

The background image shows a modern university campus. On the left, a large building with a complex, perforated metal facade (laser-cut pattern) is visible. To the right, a tall brick building with many windows stands. In the foreground, a paved walkway leads to a green lawn area where several students are gathered, some sitting on the grass and others standing. A small table is set up on the lawn. The sky is overcast.

Students' Guide

Department of Computer Science

Ashoka University

DEPARTMENT OF COMPUTER SCIENCE, ASHOKA UNIVERSITY

This guide was made by the CS Society in consultation with the CS Representative, Seniors, Alumni and Faculty members. The CS Society also acknowledges the work of the Economics Representatives in setting up the Students' Guide for Economics, parts of which have been referred to while creating this document.

DISCLAIMER: The information in this guide is meant to serve as a ready reference for students. Some information may become backdated with changes in curriculum, policies etc. Thus, you are requested to confirm the latest updates from the official website and/or the CS Student Representative before taking any action.

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1. Overview

1.1 Degree Requirements at Ashoka

To graduate with a Bachelor's degree, students are required to pass courses that are broadly divided into three categories – **Foundation Courses**, **Major Courses** (including Interdisciplinary Majors) and **Co-Curricular Courses**. First year students typically take foundation courses in the first 3-4 semesters at Ashoka, and start taking Major courses from the 2nd semester.

You also have the option to take up a completely different subject as a minor or a concentration in addition to your major. Minors and Concentrations are brief programs taken in disciplines other than your major. Minors at Ashoka require you to take 6 courses in a discipline, while a concentration requires 4 courses.

1.2 GPA and Credit System

Please note that University-wise credit requirements are subject to change, and the latest requirements are always available on the [official website](#).

At Ashoka, each course carries credit points - foundation courses as well as major specific and minor courses typically earn a student **4 credit points**, while co-curricular courses give **2 credit points**. In order to earn their degree at the end of three years, students pursuing a pure major (such as Computer Science etc.) need to have accumulated a minimum of **100 credits**. On the other hand, students pursuing an interdisciplinary major (such as CS and Entrepreneurship etc.) must fulfill a minimum of **116 credits**. A student's performance in any academic course is graded on a letter scale (ranging from A to F). Each grade carries a grade point (such as an A gives 16 grade points, while an A- gives 14.8). On this basis, at the end of every semester a student's cumulative grade point average (CGPA) and semester specific GPA are calculated. For more on this, please refer to the section on Awards and Recognition [\(3.6\)](#).

1.3 CS at Ashoka

The Department of Computer Science at Ashoka University acknowledges the increasing relevance of computing and information science to every academic discipline. In addition to classical and emerging areas of Computer Science, students have an opportunity to study interdisciplinary areas like computational biology, social and information networks, digital humanities and data-driven journalism. 2 interdisciplinary majors, a minor, a concentration are also offered by the Department in addition to an undergraduate major in Computer Science and a Ph.D. in Computer Science.

The goals of the programme include (but are not limited to):

1. Impart a deep understanding of the foundations of Computer Science
2. Enable a student to be able to systematically apply the foundational knowledge across disciplines
3. Create new knowledge in the field of Computer Science

1.3.1 Programs Offered

- Undergraduate
 - Major
 - Interdisciplinary Major
 - Advanced Major
- Minor
- Concentration
- PhD
- Graduate Assistantship

1.3.2 Faculty and Research Interests

- **Ravi Kothari**, Professor (HOD Computer Science) *Machine Learning, Pattern Recognition, Data Mining and Big Data*
- **Sudheendra Hangal**, Professor of the Practice in Computer Science *Human-Computer Interaction, Social Media and Personal Digital Archives*
- **Manu Awasthi**, Associate Professor *Computer Architecture, Operating Systems, and Computers & Society*
- **Anirban Mondal**, Associate Professor *Urban Informatics (Smart Cities), Spatial Databases and Financial Analytics*
- **Mahavir Jhavar**, Assistant Professor *Cryptography, Block-chain and Network Security*
- **Debayan Gupta**, Assistant Professor *Secure Computation, Cryptography, and Privacy*
- **Goutam Paul**, Associate Professor (Visiting - Spring 2020, Monsoon 2018) *Cryptography, Security, Information and Coding Theory, Quantum Information and Computation*
- **Subhash Bhalla**, Professor (Visiting - Monsoon 2020, Spring 2021) *Distributed Database Systems, New Query Languages*

For a complete list of all faculty (core and visiting) and PhD students pursuing CS at Ashoka, visit the [departmental website](#).



2. Curriculum

2.1 CS Major Requirements

While our attempt is to provide the most accurate information, the CS curriculum at Ashoka is frequently updated to remain relevant. Thus, please confirm the requirements with the version on the [departmental website](#) before taking any action. In case of any conflict, refer to the version on the website.

