



CHITTAGONG UNIVERSITY OF ENGINEERING & TECHNOLOGY

UNDERGRADUATE HANDBOOK

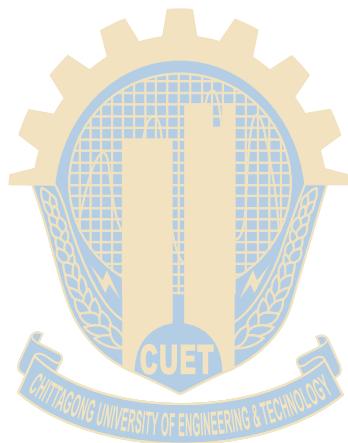
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

CSE 2015

Effective From Session 2014-2015

Undergraduate Handbook

**Rules, Regulations and Syllabuses
for the degree of
B. Sc. Engineering (CSE)**



Department of
Computer Science & Engineering (CSE)
Chittagong University of Engineering & Technology (CUET)
Chittagong-4349, Bangladesh.

Published by

Department of Computer Science & Engineering
Chittagong University of Engineering & Technology
Chittagong-4349, Bangladesh.

February 2015

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Vice-Chancellor's Welcome Message

Message of Vice-Chancellor

I am very glad to know that the department of Computer Science & Engineering (CSE), Chittagong University of Engineering & Technology (CUET) is going to publish an undergraduate hand book for the year 2015. Every year we start a new academic year with high inspiration.



To establish an honorable position in the global competitive space higher education is the fundamental building block of any nation. We are very much dignified to act as contributors to the socio-economic transformation of our nation.

You would be delighted to know that CUET is one of the prominent and prestigious autonomous self-degree awarding universities in the engineering education of Bangladesh. It was established in 1968 as Chittagong Engineering College and converted into University in September 2003. Our mission is to provide you the best start for your professional future. We have dedicated faculty and staff to shape your dream into reality. Our new vision is to become a leader in the evolution of engineering education in Bangladesh.

The department of CSE, CUET has already achieved reputation for its outstanding quality of education and research activities at undergraduate and graduate level. I hope the students will be able to groom their potentiality in the establishment of a digitally enabled CUET within next few years and I would like to inform you that as a Vice-Chancellor of this university, I have a dream to establish a digitally enabled CUET within next few years. I am happy to hear that this prospectus will guide students about the courses being offered by this department. I congratulate all the faculty members of this department for their dedication in teaching, learning and research.

I hope the department of CSE, CUET will continue to improve and expand their academic program and do everything to achieve the goals of this university.

I wish you a very successful academic year.

A handwritten signature in black ink, appearing to read "Jahangir Alam".

Prof. Dr. Md. Jahangir Alam
Vice-Chancellor
Chittagong University of Engineering & Technology

Message of the Pro Vice-Chancellor

Message of Pro Vice-Chancellor



It gives me immense pleasure to know that the department of Computer Science & Engineering (CSE), Chittagong University of Engineering & Technology (CUET) is going to publish a hand book for the undergraduate students.

CUET was established with the specific purpose of developing expertise in various fields of engineering & technology for advanced studies. We have already outlined a vision of CUET for the future and made a roadmap for turning that vision into reality.

As a Pro Vice-Chancellor, I have the opportunity to observe the extraordinary talent of our students and the dedication of our faculty and staff. The faculty and staff of the department of CSE have worked tirelessly to provide flexible, attractive, and relevant education at the undergraduate and graduate levels to meet the challenges of today's rapid changing world. In addition, this department was organized a number of conferences, workshops and seminars. The department has fulfilled their commitments to the highest levels of excellence in teaching and research as they strive to enhance the profound and positive impact of computer science for the future of Bangladesh and the whole world.

I am very proud of the achievement of the department of CSE this year and wish for a successful new academic year.

A handwritten signature in black ink, appearing to read "Rafiqul Alam".

Prof. Mohammad Rafiqul Alam
Pro Vice-Chancellor
Chittagong University of Engineering & Technology

Message of the Dean

Message of the Dean



I am very pleased to know that the department of Computer Science & Engineering (CSE), Chittagong University of Engineering & Technology (CUET) is publishing an undergraduate hand book covering an introduction about CUET, detail information of the department of CSE, the academic rules and regulations, details outlines of the courses and so on.

The department of CSE is devoted to contribute to the information age of the world by preparing highly productive and well-respected computer graduates. Our students are well developed with strong foundation in education and experience keeping consistency with the increasing demand of computing in our society. We work for building up an excellent research community comprising of faculty members and students, and thus advancing the state-of-the-art for the benefit of the society. I am very impressed with our faculty and staff and the way they are working for preparing our students as internationally competent professionals.

It is a good time for CSE to be thoughtful, to be aggressive, to think big, reach high, and become even greater as a department. I look back with satisfaction on the successes and look forward with anticipation to even more successes of the department in the future.

A handwritten signature in black ink, appearing to read "Prof. Dr. Muhammad Ibrahim Khan".

Prof. Dr. Muhammad Ibrahim Khan

Dean
Faculty of Electrical & Computer Engineering
Chittagong University of Engineering & Technology

Message of the Head of the Department



I welcome you to the department of Computer Science & Engineering (CSE) of Chittagong University of Engineering & Technology (CUET). I am very happy to inform you that we are going to publish an undergraduate handbook for the academic year 2015 covering a brief introduction about CUET, its historical background, administration, academic ordinance, course curriculum and other essential information. Moreover, it includes the detail information of our department such as laboratory facilities, research programs, extracurricular activities etc. In addition, it includes the academic rules and regulations such as admission procedure, course registration, credit structure, grading system, performance evaluation, degree completion requirements etc. Finally, this brochure contains the detailed outlines of the courses offered by this department in different levels and terms.

The department of CSE, CUET was established in 1998 to lead our country in higher education, research and development of science and technology. Our department provides a platform of world-class academic and research environment in the areas of Algorithms, Databases, Networking, Software Engineering, Theoretical Computer Science, Computer Graphics, Bioinformatics, Data Mining, Multimedia Security, Computer vision, Wireless Communication, Data Communication, Digital Signal Processing, and so on in undergraduate and graduate level of studies. The undergraduate and graduate programs of this department are designed to improve the competitiveness of the graduates with a strong theoretical background, professional and research skills.

I would like to inform you that the faculty members of this department have high-quality publications in prestigious conferences and journals. Moreover, they earn prestigious awards and professional recognition. We are working continuously to strengthen our programs to ensure a high-quality education for our students. For the first time we successfully organized 1st National Conference (NCICIT-2013) which was held on 21st November-2013 at the department of CSE, CUET and International Conference (IFOST-2014) which was held on 21st to 23rd October 2014 at Long Beach Hotel, Cox's Bazar, Bangladesh. In addition, we arrange distinguished lectures with a number of outstanding speakers. We also invite renowned multinational companies for organizing campus recruitment and cooperate students to get a foundation for their job career. Besides academic and professional activities, we usually arrange picnic, sports and some other social activities.

This handbook is considered as an indispensable reference for the students of their entire four year undergraduate academic program.

A handwritten signature in black ink, appearing to read "Kaushik Deb".

Prof. Dr. Kaushik Deb

Head

Department of Computer Science & Engineering
Chittagong University of Engineering & Technology

General Information

Introduction

01

1.1 Introduction

Chittagong University of Engineering & Technology (CUET) is one of the leading public universities of Bangladesh. It is situated alongside the Chittagong-Kaptai road, 25 km away from the city of Chittagong, the grand sea port and the second largest city of Bangladesh. The university is taking shape on 163 acres of land in a magnificent natural setting comprising pristine hills, plane lands and lakes with numerous species of plants. It is playing a pioneering role for higher education, research and development in the field of engineering and applied sciences since its inception as Engineering College, Chittagong in the year 1968. To meet the increasing demand of professional engineers for the national development, the National Economic Council of the Government of Pakistan was decided to establish the Engineering College, Chittagong on August 28, 1962 and the college started functioning on December 28, 1968 by admitting 120 students in its first academic session under the faculty of Engineering, University of Chittagong. The Engineering College, later on July 1, 1986, was declared as a self-degree awarding Institution and was renamed '**Bangladesh Institute of Technology (BIT), Chittagong**' under the BIT Ordinance 1986. On September 1, 2003, the Institute was converted into a university named as '**Chittagong University of Engineering & Technology**' under the CUET Act, 2003. The country's lone hydroelectric power station, oil refinery and many other heavy industries are situated in Chittagong. The brisk industrialization of Chittagong, congruent with geographical advantage of the country's premier sea-port has given CUET a locational advantage and opportunity for analyzing urban and industrial problems, exploring new areas of research in automation, coastal engineering and other applied fields of activities. CUET sets its guiding principles to foster the best professional competence by coupling pedagogy and research with relevance to the real-world problems. Thus the students of this university are enjoying unique and inimitable environment of learning.



