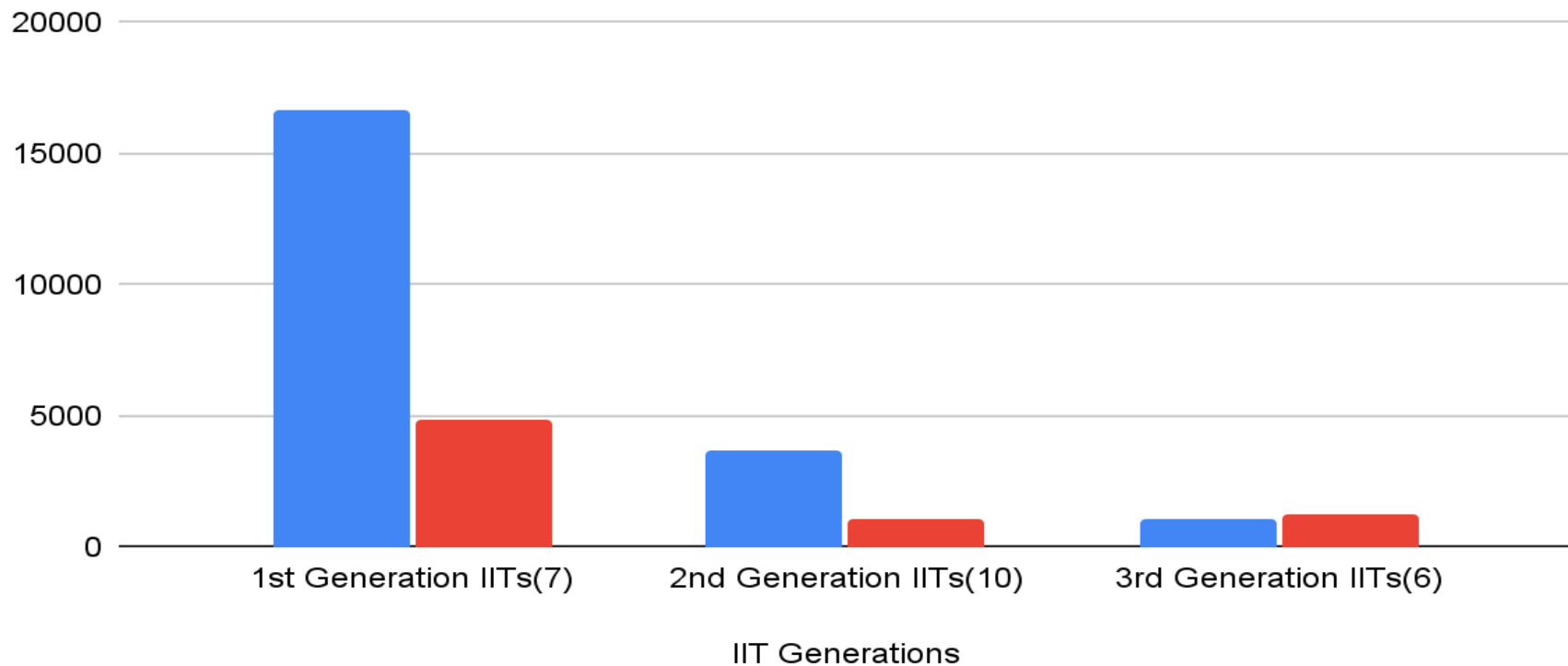
# No. of PhD theses submitted to Shodhganga Repository by IITs