To receive a B.Sc. degree with a Major in Computer Science at Ashoka University, students must accumulate 100 credit points at the end of three years. The course divisions and credit points requirement within three years for a Major in Computer Science are as follows:

- Foundation and Critical Thinking courses
- Co-Curricular courses (4 credits)
- Computer Science Major courses
 - The course division for Computer Science Major courses is given below:
 1. Compulsory 10 core courses for 40 credits.
 2. A minimum of 20 credits of electives offered by the CS department.
- Other Courses

2.1.1 CS Core Courses

These are the courses you have to take in order to obtain a BSc. (Hons) degree in CS from Ashoka. Please note that the reference books mentioned aren't official recommendations.

- | | |
|---|--|
| 1. Discrete Math | 6. Operating Systems |
| 2. Probability and Statistics | 7. Algorithm Design and Analysis |
| 3. Introduction to Computer Programming | 8. Computer Networks |
| 4. Computer Organization and Systems | 9. Introduction to Machine Learning |
| 5. Advanced Programming | 10. Programming language Design and Implementation |

2.1.2 CS Elective Courses

Here's a **non-exhaustive** list of popular CS Elective courses that have been offered at Ashoka:

- | | |
|--|-------------------------------------|
| 1. Theory of Computation | 7. Advanced Computer Architecture |
| 2. Computer Security and Privacy | 8. Advanced Machine Learning |
| 3. Data Mining and Warehousing | 9. Block-chain and Cryptocurrencies |
| 4. Database Management Systems | 10. Distributed Systems |
| 5. Unstructured Information Processing | 11. Linear Algebra |
| 6. Advanced Algorithms | |

Please Note: **ISMs count towards your electives, but there's a cap on the number of ISMs you can take.**

2.1.3 A CS Major's recommended path

- | | |
|---|---|
| <ul style="list-style-type: none"> • 1st Semester <ul style="list-style-type: none"> – No CS courses • 2nd Semester <ul style="list-style-type: none"> – Introduction to Computer Programming – Discrete Mathematics • 3rd Semester <ul style="list-style-type: none"> – Probability and Statistics – Computer Organization and Systems – Advanced Programming • 4th Semester <ul style="list-style-type: none"> – Algorithm Design and Analysis | <ul style="list-style-type: none"> – Operating Systems – CS Elective • 5th Semester <ul style="list-style-type: none"> – Computer Networks – Introduction to Machine Learning – Programming Language Design and Implementation – CS Elective • 6th Semester <ul style="list-style-type: none"> – CS Elective – CS Elective – CS Elective |
|---|---|

2.2 Advanced Major in CS (ASP)

To graduate with a Postgraduate Diploma in Advanced Studies and Research (DipASR) in Computer Science at Ashoka University, students must accumulate 32 credit points at the end of one year. The course divisions and credit points requirement for a DipASR in Computer Science are as follows,

1. A minimum of 32 credit points are required.
2. Of these 32 credits, a minimum of 16 credits must come from Computer Science courses.
3. Of these 16 credits, 4 credits must come from CS498: Capstone Project.

Some additional notes on the Capstone Project and the Capstone Thesis:

- **CS498: Capstone Project [4 Credits]:** A Capstone Project is done under the guidance of a faculty member and is aimed at encouraging a student to solve a complex problem. A Capstone Project is largely implementation focused.
- **CS499: Capstone Thesis [8 Credits]:** A Capstone Thesis is not mandatory. Enrollment in Capstone Thesis requires the approval of a faculty member who will take into account one's performance in CS498 along with other aspects (including what is being proposed). A Capstone Thesis is largely research focused.

2.3 CS Minor Requirements

In order to get a Minor in Computer Science, students are required to take 24 credits made up as follows,

1. Introduction to Computer Programming
2. Five more CS courses. Of these five, at least 3 of them must be CS core courses.

2.4 Interdisciplinary Majors

For the latest information, refer to [the departmental website](#).

In order to Major in an interdisciplinary program, students must accumulate 116 credit points in three years. The Computer Science department offers two interdisciplinary Majors - (i) **Computer Science and Mathematics**, and (ii) **Computer Science and Entrepreneurship**. The course divisions and credit points requirement within three years for these two Interdisciplinary Major are as follows,

1. Foundation and Critical Thinking courses (28 credits)
2. Interdisciplinary Major courses (76 credits)
3. Co-Curricular courses (4 credits)
4. Other courses (8 credits)

2.4.1 CS and Mathematics

The course division between Computer Science and Mathematics department for this interdisciplinary Major is given below.

- A minimum of 36 credits must come from Computer Science department. Of these 36 credits, a minimum of 28 credits must come from "Computer Science core course list for CS+Math interdisciplinary Major". The core list is given below.
- A minimum of 36 credits must come from the Mathematics department. Of these 36 credits, a minimum of 28 credits must come from "Mathematics core course list for CS+Math interdisciplinary Major". The core list is given below.
- The remaining 4 credits can come from any Computer Science/Mathematics courses.

- **Computer Science**

Introduction to Computer Programming
Computer Organization and Systems
Algorithm Design and Analysis
Computer Networks
Introduction to Machine Learning
Computer Security and Privacy
Theory of Computation

- **Mathematics**

Calculus
Linear Algebra
Algebra I
Probability
Real Analysis
Multivariable Calculus
Statistics

2.4.2 CS and Entrepreneurship

For this interdisciplinary Major, students, in addition to 4 courses (16 credits) in the Entrepreneurship department, must complete all Computer Science pure Major requirements.

