MANARAT INTERNATIONAL UNIVERSITY

DEPARTMENT OF

CSE

E-PROSPECTUS

Become A Tech Genius

Change the world

More than 4.3 million job openings globally by 2030

Technology RULES the world!

- 400 million jobs worldwide will face automation by 2030 because of Artificial Intelligence (AI)
- The number of devices connected through IoT is expected to reach 75 billion in 2025
- Google's quantum computer is 100 million times faster than any classic computer

Build Your Future in **COMPUTER SCIENCE AND ENGINEERING**

If you plan to make a difference in the world, Computer Science and Engineering can help you find solutions to address key global challenges. Our curriculum is designed to meet the ever changing demand of modern theories and practices of computer science. Our graduates gain creative, professional, and technical training and experience required to be successful in their careers. As such, they can leap into careers in one of the many exciting fields of Computer Science and Engineering.

Message of the Dean

Today's world is a world of rapid advancement of science and technology. To uphold these advancements, we need a band of capable, enthusiastic and hard-working educators and learners. The School of Engineering, Science and Technology is lucky enough to have such a team whose members keep no stone unturned to give their very best.

We at the School of Engineering, Science and Technology Manarat International University (MIU), believe that technology should not be separated from moral values. In accordance with this conviction, we have set a curriculum that is a perfect fusion of technology and moral values enabling us to develop graduates who can lead to changing the world for the better rather than creating a detrimental influence in it with the help of technology.

The School consists of three departments, namely Computer Science and Engineering (CSE), Electrical and Electronic Engineering (EEE) and Pharmacy. In 2001, the department of CSE was established at Gulshan, Dhaka, as one of the first departments of the university. The CSE curriculum provides a common core of Computer Science with an emphasis on current technology trends like Artificial Intelligence, Embedded Systems etc. Hence, it is continuing to produce graduates who work in top positions in industry and academia around the world.

I am glad to let you know that Manarat International University is going through its own digital transformation process in which the department of CSE is naturally playing a leading role in creating a unique opportunity for students to gain firsthand experience in dealing with technology for organizational transformation.

The School of Engineering, Science and Technology is currently located in the Ashulia Campus, which has a serene abundance of greenery outside of the hustle and bustle of the capital city, Dhaka. I invite all of you to enjoy a fascinating journey ahead with us.

Professor Dr. Md. Nazrul Islam
Dean
School of Engineering, Science and Technology
Manarat International University.

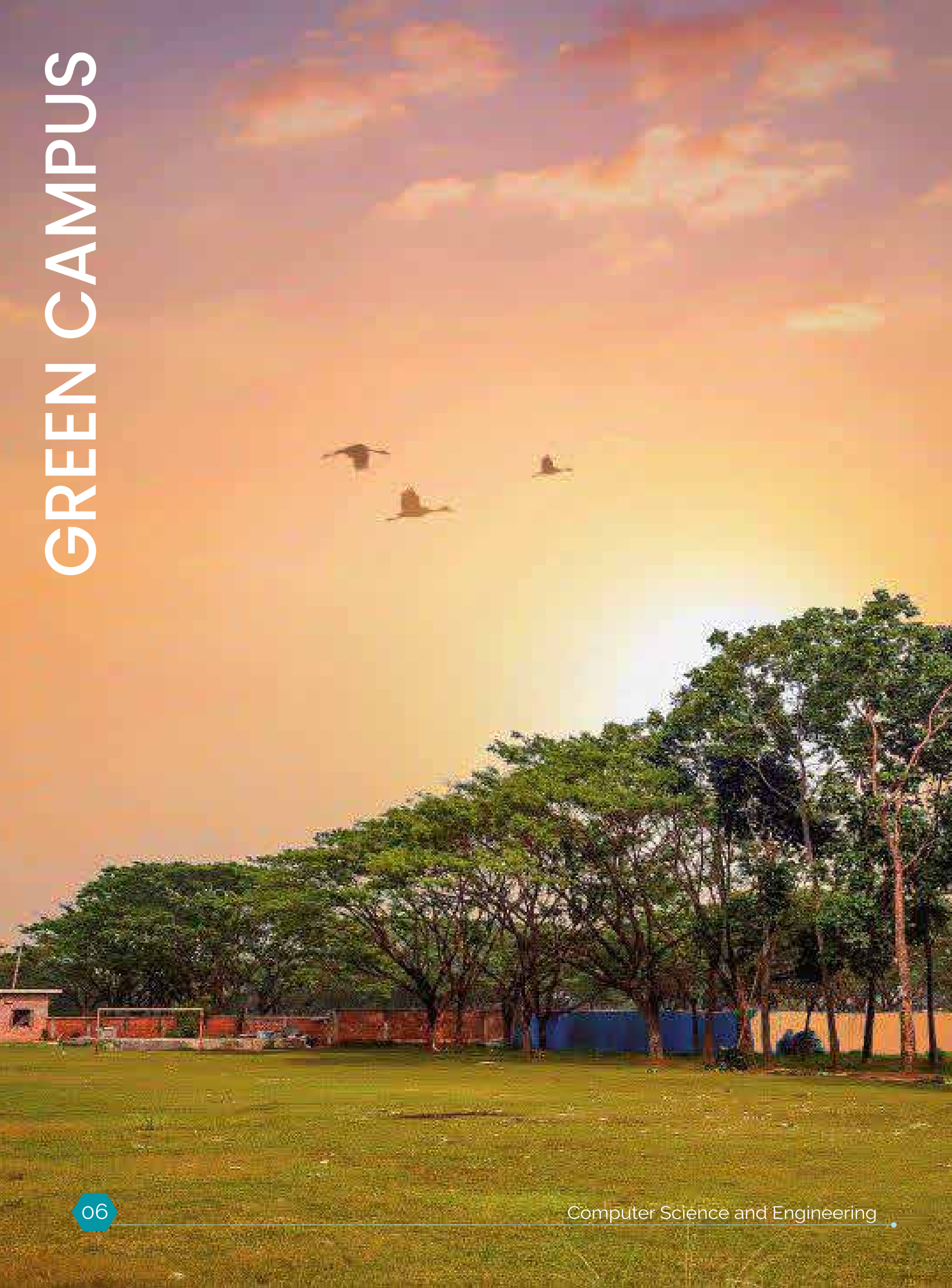
Message of the Head

Welcome to the Department of Computer Science and Engineering (CSE), Manarat International University (MIU). Our department provides an outstanding opportunity for students to pursue an exceptional, high-level education under highly skilled faculty members. Our vision is to provide quality education in both theoretical and applied fields of computer science by building a strong research and teaching environment. The department started to offer the undergraduate program in May 2001 with only 73 students. Over the years, the Department of CSE has made great strides in teaching, and continues to attract the most talented students and faculties around Bangladesh. The graduates from our department are heavily recruited by both academia and industry of home and abroad.

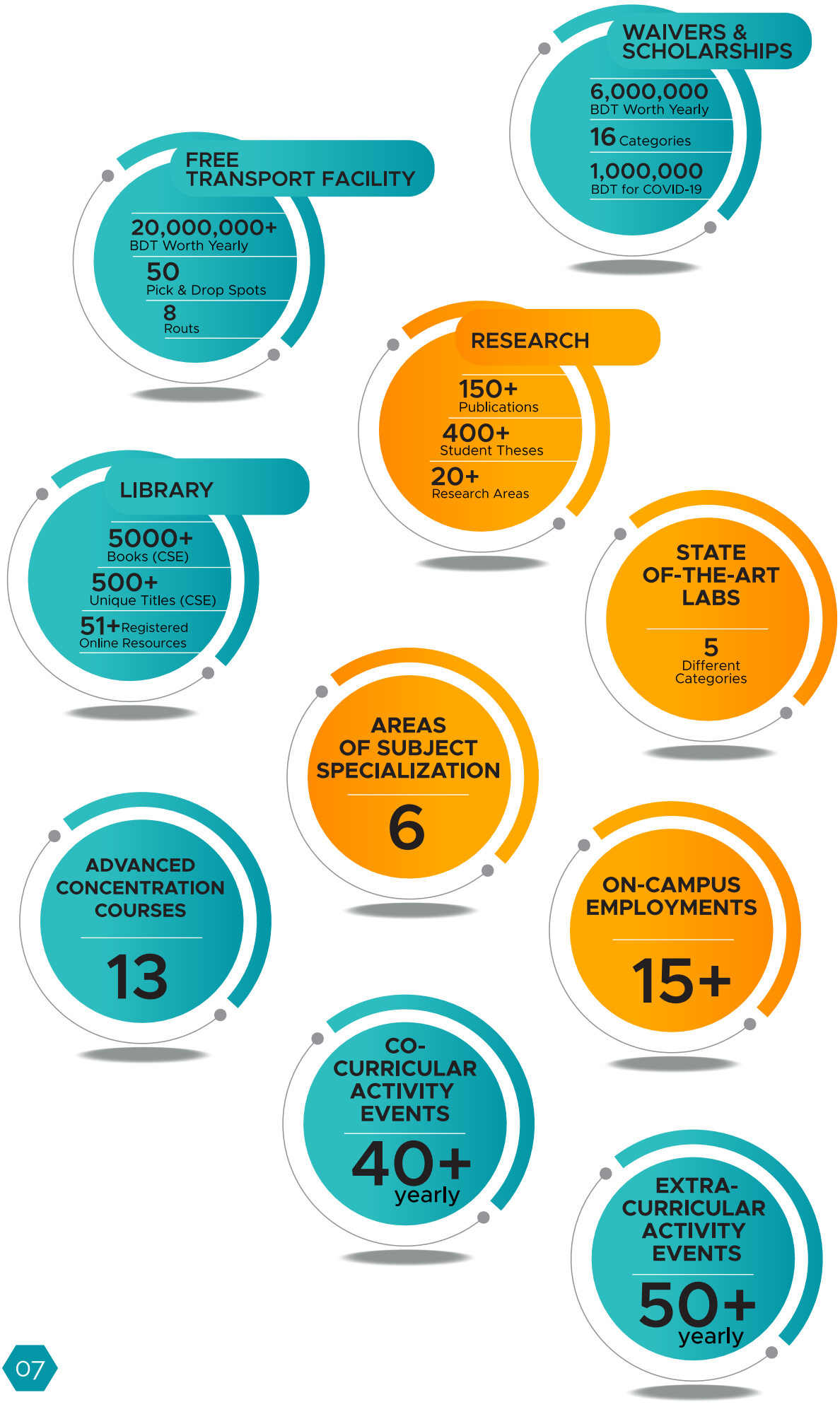
At present, this department has adequate resources and facilities for Semiconductor Devices and Technology, Digital Electronics and Logic Design, Microcontroller Interfacing, Communication Engineering, Computer and Information security, Digital Image Processing, Computer Graphics, Data Science, Artificial Intelligence, Computer Vision and Natural Language Processing, Bioinformatics and many more. The department also provides an excellent research environment for students as well as faculties. Also, both teachers and students spontaneously participate in different programs to make the department a center for excellence.

Muhammad Sajjad Hussain
Head
Department of Computer Science and Engineering
Manarat International University.

GREEN CAMPUS



MIU CSE at a glance



I am very happy and grateful that I made the right decision by entrusting my future to MIU. MIU has not only given us sufficient support in our core studies, but has offered us several other facilities including rich co-curricular and extra-curricular activities. Our teachers and seniors gracefully guide us to find the right path towards a successful career.

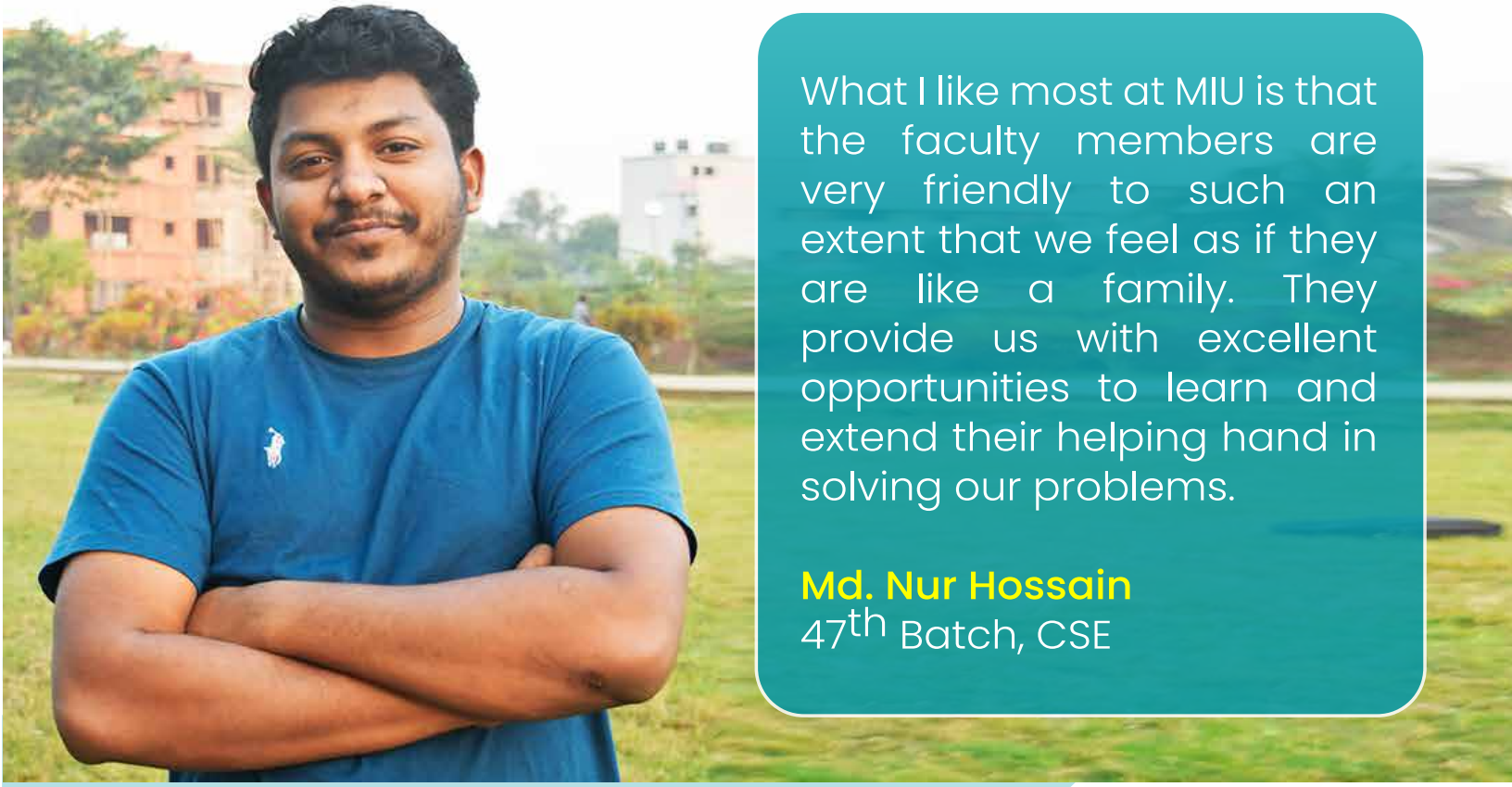
Rahat Hasan Akash
46th Batch, CSE.