| SL No | Institute Name | Degree | 2019 | 2020 | 2021 | 2022 | 2023 | Total |
|-------|----------------|--------|------|------|------|------|------|-------|
| 1 | IIT Bhilai | Ph.D | 0 | 1 | 2 | 5 | 0 | 8 |
| 2 | IIT Bhubaneswar | Ph.D | 0 | 1 | 32 | 43 | 0 | 76 |
| 3 | IIT Bombay | Ph.D | 283 | 2 | 67 | 341 | 0 | 693 |
| 4 | IIT Delhi | Ph.D | 337 | 299 | 283 | 336 | 0 | 1255 |
| 5 | IIT Dharwad | Ph.D | 0 | 0 | 1 | 1 | 1 | 3 |
| 6 | IIT Gandhinagar | Ph.D | 0 | 1 | 36 | 2 | 0 | 39 |
| 7 | IIT Guwahati | Ph.D | 203 | 172 | 237 | 248 | 74 | 934 |
| 8 | IIT Hyderabad | Ph.D | 15 | 70 | 113 | 62 | 0 | 260 |
| 9 | IIT (BHU), Varanasi | Ph.D | 121 | 119 | 162 | 72 | 0 | 474 |
| 10 | IIT Indore | Ph.D | 73 | 67 | 108 | 83 | 4 | 335 |
| 11 | IIT (ISM), Dhanbad | Ph.D | 0 | 0 | 187 | 425 | 129 | 741 |
| 12 | IIT Jammu | Ph.D | 0 | 0 | 0 | 1 | 4 | 5 |
| 13 | IIT Jodhpur | Ph.D | 0 | 0 | 4 | 12 | 0 | 16 |
| 14 | IIT Kharagpur | Ph.D | 2 | 5 | 317 | 238 | 0 | 562 |
| 15 | IIT Madras | Ph.D | 369 | 346 | 342 | 201 | 0 | 1258 |
| 16 | IIT Mandi | Ph.D | 22 | 39 | 47 | 65 | 0 | 173 |
| 17 | IIT Palakkad | Ph.D | 0 | 0 | 1 | 2 | 0 | 3 |
| 18 | IIT Patna | Ph.D | 16 | 10 | 28 | 29 | 0 | 83 |
| 19 | IIT Roorkee | Ph.D | 0 | 21 | 158 | 1 | 0 | 180 |
| 20 | IIT Ropar | Ph.D | 0 | 0 | 53 | 60 | 0 | 113 |
| 21 | IIT Tirupati | Ph.D | 0 | 0 | 0 | 4 | 0 | 4 |
| 22 | IIT Goa | Ph.D | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | IIT Kanpur | Ph.D | 0 | 0 | 0 | 0 | 0 | 0 |
|  |  | Total | 1441 | 1152 | 2176 | 2226 | 212 | 7207 |