2.5 CS Concentration Requirements

In order to get a Concentration in Computer Science, students are required to take any four (16 credits) Computer Science courses.



3. Academic Opportunities

3.1 Complimentary Disciplines

Computer Science is a very versatile subject - with applications transcending multiple disciplines. At Ashoka, we have 2 interdisciplinary courses in CS, along with Entrepreneurship and Mathematics. Apart from these, it is also common for students studying CS at Ashoka to enroll in courses from Mathematics, Economics, Physics and Biology.

3.2 Study Abroad Programs

Note that, like any other program at Ashoka, the Study Abroad Programs are subject to changes. Kindly refer to the [GESP website](#) for the latest information. Additionally, contact the departmental HOD for further clarification regarding credit transfers

Every summer, international summer schools offer undergraduate courses in different subjects and fields. These courses can be transferred (subject to faculty approval) to the total credits taken as Ashoka. The **Office of Global Education and Strategic Programmes (GESP)** is available to students for assistance and counselling in the application process.

Ashoka is currently partnered with **Wellesley College, UC Berkeley, University of Pennsylvania, Yale University, King's College London, University of Michigan, Penn Engineering, Sciences Po, and Trinity College Dublin.**

Students can also apply for research and internship opportunities abroad to get practical experience in their fields of interest through a competitive process. These opportunities are available in Lehigh University, NTU Singapore, Koç University etc. For any enquiries on the process of applying for a summer/semester abroad, kindly email studyabroad@ashoka.edu.in

3.3 Teaching Assistantships

As a TF/TA, you would be responsible for grading quizzes, holding discussion sessions and doubt clearing office hours, as well as helping with the logistics for classes. A prospective applicant can

apply to TA for only those courses which they have already studied in Ashoka in the past. While preference may be given to seniors, anyone is welcome to apply for TAs by approaching the professor directly. Some courses may have different procedures, so do confirm it with the instructor.

3.4 Independent Study Modules (ISM)

Independent Study Modules (ISM) are 4-credit research projects that provide students an opportunity to work closely with a faculty member. These projects can either be research that faculty members are already working on or any other research topic that students may be interested in. If interested, you can simply approach a faculty member through email prior to the start of the semester, requesting them for guidance through an ISM. These count towards your electives.

3.5 Research Opportunities with Professors

If you are interested in CS Research, it is a great idea to start working as a Research Assistant (RA) under a faculty member. In order to do so, you will have to personally approach faculty members in their office hours and enquire whether you can assist them on current projects. Before seeking RA roles, make sure to have prior knowledge about the research interests of your faculty member. The CS Society also has plans of creating a unified Undergraduate Research Opportunities Platform to ease out this process.

3.6 Awards and Recognition

- **Dean's List:** The Dean's List at Ashoka for any given semester includes the names of all students who, in the courses they have taken that semester, have scored a GPA of 3.65 or above. The Dean's List is awarded on a semester basis.
- **Latin Honors:** Students who have achieved scholastic distinction may be awarded the bachelor's degree with Latin honors at graduation. Honors appear on the official transcript and diploma. The criteria for these honors is as follows:
 1. **Cum Laude** (With Distinction) - GPA > 3.6
 2. **Magna Cum Laude** (With High Distinction) - GPA > 3.75
 3. **Summa Cum Laude** (With Highest Distinction) - GPA > 3.9
- **Academic Achievement Awards:** Gold Silver and Bronze Awards are awarded respectively to the students attaining the Top 3 Major CGPAs during graduation.
- **Undergraduate Research Excellence Awards:** Awarded to the graduating student with the best track record in academic research, evaluated on the basis of publications and thesis quality.
- **Service Excellence Awards:** Awarded for extraordinary service in department building through various activities..

The background of the slide features a photograph of Ashoka University's architecture. On the left is a multi-story red brick building with large glass windows. To the right is a taller, more modern building with a light-colored facade and a complex, geometric, perforated metal screen. A semi-transparent blue banner with a thin white border is positioned across the middle of the image, containing the section title.

4. CS Clubs and Societies

4.1 CS Society

The Computer Science Society at Ashoka University was founded in 2016 to strengthen the emerging CS culture on campus. It is an academic society that aims to create opportunities and resources for all students interested in this field through a host of activities. Past events include Mahavamsa - Ashoka's first programming contest, hackathons, cryptic hunts, talks and workshops. Students across majors and disciplines are welcome to join!

The CS Society is currently undergoing major structural changes. These include:

- Formation of sub-departments such as **Competitive Programming, Software Development, Machine Learning and Data Science** as per the interests of the student members of the society.
- Weekly **training and mentor-ship programs**, occasionally involving well qualified guest instructors.
- Creating a unified portal for **Undergraduate Research Opportunities** - to bring interested undergraduates and faculty members, PhD students etc. together.
- A larger presence on social media and public forums, including a **public website** and technical blogs.

Reach out to us at cs.society@ashoka.edu.in.