My family was looking for a suitable educational institute for me. Then we heard about MIU, which has a very friendly environment and offers many special facilities for female students, such as separate classrooms, hostel, canteen, common room, prayer room and playground. As a female student studying far away from home (Cox's Bazar), it was the best choice for me.

Umme Kaynat Afra
51st Batch, CSE.

A Helping Hand Goes a Long Way

Helpful faculty members are ready to assist at a moment's notice



What I like most at MIU is that the faculty members are very friendly to such an extent that we feel as if they are like a family. They provide us with excellent opportunities to learn and extend their helping hand in solving our problems.

Md. Nur Hossain
47th Batch, CSE

FACULTY MAKING AN IMPACT IN THE FIELD

The CSE department at MIU has high quality and capable faculty members, who are leading the way in improving outcomes for all students in a very friendly manner and taking initiatives that transform teaching and learning to create impact in the field.

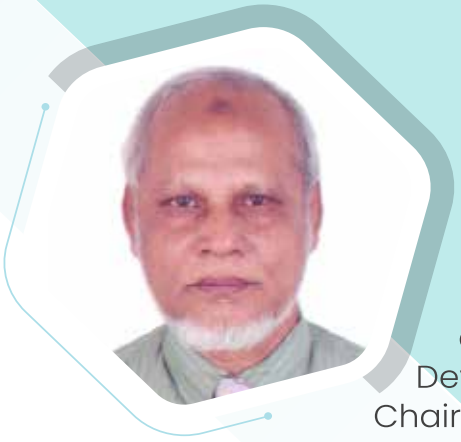
Muhammad Sajjad Hussain
Associate Professor and Head

Muhammad Sajjad Hussain is an ardent academician and has been teaching at MIU for the last 20 years. He obtained his B.Sc. in Computer Science from the College of West Virginia, USA in 2000. He obtained his M. Sc. in Computer Science and Information Technology from Islamic University of Technology (IUT), Organization of Islamic Conference (OIC), Bangladesh in 2009. His research interests include MAC Protocols and Routing Protocols of Wireless Sensor Network.

He developed software for a research project of Penn State Electromagnetic Communication Laboratory, Penn State University, Pennsylvania, USA. He is also a retired Captain of the Bangladesh Army (18th BMA Long Course). He served the Bangladesh Army for five years and retired due to medical reasons.

Professor Dr. Md. Haider Ali
Academic Advisor, Department of CSE, MIU

Md. Haider Ali (also Mohammad Haider Ali) has completed his Doctor of Engineering from the Department of Electronics and Information Engineering, Toyohashi University of Technology, Japan in the field of Computer Graphics. His research interest includes Computer Graphics and Image Processing. Dr. Mohammad Haider Ali is the fellow of Bangladesh Computer Society, and former Student Member of Institute of Electronics, Information and Communication Engineering (IEICE), Japan. He is working as a professor in the Department of Computer Science and Engineering, University of Dhaka.



Professor Dr. Md. Korban Ali

Professor Dr. Md. Korban Ali was the Dean of the School of Science Engineering and Technology, Manarat International University. He was also the Treasurer & Dean of Department of Business Administration of MIU. He worked as the Vice Chancellor of Bangladesh Islamic University, Professor & founder Chairman of the department of Population Science & Human Resource Development, Rajshahi University and Professor & Chairman of Department of Statistics, Rajshahi University, Bangladesh. He has more than 35 papers published in National and International Journals. His research areas are Econometrics, Economic & Business Statistics, Social Statistics and Population Studies. In CSE, MIU, he is teaching Statistics courses as adjunct professor.

Mohammad Rafiqul Islam
Associate Professor

Mohammad Rafiqul Islam received his B.Sc. and M.Sc. degrees in Mathematics at Shahjalal University of Science and Technology(SUST), Sylhet, and M.Phil. in Mathematics (Course work completed) at Bangladesh University of Engineering and Technology (BUET). He is an expert educator and researcher in mathematics related fields. His research area includes Mathematical Modeling, Mathematical Programming and Numerical Analysis. He has several research publications in these fields. He was awarded the Shahjalal University of Science and Technology (SUST) Scholarships for Honors and Masters examinations from Department of Mathematics, in 1996 and 1997 respectively. He is also a Life Member of the Bangladesh Mathematical Society (BMS).

Sohaib Abdullah
Assistant Professor

Sohaib Abdullah is an avid educator. He is actively involved in building tools that can make programming easy to learn for students and delivering invited talks on online education to university faculty members as well as teachers of secondary and higher secondary level. His research areas include Human Computer Interaction (HCI) and Artificial Intelligence (AI). He has several publications in these fields in international conferences and peer-reviewed journals. Currently he is also the director of the IT department, where he is working to open up opportunities for CSE students to gain first-hand real-world experience in the field of IT through internships and on-campus jobs. He obtained his B.Sc. degree in Computer Science and Engineering from Manarat International University. He also obtained an MBA degree from University of Dhaka.

Md. Ali Hossain
Assistant Professor

Md. Ali Hossain received his B.Sc. and M.Sc. degrees in Computer Science and Engineering from the Department of Computer Science and Engineering (CSE), Islamic University (IU), Kushtia, Bangladesh in 2009 and 2011, respectively. Currently, He is doing his PhD in the Departmenta of CSE, Jahangirnagar University, Savar, Dhaka. He has published 14 papers in refereed journals and conferences. His current research interest includes Bioinformatics, Machine Learning and AI. He has reviewed more than 15 papers of different international high impact journals. He has successfully supervised more than 100 undergraduate students.

Md. Imran Hosen
Lecturer

Md Imran Hosen is doing his Ph.D. at the Department of Computer Engineering, Bahcesehir University (BAU), Istanbul, Turkey. He has been awarded the TUBITAK Scholarship, which is one of the most prestigious scholarships in Turkey. He has received B.Sc. and M.Sc. degrees in Computer Science and Engineering from the Department of Computer Science and Engineering at Jahangirnagar University, Savar, Dhaka, Bangladesh in 2017 and 2019 respectively. His research focuses on Image Processing, Machine Learning and Computer Vision. He has published several research papers in those fields.

Zahurul Haque
Lecturer

Zahurul Haque completed his B.Sc. and M.Sc. in Computer Science and Engineering from Jahangirnagar University. He has been at the Department of Computer Science and Engineering as a lecturer at Manarat International University for three years. He took part in many competitive programming contests and has very good skill in solving constructive computer programming problems. He is very good at delivering lectures to students using advanced teaching techniques and inspires and motivates them in gaining higher-level qualifications and future employment. He has great enthusiasm for innovative research work and his fields of research interest include Cloud Computing, Fog Computing, IoT, Image Processing, Social Network Analysis and Wireless Communication. He has several research publications in those fields.

Mahedi Hasan
Lecturer

Md. Mahedi Hasan is a Lecturer in the Department of CSE at MIU where he has been working for the previous four years. He received his B.Sc. Engg. in EEE at Khulna University of Engineering and Technology (KUET) and M.Sc. Engg. in ICT from Bangladesh University of Engineering & Technology (BUET). He is currently serving as the Assistant Editor of Byapon, a leading bi-monthly youth science magazine of Bangladesh. Mr. Hasan has been actively associated with world-leading researchers and delivered invited talks to several universities and workshops on building robust algorithms for intelligent video surveillance systems. He has published several research articles in international conferences and peer-reviewed journals. His research area includes computer vision, deep learning, and biometrics.

Naimul Haque
Lecturer

Naimul Haque is the youngest and a very active faculty member. He enjoys programming and teaches students Competitive Programming. He created several math videos by writing python code using the minim library created by Grant Sanderson, a Stanford math graduate. He also helped students to build many hardware projects using microcontrollers. His research interest includes deep learning and computer vision. He authored a paper titled "Grayscale Portrait Colorization". He is currently working on similar research with his thesis students using Generative Adversarial Networks (GANs). Mr. Haque is currently studying Masters in Science in Computer Science and Engineering from Jahangirnagar University. He has completed his Bachelor of Science degree in Computer Science and Engineering from Ahsanullah University of Science and Technology (AUST).

Faculty members of the Department of CSE with the Registrar and the honorable Vice Chancellor

DEPARTMENT ADMINS

MD. ARIF ULLAH
Lab Officer

MD.ABDUL MALEK
Assistant Officer

MD. MIZANUR RAHMAN
Lab Assistant, CSE

MIU AMONG TOP FIVE UNIVERSITIES IN BANGLADESH

IN ONLINE EDUCATION

Achievements in Digitalization and online education:
In today's world, there are no alternatives to digitalization. This need has never been felt more direly before the COVID-19 pandemic. Manarat International University has done a great job of not only coping with the situation, but also paved the way for digitalization of education in the post COVID-19 world with the leadership of the Vice Chancellor. For his contributions, he received an award. The key achievements of MIU are outlined below:

- Implementation of Learning Management System (LMS)
- Complete online payment and registration systems through MIU campus management software
- Successful implementation of a centralized online examination system
- Proper and timely utilization of GSuite solutions, Zoom, Google Meet, messenger and WhatsApp
- Availing students to get more than 4000 courses free of cost from the best universities around the world through Coursera
- Providing every student with an e-mail at the MIU domain that provides unlimited cloud storage

Honorable VC of MIU receiving award
for his contributions in online education

Our Notable Alumni

Our graduates went to top universities in the world like New York University while others are currently working for the Bangladesh Military, Bangladesh Government and other top companies like Amazon, Grameenphone, Banglalink etc.

Rashedur Rashid

Went to **New York University**, works for Collins Aerospace, USA

After completing graduation from Manarat International University, he held different IT positions at Telebarta and NovoTel. Then he went to USA and completed his MS degree from Tandon School of Engineering, New York University, which is one of the top ranked universities in the world. Now he is working as a senior Systems Network Engineer at Collins Aerospace in New York, United States.

Samia Rahman

Works at Amazon Web Services (USA) as Cloud Engineer

Samia Rahman is an experienced Systems Engineer and is currently working as a Cloud Engineer at Amazon Web Service, USA. Before that, she worked as a Systems Engineer at the American Institute for Research. After completing her graduation from Manarat International University, she obtained her M.Sc. degree in Information Systems and Intelligent Systems from the University of Tokushima, Japan. She is currently living in Maryland, USA.

Major
Md Mostafizur Rahman,
PPM (Gallantry)

After completing graduation from MIU, Major Md Mostafizur Rahman joined the Bangladesh Army in the Signals Corps where only Computer Science and Engineering students or relevant degree holders can apply and join. He was commissioned from the Bangladesh Military Academy with 28th BMA Special Course. Then he served in three Division Signal Battalions and held all the regimental appointments within his capacity. He also served in Rapid Action Battalion (RAB-4 and RAB Intelligence) for a long time. He has earned a Post Graduate Degree from Jahangirnagar University in Computer Science and Engineering. He has also earned a post Graduate Degree from University of Dhaka. He has participated in the United Nations Peacekeeping Mission in Ivory Coast and Mali. He is currently serving at the "Army IT Support Organization" at Dhaka Cantonment.

Sabiha Fedous
Works as **Assistant Professor**
at **BUBT**

Sabiha Firdaus is an Assistant Professor at Bangladesh University of Business and Technology (BUBT). Mrs. Sabiha's favourite hobby is computer Programming. She successfully carried out the ACM-ICPC Asia Regional Dhaka Site Event 2014, BUBT, as a Member of the Executive Committee. She was the Coach at NCPC women's programming contest in 2011 from BUBT. She wrote several research papers like, "A Binary Tree Based Approach for Time Based Page Ranking in Search Engines", "Graph Theoretic Approach for Data Mining" etc.