PhD theses submitted to Shodhganga Repository by each IIT

Legend: 2023, 2022, 2021, 2020, 2019

| IIT | Total |
|-----|-------|
| IIT Madras | 1258 |
| IIT Delhi | 1255 |
| IIT Guwahati | 934 |
| IIT Dhanbad | 741 |
| IIT Bombay | 693 |
| IIT Kharagpur | 562 |
| IIT Varanasi | 474 |
| IIT Indore | 335 |
| IIT Hyderabad | 260 |
| IIT Roorkee | 180 |
| IIT Mandi | 173 |
| IIT Ropar | 113 |
| IIT Patna | 83 |
| IIT Bhubaneswar | 76 |
| IIT Gandhinagar | 39 |
| IIT Jodhpur | 16 |
| IIT Bhilai | 8 |
| IIT Jammu | 5 |
| IIT Tirupati | 4 |
| IIT Palakkad | 3 |
| IIT Dharwad | 3 |
| IIT Kanpur | 0 |
| IIT Goa | 0 |
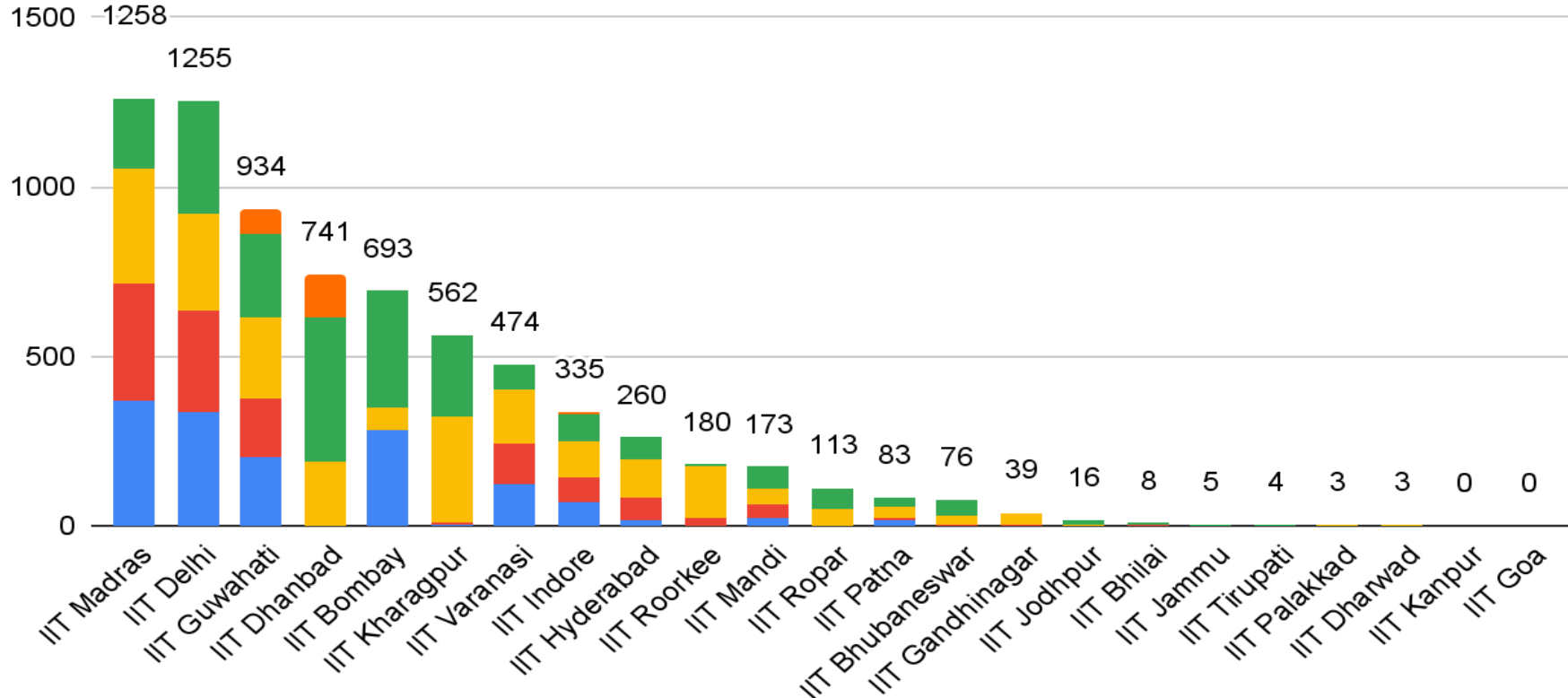
IITs with number of Thesis submitted to Shodhganga repository
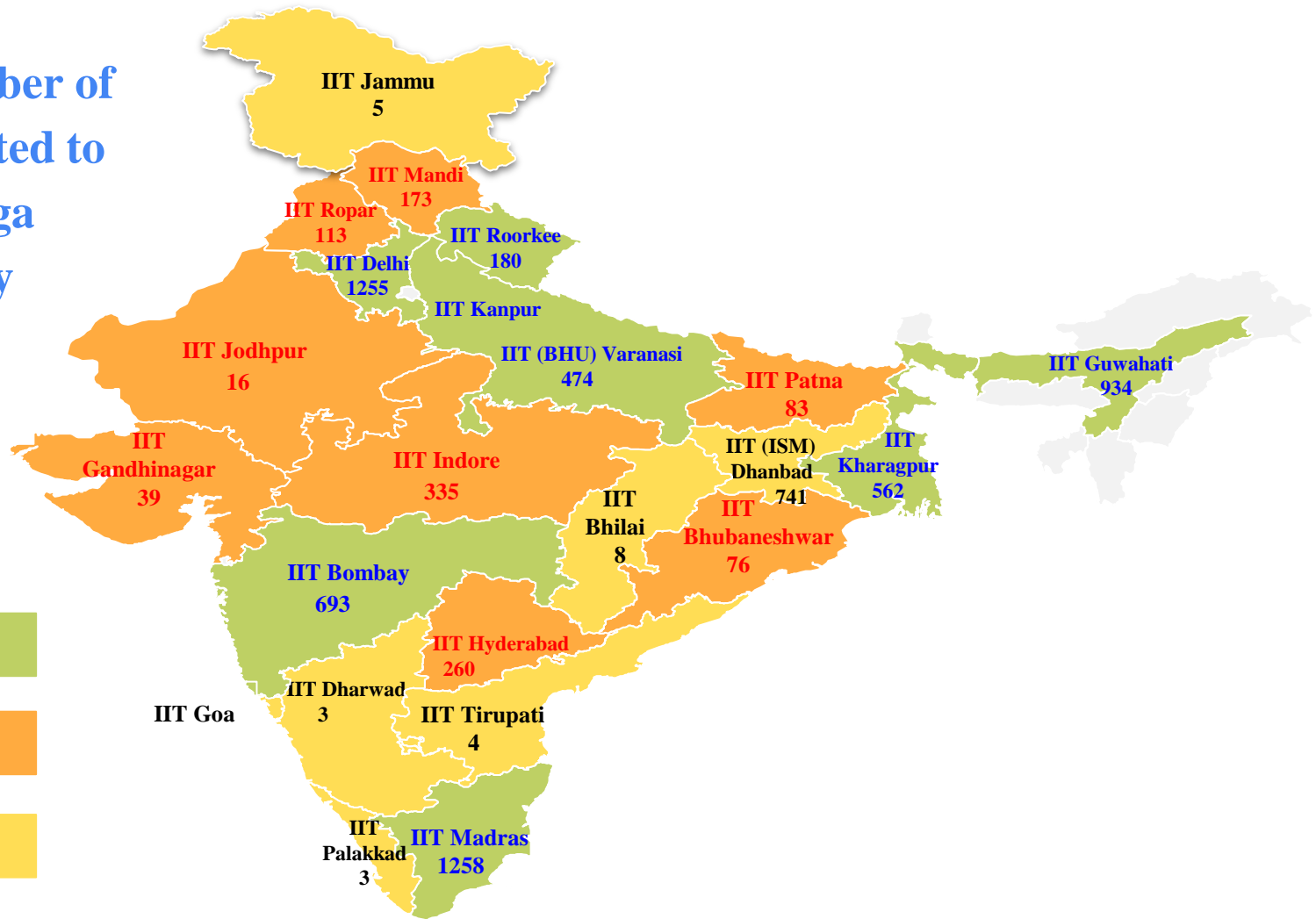
# Findings