4.2 Women in Computing Society (WiCS)

Founded by an Ashoka alumnus, Simran Bhuria, and launched on campus by Mrs. Rashmi Mohan, an ACM eminent speaker on 29th September 2016, Women in Computing Society is a small bunch of passionate students working towards making the CS culture at Ashoka a safer, healthier, and inclusive one. We also focus on supporting everyone in CS, especially womxn, academically and personally. We constantly work towards building a larger community of womxn in CS that is collaborative and supportive in nature. As an academic society, we organise talks, hackathons, cryptic hunts, workshops, problem-solving centered stalls and events, and reading groups. As a part of our larger vision of an inclusive community, we organise events focused on activism – blog posts, discussions on gender in academic spaces and sexism, sessions on building confidence and tackling other challenges for womxn in STEM and movie screenings!

1. **WiCS cryptic hunts:** We have had multiple hunts since the inception of WiCS based on different themes in collaboration with other societies such as – Ashoka’s Philosophy Society, Ashoka’s Psychology Society, Sandhi (Ashoka’s Languages Society), Ashoka Society for Politics, etc.
2. **Workshops:** These are focused on tools and skills useful for students in CS and beyond. We have done workshops on Git, web development, programming for beginners (Programming without Code), Excel/Google Sheets etc.
3. **Interactive sessions:** Some of the sessions we have organised in the past: a session with Prof. Jennifer Widom, Stanford University at Ashoka (2018), a Capstone Student Panel Discussion with senior students and alumni, an open house for CS students focused on discussions around gender in academic spaces, mixers for CS womxn.
4. **Problem-solving** centered stalls at fests and Haats: These were our attempts at sharing the joy of solving puzzles and love for algorithms with others at Ashoka.
5. Hackathons, collaborative work sessions focused on competitive programming, and unwinding sessions.

Reach out to us at wics@ashoka.edu.in.

4.3 Special CS Events

- **CS Mixer:** The CS Mixer is a unique initiate undertaken by the Department of CS every year, intended primarily to introduce the CS freshers to the seniors and members of the faculty. It is a fun event where you get to interact with all the faculty members, seek quick advice, all while enjoying free food!
- **Mahavamsa:** Mahavamsa is Ashoka’s first coding contest. It is a 48 hour coding contest with lots of cash prizes to be won. The contest is open to all current students of Ashoka University. Beginners and non-CS majors are also encouraged to participate. All you need is basic programming knowledge in a language of your choice! The first edition of Mahavamsa was held in Spring 2020 and the CS Society intends to make it a recurring event.



5. Additional Resources and Advice

5.1 University Resources

5.1.1 Library

Ashoka University provides access to a diverse set of resources through its Library. The Ashokan Library plays an essential role in the university, offering students access to both print and digital media. As an Economics major, you can access many such resources including textbooks, fun reads, magazines, academic papers, through both on-campus issue of books or remote access to eBooks. For more information on library resources, you can simply visit their [website](#). Happy exploring!

5.1.2 IEEE Explore and ACM Digital Library

- **ACM (Association for Computing Machinery) Digital Library:** Archives of 2500 -Conference proceedings, 53 Peer-reviewed Journals, 8 Technical magazines, 37 Technical newsletters. Visit <https://dl.acm.org/>, while within the campus network. Unlimited access and downloads.
- **IEEE Explore:** Archives of 44,499+ articles, 35, 921+ Transactions articles, 523,853+ Conference paper, 283+ Letters articles. Visit <https://ieeexplore.org> while within the campus network. Unlimited access and downloads.

5.1.3 Office Hours

Often scheduled twice a week, based on the convenience of the instructor, office hours are cabin appointments where students can individually discuss doubts and problems either in relation to the course material, or any other personal issues with the instructor.

5.1.4 Teaching Assistants/ Fellows

The TA/TF acts as an additional resource that the students can consult before reaching out to the instructor. The TA/TF can provide individual assistance to each student, keeping in mind specific concerns, while at the same time creating a friendly peer-assistance environment. In order to contact your TA/TF, you can simply email them on their Ashoka TA/TF email ID's which will be provided to you at the onset of the course.

5.1.5 CS Help-desk

The CS Help-desk is currently a pilot program, organised by seniors within the CS Society. You'll have student tutors that will help you with coding, related math, and concepts, aimed to provide additional support during your coursework in your first year. The CS Society will send you email updates notifying you about the timings of the Helpdesk and appointments can be made by filling up available slots.

5.1.6 CS Representative

For the current academic year, the CS Student representative is [Sehajpreet Kaur](#). When in doubt, feel free to bug her with anything CS related.

5.2 Faculty Advice

5.2.1 General Advice

Welcome to CS@Ashoka!

Computer Science, goes the joke (hint: they're not joking), has little to do with computers and is not really a science. If you really push me, I'd say that it is a study of processes, of understanding why and how things happen, and their inherent complexity: is one problem truly harder than another? E.g., is it more difficult to find a square root than a 3rd root? Why? (Maybe there's an easy trick for one and we're just being stupid.)

