<u>**DSA Roadmap**</u>

Learning Method: DSA is more about understanding and mastering the concepts, with an emphasis on clarity and correctness of implementation.

1.Prerequisites

For starting your DSA journey start with the C language as it is the most fundamental and basic language. It will strengthen your basics of coding and will also help in your semester subject PSP (Problem Solving with Programming).

Few playlists for C language :
1. https://youtube.com/playlist?list=PLxgZQoSe9cg1drBnejUaDD9GEJBGQ5hMt&feature=shared
2. https://youtu.be/irqbmMNs2Bo?feature=shared

After completing C language start learning C++ / Java for DSA journey.

- **Programming Language Basics:** Ensure you are comfortable with at least one programming language, preferably C++ or Java.

- **Mathematical Foundations:** Basic understanding of mathematics, including topics like logarithms, combinatorics, and probability, is helpful.

Now you need to follow a dedicated playlist for DSA.

You can follow :

1. For college ->
    a.https://www.youtube.com/@abdul_bari (C language)
    b.https://youtube.com/playlist?list=PLdo5W4Nhv31bbKJzrsKfMpo_grxuLl8LU&feature=shared(C language)

2. For placements and internships learn DSA from :

    a. https://www.youtube.com/@takeUforward(C++)

3. **Basic Data Structures :**
    After learning C language you will be familiar with the basic data structures such as Arrays and Strings , try to implement it with C++.
    Start practicing problems of basic data structures using C++ on the following coding platforms.

- **Coding Platforms:** LeetCode , HackerRank , HackerEarth and GeeksforGeeks to practice problems.

4. **Move to Intermediate Data Structures**

- **Stacks and Queues:**
    o **Key Concepts:** LIFO and FIFO, using stacks for expression evaluation, queues for breadth-first search (BFS).
    o **Problems:** Implement a stack using queues, evaluate a postfix expression.
- **Trees:**
    o **Key Concepts:** Binary trees, binary search trees (BSTs), tree traversal (inorder, preorder, postorder).
    o **Problems:** Lowest common ancestor, level order traversal.
- **Hashing:**
    o **Key Concepts:** Hash tables, hash functions, handling collisions.
    o **Problems:** Two-sum problem, longest consecutive sequence.
- **Heaps and Priority Queues:**
    o **Key Concepts:** Min-heaps, max-heaps, heap sort.
    o **Problems:** Find the k-th largest element, merge k sorted arrays.

4. Understand Advanced Data Structures

- **Graphs:**
    o **Key Concepts:** Graph representation, BFS, DFS, Dijkstra's algorithm, Topological sorting.
    o **Problems:** Detect a cycle in a graph, shortest path in an unweighted graph.
- **Advanced Trees:**
    o **Key Concepts:** AVL trees, segment trees, Fenwick trees.
    o **Problems:** Range sum query, find the median in a stream of numbers.

5. Dive into Algorithms

- **Sorting Algorithms:**
    o **Key Concepts:** Quick sort, merge sort, counting sort.
    o **Problems:** Implement quicksort, sort an array of 0s, 1s, and 2s.
- **Searching Algorithms:**
    o **Key Concepts:** Binary search
    o **Problems:** Find the square root of a number, search in a rotated sorted array.
- **Dynamic Programming (DP):**
    o **Key Concepts:** Memoization, tabulation, understanding the problem of overlapping subproblems.

- o **Problems:** Longest increasing subsequence, knapsack problem.
- **Greedy Algorithms:**
  - o **Key Concepts:** Greedy choice property, optimal substructure.
  - o **Problems:** Activity selection problem, minimum number of coins.

6. Practice, Practice, Practice

- **Coding Platforms:** Use platforms like LeetCode, HackerRank, and GeeksforGeeks to practice problems.

7. Master Advanced Concepts

- **Graph Algorithms:** Study more complex algorithms like Floyd-Warshall, Bellman-Ford.
- **String Algorithms:** Understand algorithms like KMP, Rabin-Karp, and Z-algorithm for pattern searching.

Process for Lost ID card

1. Register an e-FIR in nearest Cyber Cafe (can visit - Shubham Cyber Café Gate No.4).
2. Visit https://examcell.iiita.ac.in/?pg=downloads , download & print the Duplicate ID card Issuance form.
3. Carry a copy of class 10th Marksheet and e-FIR along with the filled form.
4. Submit all these documents in AAA.
5. You will be charged a fee of Rs. 750 (Id-card will be issued within a week) or Rs.1500 (Id-card will be issued immediately).