- The total number of research degrees awarded by all IITs in the 10-year period from 2012-2022 is 21,425, and the number of PhD degrees awarded increased to 3003 in 2021–2022.

- The IITs with the highest number of PhD degrees awarded in 2012-2022 were IIT Kharagpur (2977), IIT Delhi (2724), and IIT Bombay (2642).

- The data shows a variation in the number of PhD degrees awarded by each IIT. Factors contributing to this variation include the size of the institution, the number of research programs offered, faculty strength, research funding, and the popularity of research areas in each IIT.

- Newer IITs, established after 2008, have comparatively lower numbers of research degrees awarded, which is expected as they are relatively recent additions to the IIT network.

# Findings

- A total of 7,215 theses have been submitted by the IITs to the Shodhganga repository as of May 2023. This submission of theses to the repository is expected to grow in the coming years due to incentives provided by the government.

- The submission of theses to the Shodhganga repository is part of the government's efforts to make Indian research more accessible globally.

- It is expected to foster collaboration, innovation, and interdisciplinary research as experts from various fields will have access to a broader range of information.

- The Indian Institute of Technology (IIT) Madras has the highest number of Ph.D. theses with 1258, followed by IIT Delhi with 1255 and IIT Bombay with 693.

# Findings

- Making Access to IIT theses is undoubtedly a boon for the research community with open access to these valuable resources, researchers will have unrestricted access to the wealth of knowledge generated by IITs.

- This development is set to revolutionize the discovery of high-quality theses produced by IITs, providing a significant boost to researchers and scholars.

- IIT Bombay being a strong supporter of Open Access, open education resources and Open Source software has implemented successfully ETD & Institutional Repository.

- Assuming a constant growth rate, it is estimated that more than 65,000 research degrees would be awarded by IITs by the end of the next decade, with an average of 6500 PhD degrees being awarded annually by all IITs.

# Conclusion

- The accessibility of IIT theses through the Shodhganga repository is expected to have a significant impact on minimizing plagiarism and avoiding duplication of research efforts. It will also enhance the credibility and authenticity of research and streamline the academic publishing process.

- Indian Institutes of Technology (IITs), have initiated a commendable practice of submitting their theses to the Shodhganga national repository of Indian theses.

# Conclusion

- Electronic Theses and Dissertations (ETDs) offer greater accessibility, providing a boon to researchers worldwide.

- The IITs' importance in India's economic and social development.

- This study uncovers the growth in Ph.D. degrees awarded by IITs, variations among IITs, and their increasing contributions to the Shodhganga repository.

- These insights are valuable for policymakers, academics, and prospective Ph.D. students in evaluating the reputation and research output of different IITs while promoting the accessibility and impact of Indian research.