CUET Entrance



CUET Shahid Minar

1.2 The University at a Glance

CUET at a Glance			
Chancellor		Vice-Chancellor	
Mr. Md. Abdul Hamid Hon'ble President of the People's Republic of Bangladesh		Prof. Dr. Md. Jahangir Alam	
1968: Year of Establishment		1986: Transformation into Bangladesh Institute of Technology (BIT), Chittagong	
2003: Conversion into Chittagong University of Engineering & Technology (CUET)			
Land		Location	
163 acres of land blessed with natural lakes and hills		Along side of the Chittagong-Kaptai road, 25 kilometers from the center of Chittagong City	
Faculty	Departments	Students Intake	
		UnderGraduate Program (B.Sc. Engg./ B.Arch./ B.URP)	Graduate Program (M.Sc. Engg./ M. Engg./ M.Phil./ Ph.D.) (Approx. no. of students)
Faculty of Civil Engineering	➤ Dept. of Civil Engineering (CE) ➤ Dept. of Disaster & Environmental Engineering (DEE)	130 (CE)	30 (CE) 30 (DEE)
Faculty of Mechanical Engineering	➤ Dept. of Mechanical Engineering (ME) ➤ Dept. of Petroleum & Mining Engineering (PME)	130 (ME) 30 (PME)	30 (ME)
Faculty of Electrical & Computer Engineering	➤ Dept. of Electrical & Electronic Engineering (EEE) ➤ Dept. of Computer Science & Engineering (CSE) ➤ Dept. of Electronics & Tele-Communication Engineering	130 (EEE) 120 (CSE) 30 (ETE)	30 (EEE) 30 (CSE)
Faculty of Architecture & Planning	➤ Dept. of Architecture ➤ Dept. of Urban & Regional Planning (URP) ➤ Dept. of Humanities	30 (Architecture) 30 (URP)	- -
Faculty of Engineering & Technology	➤ Dept. of Physics (Phy) ➤ Dept. of Chemistry (Chem) ➤ Dept. of Mathematics (Math)		10 (Phy) 10 (Chem) 10 (Math)
Total students intake per academic year		630	180 (Approx.)
Institutes & Centers		Halls	
➤ Institute of Earthquake Engineering Research (IEER) ➤ Institute of Information & Communication Technology (IICT) ➤ Center for Environmental Science & Engineering (CESE) ➤ Institute of Energy Technology (IET) ➤ Language Center ➤ Bureau of Research, Testing & Consultancy (BRTC) ➤ Directorate of Planning & Development ➤ Directorate of Research & Extension		➤ For Male Students : 04 (accommodation : 2036) ➤ For Female Students : 01 (accommodation : 240)	
Current Students		Graduated Students	
3017 (Undergraduate), 745 (Graduate)		6385 (M=6018, F=367)	
Faculty Members		Officers and Staffs	
187		67+216=283	

1.3 Administration

The Vice-Chancellor is the Chief Executive Officer of the university. The Chancellor of the university, Honorable President of the People's Republic of Bangladesh, appoints the Vice-Chancellor for a four-year term. The administrative team comprises Vice-Chancellor, Pro-Vice-Chancellor, Deans of the Faculties, Directors of the institutes, Registrar, Heads of the academic departments, Librarian, Provosts of the residential halls, Director (Student-Welfare), Director (Planning & Development), Director (Research & Extension), Comptroller, Controller of the Examinations, Chief Engineer, and the Chief Medical Officer.

The Syndicate is the principal executive body of the university and it consists of 16 members. The Academic Council, the Finance Committee (FC) and the Planning & Development (P&D) Committee, etc. assist the Syndicate. The Academic Council, comprising the faculty of the university and other external expert members are the educational body of the university.

2. Department of Computer Science & Engineering

2.1 Mission

- The Department of Computer Science & Engineering, CUET is devoted to contribute to the information age of the world through preparing highly adored, productive and well-respected computer graduates.
- We develop our students with a strong foundation in education and experience keeping consistency with the increasing demand of computing in our society.
- We work for building up a vibrant research community comprising of faculty members, students and thus advancing the state of the art for the benefit of society by developing new ideas in research and inventions.
- We have plans to exploit the computational and research potentials of the south-east region of the country and lead the country in information technology by collaborating with the key academic and industrial partners within and outside CUET.

2.2 Introduction

The department of Computer Science & Engineering is the home of scholars and outstanding students and researchers who not only share passion for Engineering but also possess the capability of turning ideas into reality. With the main educational goal to prepare students for research and teaching careers either in universities or in industry,



CUET Convocation 2012

the department started its journey in 1998. Today the department provides one of the strongest centers for computer science and engineering research, covering such diverse areas as image processing, wireless communication, artificial intelligence, architecture, computational biology, information and data management, networks, software systems, multimedia security and graphics. From the year 2011, the department is launching post-graduate programs, viz. M. Sc. Engineering and M. Engineering. With an intake of 120 and 30 students per academic session in undergraduate and graduate level respectively, the department of CSE provides quality education with its competent faculty members and modern laboratories having state of the art equipment's. Our students, both graduate and undergraduate, excel on the national and international stages. About 500 graduates have already earned B.Sc. Engineering degree under this department. We are proud of our history and current status, and we strive towards continued excellence in research, education in the field of Computer Science & Engineering.

2.3 Course Curriculum

The department offers many up-to-date courses in the various branches of Computer Science and Engineering that include Electronics, Digital Logic and

System Design, Algorithm, Compiler Design, Software Engineering, Database Management System, Artificial Intelligence, Computer Networks, Numerical Analysis, Theory of Computing, Multimedia System, Communication Engineering, Fuzzy Logic and Neural Networks, Computer Graphics, Image Processing, etc. Moreover, the students are taught a few courses of basic electrical and mechanical engineering to groom them in basic engineering. Students have to complete some courses on basic sciences, e.g. Physics, Mathematics and Chemistry. The courses on Accounting, Economics, Management, Sociology and English etc. are also mandatory and these are offered by the department of Humanities, CUET. To meet the necessary demand of the real world, the academic committee of the department, comprised of faculty and other external experts from various fields, updates the course curriculum time-to-time. The department, and the university itself as a whole, maintain the medium of instruction as well as evaluation process completely in English.

2.4 Laboratory Facilities

The state-of-the-art laboratory facilities in the department of CSE provides a mechanism for the students to gain hands-on experience that will aid their understanding of the engineering and scientific theories taught in their classes. The Department has following laboratories: Microcomputer laboratory, Communication laboratory, Multimedia laboratory, Hardware & Networking laboratory, Microprocessor & Interfacing laboratory, Electronics & Circuit laboratory, and Natural Language Processing laboratory.

● Microcomputer Laboratory

The Microcomputer Laboratory is well equipped with 45 high-end workstations and servers and enriched with high speed internet connectivity. This laboratory provides facilities to conduct sessional (practical) classes of various courses like Web Programming, C/C++, Software Engineering, Data Structure, Database Systems, Numerical Analysis, etc. Every year the department of CSE organizes a number of programming contests in this laboratory.

● Communication Laboratory

The Communication Laboratory has a number of modern equipment's such as Modulator-Demodulator tools, Fiber Optics communication tools, GPRS Modems, etc. From this laboratory students acquire the basic knowledge of 2G Technology (GSM, CDMA), 2.5G Technology (GPRS, EDGE), 3G Technology (UMTS), etc.

● Microprocessor & Interfacing Laboratory

The Microprocessor & Interfacing Laboratory has various interfacing equipment's to facilitate the experiments exhibiting the computer control over industrial process. It has a range of microprocessor trainer kits and PLC trainer with software including data inputs simulator and terminal. Moreover the laboratory possesses Robotic arms by which the students can perform human-robot interaction related experiments.

● Multimedia Laboratory

The Multimedia Laboratory has apposite settings of high configured workstations, multimedia projector, scanner, digital camera, video capturing tools, sound systems, etc. Here the students have unique opportunity to broaden their knowledge in the amazing world of multimedia technology.

• Hardware & Networking Laboratory

The Hardware & Networking Laboratory consists of 45 high-end workstations, different series of routers, switches, Modems and various kinds of modern equipment's. It provides facilities to conduct laboratory work relevant to the course of computer networking and internet applications.

• Electronics & Circuit Laboratory

The Electronics & Circuit Laboratory contains various electronics equipment's for designing and implementation of digital circuits. It has large collection of ICs and trainer boards.



Students Working at Lab

2.5 Researches**a. Undergraduate Thesis or Projects**

The faculty members of CSE department are conducting research work in different fields and they always encourage students to do research from the undergraduate level. A thesis oriented project course named as 'Project & Thesis' worth of 4 credit hours is included in the syllabus of the undergraduate level. The duration of the course work is 2 semesters. In Level 4 Term 1, students are encouraged to submit their research proposal which contains 1 credit hour and in the following Term, the total research work or project is presented carrying the rest 3 credit hours. The main objective is to give students a proper learning of how to do research and flourish their innovative ideas and implement their thoughts as real world applications. Different topics relevant to Computer Science like Bioinformatics, Software Engineering, Algorithm Design, Data mining, Green Technology, Communication Engineering, Networking, Robotics & Computer Vision, Multimedia Security etc. are covered in undergraduate thesis works.

b. CSERJ

Computer Engineering has been the key force behind the recent technological development in the world. The Computer Science and Engineering Research Journal (ISSN: 1990-4010) aims to publish the latest research results, current practices, future trends and interchange ideas with a view to solving and locating different problems in all aspects of Computer Science and Engineering and its related fields. The journal aims to publish original research papers after being properly reviewed by the respective experts. This journal is published every year by the department of Computer Science and Engineering, Chittagong University of Engineering and Technology (CUET). All the details are available at <http://www.cse.cuet.ac.bd/cserj/>

c. Publications

The faculty members of CSE department usually publish a large number of research papers every year. Between the years 2002-2014 more than 100 research papers by the faculty of this department have been published in several renowned international journals and conference proceedings including IEEE, ICCIT, ICECE, AJIT, TJER, ICCPB, IFOST, BIBM, TSP, ISCAS, MWSCAS etc. Four papers have received "Best Paper Award" in the year of 2010, 2011, 2013 and 2014. The research works are motivated by the academic interests as well as the socio-economic problems at national level.