How to apply for Visitor's Hostel :

1. **You have to fill a google form** **https://docs.google.com/forms/d/1ONlsv6Vn_dJSBNnPCM9a8h3F1bqWi-7I4kygGZi_fmQ/viewform?edit_requested=true**
2. **Go to visitor hostel for confirmation.**

About IIIT A (Indian institute of information technology Allahabad) :

IIIT Allahabad (Indian Institute of Information Technology, Allahabad) is considered one of the premier institutes in India, particularly in the field of information technology and computer science. Here are some key points about its reputation and offerings:

Academic Programs: IIIT Allahabad offers undergraduate (B.Tech), postgraduate (M.Tech, MBA), and doctoral programs. The B.Tech in Computer Science and Engineering, Information Technology, and Electronics and Communication Engineering are particularly popular.
Faculty: The institute has a strong faculty base, many of whom hold advanced degrees from reputed institutions and have significant industry and research experience.
Research and Development: IIIT Allahabad emphasizes research and has several collaborations with industries and academic institutions. It has various research centers focusing on areas like artificial intelligence, data science, cybersecurity, and more.
Placements: The placement record is generally strong, with many top tech companies recruiting students from the campus. Graduates often secure lucrative job offers, especially in software and IT services.
Infrastructure: The campus is equipped with modern facilities, including labs, libraries, and recreational areas, which support both academic and extracurricular activities.
Extracurricular Activities: The institute encourages participation in various clubs, hackathons, and technical events, fostering a well-rounded education.
Alumni Network: The alumni network is active and well-placed in various sectors, contributing to the institute's reputation and providing opportunities for current students.
Overall, IIIT Allahabad is a good choice for students interested in pursuing a career in technology and engineering, particularly in computer science and related fields.

Library : 1 . Library is open from 7 am to 10:30pm
2 . You need to register yourself in library before issuing any books.

Resources for Semester Subjects preparation and study material :

Refer to previous years for any subjects.

For the syllabus you can visit the website of the course instructors.
For PSP(Problem solving with programming) visit **https://profile.iiita.ac.in/srdubey/teaching.php**
For LAL(Linear Algebra) visit **https://profile.iiita.ac.in/abdullah/Teaching.php**
For EP(Engineering Physics) visit **https://profile.iiita.ac.in/srijit/teaching.html**

1 **. For PSP(problem solving with programming) :** https://youtube.com/playlist?list=PLxgZQoSe9cg1drBnejUaDD9GEJBGQ5hMt&feature=shared
https://youtu.be/irqbmMNs2Bo?feature=shared and previous year papers
2 **For FEE(Fundamental of electrical and electronics engineering) : https://www.youtube.com/@nesoacademy**
3 **For EP(engineering physics) : Refer to ppt , class notes and previous year papers**
4 For LAL(linear algebra): Refer to Dr. Saurabh Verma notes or class notes from https://profile.iiita.ac.in/seemak/Teaching.php and previous year papers
5. For Technical communication skills and COI or UHV keep your answer as long as possible as marks will be provided on basis of length.

For any other study material look at the quick links section.

Societies:

The societies are split into three major categories:

1. Cultural 2. Technical 3. Sports

The hierarchy within societies goes as

1st Year: Volunteers

2nd Year: Members
3rd Year: Coordinator and Senior members
Selection process:

Selection for all these positions is officially based on interviews. However, the decision-makers often give significant weight to an individual's enthusiasm, suitability, and overall contribution to the society's goals. The interview process primarily serves to reinforce these pre-existing observations.

The societies remain active throughout the year, organizing events that are often of a high caliber, comparable to the best. The culture within these societies emphasizes both hard work and enjoyment, with after-parties commonly following successful events. These activities contribute significantly to the formation of memorable experiences during one's college life.

Cultural Societies

Cultural societies offer a unique opportunity to explore and develop personal interests that may not be directly related to academic pursuits. These societies provide a platform to learn new skills and engage in activities that contribute to personal growth. While the experiences gained here may not be reflected in your academic transcript, they play a significant role in shaping you into a well-rounded individual.

Note: All society rooms are air-conditioned, offering a comfortable environment. The size or comfort level of the room should not influence your choice of society, as facilities are comparable across the board.

Sarasva - The Literary Society

Sarasva offers opportunities for those interested in writing, prose, poetry, quizzing, or debating. The society is involved in organizing significant events such as one of North India's largest Model United Nations (MUN) conferences and TEDx talks. Members also have the chance to anchor major events during Effe. Sarasva is known for its inclusivity, accepting a large number of volunteers. Confidence during the interview process is key to selection.

GeneticX Crew - The Dance Society

For those passionate about dance, GeneticX Crew provides a platform to learn, perform, and teach various dance forms. The society has a dedicated dance room equipped with air conditioning. Selection is based on auditions, where skill and style are evaluated.