# Importance of Planning

IIT Kharagpur suspends admission to PhD and MS programme

Subhankar Chowdhury
Posted on 15 Oct 2023
05:46 AM

IIT Kharagpur has suspended admission to the PhD and MS (master of science) programme "due to severe shortage of hostel accommodation". The IIT's joint registrar, academic, last week issued a notice stating: "Admission to the PhD and MS for spring semester 2023-24 is suspended due to severe shortage of hostel accommodation for both male and female students." An IIT official said that admission for the spring semester was supposed to be held in late November.
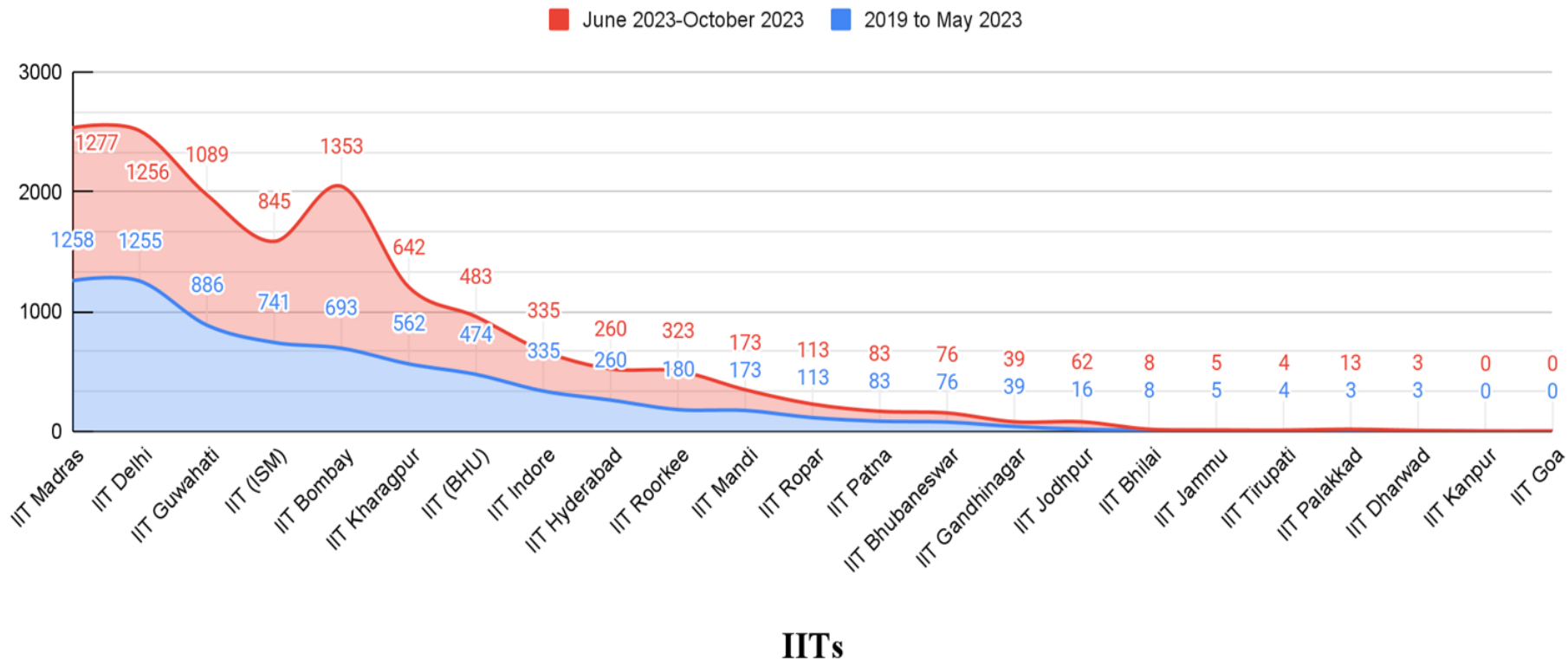
# Further research

- Analysis and comparison of subject wise Thesis awarded by IITs

- Content analysis of IIT Thesis would be interesting area

- Impact of making IITs thesis open Access on Research community

- Analysis and comparison of this study can be done beyond a decade

# References

1. Greig, M. (2005). Implementing electronic theses at the University of Glasgow: Cultural challenges. *Library Collections, Acquisitions, &amp; Technical Services*, 29(3), 326–335. https://doi.org/10.1080/14649055.2005.10766069

2. JK, Vijayakumar., & Murthy, T. A. V. (2004). *Accessing Indian university research literature : importance of ETDs in the verge of UGC-InfoNet.* https://doi.org/http://eprints.rclis.org/cgi/export/eprint/7221/Full/elis-eprint-7221.html

3. Urs, S. (2001). *Vidyanidhi: Indian digital library of electronic theses*. ACM Digital Library. https://dl.acm.org/doi/10.1145/374308.374361

4. Annual Reports of All IITs from 2012 to 2022

# Additional data after May 2023 on Shodhganga



Growth of submission of Thesis in Shodhganga after May 2023

# Thank You