Publications (Journals)	Publications (Conferences)
Journal Name	Conference Name
Journal of Lecture Notes in Artificial Intelligence, Springer	IEEE International Forum on Strategic Technology [Received Best Paper Award]
Science & Engineering Research Journal	International Conference on Electrical Information and Communication Technology [Received Best Paper Award]
International Journal of Control, Automation and Systems, Springer	International Conference on Informatics, Electronics, and Vision
Cybernetics and Systems: An International Journal	International Conference on Control Automation and Systems
Journal of Lecture Notes in Computer Science, Springer	Intelligent Transportation Systems World Congress, Busan, Korea [Received Outstanding Paper Award]
Journal of Computers	IEEE International Symposium on Circuits and Systems
Journal of Intelligent Service Robotics	IEEE The Society of Instrument and Control Engineers
Science & Engineering Research Journal	IEEE International Conference on Granular Computing
MIST journal	Computer Vision and Image Understanding
Journal of Institute of Control, Robotics and Systems	IEEE International Midwest Symposium on Circuits and Systems
International Journal of Computer Technology and Applications	IEEE International Conference on Wireless and Mobile Computing, Networking and Communications
Computer Science and Engineering Research Journal	Asia-Pacific Conference on Communications
IET communications	Queen's Biennial Symposium on Communications
KSII Transactions on Internet and Information Systems	IEEE International Conference on Intelligent Information Hiding and Multimedia Signal Processing
Journal of Communications and Networking	International Conference on Intelligent Computing
IEICE Transactions on Fundamentals of Electronics, Communication and Computer Sciences	Korea Information Processing Society Conference
IEICE Transactions on Communications	Engineering and Arts Society Conference in Korea
IEEE Communications Letters	International Conference on Computer & Information Technology
International Journal of Signal Processing, Image Processing and Pattern Recognition	International Conference on Flexible Query Answering Systems
Global Journal of Computer Science & Technology	IEEE International Conference on Bioinformatics and Biomedicine
International Journal of Advanced Robotics	IEEE Conference on Open Systems, Malaysia
Paladyn. Journal of Behavioral Robotics	International Conference on Advances in Civil Engineering
International Journal of Advanced Science & Technology	International Conference on Telecommunication and Signal Processing
International Journal of Computer Science & Information Technology	IEEE International Symposium on Robot and Human Interactive Communication
International Journal of Computer Science and Network Security	IEEE/RSJ International Conference on Intelligent Robots and Systems
International Journal of Advanced Computer Science and Application	ACM/IEEE International Conference on Human Robot Interaction
Advanced Science Letter	International Conference on Electrical and Computer Engineering
Smart Computing Review	International Conference on Electrical, Computer and Telecommunication Engineering
FEBS Letters	International Conference on Computer, Communication, Control and Information Technology
Journal of Information Security and Application	International Conference on Mechanical Engineering and Renewable Energy
Journal of the Whale Culture Association of Korea	National Conference of Intelligent Computing &
International Journal of Speech Technology	
Journal of Signal Processing	
Journal of the Engineering and Arts Society in Korea	
Journal of Acoustical Society of America	
Korea Society of Computer and Information Transaction	
Korea Information Processing Society Transaction	

2.6 Co-Curricular Activities

a. Computer Club

Department of Computer Science & Engineering (CSE) has started the activities of computer club which includes Web development, Software development, Programming Contest, Mobile Application, Linux Operating System etc. for the betterment of the practical skills of the CSE students.



b. Programming Contests

The students of CSE department are doing a praiseworthy performance in logic developing. Every year CSE department of CUET organizes a regional programming

contest consisting of the universities of Chittagong division. Besides students participate in different regional & national programming contests hosted and held in other universities of Bangladesh. CUET occupies the top position in the regional programming contest and performs well in national and international programming contests. In the last International Collegiate Programming Contest (ICPC-2010), the team from CSE-CUET got the 9th place in the university ranking in the South Asia region. The following table counts the performance of the department team in the various programming contests:

Team Name	Contest Name	Venue	Year	Position
CUET_OPROKRITISTHO	NSU ICPC	NSU	2010	16
CUET_ICON	IUT IUPC	IUT	2010	17
CUET_ICON	IIUC IUPC DIV	IIUC	2011	1
CUET_ICON	CUET IUPC DIV	CUET	2011	1
CUET_ICON	BGC IUPC DIV	BGC Trust University	2011	2
CUET_OPROKRITOSTHO	CU IUPC DIV	CU	2011	1
CUET_OPROKRITOSTHO	NSU ICPC	NSU	2011	17
CUET_ULTRAVIOLET	BUET IUPC	BUET	2012	18
CUET_DYNAMIC	BUBT IUPC	BUBT	2012	17
CUET_DYNAMIC	BGC IUPC	BGC Trust University	2012	17
CUET_[~:]	CUET IUPC DIV	CUET	2012	1
CUET_NOT_FOUND	IIUC IUPC DIV	IIUC	2012	1
CUET_ULTRAVIOLET	CUET IUPC DIV	CUET	2013	1
CUET_ULTRAVIOLET	ACM ICPC	NSU	2013	35
CUET_ULTRAVIOLET	CUET IUPC DIV	CUET	2014	1
CUET_STRANGERS	IIUC IUPC DIV	IIUC	2014	1
CUET_ONE_1	ACM ICPC	BUBT	2014	19

c. Projects Show

The department of Computer science & Engineering arranges project show to motivate our young talented software and hardware engineers to boost their innovativeness and design potentials up. The opportunity also creates a national awareness for the Software development and Hardware project implementation skills in our country.

d. Industrial Training

To bridge the gap between the academia and industry, the department arranges industrial training for the final year students as a part of their academic program. Through this industrial training, students undergo hands-on training in different reputed software companies e.g. Therap, SDSL, EATL, Datasoft, CEL, Brain Station-23 etc. as well as telecommunication companies of the country such as Teletalk, Grameen Phone, Banglalink, Robi, etc. Students also get the chance to acquire practical skills and professional experience right before they graduate and begin their careers. Likewise, the department organizes the study tours for the students to various esteemed organizations with a view to groom them for the professional competence of those very organizations. Every now and then, the department also offers workshops and training sessions for the students to make them familiar with the latest computing technologies. Apart from the training, workshops and study tours are arranged by the department. The Institute of Information and Communication Technology (IICT) under the supervision of the department, offers several short courses on Web Development using PHP, JavaScript, AJAX, MySQL and different CMS and frameworks, System Administration and Server Configuration using Linux, Database Management and Administration using Oracle, etc. Furthermore, IICT acts as Cisco Local Academy provides CCNA (Cisco Certified Network Associate) training for the students of the department.

2.7 Events

a. International Conference (IFOST 2014)

Chittagong University of Engineering & Technology (CUET) was successfully organized the 9th International Forum on Strategic Technology (IFOST 2014) on 21th to 23rd October, 2014 at Long Beach Hotel, Cox's Bazar, a city of immense natural beauty of Bangladesh. Honorable Education Minister Mr. Nurul Islam Nahid MP was the chief guest at the Inauguration Ceremony of the conference. The main theme of IFOST 2014 was "Advanced Technology: Recent Trends and Their Implications". In this conference, 298 papers were accepted among the total of 693 submitted papers. Total 163 numbers of papers were presented where 114 papers

were selected as oral presentation and 49 papers were selected as poster presentation. More than 100 foreign delegates along with around 200 local researchers and scientists were participated in the conference. The Program ended with a Gala Dinner Party and Cultural Program.



Opening Ceremony of IFOST 2014

Closing Ceremony of IFOST 2014

b. National Conference (NCICIT 2013)

The 1st National Conference of Intelligent Computing and Information Technology (NCICIT) was held on 21st November, 2013 at the department of Computer Science & Engineering (CSE), Chittagong University of Engineering & Technology (CUET). The purpose of the National Conference on Intelligent Computing and Information Technology is to provide a common forum for researchers, scientists, engineers, and practitioners throughout the country to present their latest findings, ideas, developments, and applications in all areas of Computing and Information Technology. The theme of this conference is Recent Trends in Computing and Information Technology. 37 papers were accepted among the submitted papers by the researchers from all around the country. Students, Faculty members and researchers from different public and private universities of the country have presented their accepted papers and participated in the program. Md. Monirul Islam, Professor, department of Computer Science and Engineering, BUET was the Keynote Speaker of the conference. The Program ended with a Gala Dinner Party and Cultural Program. For detail information about NCICIT 2013 please visit this URL (www.cse.cuet.ac.bd/ncicit2013).