Farhan Sabbir Siddique

Works for Banglalink

Farhan Sabbir Siddique is a Data and Platform Senior Manager in the Business Service Management (formerly IT) department at Banglalink. Soon after graduating from Manarat International University, Farhan Sabbir Siddique joined Grameenphone Ltd in the Customer Service department in 2006. In mid-2007, he was picked by HR internal assessment and given the position to work on mission critical business systems running on UNIX. He was engaged in multiple projects in Grameenphone Ltd, including CRM, billing systems, FlexiLoad, Service Activation Platform and many more. Because of his involvement in team building across the company and customer centricity, he was given the chance to lead the Manage Service Team at Accenture that worked on UNIX platforms in 2014. He continued the role until he moved to another leadership role with a bigger portfolio of managing Enterprise UNIX, Storage and Backup platform at Banglalink Digital Communications Ltd.

Md. Haris Sarker

Works for **Bangladesh Government**
as a **Programmer**

Mr. Md. Haris Sarker is working as a Programmer and Drawing and Disbursement Officer (DDO) (Grade-6, equivalent to senior Assistant Secretary) at the Department of Archives and Libraries under the Ministry of Cultural Affairs. He manages and oversees the overall software, server, storage, website and digitization activities of the department. After graduating from Manarat International University, he joined in the Delta Group of Industries as a programmer. After that he worked as a Programmer in the Department of Secondary and Higher Secondary Education under the Ministry of Education.

Mahfida Amjad

Senior Lecturer and Research Coordinator,
Stamford University Bangladesh

Mahfida Amjad is a senior lecturer and research coordinator in the Department of Computer Science and Engineering at Stamford University. Before that she was a lecturer at University of Development Alternative (UODA). She was also an Instructor at the Institute of Information Technology (IIT), University of Dhaka. After completing graduation from MIU she obtained Master in Information Technology (MIT) from IIT, University of Dhaka.

The tools, programming concepts, and the design process that I learned during my studies have been directly transferable into my professional career and it helped me to become an iOS developer. Currently, I am leading a developer team.

Ekramul Hoque

Software Engineer (iOS)
CodeNext Inc.
28th Batch, CSE

STATE-OF-THE-ART LAB FACILITIES

The department of CSE has state-of-the-art labs for students and faculty members enabling students to expose themselves to cutting edge technology. Through those labs, students can learn practical tools and techniques for solving real-world problems.

- Physics Lab
- Advanced AI Research Lab
- Digital Electronics and Microprocessor Lab
- Hardware and Networking Lab
- Computer Programming Lab

A tech-savvy curriculum for the

21st Century

CSE graduates are meant to change the world through creativity and advanced innovative technology. With this in mind, our curriculum is designed to meet the ever changing demand of modern theories and practices of computer science. In order to make sure that our graduates can leap into the careers of the future in one of the many exciting fields of CSE, we focus on the following specialization areas:

- Artificial Intelligence and Data Science
- Computer Vision and Robotics
- Cyber Security
- Mobile & Web App Development
- Network and System Engineering
- Internet of Things and Embedded Systems

"Throughout my four years of study, I found teachers as mentors and pathfinders, the students as career allies and the seniors as pioneers.

Zannat -E- Sadia Sarahan Jamila
43rd Batch, CSE.

Research Driven Learning

The right approach to education

In addition to facilitating classroom learning, our faculty are out in the field — conducting cutting-edge research in collaboration with other faculty members and students. This collaboration has created a unique research environment enabling faculty members and students to publish their papers in reputed journals and conferences.

AI Bangla Dataset

Students of the Department of CSE in collaboration with the faculty members developed AIBangla, a new benchmark image dataset of isolated handwritten Bangla characters. This dataset contains 80,403 hand-written images on 50 basic Bangla characters and 249,911 hand-written images on 171 Bangla unique pattern shapes and compound characters written by more than 2,000 unique writers from various institutes across Bangladesh. Students did tremendous hard work of collecting, sorting and sifting this huge dataset. The dataset was opened by Professor Dr. M. Kaykobad. A paper was published related to this work in the International Conference on Bangla Speech and Language Processing (ICBSLP), 2019 at Shahjalal University of Science and Technology, Sylhet, Bangladesh. Students associated with this project went and presented the paper there.

Renowned Professor
Dr. Md. Kaykobad
Inaugurating the
AIBangla dataset

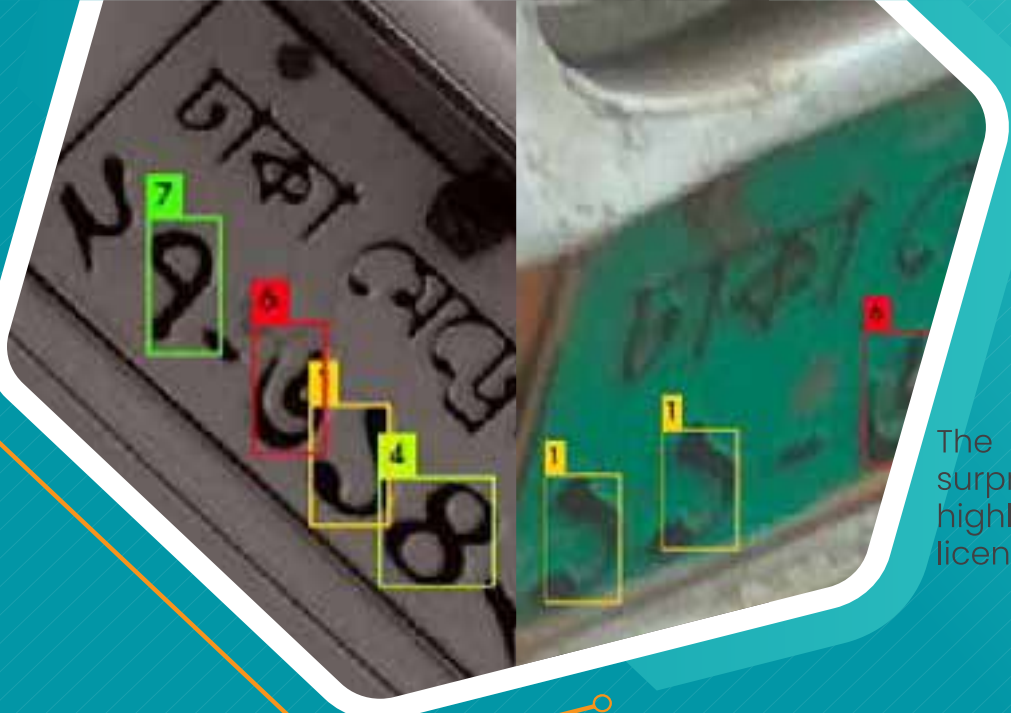
An **MIU CSE** student presenting the paper on AIBangla dataset in an **INTERNATIONAL CONFERENCE**

A Real-time Bangla Sign Language Recognition System

The Department of CSE is working on a project to develop a word-level vision-based Bangla sign language recognition system to help deaf people to communicate effectively. We have already collected a total of 6000 sign language videos where 20 professional signers do sign language videos of a total of 100 words from two different view angles. A novel temporal graph convolutional network (TGCN) has been proposed to model temporal descriptors of the sign language videos for improved performance.

Medicinal Plant Recognition

Using cutting-edge deep learning techniques, students of MIU developed a robust model to classify medicinal plants that can help people identify useful plant species quickly. A new dataset of 10 medicinal plants of Bangladesh is introduced, collected from different regions across the country. A paper related to this work was presented in the International Conference on Emerging Technology in Computing, Communication and Electronics (ETCCE), Dhaka, in 2020.



The AI model is performing surprisingly well in recognizing highly tilted and blurry Bangla license plates numbers

REAL-TIME RECOGNITION OF **BANGLADESHI LICENSE PLATES**

Department of CSE proudly represents a complete end-to-end deep learning-based ALPR system. We have introduced a dataset by collecting 1, 500 different Bangladeshi vehicular license plate images that are captured manually from the streets in different parts of the country resembling various real world scenarios. In this project, we employed a state-of-the-art object detection algorithm to localize the number plate and digits, and thereafter trained a ResNet-20-based CNN network to recognize the segmented Bangla characters. A paper was published related to this work in the International Conference on Bangla Speech and Language Processing, 2018 at Shahjalal University of Science and Technology, Sylhet, Bangladesh.

AUTOMATIC FALL DETECTION

Detection of people who have fallen down on the ground (due to health issues, accidents etc.) from a video in order to providing timely assistance to the fallen person is a challenging problem in computer vision due to the presence of many covariate factors like varying view angles, illumination, and clothing. To address this problem, students of the department of CSE developed an effective approach for detection of such a phenomenon using 2-layer RNN with LSTM architecture to model the temporal dynamics of the 2D pose information of a fallen person. The paper was published at IEEE RAAICON (IEEE International Conference on Robotics, Automation, Artificial-Intelligence and Internet-of-Things), Dhaka in 2019.

MIU Robo Fight

Robo Fight competition was held at MIU CSE Fest 2020. Eight teams participated in the Robo Fight and the Honorable VC is watching the event.

REAL-WORLD APPLICATION

Garner first-hand experience by making your ideas come to life...

"MIU has provided me with a perfect platform for working with real-world projects. As a senior year student, I am thrilled to take part in making around fifteen challenging hardware projects with the help of faculty members. It gave me valuable experience and exposure to advanced technology."

AJM Aktarujjaman Joha
43rd Batch, CSE

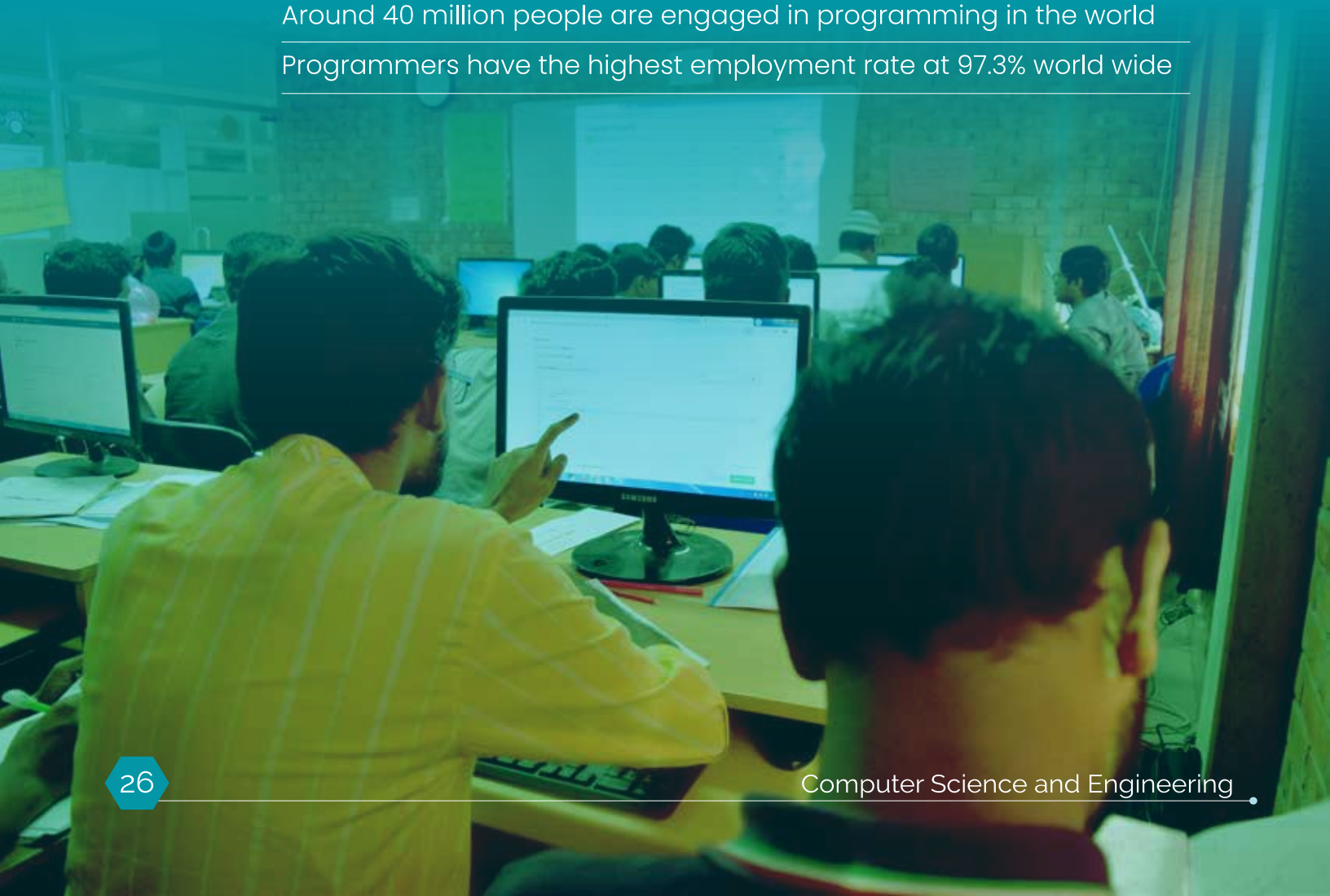
Code Camps & Programming Contests

Programming is a key pillar of Computer Science. As such, CSE students need to proficiently learn programming. In order to ensure excellence in it, a unique project named "Code Camp" was launched. In code camps, all students are individually taken care of by faculty members outside of regular classes. It creates a unique opportunity for students to gain in-depth conceptual understanding of programming. Apart from that, training for contest programming and intra-university programming contests are arranged regularly.

Did you know?

Around 40 million people are engaged in programming in the world

Programmers have the highest employment rate at 97.3% world wide



Programming contests are very exciting and enjoyable for me. Participating regularly in contests and training sessions increased my confidence level. I had a lot of fun while gathering crucial knowledge and beautiful memories in those long and challenging sessions for contest programming.

Md. Nazmul Hossain
44th Batch, CSE.