Personally, I love this subject because it's the closest thing to magic we have. We create our incantations (computer programs), prepare the appropriate sacrifices (sleep is the common currency used by undergraduates, I believe), and wave our wands (or macbooks dual-booting linux): our spells can travel across the world across the only planetary-scale infrastructure ever built by humanity, jumping across chains of electrons and photons in a system that stores (nearly) the sum total of human knowledge (and ignorance). Our spells can analyse your iris and detect diabetes well before any medical doctor could, and also tell the hospital how to best optimise their supplies; they can navigate our spacecraft across unimaginable distances and help us understand the universe; they can connect us all through social media and buoy industry through a pandemic via e-commerce. There's a dark side as well - all things can be misused.

I hope to teach you a lot about computer science. But I don't just want well-trained worker bees: I want brilliant, nuanced thought; I want technical knowledge balanced by moral fibre; but most of all, I want each and every one of you to become the very best human beings you can be (that, and understand pointers properly).

PS. Yes, computer scientists tend to use more parentheses than most other people (and what's wrong with that?).

- [Debayan Gupta](#), Assistant Professor, Ashoka University

5.2.2 Book/ Resource Recommendation

Textbooks/ Reference books recommended by Faculty:

1. Introduction to Algorithms by **Cormen, Leiserson, Rivest, and Stein**
2. The C Programming Language by **Kernighan and Ritchie**
3. The C++ Programming Language by **Bjarne Stroustrup**
4. Database System Concepts by **Avi Silberschatz**
5. Computational Complexity: A Modern Approach by **Barak and Arora**
6. Introduction to Modern Cryptography by **Katz and Lindell**
7. Cryptography and Network Security by **Stallings**
8. Compilers: Principles, Techniques, and Tools by **Aho, Lam, Sethi, and Ullman**
9. Artificial Intelligence: A Modern Approach by **Norvig and Russell**
10. Computer Networks by **Tanenbaum**
11. Computer Architecture: A Quantitative Approach by **Hennessy and Patterson**
12. Modern Processor Design by **Shen and Lipasti**

Other fun reads:

1. Gödel, Escher, Bach by **Douglas Hofstadter**
2. I am a Strange Loop by **Douglas Hofstadter**
3. The Art of Computer Programming by **Donald E. Knuth**
4. The Age of Surveillance Capitalism by **Zuboff**
5. Why Can't We All Just Get Along? by **Fry and Lieberman**
6. Propaganda by **Bernays**
7. Discourses on Livy by **Machiavelli**

5.3 Post-Ashoka Journey

5.3.1 Advice on Internships and Job Search

Internships are often a great way to explore work-roles. Ashoka University offers a 3-month long summer break, which you can utilize productively by interning. It is advisable to search for summer internships at least 2-3 months prior to the start of the break - most firms or research centers have deadlines that you should research about as early as possible. Moreover, Ashoka University's Career Development Offices (CDO) also provide internship opportunities through firms that recruit interns on campus.

If you're applying through CDO, keep your SuperSet profile updated to avoid last-minute hassle. For CS specific internships, do occasionally brush up on your Data Structures and Algorithms .

5.3.2 On Letters of Recommendation from Faculty

Graduation School applications often require letters of recommendation from faculty during the admissions process. An optimal letter-writer should ideally have you in at least one class or should have supervised you in research, thesis, or other work. Moreover, their contact with you should be relatively recent. You might also want to consider how well you performed in their class or work and whether you have had interactions with them outside of the classroom.

Note that different professors may have different rules related to Letters of Recommendation, thus make it a point to get in touch with your desired letter-writer and clarify all details well in advanced. Also, approach the faculty **at least 2 weeks** in advanced for them to be prepared.

5.3.3 Alumni Experiences in the Industry

Barun Parruck (UG'19)

Q: What does your current role at Google India entail?

A: I'm a Software Engineer 2 at Google, specifically an iOS full stack developer within the Google One team. My day to day work involves fixing bugs assigned to me, proposing and implementing new features, and writing unit tests for these features.

Q: You were active on competitive programming websites. How helpful do you think that was in helping you secure an internship at Microsoft and the subsequent job offer?

A: They were perhaps the main feature of how I got the internship. Getting the job offer from the internship was a completely different task, and primarily involved making extensive contributions to their codebase and presenting and demo'ing my additions constantly over the period of the internship.

Q: During your time at Ashoka, what were your favorite courses? Other than Programming, what area of CS intrigued you the most?

A: Software Debugging is probably the most useful course I've ever taken. Most of my interest lies in either algorithmic problem solving or full stack web development and software architecture. My favourite course was Databases and Data Mining (Debapriyo Majumdar), followed closely by Computer Organization and Systems (Vivek Seshadri)

Q: Any pitfalls one should avoid while studying CS at Ashoka?

A: Avoid taking too many courses (though definitely attend a single class of every single course, just in case you're missing out on some exceptional professors). I think a lot of people get caught up with the idea that the goal is the submission of the assignment. I've had bad grades now and then - but I've tried my best to make sure that every assignment submitted wasn't for the submission but for the content. And start early! :P

Q: What advice would you give to undergraduates who wish to join the industry?

