University of Alberta

"The important thing in life is to have a great aim, and the determination to attain it." Goethe

In line with the meaningful quote above, I have always believed in the power of imagination and the importance of being well prepared for what comes in future by setting goals. I believe that proceeding based on a well-organized schedule and clear and distinct targets is essential in order to succeed in academic society because our goals are the road maps that guide us and show us the right path to success. As a long term goal, I am keenly continuing to conduct research in *Communication* System. Besides, I enjoy conveying my knowledge to those enthusiastic to find out more. I wish to become a university professor or an active researcher after my graduate studies, and pursue an academic life as it provides me with the opportunity to be at the leading edge of *Communications Engineering*, and a lifelong student.

I am applying for M.Sc. in Communication System program of the University of Alberta and wish to pursue research in the field of Digital Communication, as my interests. My other related interests include Coding and Information theory and Interference management in wireless networks.

Since early in high school, I discovered my deep passion for mathematical principles, and I found ordinary high school Mathematics programs not rewarding anymore, so I attended the professional Mathematics classes to satisfy my insatiable desire. When I participated in Mathematics and Computer Olympiads and underwent semi-final nationwide stage, I decided to focus on Mathematics and Computer related problems more and more deeply. Moreover, my preliminary interest in electronics and relevant concepts gave me the incentive to work on a project related to renewable electrical energy source in vehicles through which I invented a new method in generating energy, culminating in project being selected as the best one in the Innovation Festival of my school and also nominated for Khwarizmi Festival. In fact my strong interest in Electronics and specially Communication field dates back to my childhood when I designed some simple circuits in PCB like the circuit of FM radio or some simple FM transmitters which were the point of departure in my serious projects at present in field of Communication.

In September 2011, after graduating from high school with a high rank and excellent GPA (19.45/20), I was ranked 321^{th} (top 0.15%) among more than 280,000 participants in the competitive nationwide university entrance examination, and identified as an elite student by NOET (National-Organization-for-Educational-Testing). As a result, I chose Amirkabir University of Technology (Tehran Polytechnic) for my undergraduate studies. This university is referred to as the mother of sustainable development, and one of the most prestigious technical universities in my country. My innate interests and potentials sparked a great incentive to pursue Electrical Engineering it's the required mathematics foundation of which is the most challenging among all engineering majors, but the most appealing to me. Now, after 3 years of my undergraduate studies in Amirkabir University of Technology, I was identified as an Exceptional Talent with a GPA of 17.39 (out of 20).

In the first years of my undergraduate studies, I strengthened my mathematical and analytical background obtained during high school, and continued my programming skills up to advanced level in C++, which was an exceptional preparation for my future academic life. I also

received an admirable mark in the C++ programming course in which I did lots of assigned projects in the best form. Dealing with fundamental courses of Electrical Engineering as well as related laboratorial courses in the second academic year, I did some academic assigned projects and I chose MATLAB classes to reinforce my programming skill, so I achieved a certificate in MATLAB Programing.

During the second year of my studies I was selected as a member of Technical Committee (TC) of AUTCUP-2012, DEMO League, a well-known competition in Iran in Robotic field. After this event and owing to my exceptional academic activity and my experience in technical committee of AUTCUP-2012, I became candidate for Scientific Association of Electrical Engineering Department and after an election in the department, I was selected by high vote. In Scientific Association I was responsible for holding the academic and software classes. I was also responsible for organizing conferences and workshops. During my membership, I organized many conferences in field of Communication and related concepts such as brain signal processing, digital communication, signal processing, antenna and image processing. Furthermore, thanks to my whole background, courses and research projects, I could find the needs of department and lack of special knowledge among the students, so after identifying the subject of conference, I tried to find the best person for presentation and after every conference I evaluated students' satisfaction with the program. Consequently, I improved conferences efficiency by applying their feedbacks. I also held some workshops to enhance the performance of students in working with Electrical Engineering software and among the software I mainly organized the workshops and classes for MATLAB software, for I had sensed the need for this software and in my opinion MATLAB software is the most important software in Electrical Engineering, using which we can verify our problems. One of the most significant activities which I have done in Scientific Association was implementing the chart of workshop software for Electrical Engineering department and since that time the classes and workshops for Engineering software have been held based on my designed chart.

Beside Electrical Engineering, Computer Science and related concepts are of interest to me. I realized nexus between my major and myriad of interdisciplinary research fields, as those in Computer Science. Regarding my bright outcome in my first major, I was awarded a chance to study a second major, so I chose Computer Science and this decision satisfied my desire for Mathematics and Computer. Having studied Computer Science for three semesters, with a high GPA (17.67 out of 20), I was been ranked 1st among all undergraduate students in Computer Science and Applied Mathematics department of Amirkabir University. Recently I was selected by the department of Computer Science and Applied Mathematics as the best student among all undergraduate students and was awarded a certificate and a cash prize. As for Computer Science & Applied Mathematics, I am really keen on Applied Probability and random process which are also the most popular research areas in Electrical Engineering because these courses are essential in Digital communication.

The third year of my undergraduate studies finished with excellent GPA of 18.19 out 20 and I was ranked 5th among all students in my research field. During that, I took the courses *"Electronics-III (High Frequency Electronics)*" and *"Laser Electronics"* which provided me an opportunity to get involved in a team working to perform some short applied projects such as R.F. oscillators which were conducted in Laser Electronics & Photonics lab under supervision of

Dr. H. Kaatuzian, where my experience and high grade won me a teaching assistant position for this course. I also carried out a project in a topic of "Designing & Simulating Teleoperation Systems Based on Haptic Feedback Using Two Channels in MATLAB" as a final project of "Linear Control Systems" course, supervised Dr. H.A.Talebi in a research team group in real-time systems lab. All of these precious experiences helped me to improve my skills in tackling practical problems and demonstrate my aptitudes for research and teamwork. Through taking more advanced courses in third year such as Signals and Systems, Communications I and II, DSP (Digital-Signal-Processing), I realized that topics in Communications including: Communication Networks, Coding and Information Theory, etc. are really appealing to me and I decided to gain more experience in such areas. One of the topics that I found extremely challenging and exciting was Coding and Information Theory about which I had studied in "*Digital Communication"* course and I passed this course with honor and was ranked 2nd among all my classmates. Digital communication triggered me to research about Coding and Information Theory, and this interest led me to conduct a great research on it; therefore, in summer 2014, as my internship program, I entered Digital Communication Lab where I conducted the project titled "**redundancy reducing coding"** under the supervision of Dr. H. Amindavar. In this project, I evaluated the efficiency of some source coding methods such as Unary, Arithmetic, Golomb, Huffman, Shanon-Fano, Shanon-Fano-Elias, Levenshtein and Fibonacci Coding, using MATLAB Programming to analyze these methods. It was a truly marvelous experience for me because during my research I studied many reference books and I improved my knowledge about Coding and Information Theory.

Considering the high quality of research and academic work, numerous and honorable faculty members and strong research facilities in Communication Systems program of Alberta, I am profoundly eager to pursue my higher education at Alberta's honorable Communication Systems Master program. I got to know some of Alberta faculty members through studying their publications and current projects. Although there are many faculty members in the works of whom I have found a deep interest, Dr. Ardakani's works in Wireless Networks, Coding and Information Theory are a pure reflection of my interests.

I look forward to being a strong addition to your department. It would therefore be a privilege to be able to secure admission to pursue graduate studies. I am confident to be given the chance of continuing my graduate studies in a suitable academic environment; I will be a successful student in my field.

Sincerely,

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