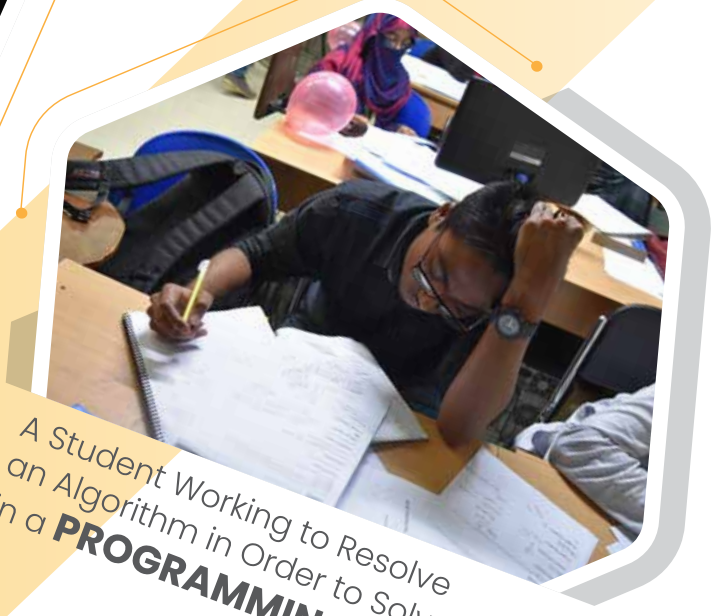
"I used to fear programming a lot. But I am grateful to my teachers and MIU as they did not give up on me. My teachers made the lessons very easy and after the class, a special program named "Code Camp" was arranged for students like me. By participating in the "Code Camp", I overcame my fear and I have gained the necessary tools, confidence and inspiration for working on programming regularly."

Farjana Sultana Samia
43rd Batch, CSE.

Opening ceremony of
CODE CAMP

Students working in a **CODE CAMP**
with the supervision of faculty members

A Projection of the Leaderboard Being Displayed on a White Board during a **PROGRAMMING CONTEST**



A Student Working to Resolve an Algorithm in Order to Solve a Problem in a **PROGRAMMING CONTEST**

A female group is trying to solve
problems in a **PROGRAMMING CONTEST**

Co-curricular Activities

Providing a leg-up to students' career

Co-curricular activities promote academic engagement, and can provide a leg up to students applying for jobs and grad schools. Apart from regularly arranging and participating in code camps, programming contests, and hardware project showcases, co-curricular activities that are popular among CSE students are hackathons, seminars, workshops, training, tutoring, participating in tech expos etc. The department of CSE also arranges large scale career counseling programs for students by inviting prominent experts in a diverse set of fields, which provides a transparent idea about the job market.

Prof. Dr. Md. Kaykobad
Delivering a Speech
at a Seminar on
Co-curricular Activities

One of **the CSE Teams**
Who Participated
in the DDI Expo

Students of MIU at the **Google Dev Fest**

Prof. Dr. Md. Kaykobad Delivering a Speech at CSE FEST 2020

Prof. Dr. Md. Haider Ali Delivering a Speech at a Seminar on Developing Software and Hardware Projects for Effective Learning

A Faculty Member is Conducting a Session in **Google Dev Fest**

Clean and Green Campus

MIU Ashulia Campus has a serene abundance of greenery outside of the hustle and bustle of Dhaka. Beautiful flowers, big trees and numerous medicinal plants in the campus gives a refreshment to the mind as soon as you step foot inside the campus. Coming to the campus, you will find gardeners and cleaners always working to keep the campus clean and green. Students regularly take various initiatives to keep the campus clean and in order.

Library

Resources

The MIU library boasts a robust collection of books, journals and other resources for all students and faculty members to make academic progress easier. It has 25,000 physical copies of books that encompass 3000 separate titles. It contains books pertaining to the Liberation War and the history of Bangladesh. It also has hard copies of journals published by students and teachers of MIU and other universities as well.

As for recreational reading, the MIU library keeps copies of foreign magazines, job and career related books and magazines and both Bangla and English novels.

We are also proud to present the "Bangabandhu Corner" which contains books and other articles and materials that cover the history of our founding father Bangabandhu Sheikh Mujibur Rahman and his undying contributions to the liberation of our beloved country of Bangladesh.

Finally, we offer on campus access to online journals and books via JSTOR and Emerald (form inside the campus only) which contains an abundance of academic papers that make research a breeze for students and faculty alike.

Services

In the MIU library, students have access to both Bangla and English daily newspapers from 4 or 5 reputable publishers. MIU allows books to be checked out from the library as long as the rules are followed. Apart from that, computers are kept inside the library that have internet access. These computers also allow access to online books and journals via JSTOR and Emerald. Plus, the library keeps audio-visual copies of certain books and provides catalogue search options using KOHA.

Hostel

Our university offers a safe place for female students. Finding a place to stay can be a great obstacle for some female students who don't have any relatives in Dhaka. Our hostel facilities provide a safe and affordable place where they can feel at home. We have coordinators monitoring the female hostel to maintain security and order. The hostel is close to the campus and living here enables students to save time that would otherwise be wasted during travel.

Free Wi-Fi internet

MIU provides free high speed internet access 24/7 via Wi-Fi for all students inside the campus regardless of department or seniority.

Free Transport Facility

MIU provides ample provisions for students to get to the Ashulia campus of MIU and back to the city via a punctual bus transportation system. It has always been free for students. Our university also allows transportation for students when they are participating in co-curricular activities and sports outside the campus.

Transport facility provided by MIU is worth BDT 70,000,000 yearly and for CSE students it is worth BDT 20,000,000 yearly.

BUS SCHEDULE FOR WINTER

Pick and Drop Spots	Time of Arrival to Ashulia Campus		Time of Return from Ashulia Campus	
	1st Trip	2nd Trip	Return Trip-1	Return Trip-2
Mirpur-01	8.15	10.00	1.05	4.35
Rampura Bridge	7.20	None	None	4.35
Notun Bazar (Badda)	7.45	None	1.05	4.35
Uttara (House building)	8.10	10.00	None	4.35
Hamyetpur (savar)	8.05	None	1.05	4.35
Savar (Bus Stand)	8.30	None	None	4.35

BUS SCHEDULE FOR SUMMER

Mirpur-01	8.15	10.00	3.05	5.05
Rampura Bridge	7.20	None	3.05	5.05
Notun Bazar (Badda)	7.45	None	3.05	5.05
Uttara (House building)	8.10	10.00	3.05	5.05
Hamyetpur (savar)	8.05	None	3.05	5.05
Savar (Bus Stand)	8.30	None	3.05	5.05

BUS SCHEDULE FOR FRIDAY

Pick and Drop Spots	Time ofArrival to Ashulia Campus	Time of Return from Ashulia Campus
Mirpur-01	7.30am	8.00pm
Rampura Bridge	7.30am	8.00pm
Notun Bazar (Badda)	7.30am	8.00pm
Uttara (House building)	7.30am	8.00pm
Gazipur	7.30am	8.00pm
Chandura	7.30am	8.00pm
Hamyetpur (savar)	7.30am	8.00pm
Savar (Bus Stand)	7.30am	8.00pm

BEYOND EDUCATION

A Complete Environment for Proliferation of both Mind and Body

MIU is one of the few private universities which has a large playground, where students can play cricket, football, volleyball, etc. to refresh their mind.

VOLUNTEER OPPORTUNITY

Voluntary social activities like sending relief to flood affected areas, winter clothing distribution, Eid gift distribution among disadvantaged people etc. are regularly arranged to raise empathy, leadership and patriotism among students.

Arts and Cultural Activities

Every year, various cultural activities are arranged such as photo exhibitions, wall decoration, singing and acting competitions etc.

Religious, spiritual and ethical life

Religious discussion session are arranged regularly like Iftar Mahfil during Ramadan to build healthy personality.

Recreation

CSE department has a culture of arranging various festivals for mental well-being. Among them, 'Mehedi Fest', 'Pitha Utshab', and 'WinterFest' etc. are noteworthy.

CLUB ACTIVITIES

In order to enhance the quality of life and introduce students to co-curricular activities, MIU CSE club is operating under the guidance of a teacher moderator with the motto "Creating tech leaders of tomorrow". To expand the horizon of knowledge through discussion, co-operation and collaboration, the club has established different forums and platforms namely: Math forum, Linux forum, MIU Programming Group and career development forum. Apart from that the club also extends its organizational capabilities in arranging social, cultural and recreational activities.

CSE FEST 2020

MIU CSE Club organized a two-day mega event named 'CSE Fest 2020", where 10 different events were held, with more than 1000 participants. Some of the competitions and events like math and ICT Olympiads were arranged for the students of Higher Secondary level. Students from more than 30 colleges took part in those events. High profile guests like Professor Dr. M. Kaykobad and Professor Dr. Haider Ali delivered valuable speech on different topics. Lively session with Sadman Sadik, interesting Hardware and software projects by the students and events like ROBO fight, gaming and programming contests created enough enthusiasm and zeal among students, faculty members and other participants.

ON-CAMPUS EMPLOYMENTS and INTERNSHIPS

MIU always had a culture of giving students on-campus job opportunities, internships and full-time jobs. Many students have used it as a launching pad for their careers. The CSE department gives its top students the opportunity to serve as faculty members. Moreover, fresh CSE graduates get a chance to do internships in the IT Department of MIU and can gain invaluable first-hand real-world knowledge in various fields of IT.

Adjunct Faculty Members at **Department of CSE**

Md. Nazmul Haque Riad
37 batch, CSE (CGPA 3.95)

Md. Shamimul Islam
38 batch, CSE (CGPA 3.99)

Raisa Akter
40 batch, CSE (CGPA 3.99)

Mahin Chowdhury
34 batch, CSE

Aminul Islam Maruf
41 batch, CSE

Yeahyea Sarker
42 batch, CSE

Interns at **IT Department**

From childhood, my dream was to study computer science. MIU was the only private university I found which has a very affordable cost while not undermining its quality in any way. MIU has a very generous waiver policy without which I wouldn't have fulfilled my dream.

Mazidul Islam Limon
46 Batch, CSE

MIU PROVIDES MORE THAN BDT
4 CRORE WORTH OF
SCHOLARSHIPS IN **16**
DIFFERENT CATEGORIES EVERY YEAR

WAIVER, SCHOLARSHIP AND FINANCIAL AID

MIU provides sixteen different categories of aid in the form waiver, scholarship and financial aid under which students can apply. This is more than what any other university currently offers in Bangladesh. A summary of the types is described below:

1. Tuition fee waiver based on SSC and HSC or Equivalent examination results (up to 100%)
2. Scholarships based on semester results (SGPA) at MIU (up to 100%)
3. 100% waiver for 3% of total students of each semester, who are from remote and underdeveloped areas and poor but meritorious.
4. 100% waiver for the families of freedom fighters
5. Special waiver for meritorious low-income students (up to 100%)
6. Additional special waivers (5%) for siblings
7. Additional special waivers (5%) for spouse
8. Additional special waivers (5%) for offspring
9. Special waived admission packages for CSE and EEE evening programs
10. Special waived admission packages for LLB and EEE day programs
11. 10% waiver based on SSC and HSC results on waived packages
12. 20% scholarship on semester results for those who are enjoying waived packages
13. 40% waiver for MIU graduates for MA in English and MBA programs
14. 30% waiver for master's programs for students outside of MIU
15. 50% admission fee waiver for all students
16. Special waiver for promotional contribution

DETAILS OF POLICIES FOR **WAIVER SCHOLARSHIP** AND **FINANCIAL AID**

I) 100% waiver will be given (as per Private University Act. 2010) to students who fall under the following categories:

a) 3% of total student of each semester, who are from remote and underdeveloped areas and poor but meritorious.

b) 3% of total students of each semester from the freedom fighter's quota

NB: The deserving candidates should apply in the prescribed form.

II) Waiver based on SSC+HSC or Equivalent examinations results:

Up to 100% tuition fee waiver is available based on combined results of SSC and HSC (without 4th subject). This waiver will be continued for the first year without needing to fulfil any condition. For the continuation of this scholarship for the rest of their program, students need to maintain a certain CGPA/SGPA each semester. In case of failure to maintain required CGPA, students may enjoy next slab's waiver benefit up to the lowest slab. The following table elaborates the details of this waiver scheme:

GPA in SS+HSC or Equivalent Esaminations (without 4th subject)	Tuition fee waiver(%)		Required CGPA/SGPA at MIU examinations
	Gulshan	Ashulia	
GPA Below 7.00	0%	5%	2.60
GPA 7.00-7.49	5%	15%	2.80
GPA 7.50-7.99	10%	20%	2.90
GPA 8.00-8.49	15%	25%	3.00
GPA 8.49-8.99	20%	30%	3.10
GPA 9.00-9.49	30%	45%	3.30
GPA 9.49-9.99	40%	50%	3.50
GPA 10	100%	100%	3.70

III) Scholarship Based on Semester Result SGPA at MIU Examinations:

Scholarship (25% to 100%) is offered to the top 10% students of every program based on SGPA (Semester Grade Point Average) at MIU per semester. For eligibility, students are required to have a minimum SGPA of 3.5 and must take at least 9 credits (for non-pharmacy students) or 15 credits (for Bachelor of Pharmacy students) per semester. If 2 or more students achieve same SGPA, then CGPA will be considered as tie-breaker. Furthermore, if CGPA is also equal for those students, then SSC and HSC GPA will be used as tie-breaker. These conditions are not applicable for package programs at Ahsulia campus. This waiver scheme is applicable from 2nd semester onwards. Policies regarding percentage of waivers given are summarized in the table below:

Scholarship (in the form of waiver on tuition fee)	% of total Registered Students Eligible for Scholarship
100%	1%
50%	2%
25%	7%

IV) Special Waiver only for new students (meritorious but from low income group):

Maximum 10% of the total newly enrolled students of the respective semester are entitled to get a special waiver (Financial Aid) who are meritorious but from low-income group (parents/guardians' income is less than a certain threshold). This waiver is awarded through a process of scrutinization as per the policy of the authority of MIU.