Inauguration Ceremony of NCICIT 2013

Prof. Dr. Md. Jahangir Alam, honorable VC of CUET delivering speech at the Inauguration of NCICIT 2013

c. Recruitments

On-Campus Recruitment program allows employers the opportunity to hold presentation sessions and conduct interviews among the final year students. It brings scopes for Juniors, Seniors and Graduate Students to sit for interview on campus with top employers for some of the most competitive internships and full-time jobs available.



SAMSUNG Recruitment Program 2013

The department of CSE, CUET invites and arranges recruitment program of the renowned companies to better facilitate our students who will be graduating or one step behind their graduation. So far Samsung, Enosis, Huawei, SSDL conducted their recruitment program in the department and recruited almost 25 students from CSE, CUET.

d. Seminars and Workshops

The department of Computer Science and Engineering often arranges many seminars and workshops to provide students with the most comprehensive resources and opportunities in the field of Computer Science and Engineering. The workshops provide world-class professional development training that is designed to educate students on relevant issues and equip them with the required skills and competencies.

e. Distinguished Lectures

The department invites scientists and engineering professionals who help lead their fields in new technical developments that shape the global community.



JICA is going to start IT Engineers Examination Regional Centre at CUET. In this regard an awareness seminar on ITEE was arranged on 19th August, 2014 at Department of CSE, CUET. Honorable VC of CUET, Prof. Dr. Jahangir Alam was present there as a chief guest.



Rajib Roy, Ex-Student of CUET and CEO of Royex Technologies delivered a talk in a seminar entitled "Meet the professional" at the department of CSE, CUET on the 14th August, 2014. The main purpose of this event was to create a bridge between the researcher & professional.



A 5 days long workshop on android mobile application training in CUET was held on 7th February and ended on 11th February 2014. The event was organized by the Ministry of ICT under the project of "National Application Development Awareness & Capacity Building Program".

These experts are specialized in the field of interest of their Society/Council and basically deliver a speech on the ongoing research works or future prospects of the relevant concentrations. The purpose of the lectures is to provoke discussion and debate about a range of topics and subjects, mostly oriented around computer science and engineering. Thus, our students are introduced to world class research works and can extend their knowledge and experience in the respective fields.



Dr. Ragib Hasan, Asst. Prof., Dept. of CIS University of Alabama, USA delivered a talk on "Cloud Computing: A Silver lining, or Security nightmare? An Overview of Key Research Problems in Cloud Security, and Higher Studies in USA - Opportunities and Advice" at CUET on 12th May, 2014.



Prof. Dr. M. Kaykobad, Professor, Department of Computer and Science and Engineering, Bangladesh University of Engineering and Technology delivered a talk on motivating young researchers.



Dr. Hasan Jamil, Associate Professor, Department of Computer Science, University of Idaho, USA, delivered a talk on "Graph Data Research" at CUET on the 28th May, 2014.

f. CSE Festival

The day is for celebration and gathering of all Computer Science, Computer



Inauguration Rally of CSE Festival - 2014

Cultural Night at CSE Festiva I - 2014

Engineering personalities, and anyone interested about CSE. They come and learn about the many opportunities they possess in the industry or in academia. It is the premiere outreach activity organized by the CSE department held at CUET. The department of CSE observes CSE day every year and organizes Programming Contest, Game Contest, Project Show, Seminars, Cultural Night and many other events throughout the whole day.

g. Study Tour



Picnic 2012 at Cox'sBazar

2.8 Upcoming Events

a. ICT incubator

To fulfill the mission of VISION 2021: Digital Bangladesh CUET submitted a proposal to ICT ministry of Bangladesh to establish ICT incubator in CUET. The purpose of this incubator is to ensure effective use of Information and Communication Technology (ICT) in all ICT relevant fields to make a digitally enabled country. Establishing ICT incubator/STP at CUET will facilitate building knowledge based industries, enhancing foreign exchange, research and invention etc. CUET students will get taste of professional experience during their student life through this incubator and can join in national and international well renowned companies by using their experience that they achieve in their student life.

2.9 Consultancy

The department of CSE provides consultancy services to various government and private organizations for their proper and viable automation. The consultancy services cover the feasibility study (technical and financial); preparation of Hardware and Software specifications; design and development of software; Network design and implementation; Websites design, etc.

2.10 Faculty Members

<Name> Dr. Kaushik Deb **<Position>** Professor and Head **<Qualification>** Ph.D. (Korea) **<Email>** debkaushik99@cuet.ac.bd **<Research Interest>** Computer Vision, Human Computer Interaction, Pattern Recognition

<Name> Dr. Muhammad Ibrahim Khan **<Position>** Professor **<Qualification>** Ph.D. (JU) **<Email>** muhammad_ikhancuet@yahoo.com **<Research Interest>** Computer Graphics, Image Processing, Digital Watermarking, Bioinformatics, Graph Theory

<Name> Dr. M. Moshiul Hoque **<Position>** Associate Professor **<Qualification>** Ph.D. (Japan) **<Email>** mmoshiulh@gmail.com **<Research Interest>** Natural Language Processing, Robotics, HCI

<Name> Dr. Asaduzzaman **<Position>** Associate Professor **<Qualification>** Ph.D. (Korea) **<Email>** asad@cuet.ac.bd **<Research Interest>** Wireless Communication & Networking

<Name> Dr. Mohammad Shamsul Arefin **<Position>** Associate Professor **<Qualification>** Ph.D. (Japan) **<Email>** sarefin@cuet.ac.bd **<Research Interest>** Data Mining, Cloud Computing, Big Data Management, Semantic web, Multilingual Data Management, Object Oriented System Development, Distributed System

<Name> Mir Md Saki Kowsar **<Position>** Assistant Professor **<Qualification>** B.Sc. in EEE (CUET) **<Email>** sakikowsar@cuet.ac.bd **<Research Interest>** Computer Networks, Data Communication

<Name> A.H.M. Ashfak Habib **<Position>** Assistant Professor **<Qualification>** M.Sc. in CSE (BUET), (On study leave for Ph.D. Program, Malaysia) **<Email>** ashfak@cuet.ac.bd **<Research Interest>** Graph Theory, VLSI, Computational Geometry, Networking

<Name> Mohammad Obaidur Rahman **<Position>** Assistant Professor **<Qualification>** B.Sc. in EEE (BUET) **<Email>** obaidur_91@cuet.ac.bd **<Research Interest>** Microprocessor & Interfacing, Communication

<Name> Dr. Md. Mokammel Haque **<Position>** Assistant Professor **<Qualification>** Ph.D. (Australia) **<Email>** mokammel@cuet.ac.bd **<Research Interest>** Wireless Sensor Network, Mobile Ad-Hoc Network, Cryptography

<Name> Dr. Pranab Kumar Dhar **<Position>** Assistant Professor **<Qualification>** Ph.D. (Japan) **<Email>** pranab_cse@yahoo.com **<Research Interest>** Multimedia Security, Digital Watermarking, Multimedia Data Compression, Digital Signal Processing

<Name> Md. Monjur-ul Hasan **<Position>** Assistant Professor **<Qualification>** M.Sc. in CSE (Canada) **<Email>** monjur@cuet.ac.bd **<Research Interest>** Software Engineering, Operating System

<Name> Muhammed Kamal Hossen **<Position>** Assistant Professor **<Qualification>** B.Sc. in CSE (CUET) **<Email>** mkhossen@cuet.ac.bd **<Research Interest>** Microprocessor & Computer Interfacing, Software Engineering

<Name> Thomas Chowdhury **<Position>** Assistant Professor **<Qualification>** M.Sc. in CSE (Canada), (On study leave for Ph.D. Program, Canada) **<Email>** thmschy@cuet.ac.bd **<Research Interest>** Robotics, Networking

<Name> Md. Enamul Hoque Prince **<Position>** Assistant Professor
<Qualification> M.Sc. (Canada), (On study leave for Ph.D. Program, Canada) **<Email>** enamul_hoque@cuet.ac.bd **<Research Interest>** Information Visualization, Natural Language Processing, Information retrieval

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<Name> Tauhidul Alam **<Position>** Assistant Professor **<Qualification>** B.Sc. in CSE (CUET), (On study leave for Ph.D. Program, USA) **<Email>** tauhid_cuet@cuet.ac.bd **<Research Interest>** Data Mining, Mobile Computing

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<Name> Md. Iqbal Hasan Sarkar **<Position>** Assistant Professor
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<Name> Mahfuzul Hoq Chowdhury **<Position>** Assistant Professor
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<Name> A.S.M. Kayes **<Position>** Lecturer **<Qualification>** B.Sc. in CSE (CUET) (On study leave for Ph.D. Program, Australia) **<Email>** kayes99_cuet@cuet.ac.bd **<Research Interest>** Security in communication, Digital Logic & System Design

<Name> Sujan Chowdhury **<Position>** Lecturer **<Qualification>** B.Sc. in CSE (CUET), (On study leave for Ph.D. Program, Australia) **<Email>** sujan_cse@cuet.ac.bd **<Research Interest>** Image Processing, Ontology Construction

<Name> Nipa Chowdhury **<Position>** Lecturer **<Qualification>** M.Sc. (BUET), (On study leave for Ph.D. Program, Australia) **<Email>** nipa83@cuet.ac.bd
<Research Interest> Speech Recognition, Distributed Search Technique

<Name> Priyam Biswas **<Position>** Lecturer **<Qualification>** B.Sc. in CSE (BUET), (On study leave for M.Sc Program, USA) **<Email>** pbiswas@cuet.ac.bd
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<Research Interest> Image Processing, Data Mining

<Name> Ashraful Huq Suny **<Position>** Lecturer **<Qualification>** B.Sc. in CSE (CUET) **<Email>** a_suny08@yahoo.com **<Research Interest>** Algorithm

<Name> Rahma Binty Mufiz Mukta **<Position>** Lecturer **<Qualification>** B.Sc. in CSE (CUET) **<Email>** rahmamukta@gmail.com **<Research Interest>** Networking

<Name> Mohammed Safayet Arefin **<Position>** Lecturer
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<Research Interest> Natural Language Processing, Object Oriented Programming, Robotics

Academic Rules and Regulations for the Undergraduate Students

[Effective from the Level-1 Term-I of Session 2012-13 and onwards.]