Virtuosi - The Music Society

Virtuosi is the society for individuals with a strong interest in music, whether in playing instruments or vocal performance. The society embraces a wide range of musical genres, with a particular focus on both Indian and international rock music. Auditions are open to all, and even those without prior stage experience are encouraged to participate.

AMS - The Acoustics and Media Society

AMS is responsible for managing the sound, visuals, and media coverage of events. Members handle tasks such as operating sound and lighting equipment in the main auditorium and photography. The society is ideal for those with an interest in photography, photo editing, and video editing.

Nirmiti - The Fine Arts Society

Nirmiti oversees the artistic and decorative aspects of events on campus. This includes creating themed designs for various festivals and events. The society seeks individuals with creativity and a willingness to work on hands-on projects. Prospective members are required to present samples of their artwork during the interview process.

Rangtarangini - The Dramatics Society

Rangtarangini is dedicated to the performing arts, with a focus on acting, directing, and screenwriting. The society is known for its high standards and the quality of its performances, which consistently draw large audiences. Auditions are open to all, regardless of prior acting experience, with confidence and audience engagement being key factors in the selection process.

Team Effervescence

Team Effervescence is responsible for transforming ideas related to the Effervescence festival into reality. The team recruits a large number of volunteers, providing them with varied experiences, from putting up event banners to welcoming star performers. Hard work and dedication are crucial for recognition within the team, and those who excel may have the opportunity to join the core team in subsequent years.

Technical Clubs

The technical clubs at IIIT-A primarily consist of two societies: GeekHaven and Tesla. Tesla was originally a wing within GeekHaven but became an independent society in 2018. Members of these clubs are highly focused on technical skills, often engaging in activities such as coding, development, and cybersecurity. Membership in these clubs is highly sought after, and students must pass interviews held in April to join.

GeekHaven

GeekHaven comprises several wings, each specializing in different aspects of technology:

- **Web Development:** This wing attracts a large number of applicants during the recruitment period and has a strong legacy of producing skilled programmers.
- **FOSS (Free and Open Source Software):** Members of this wing are dedicated to writing and sharing high-quality open-source code.
- **Design:** The Design Wing is responsible for creating posters and other visual content for events, relying on their creativity and design skills.
- **Cyber Security:** This wing conducts regular workshops and events, particularly for first-year students, focusing on cybersecurity topics.
- **Machine Learning:** Established seven years ago, this wing focuses on AI and machine learning, often working on complex projects.
- **Competitive Programming:** Known for their intense focus on coding competitions, members of this wing are highly skilled programmers who participate in various coding contests.

Tesla (The Electronics Society)

Tesla, an electronics-focused society, consists of the following wings:

- **IoT (Internet of Things):** This wing focuses on IoT technologies, offering workshops and talks on various related topics.
- **Robotics:** The Robotics Wing engages in the development of robots, including path-following and obstruction-avoiding bots.
- **Electronic Devices and Automation:** This wing specializes in advanced electronics and automation, working with tools like MATLAB and PSpice.

Team Aparoksha

Team Aparoksha is responsible for organizing Aparoksha, the annual technical festival at IIIT-A. The team works diligently to create an engaging and educational experience, with activities centered around coding, development, and design. Volunteering with this team offers numerous opportunities to learn and collaborate.

IIIC (IIITA Info and Incubation Centre)

IIIC is a business incubator at IIIT-A that supports promising startups with financial aid, technical assistance, and human resources. The center is backed by the Department of Electronics and Technology under the Startup India project. Volunteering with IIIC provides valuable exposure to the startup ecosystem and helps students gain insight into the commercial world. The center also organizes the E-Summit, an annual event held in February.

Sports Club (SPIRIT)

The sports club at IIIT-A, known as SPIRIT, organizes and participates in various sports events throughout the year, including inter-year tournaments and faculty vs. student matches. The club oversees sports facilities such as football, basketball, cricket, tennis, swimming, badminton, squash, and more. SPIRIT plays a prominent role during Asmita, the annual sports festival, which is a highlight of the campus calendar, fostering a lively and competitive atmosphere.

Student's Gymkhana

The term "Gymkhana" historically referred to a gentleman's club during the British Raj. At IIIT-A, the Students' Gymkhana is a student-led council that plays a crucial role in campus life. It is involved in organizing various events, including the annual Gymkhana Elections. These elections, held every February, provide students with the opportunity to vote for their preferred candidates in a fair and democratic process. Campaigning typically intensifies in the days leading up to the election.