GPA in SSC+HSC or Equivalent Exam (without 4th Subject)	Tuition fee Waiver	Required CGPA/SGPA at MIU Exam
9.00 - 10.00	Up to 100%	3.30
8.00 - 8.99	Up to 50%	3.00
7.00 - 7.99	Up to 25%	2.70

V)

Additional 5% waiver for siblings, spouse (husband-wife) and offspring (parent-child) will be given for the entire study period for both undergraduate and graduate programs.

Other conditions for entitlement of waiver and scholarship:

1. Waiver based on SSC and HSC/equivalent examination results, and Special Waiver shall remain valid for 4 years/entire program subject to maintaining required SGPA/CGPA at MIU examinations.
2. A student may avail only one type of waiver/scholarship at a time from the above categories I, II, III, & IV whichever is maximum for him/her.
3. Waiver/scholarship will not be applicable for retake / improvement courses.
4. Any student enjoying waiver/scholarship must abide by the rules and regulations of MIU, the failure of which may result in the cancellation of his/her scholarship.
5. In case of Special Waiver, the authority of MIU reserves the right to change the policy time to time for the greater interest of the University.

ADMISSION

Requirements

- Students must have a minimum GPA of 2.5 in both SSC and HSC Examinations.
- If an applicant has a GPA of less than 2.5 either in their SSC or HSC, their minimum GPA for SSC or HSC must not be below 2. Also, they need to have a total minimum GPA of 6 (SSC and HSC combined).
- Applicants must be from the science background in SSC and HSC and must have Mathematics, Physics and Chemistry in their HSC.
- English medium students must have a minimum of 5 subjects in their O-levels with at least "B" grades in four subjects and a minimum of 3 subjects in their A-levels with a minimum of "C" grade in all 3 subjects.
- Equivalent degrees should be provided for Madrasah Education Board.
- Equivalent degrees should be provided for US High School Diploma.
- Admission to the CSE undergraduate program depends on satisfactory result in MIU's admission test held approximately four weeks before beginning of each semester.
- The admission test may be waived for an applicant having a score of 1100 or more in SAT. students with TOEFL scores of 500 or above are exempted from taking the English section of the admission test.

Core Credits	94
General Education(GED)Credits	24
Interdisciplinary	6
Elective/Concentration	9
Thesis/Project Work	4
Total Credits	**137**
Duration Years	4 years
Number of Semesters	12

Tuition Fees				
Core, concentration and interdisciplinary Credits : 113 with 2500 Tk. per credit GED Credits: 24 with 1400 Tk. per credit				
Total GPA (SSC+HSC, without 4th Subject)	***Waiver**	**CGPA/SGPA at MIU**	**Average Cost** (Per Semester)	**Total Cost (BDT)**
Below 7.00	5%	2.60	31,025	3,84,295
7.00 – 7.49	15%	2.80	28,390	3,52,685
7.50 – 7.99	20%	2.90	27,073	3,36,880
8.00 – 8.49	25%	3.00	25,756	3,21,075
8.50 – 8.99	30%	3.10	24,439	3,05,270
9.00 – 9.49	45%	3.30	20,488	2,57,855
9.50 – 9.99	50%	3.50	19,171	2,42,050
10.00	100%	3.70	6,000	84,000
		Total Fees without waiver =		**4,00,100**

* The waiver based on SSC and HSC or equivalent Exams will be continued for first one year without considering required CGPA/SGPA at MIU examinations. After one year such waiver will be continued based on maintaining of the required CGPA/SGPA at MIU examinations.

Total cost for Diploma Holders (Package for CSE evening program): BDT. 1,73,900/-

Break down of fees structure		
Core Courses fee: 2,500 × 113 Credits	=	2,82,500 Tk.
GED Courses fee: 1,400 × 24 Credits	=	33,600 Tk.
Admission Fee (One time): 12,000 × 1	=	12,000 Tk.
*Other charges (Semester wise): 6,000 × 12	=	72,000 Tk.
Total (Tuition fees+admission fee+other	**=**	**4,00,100 Tk.**

***Other charges** (Exam. fees, Library fees, Development fees, & Co-Curricular fees)

Mode of payment

Students have to pay the required fees/charges of any semester in 2 (two) installments;

For 1st semester :
1) The students will pay a) admission fee and b) Tk. 6,000 as semester fee at the time of admission.
2) The remaining fees/charges has to be paid before the mid-term examination.

For other semesters :
1) Tk. 10,000 has to be paid at the time of registration. If the fees/charges are less than Tk. 10,000, the students may pay Tk. 6,000 at the time of registration.
2) The remaining fees/charges has to be paid before the mid-term examination.

Academic Calendar

Semesters	Duration	No. of weeks
Spring	January - April	16
Summer	May - August	16
Fall	September - December	16
	Vacation and Breaks	04

PROGRAM DETAILS

PROGRAM

Bachelor of Science in
Computer Science and Engineering
(B. Sc. in CSE)

PROGRAM OBJECTIVE

The four year Bachelor of Science degree in Computer Science and Engineering is designed to prepare the students to acquire the ability to apply computer science and information technology in business, production, scientific analysis and research for efficient day-to-day operation and use it as a decision making tool to improve productivity. All throughout, the program focuses on broadening the student's understanding of logical argument, algorithm, computer programming, theories of computation, software as well as fundamental knowledge of computer.

PROGRAM STRUCTURE

Bachelor of Science in Computer Science and Engineering primarily involves the study of a number of core courses, which every computer engineer should know and significant number of courses from specialized areas. Although this program is a specialized one, still there is scope of optional courses in the final year for the students to choose other subjects of further interest. Core courses build the foundation and specialized courses prepare the students for the specific areas of CSE. To understand the underpinning theory of the courses of CSE, a number of courses on Mathematics, Statistics, Physics, Electrical Engineering, and Computer Science and Engineering have been felt mandatory to include in the syllabus. This undergraduate curriculum is designed in such a way that after graduation the graduates will have a reasonable amount of general idea about humanities subjects and they will obtain a good communication skill in English as well. The curriculum includes a good number of university required course known as General Education Courses (GED). Areas of the GED courses include Linguistics (English and Arabic), Liberal Arts and Islamic Studies. In addition some courses on Economics, Management, and Accounting have been incorporated to make the syllabus a balanced and reasonably complete one.

DEGREE **REQUIREMENTS**

To obtain the Bachelor of Science degree from the Department of Computer Science and Engineering, each student is required to successfully complete a minimum of 137 credits. In addition to minimum 137 credits, students may also take extra courses from the elective courses for wider specialization. The distribution of the credits are given below:

8 GED Courses	24 credits
3 Interdisciplinary Courses	06 credits
34 Core Courses	94 credits
3 Elective/Concentration Courses	09 credits
Thesis/Project Work	04 credits
Total	**137 credits**

The distribution of credits and contact hours of courses of Bachelor of Science program in the Department of Computer Science and Engineering (CSE) are as follows:

GENERAL EDUCATION COURSES (GED)

Sl. No.	Course Code	Course Title	Contact Hours / Week	Credits
1	GED111	Fundamentals of English	3	3
2	GED122	Basic Concept of Islam	3	3
3	GED213	Composition and communication Skills	3	3
4	GED224	Bangladesh Studies	3	3
5	GED235	Life of Teachings of Prophet Muhammad (SM)	3	3
6	GED316	Quranic Language	3	3
7	GED327	Quran, Science & Humanity	3	3
8	GED338	Environmental Studies	3	3
Optional for Non Muslim Students	GEA122	History of Bengal	3	3
	GEA316	Comparative Social System	3	3
	GEA327	Peace and Conflict Studies	3	3
		Total (8 Courses) =	**24**	**24**

INTERDISCIPLINARY COURSES

Sl. No.	Course Code	Course Title	Contact Hours / Week	Credits
1	ECO101	Economics	2	2
2	ACC201	Financial and Managerial Accounting	2	2
3	MGT301	Industrial Management	2	2
		Total (3 Courses) =	**6**	**6**

CORE COURSES

Sl. No.	Course Code	Course Title	Contact Hours / Week (Theory + Lab)	Credits
1	CSE101	Essential Computing	2 + 2	3
2	CSE102	Structured Programming	2 + 2	3
3	EEE101	Electrical Circuits	2 + 2	3
4	MTH100	Engineering Mathematics	2 + 0	2
5	PHY102	Physics	3 + 2	4
6	EEE102	Basic Electronics	2 + 2	3
7	MTH104	Differential Calculus and Co-ordinate Geometry	3 + 0	3
8	CSE104	Discrete Mathematics	3 + 0	3
9	CSE203	Theory of Computing	2 + 0	2
10	CSE207	Object Oriented Programming (using Java)	3 + 2	4
11	CSE208	Data Structures	2 + 2	3
12	CSE209	Digital Logic Design	2 + 2	3
13	CSE210	Algorithms	2 + 2	3
14	CSE211	Assembly Language	0 + 2	1
15	MTH201	Integral Calculus and Differential Equations	3 + 0	3
16	MTH203	Complex Variables, Fourier and Laplace Transform	3 + 0	3
17	MTH205	Linear Algebra and Vector Analysis	3 + 0	3
18	STS301	Statistics and Probability	2 + 0	2
19	CSE302	Computer Organization and Architecture	3 + 0	3
20	CSE303	Data and Computer Communication	3 + 0	3
21	CSE304	Database Systems	3 + 2	4
22	CSE314	Microprocessor and Interfacing	2 + 2	3
23	CSE310	Operating Systems	2 + 2	3
24	MTH311	Numerical Methods	2 + 2	3
25	CSE312	Software Development	0 + 2	1
26	CSE313	System Analysis and Design	2 + 2	3
27	CSE402	Software Engineering	2 + 0	2
28	CSE403	Computer Graphics	2 + 2	3
29	CSE414	Internet and Web Programming	1 + 2	2
30	CSE409	Compiler Design	2 + 2	3
31	CSE410	Computer Networking	2 + 2	3
32	CSE411	Artificial Intelligence	2 + 2	3
33	CSE412	Introduction to VLSI	2 + 0	2
34	CSE443	Management Information System	2 + 0	2
		Total (34 Courses) =	**73 + 42**	**94**

ELECTIVE/CONCENTRATION COURSES (Any three courses should be taken)

Sl. No.	Course Code	Course Title	Contact Hours / Week (Theory + Lab)	Credits
1	CSE431	Advanced Database Systems	2 + 2	3
2	CSE432	Multimedia Systems	2 + 2	3
3	CSE433	Neural Networks and Fuzzy Systems	2 + 2	3
4	CSE434	Digital Signal and Image Processing	2 + 2	3
5	CSE435	Parallel and Distributed Processing	3 + 0	3
6	CSE436	Pattern Recognition	2 + 2	3
7	CSE437	Computer Vision and Robotics	2 + 2	3
8	CSE438	Simulation and Modeling	2 + 2	3
9	CSE439	Telecommunication Engineering	3 + 0	3
10	CSE472	Cellular, Mobile and Satellite Communication	2 + 2	3
11	CSE441	Optical Fiber Communication	3 + 0	3
12	CSE 455	Digital Electronics and Pulse Techniques	2 + 2	3
13	CSE492	Embedded System	2 + 2	3
			Total (3 Courses) =	**9**

THESIS/PROJECT WORK

Sl. No.	Course Code	Course Title	Credits
1	CSE400	Thesis/Project Work	4
		Total (1 Course) =	**4**

DESCRIPTION OF THE COURSES

GENERAL EDUCATION COURSES (GED)

GED111 FUNDAMENTALS OF ENGLISH
3 credits 3 hours/week
Word Formation, Nominal Group & Modifiers of Nouns, Verbs & Tenses, Sequence of Tense, Preposition, Model Auxiliaries, Subject-Verb Agreement, Simple Sentence & its structure, Use of passive Expressions , Interrogative Sentence and types of Questions, Imperative & Expletory Sentences, Complex Sentence & Its Structure, Direct & indirect Speech, Effective Writing

GED122 BASIC CONCEPTS OF ISLAM
3 hours in a week & 3 Credits
As a first course on Islam, it deals with the basic concepts of Islam and its message through ages. It offers the student a clear understanding of the fundamental beliefs of Islam and examines the impact of these beliefs in human life. Topics include: Islam – its meaning and message, Islam – the religion of submission to Allah, Islam – the religion of nature, Islam – the message to humanity, Islam – the mission of all Prophets, etc. It also covers Articles of faith or aspects of fundamental beliefs of Islam like belief in the Unity of Allah, belief in the Prophets and prophet hood, its mission down from Adam (AS) to Prophet Muhammad (SAAS), belief in the Day of Judgment and life hereafter. Finally, it examines the impact of belief in Unity of Allah, the prophet hood and the Day of Judgment on human life. Its course structure enables students of different religions and cultural backgrounds to easily understand Islam's importance and necessity.

GED213 COMPOSITION AND COMMUNICATION SKILLS
3 credits 3 hours/week
Prerequisite: GED 111 English Fundamentals
Basic skills & Function of language, Basic English Pronunciation & Introduction to IPA, Basic Speaking & writing Skills, Effective Use of language, Interpreting Different Types of texts in Different Contexts, Developing Language Skills for Producing Speeches & Written Forms, Writing Paragraph, Essay & Summary, CV Writing, letter (Formal & Informal) & E-mail, Dictation Practice & Listing Comprehension, reading Comprehension.