CONDUCT OF ACADEMIC PROGRAMS (For undergraduate studies)

3.1 Definitions:

In this rules and regulations, unless the context otherwise requires:

- 3.1 □ "University" means the Chittagong University of Engineering & Technology abbreviated as CUET;
- 3.2 □ "Rules and Regulations" means Academic rules and regulations;
- 3.3 □ "Syndicate" means the Syndicate of the University;
- 3.4 □ "Academic Council" means the Academic Council of the University;
- 3.5 □ "Academic Committee" means Academic Committee for the Undergraduate Studies of Degree Awarding Departments as provided in Article 26 of the Act as well as Article (3) of the First Statutes;
- 3.6 □ "Vice-Chancellor" means the Vice-Chancellor of the University;
- 3.7 □ "Dean" means the Head of a Faculty of the University;
- 3.8 □ "Registrar" means the Registrar of the University;
- 3.9 □ "Department" means concerned Academic Department of the University;
- 3.10 □ "Head" means the Head of the Academic Department;
- 3.11 □ "Chairman" means the Chairman of the Examination Committee of a department of the University;
- 3.12 □ "Controller" means the Controller of Examinations of the University;
- 3.13 □ "Equivalence Committee" means the Equivalence Committee of the University;
- 3.14 □ "Level" means an academic year, consisting of Term-I and Term-II.
- 3.15 □ "Term" means Term-I or Term-II consisting of 18 weeks in each Term.
- 3.16 □ "Self Study Examination" means an examination is given for conducting examination of failed courses after two weeks of Term-II final examination results.
- 3.17 □ "Student" means a student admitted in any Degree awarding Department of the University.
- 3.18 □ "Course system" means pass or fail on course basis.
- 3.19 □ "Failed courses" means the courses registered but not appearing at the examination or not passed after appearing at the examination.
- 3.20 □ "Discontinuity" means failure to appear in all courses (theory and sessional) in a particular semester/level.

3.2 Departments:

3.2.1 Degree Awarding Departments (According to Department Code):

The University shall have the following Degree Awarding Departments:

- (i) □ Department of Civil Engineering (01);
- (ii) □ Department of Electrical & Electronic Engineering (02);
- (iii) □ Department of Mechanical Engineering (03);
- (iv) □ Department of Computer Science & Engineering (04);
- (v) □ Department of Urban and Regional Planning (05);
- (vi) □ Department of Architecture (06);
- (vii) □ Department of Petroleum and Mining Engineering (07);
- (viii) □ Department of Electronics and Telecommunication Engineering (08);
- (ix) □ Any other Department to be instituted by the Syndicate on the recommendation of the Academic Council.

3.2.2 Teaching Departments:

The University shall have the following Teaching Departments:

- (i) Department of Architecture;
- (ii) Department of Chemistry;
- (iii) Department of Civil Engineering;
- (iv) Department of Computer Science & Engineering;
- (v) Department of Electrical and Electronic Engineering;
- (vi) Department of Electronics and Telecommunication Engineering;
- (vii) Department of Humanities;
- (viii) Department of Mathematics;
- (ix) Department of Mechanical Engineering;
- (x) Department of Petroleum and Mining Engineering;
- (xi) Department of Physics;
- (xii) Department of Urban and Regional Planning;
- (xiii) Any other Department to be instituted by the Syndicate on the recommendation of the Academic Council.

3.2.3 Degrees to be Offered:

The University shall offer courses leading to the award of the following degrees:

- i) Bachelor of Science in Civil Engineering, abbreviated as B. Sc. Engineering (Civil Engineering).
- ii) Bachelor of Science in Computer Science & Engineering, abbreviated as B. Sc. Engineering (Computer Science & Engineering).
- iii) Bachelor of Science in Electrical & Electronic Engineering, abbreviated as B. Sc. Engineering (Electrical & Electronic Engineering).
- iv) Bachelor of Science in Mechanical Engineering, abbreviated as B. Sc. Engineering (Mechanical Engineering).
- v) Bachelor of Architecture, abbreviated as B. Arch.
- vi) Bachelor of Urban and Regional Planning, abbreviated as BURP.
- vii) Bachelor of Science in Petroleum and Mining Engineering, abbreviated as B. Sc. Engineering (Petroleum and Mining Engineering).
- viii) Bachelor of Science in Electronics and Telecommunication Engineering, abbreviated as B. Sc. Engineering (Electronics and Telecommunication Engineering).
- ix) Any other degree that may be awarded by a Department on the approval of the Syndicate upon the recommendation of the Academic Council.

3.2.4 Student Admission, Equivalence and Admission on Transfer:

3.2.4.1 The four academic years of study for the degree of B. Sc. Engineering and BURP shall be designated as Level-1 class, Level-2 class, Level-3 class and Level-4 class in succeeding higher Levels of study. The five academic years of study for the degree of B. Arch shall be designated as Level-1 class, Level-2 class, Level-3 class, Level-4, and Level-5 class in succeeding higher Levels of study. Students shall be admitted into the Level-1 class.

3.2.4.2 An Admission Committee shall be formed in each academic session by the Academic Council for admission into Level-1 B. Sc. Engineering, BURP and B. Arch class, vide Article 42 of the University Act.

- 3.2.4.3 According to Article 42(2) of this University Act, candidate for admission into the Level-1 class must have passed the H.S.C. Examination from a Higher Secondary Education Board in Bangladesh (after 12 years of schooling) with Physics, Chemistry and Mathematics as his/her subjects of Examination or any examination in Higher Secondary Level of examination recognised as Equivalent there to, and must also fulfil all other requirements as may be prescribed by the Admission Committee.
- 3.2.4.4 As specified in Article 42(1) of this University Act, the rules and conditions for admission into various courses of studies of Departments shall be framed by the Academic Council on the recommendation of the Admission Committee.
- 3.2.4.5 All candidates for admission into the courses of B. Sc. Engineering, BURP and B. Arch. must be the citizens of Bangladesh unless the candidature is against the seats which are reserved for foreign students. Candidates for all seats, except the reserved ones, if any, shall be selected on the basis of merit. The rules for admission into the reserved seats (for foreign students & tribal), if any, shall be framed by the Academic Council on the recommendation of the Admission Committee.
- 3.2.4.6 No candidate shall be admitted in the Level-1 class after the beginning of the corresponding session, i.e., when the classes start.
- 3.2.4.7 List of newly admitted students shall be notified in the University notice Board as well as in the University Website before commencement of the classes.
- 3.2.4.8 If any newly admitted student fails to register the courses and to attend the classes within the first two weeks time after the start of classes, he/she will not be allowed to attend his/her classes at Level-1 course(s) but his/her admission into the Level-1 of the respective academic session will remain valid up to six weeks.
- 3.2.4.9 If any student fails to report within the first six weeks time after the start of classes, his/her admission shall be cancelled.

3.2.5 Method of offering Course and Instruction:

The undergraduate curricula of Chittagong University of Engineering & Technology are based on course system. The salient features of course system are:

- 3.2.5.1 The Number of regular theoretical courses and the related examination papers shall not exceed six in each Term.
- 3.2.5.2 Provision for Continuous evaluation of student's performance, through attendance, class test, sessional class, etc.
- 3.2.5.3 Evaluation of the performance of course/courses by using Letter Grades and Grade Points instead of numerical marks;
- 3.2.5.4 Provisions for Optional/Elective courses may be available at any Level of B. Sc. Engineering, BURP and B. Arch. Courses.

3.2.5.5 In the curriculum, besides the professional courses pertaining to each discipline, there is an emphasis on acquiring knowledge in basic sciences, humanities and social sciences. Emphasis shall be given to introduce courses dealing with professional practices, project planning and management, socio-economic and environmental aspects of development projects, communication skills, etc.

3.2.6 Academic Calendar:

3.2.6.1 Number of Terms in an Academic Year (Level):

There shall be Two Terms (Term-I, Term-II) in an academic year (designated as Level). In addition, Self Study examination will be held for conducting examinations of failed course(s). The Self Study examination will be held after one week of Term-II results publication. Notification of the examination will be circulated before two weeks of the Self Study examination.