A: Definitely I'd say you need to focus on getting your interviews right. I seem to do pretty well in traditional SWE interviews and a large part of that comes from my competitive programming background, as well as just grinding leetcode and practicing mock interviews a lot. If you don't interview often, it's quite likely that stress will act up and cause you to perform subpar. And reach out to seniors, professors, anybody - connections are important in the industry re: getting referrals. Participate in all the popular company recruitment drives like the Facebook Hacker cup, or the Google Code jam/kickstarter. And finally, you can always reach out to recruiters on LinkedIn if you've got a decent profile to be able to bring a more personal touch to the applications you make

Barun Parruck is a Software Engineer at Google Inc. He was formerly a Software Engineer at Microsoft where he had also interned in his junior year. As a student, Barun was very active on competitive programming websites like [Codeforces](#)

Nishka Dasgupta (ASP'19)

Q: What does your current role at Microsoft Research Lab, India entail?

A: I work as a Research Fellow. Under the guidance of my manager, I am currently trying to develop efficient protocols in Multiparty Computation (MPC).

Q: What do you think, helped you secure your current role?

A: Both my previous summer internships had been research-focused, specifically on cryptography projects, so that certainly played a factor. By fortunate coincidence, my most recent internship before I applied had been in multiparty computation (MPC), and the manager whom I applied to work with was also interested in MPC at the time, so our research interests aligned. Having strong recommendations also helped.

Q: How should one prepare for job/internship searches?

A: While not every role will have the same requirements, there are some general best practises that have helped me. Cover your bases before any interview or exam; a lot of interviews, even for specific roles, often expect a breadth of basic knowledge anyway. Be prepared to network and find out which of your professors (especially professors who have a positive impression of you) knows someone who knows someone who works at your dream company/university. Talk to your seniors, batchmates and professors as well, to learn about opportunities you would not have heard of otherwise (that's how I learned about the RF programme at MSR). Don't take rejection personally; focus on learning from your mistakes. Try not to bluff too hard about your interest or knowledge regarding any field/professor unless you are prepared to put in the work until you really are as dedicated/knowledgeable as you claimed to be.

Q: Any pitfalls one should avoid while studying CS at Ashoka?

A: As most of the professors don't really impose a specific language, it can be easy to get too comfortable with only one language. This is a mistake. Look for excuses to learn new languages or frameworks that you are not being forced to learn in a class, especially those popularly used in your preferred field (e.g most big crypto projects are written in C/C++) or in the industry at large. Python is delightful up until your job interviewer asks you questions about memory errors in C. Although mathematics courses are not compulsory for CS at Ashoka, some fields (and grad schools) will expect certain courses (e.g a Linear Algebra requirement for AI focused programmes; a Number Theory requirement for theoretical crypto). If you have a preferred field, do your research on what is needed (talk to relevant professors too) and plan your courses accordingly.

Q: Any advice for undergraduates about the Industry?

A: Long working hours are, unfortunately, the norm, whether in research or in development. Especially near deadlines, sleep can be hard to come by. So, start working on your ability to handle stress. In research specifically, you will often be expected to take the lead and start making suggestions instead of waiting for your mentor to tell you what to do next; if you have trouble with that, start practising.

Nishka is a Research Fellow at Microsoft Research Labs, India. She has interned at Nanyang Technological University - Singapore, and Tata Institute of Fundamental Research - Mumbai, as an undergraduate researcher.

5.3.4 Alumni Experiences in Higher Education

Anavi Kajla (ASP'18)

Q: You pursued your Masters in Human-Computer Interaction. How good a field, in your opinion, is HCI for someone who wants to study Computer Science in sync with the Humanities?

A: HCI is a highly interdisciplinary field and can draw from virtually any discipline. A degree in CS and then going into HCI is highly beneficial because you have a deeper understanding of software development and various technical constraints. Ultimately, any job in UX will involve a high degree of communicating with developers about the designs you create and knowing how they work gives you an advantage.

Q: You have also interned at Amazon. What skills do such companies look for while hiring students who specialize in UI/UX? Do Data Structure and Algorithm skills take precedence? Or are Software Engineers who work on UI/UX projects evaluated differently?

A: There are 4 paths someone interested in UI/UX can take: UX Designer, UX Engineer, Visual Designer and UX Researcher. Skills & evaluation depends on which role you're interested in and usually doesn't require knowledge of CS concepts we're taught in our major. I would highly recommend looking up these specializations for a more in-depth understanding of what each role entails and where your interests/strengths lie. There are skills common to all these that employers typically look for: a portfolio of projects (super important!), storytelling skills, creative problem-solving and the ability to communicate well with others. In my case, I was exclusively an SDE and didn't have much of a UI/UX component in my internship apart from working on a small front-end project.

Q: What parameters would you advise an undergrad at Ashoka to focus on, if they wish to pursue graduate studies in Human-Computer Interaction?

A: Since most CS classes at Ashoka have a project component in them, it would be beneficial if students could go and talk to actual users of the product they're building and get feedback on it! This would help them understand the importance/role of UX in product development and also, make for a great portfolio project. Apart from that, getting familiar with various prototyping tools (eg. Sketch, Figma) is a great place to start developing interaction & visual design skills. Some of these tools also offer students free plans! And, front-end skills are a bonus too.