GED224 BANGLADESH STUDIES
3 hours in a week & 3 Credits
It is designed to acquaint students with Bangladesh's socio-economic conditions. Emphasis is given on political feature, economic feature and the administrative framework of Bangladesh. The course also encompasses the activities of NGO in rural area and the role of donors in our economic development. This course analyses the process of social, political, and economical changes in Bangladesh while focusing on the factors that determine the direction of these changes. It also examines the national policies that intervene the process of social, political and economic development.

GED235 LIFE AND TEACHINGS OF PROPHET MUHAMMAD (SM)
3 hours in a week & 3 Credits
This course builds on the material presented in GED-102. The course focuses on the basic tenets and rules of Islam. It tells the student what a Muslim should do and what he/she should not. The course presents islam as the complete code of life. Topics covered in the course are: the pillars of Islam, the prayer (Salah) and the wisdom behind, fasting (Sawm) and its wisdom, payment of obligation charity to the poor (Zakah) and the wisdom behind, and performing pilgrimage (Hajj) and its far reaching impact and wisdom. It will also focus on the concepts of Halal and Haram in Islam, the Islamic Shariah (rullings) and its sources, i.e.; the book of Allah (al-Kitab), the tradition of the Prophet (Sunnah), the Consensus of Ummah (Ijma), the analogy (Qiyas) and the reformation (Ijtedah), Jihad – its real concept, the struggle for establishing good and revoking the evil, etc.

GED316 QURANIC LANGUAGE
3 hours in a week & 3 Credits
This course is designed to teach students the basic skills of the Arabic Language. The students are expected to write and speak simple sentences in Arabic after completing this course. The purpose of this course is to increase a student's ability to read, write, communicate in Arabic and raise interest in Islam. The course deals with the alphabet, the writing system, pronunciation, the most commonly used basic vocabulary and the elementary sentence patterns. The proficiency level of this course is basic. No understanding of the language is required for this course, as the training material has been designed to accommodate the novice students.

GED327 QURAN, SCIENCE AND HUMANITY
3 hours in a week & 3 Credits
This course deals with the program of life Islam offers for mankind, its achievements in the past, present situation and future prospects. Topics included in this course are: Man as the vicegerent of Allah on earth, concept of ethics and morality in Islam, duties and responsibilities of a Muslim towards his/ her family, society, state and the humanity at large, the achievement of Islam in culture and civilization. It also deals with the economic system of Islam, and more importantly, it tries to focus challenges facing Islam today and way to address these challenges.

GED338 ENVIRONMENTAL STUDIES
3 hours in a week & 3 Credits
This course aims at providing students with an understanding of the continuing of environmental degradation and its impact on eco system and the resulting effect on human society. It is a good foundation course that explores ecology, green house effect, global warming and other environmental issues both at the national and transnational levels. The course also focuses on environmental malpractices in local, regional and global buisnesses, and offers ethical perspacives on finding appropriate solutions to those environmental hazards.

GEA122 HISTORY OF BENGAL
3 hours in a week & 3 Credits
This course aims to introduce to the students the history of Bengal which includes advent of the Muslims, Bakhtiyar Khalji, Rule of the Khalji Chiefs, Ilias Shahi Rule: Shamsuddin Ilias Shah, Sikandar Shah, Ghyasuddin Azam Shah, Raja Ganaesh and his successor, Afgan Rule, Establishment of Maghal rule, Conquest of Bengal by Akbar; Bara Bhuiyans; Subadar Islam Khan, Subadar Mir Jumla; Subadar Shaesta Khan, Advent of the Europeans, Bengal under the Nawabs:
Murshid Quli Khan, Alivardi Khan, Sirajuddoula, Indian on the eve of Mughal conquest: Political social and economic condition, Babar and the foundation of the Mughal empire, Humayun and Sher Shah, Akbar: Restoration and recognition of the Empire, Jahangir and Shahajahan, Aurangazeb, Decline and downfall of the Mughal empire, Government, society, art and culture under the Mughul empire, Growth of British power in South Asia: Battle of Polashi, Battle of Buxar, Grant of Diwani, Dual Government, South Asia under company's administration: Administrative, social, economic and judicial reforms, Land settlement, educational policy, Social and Political Movements: Sir Syed Ahmed Khan and Aligahr Movement, Syed Ameer Ali and Nawab Abdul Latif, Foundation of the All Indian National Congress (1885); Partition of Bangal (1905), Foundation of All Indian Muslim League, Khilafat Movement, Non-Cooperation Movement, Civil Disobedience; Indian Independence Act of 1947. After completing this course the students will be able to learn the rich history of Bengal in brief.

GEA316 COMPARATIVE SOCIAL SYSTEM
3 hours in a week & 3 Credits
Focusing mainly on Islamic and Muslim societies, the course covers discussion on various social systems within a comparative framework. This is intended to keep the students informed and aware of the options related to societal aspects of life and world-views and to enliven their curiosity for future inquiry.

GEA 327 PEACE AND CONFLICT STUDIES
3 hours in a week & 3 credits
Peach: Meaning concept and dimensions of peace; positive peace, Negative Peace. Conflict: Meaning and formation; factors of conflict; causes and consequences of conflict. Different forms of conflict and conflict Resolution; Different Parties involve in the conflict; violence; Structural violence, Direct violence, Conflict Reclusion ,Conflict Management Conflict Transformation towards peace, Armament and disarmament, world military expenditure and its impact on the development, National development through Peace Education, Culture of Peace and Peace Studies, international Education and Peace Studies, United Nations forums and its role in the Peace Building

DESCRIPTION OF THE COURSES

INTERDISCIPLINARY COURSES

ECO101 ECONOMICS

2 hours in a week & 2 Credits

Definition of Economics; Economics and Engineering; Principles of Economics. Microeconomics: Introduction to various economic systems – capitalist, command and mixed economy; Fundamental economic problems and the mechanism through which these problems are solved; Theory of demand and supply and their elasticities; Theory of consumer behavior; Cardinal and ordinal approaches of utility analysis; Price determination; Nature of an economic theory; Applicability of economic theories to the problems of developing countries; Indifference curve techniques; Theory of production, production function, types of productivity; Rational region of production of an engineering firm; Concepts of market and market structure; Cost analysis and cost function; Small scale production and large scale production; Optimization; Theory of distribution; Use of derivative in economics: maximization and minimization of economic functions, relationship among total, marginal and average concepts.

Macroeconomics: Savings; investment, employment; national income analysis; Inflation; Monetary policy; Fiscal policy and trade policy with reference to Bangladesh; Economics of development and planning.

ACC201 FINANCIAL AND MANAGERIAL ACCOUNTING

2 hours in a week & 2 Credits

Financial Accounting: Objectives and importance of accounting, branches of accounting, accounting as an information system, computerized system and application in accounting. Recording Systems: double entry mechanism, accounts and their classification, accounting equation, accounting cycle journal, ledger, trial balance. Preparation of financial statements considering adjusting and closing entries. Accounting concepts and conventions. Financial statements analysis and interpretation: ration analysis- tests for profitability, liquidity, solvency and overall measure.

Costs and Management Accounting: Cost concept and classification. Segregation and mixed costs. Overhead costs: meaning and classification, allocation of overhead cost, overhead recovery method. Job order costing: preparation of job cost sheet and quotation price. Inventory valuation: absorption costing and variable costing technique. Cost volume profit analysis: meaning, breakeven analysis, contribution margin approach, sensitivity analysis. Short term investment decision: relevant and differential cost analysis; Linear programming. Long term investment decisions: capital budgeting, various techniques of evaluation of capital investment, investment appraisal under uncertainty, risk management, capital rationing. Concept of working capital, need for working capital, management of cash, stock debtors.

MGT301 INDUSTRIAL MANAGEMENT

2 hours in a week & 2 Credits

Introduction to management and planning in industrial organizations; Organization: theory and structure, coordination, span of control, authority delegation, groups, committee and task force, manpower planning; Personnel management: scope, importance, need hierarchy, motivation, job redesign, leadership, participative management, training, performance appraisal, wages & incentives, informal groups, organizational change and conflict; Cost and financial management: Elements of costs of products depreciation, break-even analysis, investment analysis, benefit cost analysis; Management accounting: Cost planning and control, budget & budgetary control, development planning process; Marketing management: Concepts, strategy, sales promotion, patent laws; Technology management: Management of innovation and changes, technology life cycle, Case studies.

CORE COURSES

CSE101 ESSENTIAL COMPUTING

Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits

Introduction to computers, type and generation of computers, basic organization and function units, hardware and software, number system and codes, number representation, memory, input and output devices, computer languages, machine languages, assembly language, high level language, language translator, interpreters, assemblers and compilers, software, types of software, system software and application software. Other topics covered are: examples of system software – DOS, Windows, Unix, System utilities, classification of application software, word processor, spreadsheet, database management, mathematical and statistical package, modeling and simulation, business and financial packages, communication software, e-mail, intranet & internet.

CSE102 STRUCTURED PROGRAMMING
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Programming languages, algorithms and flow charts. Structured Programming using C: constants, variables and data types, arithmetic and logical operation, loops and decision making, user-defined functions, character and strings, arrays, pointers, structures and unions, file management, graphics programming. Object oriented Programming using C++: introduction, classes and objects; polymorphism; function and operator overloading; inheritance.

EEE101 ELECTRICAL CIRCUITS
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Circuit variables and elements: Voltage, current, power, energy, independent and dependent sources, resistance. Basic laws: Ohm's law, Kirchoff's current and voltage laws. Simple resistive circuits: Series and parallel circuits, voltage and current division, wye-delta transformation. Techniques of circuit analysis: Nodal and mesh analysis including supernode and supermesh. Network theorems: Source transformation, Thevenin's, Norton's and superposition theorems with applications in circuits having independent and dependent sources, maximum power transfer condition and reciprocity theorem. Energy storage elements: Inductors and capacitors, series parallel combination of inductors and capacitors. Responses of RL and RC circuits: Natural and step responses. Alternating current: Instantaneous and rms current, voltage and power; average power for various combinations of R, L and C circuits; Phasor representation of sinusoidal quantities, Introduction to three phase circuits. Electric Filters: Properties of symmetrical networks filter fundamentals, Characteristics impedance, different types of filters, propagation constant and frequency response. Active filters. Electromagnetic field: The electromagnetic field equations, the displacement current, Maxwell's equations, scalar and vector potentials, retarded potentials, Poynting vector.

MTH100 ENGINEERING MATHEMATICS
2 hours in a week, 2 Credits
Algebra: Series, Exponents, Logarithms and Determinants, Binomial theorem, Linear equations, Simultaneous and Quadratic equations, inequalities; Functions: functions and relations, functional notation, composite and inverse functions; Graphs: rectangular coordinates, polynomials, exponential functions, sketching curves, the graph of a function, graphical solution of equations, using the graphs for estimation-extrapolation and gradients, the area under a curve, sets and Venn diagrams; exponents; graphs of trigonometric functions, complex numbers, analytic geometry, straight line, circle, parabola, ellipse, & hyperbola; exponential and logarithmic functions, calculus: differentiation, geometric meaning of differential coefficient, successive differentiation, integration and first order differential equation.

PHY102 Physics
Theory: 3 hours in a week, Lab: 2 hours in a week & 4 Credits
Heat & thermodynamics: Principle of temperature measurements: Platinum resistance thermometer, Thermo-electric thermometer, Pyrometer; Kinetic theory of gases: Maxwell's distribution of molecular speeds, Mean free path, Equipartition of energy, Brownian motion, Van der Waal's equation of state, Review of the First law of thermodynamics and its application, Reversible & irreversible processes, Second law of thermodynamics, Carnot; Efficiency of heat engines, Carnot theorem, Entropy and Disorder, Thermodynamic Functions, Maxwell relations, Clausius-Clapeyron equation, Gibbs phase rule, Third law of thermodynamics. Waves & Oscillations: Differential equation of a Simple Harmonic Oscillator, Total energy & average energy, Combination of simple harmonic oscillation, Lissajous figures, Spring-mass system, Calculation of time period of torsional pendulum, Damped oscillation, Determination of damping co-efficient. Forced oscillation. Resonance, Two-body oscillation. Reduced mass Differential equation of a progressive wave, Power & intensity of wave motion, Stationary wave, Group velocity & Phase velocity. Physical Optics: Theories of light: Interference of light, Young's double slit experiment, Displacements of fringes & its uses. Fressnel Bi-prism, Interference at wedge shaped films, Newton's rings, Interferometers; Diffraction of light: Fresnel and Fraunhoffer diffraction. Diffraction by single slit. Diffraction from a circular aperture, Resolving power of optical instruments, Diffraction at double slit & N-slits- diffraction grating; Polarization: Production & analysis of polarized light, Brewster's law, Malus law, Polaroid. Properties of Matter: States of matter; Elastic properties of solids: Coefficients of elasticity, Energy calculation; Flow of liquids: Equation of continuity, Laminar and turbulent flow, Reynolds number & its significance, Bernoullis theorem and its application; Viscosity: poiseulles equation, Motion in a viscous medium, determination of coefficient of viscosity; Surface tension: Tension and surface energy, Capillarity and Surface tension as a molecular phenomenon, Surface Angle of contact, Quincke's method

EEE102 Basic Electronics
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
P-N junction as a circuit element: Intrinsic and extrinsic semiconductors, operational principle of p-n junction diode, contact potential, current-voltage characteristics of a diode, simplified dc and ac diode models, dynamic resistance and capacitance. Diode circuits: Half wave and full wave rectifiers, rectifiers with filter capacitor, characteristics of a zener diode, zener shunt regulator, clamping and clipping circuits. Bipolar junction transistor (BJT) as a circuit element: Bipolar junction transistor: current components, BJT characteristics and regions of operation, BJT as an amplifier, biasing the BJT for discrete circuits, small signal equivalent circuit models, BJT as a switch. Single stage mid-band frequency BJT amplifier circuits: Voltage and current gain, input and output impedance of a common base, common emitter and common collector amplifier circuits. Metaloxide semiconductor field-effect-transistor (MOSFET) as circuit element: structure and physical operation of an enhancement MOSFET, threshold voltage, Body effect, current-voltage characteristics of an enhancement MOSFET, biasing discrete and integrated MOS amplifier circuits, single-stage MOS amplifiers, MOSFET as a switch, CMOS inverter. Junction field-effect-transistor (JFET): Structure and physical operation of JFET, transistor characteristics, pinch-off voltage. Introduction to IC fabrication techniques.