3.2.6.2 Eligibility for Self Study Examination:

A student shall be eligible for appearing at the Self Study examination if he/she attends at least 60% classes of a particular course.

3.2.6.3 Duration of Terms and Rules for Conducting Course(s):

The duration of each of the Term-I and Term-II will be a maximum of 19 weeks, which will be used as follows:

A. Term-I

Classes	13 weeks
Mid Term Break (Generally after 50% of the Term Duration)	1 week
Preparatory Leave for Examination	1 weeks
Term Final Examination Period Duration (6 days interval/course)	*4 weeks 1 day
□ □	19 weeks 1 day

**Inter Term Break

B. Term-II

Classes	13 weeks
Mid Term Break (Generally after 50% of the Term Duration)	1 week
Preparatory Leave for Examination	1 weeks
Term Final Examination Period Duration (6 days interval/course)	*4 weeks 1 day
□ □	19 weeks 1 day

Inter Term Break including Publication of Results & course registration of Self Study Examination

C. Ramadan, Puja and other Vacations throughout the Level

D. Compensatory Class (es)

□ □

Total = 51 weeks

(*Design for 05 theory courses)

(** Term-I result is to be published by 4 weeks after the Term-I final examination)

3.2.6.4 A student shall be allowed to appear at Self Study examination for a maximum of 5 (five) failed course(s) retaining his/her previous attendance and class test marks of a particular course.

3.2.6.5 The maximum grade obtainable in any course by a student in the Self Study examination shall be 'B'.

- 3.2.6.6 A student shall not be allowed to register courses of Level-3, unless he/she passes all the prescribed courses of Level-1 for B.Sc. Engineering and BURP. Similarly, a student shall not be allowed to register courses of higher Levels (Term I and Term II), unless he/she passes all the prescribed design Studio (I-X) and Visual Communication courses of different Levels for B. Arch.
- 3.2.6.7 A student not eligible for appearing at the Self Study Examination shall have to register the failed courses in regular Term. He/she shall repeat the course(s) like a regular student with prior application to the Head of the Department concerned. In that case, the maximum grade obtainable in any course by the student shall be 'B'.
- 3.2.6.8 The Head of the Department will propose through Dean of the respective Faculty an academic schedule for all academic Levels to the Academic Council for approval and will announce the same before the starting of the classes.
- 3.2.6.9 In case a student fails in sessional course(s) he/she shall have to register the same as a regular student. In that case, the maximum grade obtainable in any course by the student shall be 'B'.
- 3.2.7 Duration of Course and Course Structure:**
- 3.2.7.1 The B. Sc. Engineering and BURP courses shall extend over a period of four academic Levels, however, the B. Arch. courses shall extend over a period of five academic years.
- 3.2.7.2 The curricula of the B. Sc. Engineering, BURP and B. Arch. degree in the different Departments shall be, as proposed by the Academic Committee for Undergraduate Studies and approved by the Syndicate on recommendation of the Academic Council.
- 3.2.7.3 The Academic Committee for Undergraduate Studies shall review the curricula at least once in every academic Level and put forward the recommendations to the Academic Council.
- 3.2.7.4 Contact hour(s) of the teaching load(s) shall have to be counted according to the following guidelines:

SL. No.	Nature of Course	Contact Period (in a Term)	No. of Credits
1	Theory Lecture	1 hour per week	1.00
2	(i) Laboratory (ii) Sessional (iii) Design (iv) Design Studio (for B. Arch.)	3/2 hours per week 2 hours per week 3 hours per week 2 hours per week for Level-1 1.5 hours per week for level-2, 3 and 4 1.25 hours per week for level-5	0.75 1.00 1.50 1.00 1.00 1.00
3	Project and Thesis	3/2 hours per week 3 hours per week 6 hours per week	0.75 1.50 3.00
4	Field work	2 weeks of field work (Survey)	1.00
5	Industrial training	2 weeks	1.00
6	Professional Training (for BURP)	4 weeks	Non credit
7	Professional Training (for B. Arch.)	8 weeks	Non credit

- 3.2.7.5 Field work (Survey)/Industrial Training/ Professional Training should be completed within the time allowed for the Term. For that, if necessary, rescheduling of classes can be done in consultation with Dean of the respective Faculty.
- 3.2.7.6 Minimum credit hour requirements for the awards of bachelor's degree in Engineering, URP and Architecture will be decided by Academic Committee subject to the approval of Academic Council. However, at least 155 credit hours for B. Sc. Engineering, 159 credit hours for BURP, and 191 credit hours for B. Arch. must be earned to be eligible for graduation.
- 3.2.7.7 The total number of credit hours for which a student can register in each regular Term shall be around 25.
- 3.2.7.8 The total contact period for students including lecture and lab/sessional shall be between 25 and 35 periods per week, each period being of 50 minutes duration. Normally, there shall be five working days in a week and the working days will be counted as per the calendar days.
- 3.2.7.9 In each degree awarding Department, a teacher to be nominated by the Head of the Department shall act as Course Co-ordinator in each Level. The Course Coordinator of Level-4/ level-5 shall also be the Member Secretary to the Academic Committee.
- 3.2.7.10 A course plan for each course showing the details of lectures is to be announced by the concerned teacher at the beginning of the Term.
- 3.2.7.11 Credit in any theory subject/course shall not exceed 4 and in sessional/laboratory/ design-subject/course it shall not exceed 1.5 for B.Sc. Engineering. However, for B. Arch and BURP the Credit in any theory subject/course shall not exceed 4 Credit and the credit in sessional/design studio courses shall be as specified by the Academic Curricula.
- 3.2.7.12 Project and Thesis is to be done in Level-4 as compulsory course. The total number of credits and distribution of credits for project and thesis in two terms of Level-4 will be as incorporated in approved curriculum for B. Sc. Engineering and BURP; however, for B. Arch., Project and Thesis is to be done in Level-5 as compulsory course. The total number of credits and distribution of credits for project and thesis in two terms of Level-5 will be as incorporated in approved curriculum.
- 3.2.7.13 The assessment in laboratory/sessional courses shall be made through observation of the student at work in class, viva-voce, quiz/ jury board (for Design Studio), etc. Assessment of result of each sessional class shall be posted to the sessional card as well as to the Display Board before the next class.

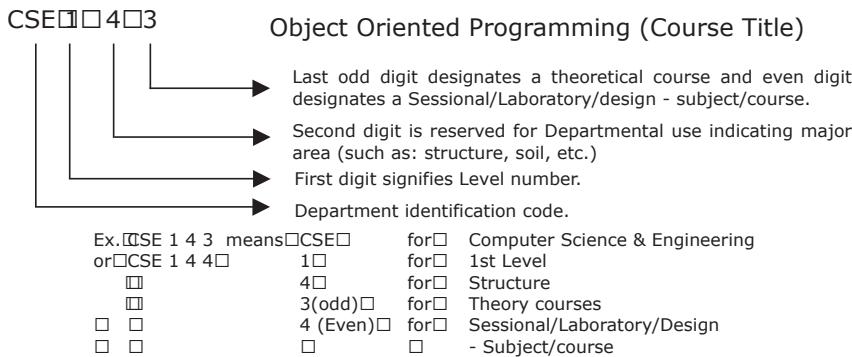
3.2.8 Course Designation and Numbering System:

Each course shall be designated by a two to four letter word identifying the Department which offers it followed by a three digit number with the following criteria.

- 3.2.8.1 The first digit shall represent the Level in which the course is taken by the students.
- 3.2.8.2 The second digit shall be reserved for Departmental use for such things as to identify different areas within a Department.

- 3.2.8.3 The last digit shall represent a theoretical course when it is an odd digit and a Sessional/Laboratory/Design-Subject/course when it is even.

The course designation system is illustrated by one example as shown below:



3.2.9 Course Offering and Instruction:

The medium of instructions is English. The compulsory and optional courses at different Levels shall be offered according to the approved curricula. The optional and incomplete course(s) shall have to be registered with the prior approval by the Head of the Department.

3.2.10 Registration Requirements:

Every regular student, if he/she wants to study, shall have to register the course(s) before the beginning of the class of each term of each level.