Q: Are there any pitfalls one should avoid while studying CS at Ashoka?

A: The Ashoka CS department has grown a lot since I graduated and students should take advantage of the variety of classes offered to develop their interests. When I was attending, my batchmates & I would take whichever course was offered so we could complete our major! It didn't afford us the flexibility to take classes that we were genuinely interested in. Apart from one introductory HCI class in my second year, I wasn't able to study more topics in the field. But now hopefully you can!

Q: What advice would you give to undergraduates who wish to eventually join the industry in a similar field?

- A:
- Try to involve users in your class projects early to get a feel of the work you'll be doing as a UXer
 - Working on a portfolio takes time, so start early! (look [here](#) for inspiration)
 - Research the field and it's many specializations well before you decide to take the leap - it's not for everyone

Anavi is currently a product designer at the Library of Congress - USA. She pursued her Masters in Human Computer Interaction from the University of Maryland-College Park. She has also interned at Amazon as a Software Development Engineer

Pratyush Ranjan Tiwari (ASP'20)

Q: What are your current research interests?

- A: My main research area of interest is cryptography. My areas of interests within cryptography are verifiable computation, quantum cryptography, privacy-preserving techniques and fundamentals of cryptography. I am particularly interested in designing protocols with minimal trust requirements.

Q: What undergraduate research that you have undertaken are you the proudest of?

- A: Two main projects: a) Is the paper I published at IEEE Security and Privacy on the Blockchain titled CryptoWills, which is a protocol for secure and private last wills for cryptocurrencies. This allows for people's funds in cryptocurrencies to be distributed to their loved ones after they passed away, this is a first protocol solving that problem. b) Security & Privacy and attacks on Aadhaar: I worked on this with a big team of people at Ashoka under Prof. Debayan Gupta. My personal contribution was towards the cryptography used in Aadhaar, I devised the biggest attack on Aadhaar till date. The paper is embargoed and we are awaiting govt. permission to publish.

Q: Any pitfalls one should avoid while studying CS at Ashoka?

- A: Don't do things because other people think they're cool. Find out for yourself if working for a big tech company will actually be your dream job. Since Ashoka is new and we don't really get the FAANG companies to visit and hire, people at Ashoka CS often develop this fantasy for such jobs. Do internships to figure out what a career in a particular direction is like, do an internship with some startup in Bangalore/some other city in India (and abroad too if you can) to find out what it's like living that life. Intern at a university in India (and abroad too if you can) to figure out what life in academia is like. Bottomline, whatever possible career trajectories you want to try out, do that a lot, even if it costs you some grades (tbh, don't drop below 3.5 tho). Start looking for internships for the next summer from August, ask professors to connect you with people. After the summer before 4th year you can basically have a plan then on what to do next. Finding jobs/grad schools etc. will take a year and that's what the

4th year is for. Try different dept. at Ashoka and their courses, doing interdisciplinary things opens new doors career wise. Only work with people you enjoy working with. Don't fall into the classic CS stereotype, and be healthy, well rounded and don't let your major be your identity.

Q: How should one prepare for Grad School applications?

A: Once you know you're applying the most important aspects are

1. **Published papers/pre-prints:** Pre-prints are fully written papers which are not yet accepted for publishing. This is the easiest foot-in-the-door from the perspective of admission committees. If you don't have this yet, I would suggest getting at least a pre-print worthy research idea, working on it and then applying.
2. **Recommendation:** Only ask people who will recommend you 110% positively, make you look awesome. Try to get someone very successful in your research area/field to write a rec, this person should be preferably from outside Ashoka. The way to do this is to get internships with people like this and then working super hard to impress them.
3. **Grades:** Sorry but yes, the higher your grades the better your chances in general. However, everything above a 3.8 is the same. The big brackets I would say are a) 3.8+ b) 3.5+ c) 3.2+ d) apply later. In case of d) do something awesome to stand out, like publish a paper at a top venue to stand out, work somewhere popular, get a recommendation from someone who is super popular in the field and only then apply. Or go to an okayish place for a Master's and then improve.

Q: Any advice for undergraduates about the higher studies in CS?

A: If you haven't done any research, then don't go to grad school. Only go to grad school if you've worked on research problems, and know that you want to take advanced courses and also do more research. Don't go if you're unsure/ because don't have anything else lined up. Ideally you should pay 0 for grad school, and arguably go only when you don't have to pay.

Pratyush is a passionate cryptographer, pursuing his PhD from John Hopkins University. He was also accepted to NYU's Courant School of Mathematics. His internship experience includes research roles at Indian Institute of Technology-Madras, Chennai Mathematical Institute, Dunya Labs, and Celo-Berlin.

Vineet Reddy (ASP'20)

Q: You were accepted to some very reputed departments like NYU Tandon and UChicago. What path did you tread as an undergraduate that helped you secure these?