1. Speaker: Raj Kumar (RSS2023502)
2. President: Om Khangat (IIT2021218)
3. General Secretary: B.T. Manoj Pallakki (IIB2022008)
4. Vice President: Omkar Vinod Manapure (MML2023007)
5. Members of UG Presidential Council: Aditya Singh Tomar (IIT2021208) and Ritik Kumar (IIT2021205)
6. Member of PG Presidential Council: Satyam Tripathi (IMB2023059)

Prayaas

Prayaas is a volunteer initiative started by the students of IIIT-A, focused on giving back to society by providing educational support to underprivileged children in the Jhalwa area. The movement aims not only to teach basic subjects but also to raise awareness about social issues among young minds. Volunteers in Prayaas are dedicated and work tirelessly to make a positive impact on the community. Their efforts have significantly benefited many children, reflecting the commitment of the student body to social responsibility and meaningful change.

Scholarships and Bank loans :

IIIT Allahabad students can avail educational loans from various nationalized banks. These loans cover tuition fees, hostel fees, and other related expenses like laptops.
IIIT Allahabad has tie-ups with various banks like State Bank of India (SBI), Punjab National Bank (PNB), Union Bank and others, which streamline the loan application process.

Students need to submit proof of admission, fee structure, academic records, and identity documents. Co-applicant details (usually parents or guardians) and their income proof may also be required.

To apply for the loan banks are present on campus on the day of admission.

Typically, repayment begins after a moratorium period, which includes the duration of the course plus 6-12 months. Repayment tenures can range from 5 to 15 years, depending on the loan amount and the bank's policy.

IIIT Allahabad provides meri-cum-means award on basis of cumulative average of SGPI of first and second semester.

ELIGIBILITY :-

1. CA of SGPI of First & Second Semesters should be equal to or above 8.5.
2. Parental Income is upto (not more than) Rs. 5.00/- Lakh per annum.
3. Students getting scholarship/financial assistance from any other source are NOT ELIGIBLE.

   Total number of beneficiaries will be 3% of total strength in each program/stream.

   LIST OF NECESSARY DOCUMENTS TO BE ATTACHED WITH THE FORM :-
1. Declaration/Undertaking by the applicant as attached in the Application Form.
2. Annual Income Certificate of Parent/Guardian verified by Tehsildar/Collector of native District.
3. Fee Receipt of Third Semester.

There are various regional wise scholarship, details of which can be acquired by contacting the scholarship section in AAA.

Frequently keep check mails for scholarships.

College Fests :

The Annual Cultural fest,Effervescence

Within just a few weeks of starting college, you will find yourself immersed in the excitement of Effervescence, commonly known as "Effe." It is one of the most anticipated events of the year, offering three nights filled with enjoyable activities, particularly if you are involved in a cultural club or volunteering.

Your first significant interactions with seniors are likely to occur during this fest. The evenings are packed with engaging pro-shows and main stage events, such as Footloose (a group dance competition), A'la Mode (the fashion show), Innovation (the drama event), and Incendiary (the battle of the bands).

The highlight of the festival is the final night, often referred to as "Celebrity Night." In the past, Effe has hosted renowned celebrities like Benny Dayal, Neha Kakkar, Sunidhi Chauhan,Shalmali Kholgade,KR$NA,Darshan Raval, and Farhan Akhtar. Afternoons are equally vibrant, offering a variety of events to suit every interest. Whether your passion lies in dance, music, drama, photography, or simply exploring something new, you will find activities that match your interests. Depending on your dedication, you might even be entrusted with prestigious responsibilities, such as overseeing the travel and hospitality arrangements for the visiting celebrities.

The Annual Technical Fest,Aparoksha

This college has some really smart and creative people. They've found a way to mix fun with coding and electronics, and that's how Aparoksha, also known as APK, is born every year.

Aparoksha is all about exciting themes, a massive student-led hackathon called Hack in the North, gaming tournaments, and over 45 diverse tech events—some designed just for first-year students. The electronics events are especially impressive, showing off the technical skills of IIIT Allahabad across three full days. Yes, even at 3 AM, there's something happening!

Whether you want to hack, design websites, or play Counter-Strike at four in the morning, they've got you covered. The fest also includes a Humor Night, where popular stand-up comedians lighten things up. In previous years, Aparoksha hosted comedians like Karunesh Talwar, Kunal Kamra, and Zakir Khan, who entertained the audience with their humor.

Alongside the fun, the fest also features insightful keynote speeches and conferences. Each March, the tech community eagerly looks forward to Aparoksha, a highlight of the year at IIIT Allahabad.

Ragging :
In case of any issue regarding to ragging in the campus premises or hostel please contact to chief proctor through mail chiefproctor@iiita.ac.in or contact using +91- 9450141862 , +91- 9415132196

Exam Pattern :

Quiz 1 + Quiz 2 + internals will carry 35 marks
Midsem exam will cary 25 marks
Endsem exam will carry 40 marks

For Academic calender : view in quick links

For placement stats and past recruiters: view the official college website - > https://placement.iiita.ac.in/