3.2.10.1 Registration/Form Fill up Procedure for Regular and Self Study Students:

a) The Registration and Form fill up of examination shall have to be conducted by the Department. Each student needs to fill up his/her form to appear at the examination. The date, time and venue for filling up the forms to appear at the examination will be announced in advance by the Office of the Controller of Examinations and the date, time and venue for course registration will be announced by the Registrar's Office. A student shall have to pay fine as described below for late registration beyond the time/schedule as declared by the Office of the Registrar:

- i) A student shall be allowed to register course(s) up to one week after starting classes of the Term with a late fine of Tk. 500.00.
- ii) For a period of more than one week but less/equal to two weeks after strating classes of the Term, a student shall be allowed to register course(s) with a late fine of Tk. 1000.00.
- iii) A fine of Tk. 2000.00 shall have to be paid by a student who will be registering course(s) in the period of more than two weeks but less/equal to 40% of the Term duration.

iv) A student shall not be allowed for registration of any course after 40% of the Term period elapsed. But, this may be relaxed for students completing Level 4 Term-II for B. Sc. Engineering and BURP, and Level 5 Term-II for B. Arch. final examination with recommendation from the Adviser and Head of the Department, and a late fine of Tk. 5000.00 for each such registration.

b) If a student of Level-1 fails in all theory courses registered by him/her and obtains "F" grade in each of the courses and fails to earn any credit against theory courses but may/may not earn credit against sessional course/courses, he/she shall have to register the same theory course(s) in Level-1 of the next Academic Session. The maximum grade obtainable by a student in any re-registered theory course will be "B". However grade obtained in sessional course/courses will be retained. For the re-registration of these courses an elapse of time for previous Academic Year equivalent to one Academic Year will be considered and this period will be deducted from the total period of time allowed for the completion of B. Sc. Engineering, BURP and B. Arch. degrees as mentioned in article 3.2.19 of the Academic Ordinance.

c) Registration for Self Study Students:

A student shall register course(s) to appear at the Self Study examination at least two days before starting of the examination of a particular course. The maximum number of courses to be registered by a student shall be Five (5). The maximum duration of the self Study examination shall be two weeks. The date, time and venue for filling up the forms to appear at the examination will be announced in advance by the Office of the Controller of Examinations and the date, time and venue for course registration will be announced by the Registrar's Office.

3.2.10.2 **Appointment of Adviser:**

One adviser will be appointed for each student by the Department who will advise the student about the courses to be registered by the student. The adviser will discuss with the students about his academic program and then decide the number and nature of courses for which he can register. However, it is the student's responsibility to keep contact with his adviser who will review and eventually approve the student's specific plan of study and check on subsequent progress. The number of students under each adviser will be decided by the Head of the Department concerned.

3.2.10.2 **Limits on the Credit Hours:**

A student must be enrolled for the requisite number of credits as mentioned in article 3.2.7.6 and 3.2.7.7

3.2.10.3 **Withdrawal from a Semester:**

If a student is unable to complete any Term (Term-I &/or Term-II) due to illness, accident or any other valid reason etc., he/she may apply to the Registrar through the concerned Head of the department for total withdrawal from the Term before the start of Term Final Examination.

3.2.11 Striking off the Names:

The names of the students shall be struck off and removed from the rolls of the university on the following grounds:

- 3.2.11.1 Withdrawal of names from the rolls of the University after having cleared all University fees, Hall and other dues to the University.
- 3.2.11.2 Failure to earn required credits for graduations as outlined in the respective curriculum and/or to earn CGPA requirement as per 2.1.17.4 within the maximum allowed time of seven (7) academic years for B.Sc. Engineering and BURP and eight (8) academic years for B. Arch.
- 3.2.11.3 Admission of a newly admitted student in the Level-1 class will be cancelled, if he/she fails to report within first six consecutive weeks after the beginning of the class.

3.2.12 Grading System:

- 3.2.12.1 The letter grade system shall be used to assess the performance of the student and shall be as follows:

Numerical grade	Letter grade	Grade point
80% or above	A+ (A Plus)	4.00
75% to less than 80%	A (A Regular)	3.75
70% to less than 75%	A- (A Minus)	3.50
65% to less than 70%	B+ (B Plus)	3.25
60% to less than 65%	B (B Regular)	3.00
55% to less than 60%	B- (B Minus)	2.75
50% to less than 55%	C+ (C Plus)	2.50
45% to less than 50%	C (C Regular)	2.25
40% to less than 45%	D	2.00
Less than 40%	F	0
Not register in the Registration.	I	-

A grade 'X' shall be awarded for courses (like project/Thesis, design, etc.) in the Term-I, which will continue through to the next Term-II.

- 3.2.12.2 The minimum passing grade in a theory course shall be D and the minimum passing grade in a Laboratory / Sessional / Project / Thesis, field work course/Industrial Training (henceforth referred to as sessional course) will be C.

3.2.12.3 Calculation of GPA:

Grade Point Average (GPA) is the weighted average of the grade points obtained in all the courses passed/completed by a student in a Term. 'F' grades will not be counted for GPA calculation. GPA of a Term will be calculated as follows:

$$\text{GPA} = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i},$$

where,

n is the number of courses passed by the student;

C_i is the number of credits assigned to a particular course i;

And **G_i** is the grade point corresponding to the grade awarded for i-th course.

The Cumulative Grade Point Average (CGPA) gives the cumulative performance of the student from first Term up to any other Term to which it refers and is computed by dividing the total grade points ($\Sigma C_i G_i$) accumulated up to the date by the total credit hours (ΣC_i).

$$\text{CGPA} = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i}$$

Both GPA and CGPA will be rounded off to the second place of decimal for reporting.

3.2.13.1 Distribution of marks for a given course will be as follows:

(i) Theory courses:

Class participation and attendance	10%
Class tests/Class assessment	20%
Term Final Examination (3 hours duration)	70%
Total	100%

(ii) Laboratory/Sessional/Design-subject/work courses:

a) B.Sc Engineering

Quizzes	15%
Viva-voce	15%
Class performance including reports	60%
Attendance	10%
Total	100%

b) BURP

Quizzes / Drawing Evaluation / Presentation	15%
Viva-voce	15%
Class performance including reports	60%
Attendance	10%
Total	100%

c) B. Arch.

Attendance	10%
Jury (report, preliminary Jury and final Jury)	90%
Total	100%

(iii) Project/Thesis:

a) B. Sc. Engineering and BURP:

Viva-voce	30%
External examiner	20%
Supervisor (internal examiner)	50%
Total	100%

b) B. Arch.:

Attendance	10%
Jury (report, preliminary Jury and final Jury)	90%
Total	100%

3.2.14 Basis for Awarding Marks for Class Participation and Attendance will be as Follows:

Attendance	Marks
90% and above	10%
85% to less than 90%	9%
80% to less than 85%	8%
75% to less than 80%	7%
70% to less than 75%	6%
65% to less than 70%	5%
60% to less than 65%	4%
To less than 60%	0%

3.2.15 A student will be given "F" grade in any course if he/she fails at Term final examination.

3.2.16 Class Tests:

3.2.16.1 The number of Class Tests of a course shall be ' $n+1$ ', where ' n ' is the number of credits of the course. Evaluation of the performance in the class test will be on the basis of the best ' n ' number of class tests.

3.2.16.2 Duration of each Class Test shall not be exceed 20 minutes.

3.2.16.3 For convenience of conducting the Class Tests a half an hour time slot should be kept at the beginning of each working day.

3.2.16.4 The dates for the Class Tests shall be fixed by the Course Coordinator and shall be announced accordingly.

3.2.16.5 All Class Tests shall be of equal value. The result of each individual Class Test shall be posted to Display Board for information of the students before the next Class Test is held.

3.2.16.6 The marks of the Class Tests shall be submitted to the Head of the Department before beginning of preparatory leave.

3.2.17 Earned Minimum CGPA for awarding Degree:

3.2.17.1 The courses in which a student has obtained 'D' or a higher in theory and 'C' or higher in sessional/laboratory/Project/ Thesis/Field work/Industrial Training Grade will be counted as credits earned by him/her. Any course in which a student has obtained 'F' grade will not be counted towards his/her earned credits.

3.2.17.2 A student, who obtains an 'F' grade in any course(s) in any Term, will have to repeat the course(s). If a student obtains an 'F' in an optional course(s), he/she may choose to repeat the course(s) or take substitute course(s), if available.

3.2.17.3 'F' grades will not be counted for GPA calculation. 'F' grades shall not be reflected in Transcript.

3.2.17.4 The minimum CGPA requirement for the award of Bachelor of Engineering and URP Degrees is 2.25 and that for Bachelor of Architecture is 2.20. Candidates for Bachelor's degree in Engineering, URP and Architecture shall be awarded Honors if he/she obtained CGPA 3.75 or higher.

3.2.18 Award for Academic Excellence:**3.2.18.1 Chancellor's Award**

Candidates for Bachelor's degree in Engineering, URP and Architecture shall be awarded the Chancellor's Award if their CGPA is 4.0.

3.2.18.2 Dean's Award

Candidates for Bachelor's degree in Engineering, URP and Architecture shall be awarded the Dean's Award if their CGPA is 3.75 or higher.

3.2.19 Time Limits for the Completion of Bachelor's Degree:

A student must complete all requirements for the fulfillment of degree within a maximum period of seven academic years for B. Sc. Engineering and BURP and eight academic years for B. Arch. This includes discontinuity due to any cause (fail, expulsion, not appearing in the examination etc). But, exception may be done only for those students who have passed all prescribed Sessional courses. In such cases, a prior approval of the Academic Council with recommendation from the Head of the department concerned shall be needed. In this connection, a student shall have to pay the registration fee as prescribed by the Academic Council.

3.2.20 Industrial/Professional Training Requirements:

Depending on each Department's own requirement a student shall have to complete a prescribed number of days of industrial/professional training in addition to minimum credit and other requirements, to the satisfaction of the Department.

3.2.21 Publication of Results:

3.2.21.1 A student who successfully complete the prescribed courses of all the Terms and all academic requirements for fulfillment of degrees of Bachelor's will have to apply to the Controller of Examinations through the Head of the Department for Graduation.