MTH104 DIFFERENTIAL CALCULUS AND CO-ORDINATE GEOMETRY
3 hours in a week & 3 Credits
Differential Calculus: Functions of real variables and their plots, limits, continuity and derivates, physical meaning of derivatives of a function, Successive derivatives, Leibniz theorem, Roll's theorem, Mean value theorem, Taylor's theorem, Taylor's and Maclaurian's series and expansion functions, Maximum & Minimum values of functions, functions of two or three variables, partial and total derivatives
Co-ordinate Geometry: 2D Geometry-Change of axes, transformation of Coordinates, pair of straight lines, system of circles, co-axial circles & limiting points, tangent and normal, chord of contact, chord in terms of middle points, conjugate diameter, director circles. 3D Geometry-straight lines, Planes and Equation of solid bodies.

CSE104 DISCRETE MATHEMATICS
3 hours in a week & 3 Credits
Introduction: Set theory-Set operation, Representation of Sets, Algebraic Properties of set, computer representation of set, Logic-Prepositional Calculus, Logic and bit operation, Predicate and quantifier, Translating sentence into logical expressions; Function: Introduction of function, some important function, Properties of function, Sequence and summation, Relation: Representation of Relation, Properties of Relation, Some important Relations, Closures of relation; Number Theory: Fundamental Theorem of Arithmetic, Modular Arithmetic, GCD, LCM, Prime Number, Congruence; Methods of Proof, First and Second principle of Mathematical induction.; Counting Principle: Basic Counting principle, Inclusion-Exclusion principle, Application of Sum rule and Product rule, Pigeon hole principle, Permutation Combination, Binomial Theorem; Recurrence relations and recursive algorithms. Graph theory: Definition of Graph, Types of graphs, Representation of graph, Euler and Hamilton path, circuit, Graph coloring, Isomorphism of graph; Tree: Spanning tree, algorithm of several trees, Application of trees, Tree traversal , Trees and sorting.

CSE203 THEORY OF COMPUTING
2 hours in a week & 2 Credits
Basic elements of formal languages and computability; Regular languages and finite automata; Context-free grammars, languages and pushdown automata; Turing Machines, recursive languages and functions; Hierarchy of formal grammars and languages; Unsolvable/undecidable problems; Computable functions and recursive function theory; Computational complexity classes and measures; Intractable problems and NP-completeness.

CSE207 OBJECT ORIENTED PROGRAMMING (USING JAVA)
Theory: 3 hours in a week, Lab: 2 hours in a week & 4 credits
Introduction to object oriented Programming (OOP); Concepts and Techniques of OOP: Class and objects, Polymorphism and Overloading, Class hierarchy and Inheritance; OOP facilities for extensive and robust program design. Variable &Class: Local variable, global variable. Method: Method overloading and Method overriding; Class: Default constructor, abstract class, final class and static class. Object: Definition of an object, object model, relation between an object and a class. Thread: Use of a thread, different ways to get a thread, how to start a thread, special character of start method of the Thread class; Interface: Definition of an interface, use of interface, contents of an interface, an abstract class can be used as an interface. Exception: Definition of exception, how to generate, throw and handle an exception, exception ducking; Applet: Life cycle of an applet, major events in the life of an applet, looping problem of init method, embedding an applet to a web page, paint method, repaint method; Event Handling: Event source, different kind of listeners, registering the listener; Layout Management: Container, component, flow layout, border layout, grid layout; Input Output: Stream, input stream, output stream, character stream, byte stream, Reader & Writer classes to handle input and output. Networking: Socket, server socket, connect a client to a server.

CSE208 DATA STRUCTURES
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 credits
Concepts of data structures; Elementary data objects; Common data structures: Arrays, Lists, Stacks, Queues, Graphs and Trees; Advanced data structures: heaps, Fibonacci heaps, B-trees; Applications of data structures: Recursion, Sorting, Searching, Hashing, Storage Management and Solving Computational problems.

CSE209 DIGITAL LOGIC DESIGN
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 credits
Logic function and gates: Different types of gates and their truth tables, Boolean algebra, physical devices use to construct gates, NOT, AND, OR NOR, NAND and EXOR, EXNOR Universalities of gates; Simplification of logic circuits: The map methods, product of sum simplification, Sum of product methods, graphical methods, pairs, quad and octets; Combinational logic circuits: Adders, subtractor, binary parallel adders, carry look-ahead adder, decoder, encoder, multiplexer & demultiplexer. Sequential circuits: Oscillators & multivibrators, Flip – Flops – R- S J- K & D- Flip – Flops, Counters binary up-down, shift registers; IC Logic Families: DTL, TTL,ECL, MOS, CMOS, I2L and their circuits; Memory devices: Semiconductor memories, RAM ,ROM, PLA's, EPROM, magnetic core memories; Converters: Different types of A/D and D/A Converters with applications.

CSE210 ALGORITHMS
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 credits
Algorithm, Properties of good algorithm, Algorithmic Complexity Analysis, Asymptotic Notations; Methods for the design of efficient algorithms: Divide and Conquer approach & Heaps, Greedy method, Dynamic programming, Backtracking, Branch and Bound, Polynomial evaluation, Lower bound theory; Graphs basic & traversal techniques: Representation of Graphs, Breadth First Search, Depth First Search, Algorithm of BFS and DFS, Minimum Spanning Tree, Kruskal and Prims Algorithm, Complexity Analysis; Shortest Path& Backtracking: Single Source Shortest Paths, Dijkstra's Algorithm, and Bellman-Ford Algorithm. All pair Shortest Path, Floyd Warshall Algorithm, Backtracking, n-Queen Problem, and Complexity Analysis, Branch and Bounds.

CSE211 ASSEMBLY LANGUAGE
Lab: 2 hours in a week & 1 credit
System Architecture for Assembly language; Assembly programming basics; Assembly instruction types and their formats: Arithmetic, Logical, Transfer control and conditional processing, String processing, Input/Output; Interrupts; Procedures; Interfacing using Assembly language.

MTH201 INTEGRAL CALCULUS AND DIFFERENTIAL EQUATIONS
Theory: 3 hours in a week & 3 Credits
Integral Calculus: physical meaning of integration of a function, integration as an inverse process of differentiation, different techniques of integration, definite integral as the limit of a sum and as an area. Definition of Reimann integral, fundamental theorem of integral calculus and its application to definite integrals, reduction formula, improper integrals, double integration, evaluation of areas and volume by integration.
Differential Equation: Definition and solution of ordinary differential equations, first order differential equation, second first order linear differential equation with constant coefficient, initial value problems, Bessel's and Legender's differential equation.

MTH203 COMPLEX VARIABLES, FOURIER AND LAPLACE TRANSFORM
Theory: 3 hours in a week & 3 Credits
Complex Variable: Complex number system, general functions of a complex variable, limits and continuity of a function of complex variable and related theorems, complex function differentiation and the Cauchy- Riemann equations, infinite series. Convergence and uniform convergence. Line integral of a complex function. Cauchy integral formula Liouville's theorem. Taylor's and Laurent's theorem, singular points. Residue. Cauchy's residue theorem.
Laplace Transforms: Definition. Laplace transforms of some elementary functions. Sufficient conditions for existence of Laplace transforms. Inverse Laplace transforms. Laplace transforms of derivatives. The unit step function. Periodic function. Some special theorems on Laplace transforms. Partial fraction. Solution of differential equations by Laplace transforms. Evaluation of improper integrals.
Fourier Analysis: Real and complex forms of Fourier series. Finite transform. Fourier integral. Fourier transforms and their uses in solving boundary value problems.

MTH205 LINEAR ALGEBRA AND VECTOR ANALYSIS
Theory: 3 hours in a week & 3 Credits
Linear Algebra: Introduction to systems of linear equations, Gaussian elimination, definition of matrices, algebra of matrices, transpose of a matrix and inverse of matrix, factorization, determinants, quadratic forms, matrix polynomials. Euclidean n-space, linear transformation IR n to IR m. Properties of linear transformation from IRn to IRm. Real vector spaces a subspaces. Basis and dimension. Rank and nullity. Inner product spaces. Gram- Schmidt process and QR-decomposition. Eigen values and Eigen vectors. Diagonalization linear transformation: Kernel and Range. Application of linear algebra to electric networks.
Vector Analysis: definition of vectors. Equality, addition and multiplication of vectors. Linear dependence and independence of vectors. Differentiation and integration of vectors together with elementary applications. Definitions of line, surface and volume integrals. Gradient of a scalar function, divergence and curl of vector function. Physical significance of gradient, divergence and curl. Various formulae. Integral forms of gradient, divergence and curl. Divergence theorem. Stoke's theorem. Green's and gauss's theorem.

STS301 STATISTICS AND PROBABILITY
2 hours in a week & 2 Credits
Frequency distribution of data-population and sample, mean, median, mode, geometric mean, weighted average, harmonic mean, variance, moments, skewness & kurtosis, correlation theory, linear and nonlinear regression, least square method of curve fitting, probability and its theories, discrete and continuous random variables, mathematical expectation, conditional probability, probability distribution – binomial, Poisson and normal distribution-their applications, introduction to stochastic process and applications

CSE302 COMPUTER ORGANIZATION AND ARCHITECTURE
Theory: 3 hours in a week & 3 Credits
Basic structures of computer systems; Information representation and transfer; Performance measurement; Instructions and data access methods; Control Unit: hardwired and microprogrammed; Memory organization; I/O systems and Interrupts; Arithmetic Logic Unit (ALU): arithmetic and logical operations floating point operations, ALU design; Pipelining and Parallel processing; RISC and CISC machines; Multi-processor architecture.

CSE303 DATA AND COMPUTER COMMUNICATION
Theory: 3 hours in a week & 3 Credits
Introduction to layered approach to communication systems, properties of various transmission media, calculation of channel capacity, modulation techniques and modems, multiplexes and concentrators, public services, circuit and packet switching facilities, error detection methods, local area networks and internetworking, frequency ranges: frequency ranges of telegraph speech, music and video based band signals, commercial bandwidth, application in long distance transmission, multiplexing; frequency division multiplexing(FDM), time division multiplexing(TDM), PAM, PCM; radio wave propagation; effect of ionosphere and earth-curvature, RADAR and its application. Amplitude modulation (AM), phase modulation (PM), frequency modulation (FM), radiation aerials and lines. Telephonic traffic, signaling, basic principle, introduction to mobile communication and cellular concepts; Error handling; Introduction to advanced data communication technologies and Internet.

CSE304 DATABASE SYSTEMS
Theory: 3 hours in a week, Lab: 2 hours in a week & 4 Credits
Basic concepts of data and database systems; Data models; Entity-Relationship Model; Query languages: Relational algebra and calculus, SQL; Query processing: interpretation, cost estimation, optimization; Functional dependency and normalization; Indexing and Hashing: File organization; Data Dictionary and directory systems; Database management: database administration, security & integrity; Introduction to distributed databases.

CSE314 MICROPROCESSOR AND INTERFACING
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Introduction to different types of microprocessors and programmable circuits; Study of a primitive microprocessor: architecture, instruction set, interrupt structure, interfacing I/O devices; Distinguishing features of some advanced microprocessors from Intel, Motorola, IBM and so on;
System connections and timing; Digital interfacing: programmable ports and Handshake I/O, interfacing keyboards, alphanumeric and power devices; Analog interfacing techniques and applications; Bus organization and arbitration; Maximum mode and DMA; Coprocessors; Peripherals: Displays, mass storage systems, printers, touch screens, digitizers etc.

CSE310 OPERATING SYSTEMS
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Introduction to operating system concepts; Process management: Inter process communication, concurrency and scheduling; Memory management: addressing, virtual memory techniques (paging, segmentation); File systems: implementation, security and protection; Management of I/O; Deadlock handling; Distributed operating systems: Hardware/Software concepts, communication and synchronization.

MTH311 NUMERICAL METHODS
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Significant figure, Rounding off numbers, Error in Numerical Calculation. Solution of Algebraic and Transcendental Equation, Methods for solving non-linear equations; Interpolation; Curve fitting methods; Numerical differentiation and integration; Solution of systems of linear equations; Numerical solution of ordinary differential equations.

CSE312 SOFTWARE DEVELOPMENT
Lab: 2 hours in a week & 1 Credit
Students will work in groups or individually to produce high quality software using state of the art software development tools. Students will have to prepare proper documentation as well to the software developed. Student should use his previous knowledge such as database system, data structure etc. They will use any of the following high level programming such as Java, Visual C++ or Visual Basic, Web pages with ASP/JSP/PHP as front-end Oracle, SQL Server, My SQL, Ms Access as back-end.

CSE313 SYSTEM ANALYSIS AND DESIGN
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Information and System; Systems Analysis and Systems Analyst; Information gathering techniques; Structured analysis of systems; Feasibility Study: concepts and classification, cost benefit analysis, operational feasibility; Project scheduling; Design of an information system; Describing process and data; Quality and testing;; ; Design of user interface, programs, files and databases; Security and ethical issues.