A: I think having a solid research/project experience in your undergrad really sets you apart from other students. Keep in mind that Ashoka CS still does not have the same reputation as that of other programs in India (think IIT's IIIT's and BITS). I think focusing on this can be really useful when one is applying to graduate programs. Also, developing good rapport with your professors helps as you'll need their references when you start applying.

Q: According to you, what sets someone apart when applying to universities for a Masters in CS?

A: From what our professors have told me - SoP and your LoRs seem to matter, by far, the most. While your GPA is important, most of the time, it your SoP and LoRs that set you apart from every other applicant. Stuffing them with solid references and good content should really help.

Q: What is the next 'big' thing you aspire to achieve?

A: Ideally, work as a Software Developer in one of the Big 4 tech companies. Something long term would be to retire as soon as possible! Trust me, slogging off at work sucks.

Q: Any pitfalls one should avoid while studying CS at Ashoka?

A: One of the biggest pitfalls I noticed coming from an engineering program was how the education for most CS majors ends with the classroom. Most of the stuff I picked up was by doing random side projects and messing around with some popular libraries. Don't just do what your courses tell you to, pick up random stuff and just work on it – you'll probably learn a lot more than what your courses teach.

Q: Any advice for undergraduates about the higher studies in CS?

A: Work hard in Discrete Math and Algorithms! They're super important courses that I should have paid a lot more attention to. Don't worry too much about your grades, they'll be fine as long as you put in a bit of effort. Don't just be a one trick pony – learn more than Python. Most of all, enjoy your time at Ashoka, it's going to be great.

Vineet is a Machine Learning Enthusiast, and was accepted to Masters programs at the New York University, University of Chicago, University of Massachusetts Amherst, and University of Maryland. Due to the ongoing COVID-19 crisis, he has decided to defer his admit to the next year. He's currently working as a software development engineer at EACIIT - a Singapore based Big Data Analytics leader.

Aditya Singh (ASP'20)

Q: What is the most important advice you would give juniors who wish to get into top Masters programs?

A: I think the most important thing is to actively engage with the material and faculty while taking courses. Before making the decision to apply for further studies, it's important to be clear about what one would like to study further. Personally, being involved in various different projects helped me in identifying the areas I really wanted to focus on and pursue further.

Q: According to you, which aspect of your application was most instrumental in you getting accepted into top universities?

A: Applying for postgraduate studies is a pretty holistic process so pinpointing one single aspect is difficult. I think having industry exposure along with some research experience is helpful as it shows versatility, which then also reflects in the recommendations. Doing decently well on standardized tests is essential as they act as a virtual cutoff for some universities. The statement of purpose is also as important as anything else and should be thoroughly reviewed.

Q: Any pitfalls one should avoid while studying CS at Ashoka?

A: I can't say in general, but in my experience, I found that it's easy to become a little disconnected and solely grade obsessed at Ashoka, which is a detrimental mindset to have. Making the effort to interact and grow with not only your professors, but also your peers, goes a long way in helping you get the most out of the time you spend here.

Q: How would you compare research experience and industry internships when it comes to applying to Masters programs in grad schools?

A: I think it really depends on the sort of programs and universities one is targeting. For more theoretical and research-based programs I emphasized my research experience with professors at Ashoka and outside, whereas for programs that are also directed towards the industry (like data science, information systems, etc.) I put more emphasis on the internships. The recommendation letters also varied correspondingly. Again, it's helpful to identify the area one would like to pursue, and plan the summer/winter commitments accordingly.

Q: As you will be studying Computational Data Science at CMU, what is the most important skill people interested in Data Science must cultivate?

A: I think the most important skill to cultivate would be to keep your fundamentals in mathematics strong, especially in subjects like linear algebra and real analysis. One might be able to intuitively understand how CNNs look for features across visual data, but knowing how the process of Stochastic Gradient Descent works is as important.

Aditya plans to attend Carnegie Mellon University for an MS in Computational Data Science. He was also accepted to other reputed universities like University of Massachusetts-Amherst and University of Maryland. He was formerly a Research Intern at ISRO and Indian Institute of Technology-Gandhinagar

5.4 Useful Contacts

- To contact any student (batch mate/senior/alumni) at Ashoka, it is convenient to use the Ashoka Email. The general syntax of one's email is **<firstname>.<lastname>_<batch>@ashoka.edu.in** and you can use this format to look up/ contact anyone at Ashoka. Keep in mind that if one has multiple active email addresses, you will need to use your discretion, as follows:
 - If one has separate **asp** and **ug** emails, contact them on their latest email (i.e **asp** in this case). Similarly, contact alumni on their alumni email ID.
 - Contact your TAs and TFs on their TA IDs, and not their personal emails, for course-related queries - makes their lives easier
- If you do not know who to contact for anything remotely related to Computer Science, you should probably contact the CS Representative first. For Monsoon 2020, the CS Representative is
 - Sehajpreet Kaur (sehajpreet.kaur_ug21@ashoka.edu.in)
- All Ashoka faculty can be contacted using the Ashoka Email. Ashoka Staff have simpler email syntaxes - **<firstname>.<lastname>@ashoka.edu.in**