

# Irish Debbarma

N Block Hostel, Indian Institute of Science, Bangalore, Karnataka-560012, India

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## EDUCATION

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### Indian Institute of Science

*Bachelors of Science (Research) with Math major*

**Bangalore, Karnataka, India**

*Expected Graduation: July 2023*

### Bansal Public School

*Central Board of Secondary Education (CBSE)*

**Kota, Rajasthan, India**

*Higher Secondary Education: 2019*

### Holy Cross School

*Indian Certificate of Secondary Education (ICSE)*

**Agartala, Tripura, India**

*Secondary Education: 2017*

## RESEARCH INTERESTS

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I like Number Theory and Algebra in general with specific interests in Modular Forms and Elliptic functions, Analytic Number Theory, Algebraic Number theory.

## PROJECTS

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### Summer Project

*June 2020-August 2020*

TOPIC: BINARY QUADRATIC FORMS, AND ITS REDUCTION

*Guide: **Professor B. Sury** from Indian Statistical Institute (ISI), Bangalore.*

- Solved first 3 chapters of *Introduction to the Theory of Numbers* by Niven, Zuckerman, Montgomery.
- Read chapter 1 of this book by Lemmermeyer.
- Wrote a report on the three project topics (Gauss reduction, Gauss class number problem, Zagier's one line proof of the two squares problem) mentioned in the book . Please find my report [here](#). Certificate of work by mentor can be found [here](#).

### Summer Project

*June 2021-August 2021*

TOPIC: ZERO SUM PROBLEMS IN FINITE ABELIAN GROUPS

*Guide: **Professor Venkatesh Rajendran** from Indian Institute of Science (IISc), Bangalore*

- First proved the Structure theorem of finite abelian groups.
- Read the expository article on *Zero sum problems*.
- Understood some preliminary results on Davenport's constant, Erdős-Ginzberg-Ziv constant,  $\eta$ -constant for Abelian groups of the type  $C_n, C_m \oplus C_n, C_2 \oplus C_2 \oplus C_{2n}$ .
- Wrote a detailed report on the proofs I encountered while reading. Please find my report [here](#).

### Winter Project

*December 2021-Ongoing*

TOPIC: CUBIC AND QUARTIC RECIPROCITY LAWS

*Guide: **Professor Shaunak Deo** from Indian Institute of Science (IISc), Bangalore*

- Reading chapter 9 from the book *A Classical Introduction to Modern Number Theory* by Kenneth Ireland, Michael Rosen and solving end of chapter questions, hopefully leading to the study of Stickelberger Relation and Eisenstein Reciprocity Law.
- Mainly focused on the proofs of the Reciprocity laws.

## COURSES TAKEN

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### Mathematics courses:

- *Taken in Fall semester 2019:* Real Analysis and Linear Algebra-I

- *Taken in Spring semester 2020:* Real Analysis and Linear Algebra-II
- *Taken in Fall semester 2020:* Probability and Statistics
- *Taken in Spring semester 2021:* Introduction to Basic Analysis, Introduction to Algebraic Structures, Ordinary Differential Equations.
- *Taken in Fall semester 2021:* Algebra-I (Groups, Rings and Modules), Linear Algebra, Multivariable Calculus, Representation theory of finite groups.
- *Taken in Spring semester 2022:* Algebra-II (Fields and Galois Theory), Complex Analysis, Measure Theory, Algebraic Number Theory, Coxeter Groups.

## ACHIEVEMENTS

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- Kishore Vaigyanik Protsahan Yojna (KVPY) Scholar, fellow since 2019. Awarded by the Department of Science and Technology, Govt. of India.
- Percentile of 99.51 in the Joint Entrance Exam (JEE) Mains of 2019.

## CO-CURRICULAR

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- Independently reading Tom M. Apostol's *Introduction to Analytic Number Theory* and Apostol's *Modular Functions and Dirichlet Series in Number Theory*
- Programming Languages: C, Java, SAGE math,  $\text{\LaTeX}$ .
- Human languages I am fluent in: English, Hindi, Bengali, Kokborok (mother tongue) and a very basic knowledge of french.
- I am also interested in reading history and non-fictional books.
- Current Convenor of the Football Club at IISc, former Logistics coordinator for Pravega-2021 (Undergraduate fest at IISc, Bangalore).
- Was part of the Notebook Drive at IISc.
- Was a part of National Cadet Corps (NCC) for two years 2014-16.
- Regular member of the IISc college football team.