CSE402 SOFTWARE ENGINEERING
Theory: 2 hours in a week & 2 Credits
Concepts in software engineering: requirements definition, modularity, structured design, data specifications, functional specifications, verification, documentation, software maintenance, software support tools, software project organization and quality assurance approaches.

CSE403 COMPUTER GRAPHICS
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Introduction to computer graphics, hardware, software and fundamental ideas of modern computer graphics systems; Graphical data processing; Scan conversion and its side-effects; Implementation of graphics concepts of two-dimensional and three-dimensional viewing, clipping and transformations; Device independent programming, graphics primitives and attributes, interactive graphics, input devices, event driven input, user interfaces, translation, rotation, scaling, shearing, 3D graphics, projections, 3D curves and surfaces, hidden surface elimination algorithms, Raster graphics concepts: Architecture, algorithms and other image synthesis methods; Design of interactive graphic conversions; lighting models.

CSE414 INTERNET AND WEB PROGRAMMING
Theory: 1 hour in a week, Lab: 2 hours in a week & 2 Credits
HTML technology, Applications and examples, The nuts and bolts of HTML; Tools and guides; Practical considerations; Beyond HTML; Future of HTML, HTML home page authoring tools; Introduction to the PHP programming, Overview of JAVA, JAVAscript, PERL, CGI and tools; Browsing systems: browsing features and capabilities; Netscape, Internet explorer & Other browsers; Building a corporate Web Site: Using Apache server; Elements of Web server; Internet security management issues, Extensions and applications on the Web, Legal and ethical issues;

CSE409 COMPILER DESIGN
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Compiler structure, lexical analysis, symbol tables, parsing, syntax-directed translation, type checking, run-time organization, heap storage management, intermediate code generation, code optimization, error management.

CSE410 COMPUTER NETWORKING
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Introduction to computer networks, LAN, MAN and WAN; OSI reference model; TCP/IP Reference Model; Data Link Layer: Sliding window protocol, HDLC, SLIP, PPP, ALOHA, CSMA/CD, IEEE standards for LANs and MANs, Bridges; Network Layer: Routing algorithms, Internetworking, IP Protocol, Network layer in ATM network, Congestion Control Algorithms, Quality of service; Transport Layer: Transport services, TCP and UDP, ATM Adaptation layer; Application Layer: Network Security, SNMP, DNS, Electronic mail, WWW.

CSE411 ARTIFICIAL INTELLIGENCE
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Survey of basic AI concepts and controversies; Knowledge Representation: First order predicate logic and rule-based representation, inconsistencies and uncertainties, structured representation; Knowledge Organization and Manipulation: search and control strategies, game playing, planning, decision making; Perception and Communication: natural language processing, visual image understanding; Knowledge acquisition (Machine learning); Introduction to knowledge-based systems (Expert systems); AI programming languages: Prolog.

CSE412 INTRODUCTION TO VLSI
Theory: 2 hours in a week & 2 Credits
Integration Scale, SSI, MSI, LSI, VLSI, ULSI, design of reliable VLSI circuits. Introduction to MOS technology, PMOS, NMOS and CMOS transistor structures. Physics of MOS transistors, Fluid model, Electrical characteristics, MOS fabrication steps, stick diagram, design rules and layout. Noise consideration, design and operation of large fan in and fan out circuits, clocking methodology, techniques for data path and data control design, simulation techniques, parallel processing, systolic architecture.

CSE443 MANAGEMENT INFORMATION SYSTEM
Theory: 2 hours in a week & 2 Credits
Information Systems and Technologies, Business Applications, Development, and Management. Competing with Information Technology: Fundamentals of Strategic Advantage, Use of Information Technology for Strategic Advantage. The Internet, Intranets, and Extranets in Business: The Internetworked E-Business Enterprise, Enterprise Communication and Collaboration. Electronic Business Systems: Cross-Functional E-Business Systems, Functional E-Business Systems: Marketing Systems, Manufacturing Systems, Human Resource Systems ,Accounting Systems ,Financial Management Systems. Electronic Commerce Fundamentals and it's Applications with regarding issues. Decision Support in E-Business and Artificial Intelligence Technologies in Business. E-Business Planning Fundamentals, Implementing E-Business Strategies. Developing E-Business Solutions, Implementing E-Business Systems. Security, Ethical, and Societal Challenges of E-Business, Security Management of E-Business. Enterprise and Global Management of E-Business Technology. Application Hardware and Software in Business. Data Resource Management. Telecommunications and Networks .

CSE400 THESIS/PROJECT WORK
Lab 8 Hours in a week & 4 Credits
Study of problems in the field of Computer Science & Engineering.

SE400 THESIS/PROJECT WORK
Lab 8 Hours in a week & 4 Credits
Study of problems in the field of Computer Science & Engineering.

ELECTIVE/CONCENTRATION COURSES (Any three courses should be taken):

CSE431 ADVANCED DATABASE SYSTEMS
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Storage and File Structure - physical storage media, magnetic disks, RAID, tertiary storage, storage access, file organization, organization of records in files, data-dictionary storage, storage for object-oriented databases. Query processing & query optimization - measures of query cost, selection operation, sorting, join operation, other operations, evaluation of expressions, estimating statistics of expression results, transformation of relational expressions, choice of evaluation plans, materialized views. Database system architectures: centralized and client–server architectures, server system architectures, parallel systems, distributed systems, network types. Advanced transaction processing: transaction-processing monitors, transactional workflows, main-memory databases, real-time transaction systems, long-duration transactions, transaction management in multidatabases. Advanced querying and information retrieval: decision-support systems, data analysis and olap, data mining, datawarehousing, information-retrieval systems. Application development and administration: web interfaces to databases, performance tuning, performance benchmarks, standardization, E-commerce, legacy systems. Advanced data types and new applications : motivation, time in databases, spatial and geographic data, multimedia databases, mobility and personal databases

CSE432 MULTIMEDIA SYSTEMS
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Text, image and graphics, sound, audio, video, animation, music, speech, data compression techniques, JPEG, MPEG, H.261, Intel's DVI, Microsoft's AVI, audio compression, fractal compression, multimedia file standards – RTF, TIFF, RIFF, MIDI, AVI. Multimedia storage and retrieval technology, magnetic media technology, optical media technology, CD ROM and its architecture, magneto-optical devices, multimedia input, output and communication systems, pen input, video and image display systems, multimedia databases, multimedia communication systems, graphical user interface, multimedia applications, image and voice recognition, optical character recognition, tele-service, video conferencing, messaging, entertainment, virtual reality, interactive audio and video, video games.

CSE433 NEURAL NETWORKS AND FUZZY SYSTEMS
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Introduction to Neural processing, Neural networks, weights, training, feedback, noise, memory, supervised and unsupervised learning. Construction of Neural Network: Perceptrons , weight determination, binary to bipolar mapping, auto associative network, network nodes and input patterns, orthogonal bit patterns, stability and plasticity, short-term and long-term memory, layers in a Neural network, the Threshold function, applications, Neural network models, supervised learning, unsupervised learning and resonance, convergence; Competitive Network: Simple competitive network: Winner-take-all network, Adaptive Resonance Theory (ART), ART-1 architecture and algorithm, Kohonen Self-organizing Maps (SOMs), Counter Propagation Network (CPNs) ; Associative memory network; Fuzzy system: Introduction to Fuzzy system, Fuzzy relations, fuzzy numbers, Linguistic description and their analytical form, fuzzy control.

CSE434 DIGITAL SIGNAL AND IMAGE PROCESSING
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Introduction to speech, image & data processing; Discrete time signals, sequences; Linear Constant Coefficient difference equation; Sampling continuous time signals; Two dimensional sequences and systems; Z-transform, Inverse Z-transform, H-transform; Frequency domain representation, discrete time systems and signals; Fourier series and Fourier Transform; Parseval's theorem; Equivalent noise definition of bandwidth; Convolution, Correlation and method of numerical integration; Computation of the DFT: Goertzel FFT, Chirp Z transform algorithms; Digital image and its characterization. Digital image processing systems, image acquisition, quality measures of digitalized image, two dimensional image transformations, image enhancement techniques, image restoration, image analysis and understanding of image coding.

CSE435 PARALLEL AND DISTRIBUTED PROCESSING
Theory: 3 hours in a week & 3 Credits
Parallel computations, architectural model for parallel processing, pipelining and operation overlapping in numeric and nonnumeric applications, parallel algorithms, measurements of performance, distributed system architecture. Distribute computing: development of algorithms for parallel and distributed architectures, resource allocation, concurrency control, synchronization, and recovery mechanism in distributed systems, client-server model, inter-process communication, remote procedure calls. Other topics covered are: file systems – remote file access, NFS and FTAM, transactions – two phase protocols, recovery intentions list, concurrency control locks, timestamps and optimistic concurrency control.

CSE436 PATTERN RECOGNITION
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Introduction to pattern recognition: features, classifications and learning. Statistical, structural and hybrid methods; Learning algorithms; Introduction to pattern grammars and languages; Parsing techniques; Applications to speech recognition, remote sensing, biomedical area and computer aided design.

CSE437 COMPUTER VISION AND ROBOTICS
Theory: 2 hours in a week Lab: 2 hours in a week & 3 Credits
Introduction to computer vision and perception; Image generation, Physics of image and sensors, statistical, estimation, binary vision and industrial vision systems, representations of the visual world; Two-dimensional systems, common recognition problems; Introduction to robotics: industrial robots, programming systems, geometric reasoning, assembly planning, collision avoidance, mobile robots, robotics IQ test, smart robotics.

CSE-438 SIMULATION AND MODELING
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Simulation methods, model building, random number generator, statistical analysis of results, validation and verification of techniques, digital simulation of continuous systems, simulation and analytical methods for analysis of computer systems and practical problems in business and practice; Introduction to simulation packages.

CSE439 TELECOMMUNICATION ENGINEERING
Theory: 3 hours in a week & 3 Credits
Introduction: Principle, evolution, networks, exchange and international regulatory bodies. Telephone apparatus: Microphone, speakers, ringer, pulse and tone dialing mechanism, side-tone mechanism, local and central batteries and advanced features. Switching system: Introduction to analog system, digital switching systems - space division switching, blocking probability and multistage switching, time division switching and two dimensional switching. Traffic analysis: Traffic characterization, grades of service, network blocking probabilities, delay system and queuing. Modem telephone services and network: Internet telephony, facsimile, integrated services digital network, asynchronous transfer mode and intelligent networks.

CSE472 CELLULAR, MOBILE AND SATELLITE COMMUNICATION
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Concepts of mobile and cellular communication, TDMA, CDMA, SDMA. base stations, switching center, frequency range cell-splitting, fading multipath channels, delay spread & Doppler spread ,diversity technique. GSM model; Propagation of radio waves, radar equation, radar cross-section, pulse repetition frequency, range ambiguities : CW, FM-CW MTI radar, antennas, receiver processors, displays. Geo-stationary Satellite, up link, down link & cross link, transponder. Microwave transmissions and reception through satellite system. Domestic satellite receiver systems.

CSE441 OPTICAL FIBER COMMUNICATION
Theory: 3 hours in a week & 3 Credits
Introduction to advantages and future prospect of Optical Fiber Communication. Optical Fiber – mode theory, fiber types and characteristics. Light sources: light emitting diode and laser diode. Detectors: PIN and avalanche photo detectors. Receiver analysis: direct detection and coherent detection, noises and limitations. Transmission limitations: chromatic dispersion, nonlinear reflection, scattering, four wave mixing, laser phase noises. Optical amplifier: laser and fiber amplifiers. Multi-channels optical systems: frequency division and wavelength division multi-channels system. Optical devices, components and communication.

CSE455 DIGITAL ELECTRONICS AND PULSE TECHNIQUES
Theory: 2 hours in a week, Lab: 2 hours in a week & 3 Credits
Diode logic; Transistor switches; Logic Families: RTL, DTL, DCTL, TTL, ECL, IIL, MOS, CMOS; Electronic circuits for flip-flops, counters and registers, memory systems, PLAs; A/D and D/A converters with applications; Comparator circuits; Switching circuits; Multi vibrator: monostable, bistable, astable, Schmitt trigger; Voltage and current time-based generators; Timing circuits.

CSE492 EMBEDDED SYSTEM
Theory: 2 hours in a week. Lab: 2 hours in a week & 3 Credits
Introduction to Embedded and Real-time Systems, Characteristics of Embedded system. RTOS: Real time Operating Systems, Pre-emptive and Non-pre-emptive Scheduling. Scheduling: Data Flow Graph, Distribution Graph, Force Calculation . Data path: Resource Allocation, Data Binding, Data path Synthesis . High Level Synthesis. RTX operating system environment. Software Synthesis I : Software scheduling problem, process state, Software Estimation. Software Synthesis II : Rate Monotonic Priority Assignment, Utilization Based Analysis, Response Time Algorithm. Software Synthesis III: Polling server, Schedulability analysis, Total Bandwidth Server. Hardware Software Co-design and Embedded SoPC (System on Programmable Chips). Accelerator based Embedded System. Fault-tolerant Embedded Systems .

MANARAT INTERNATIONAL UNIVERSITY

Permanent Campus:
Ashulia Model Town, Khagan, Ashulia, Dhaka
Phone: 01819245895, 01780364415, 01709126391

Gulshan Own Campus:
Plot # CEN-16, Road # 106 Gulshan-2, Dhaka 1212.
Phone: +88-02-55060025, 222262251, 01780364414
E-mail: admission@manarat.ac.bd