3.2.21.2 The Controller of Examinations shall publish the result.

3.2.21.3 Provisional degree will be awarded on completion of credit and CGPA requirement, by the Academic Council.

3.2.21.4 Students of regular batch who have completed their all courses in regular Level-4/ Level-5 Term-II examination or in respective Level-4/ Level-5 self Study examination, will be eligible to be included in the merit list of concerned academic session, provided that they must have completed and passed their project/thesis course within 45 days from the last day of Level-4/ Level-5 Self Study examination. The irregular or included students from the previous academic rules and regulations shall not be considered as regular students.

3.1.21.2 The Controller of Examinations shall publish the result.

3.1.21.3 Provisional degree will be awarded on completion of credit and CGPA requirement, by the Academic Council.

3.1.21.4 Students of regular batch who have completed their all courses in regular Level-4 Term-II examination or in respective Level-4 short term examination, will be eligible to be included in the merit list of concerned academic session, provided that they must have completed and passed their project/thesis course within 45 days from the last day of Level-4 short term examination. The irregular or included students from the previous academic rules and regulations shall not be considered as regular students.

3.2.22 Inclusion of Student(s) from Previous Course System (Introduced from the Session 1998-99 of 1st Year and New Course System from Session 2003-04 of Level-1) to Presently Followed Course System:

3.2.22.1 Incomplete and Failed course(s) of the student studying in different year of class (session-1998-99 to Session-2002-03) shall be treated as failed course(s). The student(s) shall have to clear the failed course(s) in the Examination conducted during the Short Term.

3.2.22.2 The student(s) who made discontinuity during any academic session in the previous course system will be allowed to register the course(s) of the same Level in this new course system.

3.2.22.3 Time Limit for Completion of Bachelor's Degree:

Time allowed for a student absorbed in new course system from previous course system to complete studies leading to a bachelor's degree shall be counted as follows:

- Time allowed for the completion of degree = (7-m) years
 - Where m = Academic years already spent by the student in previous course system excluding discontinuity already made (if any).

3.2.22.4 Student(s) failed to pass in different course(s) in the previous course system will be absorbed in the new course system of curricula as and when such situation will arise.

SUMMARY OF COURSES //

Level-1 Term-I B. Sc. Engineering (CSE)

Course No.	Course Title	Theory hrs/cycle	Cr	Sessional hrs/cycle	Cr	Total Credit
CSE-141	Computer Basics and Programming	3	3	-	-	3
ME-143	Basic Mechanical Engineering	3	3	-	-	3
Math-141	Differential Calculus and Integral Calculus	3	3	-	-	3
Phy-141	Physics	3	3	-	-	3
Hum-141	English and Economics (2+2)	2+2=4	4	-	-	4
CSE-142	Computer Basics and Programming (Sessional)	-	-	3	1.5	1.5
ME-144	Basic Mechanical Engineering (Sessional)	-	-	3/2	0.75	0.75
Phy-142	Physics (Sessional)		-	3	1.5	1.5
	Total:	16	16	7 ½	3.75	19.75

Level-1 Term-II B. Sc. Engineering(CSE)

Course No.	Course Title	Theory hrs/cycle	Cr	Sessional hrs/cycle	Cr	Total Credit
CSE-143	Object Oriented Programming	3	3	-	-	3
EE-181	Basic Electrical Engineering	3	3	-	-	3
Math-143	Co-ordinate Geometry & Ordinary Differential Equation	3	3	-	-	3
Chem-141	Chemistry	3	3	-	-	3
Hum-143	Sociology & Government	3	3	-	-	3
CSE-144	Object Oriented Programming (Sessional)	-	-	3	1.5	1.5
EE-182	Basic Electrical Engineering (Sessional)	-	-	3	1.5	1.5
ME-146	Engineering Drawing (Sessional)	-	-	3	1.5	1.5
Chem-142	Chemistry (Sessional)	-	-	3/2	0.75	0.75
	Total:	15	15	10 ½	5.25	20.25

SUMMARY OF COURSES

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Level-2 Term-I B. Sc. Engineering(CSE)

Course No.	Course Title	Theory hrs/cycle	Cr	Sessional hrs/cycle	Cr	Total Credit
CSE-221	Digital Logic Design	3	3	-	-	3
CSE-241	Data Structure	3	3	-	-	3
EE-281	Electronic Devices and Circuits	3	3	-	-	3
Math-241	Vector, Matrix and Fourier Analysis	3	3	-	-	3
Hum-241	Industrial Management & Accountancy (2+2)	2+2=4	4	-	-	4
CSE-222	Digital Logic Design (Sessional)	-	-	3	1.5	1.5
CSE-242	Data Structure (Sessional)	-	-	3/2	0.75	0.75
EE-282	Electronic Devices and Circuits (Sessional)	-	-	3	1.5	1.5
	Total:	16	16	7 1/2	3.75	19.75

Level-2 Term-II B. Sc. Engineering(CSE)

Course No.	Course Title	Theory hrs/cycle	Cr	Sessional hrs/cycle	Cr	Total Credit
CSE-211	Discrete Mathematics	3	3	-	-	3
CSE-223	Digital Electronics & Pulse Techniques	3	3			3
CSE-243	Algorithms Design and Analysis	3	3	-	-	3
EE-283	Electrical Drives and Instrumentation	3	3	-	-	3
Math-243	Complex Variables and Laplace Transformation	3	3	-	-	3
CSE-224	Digital Electronics & Pulse Techniques (Sessional)	-	-	3	1.5	1.5
CSE-244	Algorithms Design and Analysis (Sessional)	-	-	3	1.5	1.5
EE-284	Electrical Drives and Instrumentation (Sessional)	-	-	3	1.5	1.5
	Total:	15	15	9	4.5	19.5

SUMMARY OF COURSES

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Level-3 Term-I B. Sc. Engineering(CSE)

Course No.	Course Title	Theory hrs/cycle	Cr	Sessional hrs/cycle	Cr	Total Credit
CSE-323	Applied Statistics & Queuing Theory	3	3	-	-	3
CSE-331	Theory of Computing	2	2	-	-	2
CSE-333	Microprocessors and Assembly Language Programming	3	3	-	-	3
CSE-341	Numerical Analysis	3	3	-	-	3
CSE-351	Data Base Management Systems	3	3	-	-	3
CSE-334	Microprocessors and Assembly Language Programming (Sessional)	-	-	3	1.5	1.5
CSE-342	Numerical Analysis (Sessional)	-	-	3	1.5	1.5
CSE-352	Data Base Management Systems (Sessional)	-	-	3	1.5	1.5
	Total:	14	14	9	4.5	18.5

Level-3 Term-II B. Sc. Engineering(CSE)

Course No.	Course Title	Theory hrs/cycle	Cr	Sessional hrs/cycle	Cr	Total Credit
CSE-313	Data Communication	3	3	-	-	3
CSE-321	Computer Architecture	3	3	-	-	3
CSE-335	Operating systems	3	3	-	-	3
CSE-345	Artificial intelligence	3	3	-	-	3
CSE-353	System Analysis and Design	3	3	-	-	3
CSE-314	Data Communication (Sessional)	-	-	3/2	0.75	0.75
CSE-336	Operating systems (Sessional)	-	-	3	1.5	1.5
CSE-346	Artificial intelligence (Sessional)	-	-	3/2	0.75	0.75
CSE-354	System Analysis and Design (Sessional)	-	-	3/2	0.75	0.75
	Total:	15	15	7 1/2	3.75	18.75

Level-4 Term-I B. Sc. Engineering(CSE)

Course No.	Course Title	Theory hrs/cycle	Cr	Sessional hrs/cycle	Cr	Total Credit
CSE-411	Computer Networks	3	3	-	-	3
CSE-431	Compiler Design	3	3	-		3
CSE-437	Computer Peripherals and Interfacing	3	3	-	-	3
CSE-487	Communication Engineering	3	3	-	-	3
CSE-412	Computer Networks (Sessional)			3/2	0.75	0.75
CSE-432	Compiler Design (Sessional)	-	-	3	1.5	1.50
CSE-438	Computer Peripherals and Interfacing (Sessional)	-	-	3/2	0.75	0.75
CSE-488	Communication Engineering (Sessional)	-	-	3/2	0.75	0.75
CSE-400	Project & Thesis			2	1.0	1.0
CSE-402	Industrial Attachment (Sessional)			1	1	1
	Option-I	3	3	3/2	0.75	3.75
	Total:	15	15	13	6.5	21.50

List of Optional Courses: Optional-I

Course No.	Course Title	Theory hrs/cycle	Cr	Sessional hrs/cycle	Cr	Total Credit
CSE-441	Simulation and Modeling	3	-	-	-	3
CSE-442	Simulation and Modeling(Sessional)	-	-	3/2	0.75	0.75
CSE-443	Pattern recognition	3	-	-	-	3
CSE-444	Pattern recognition (Sessional)	-	-	3/2	0.75	0.75
CSE-445	Multimedia theory	3	-	-	-	3
CSE-446	Multimedia theory (Sessional)			3/2	0.75	0.75
CSE-447	Neural Networks and Fuzzy logic	3	-	-	-	3
CSE-448	Neural Networks and Fuzzy logic (Sessional)	-	-	3/2	0.75	0.75
CSE-449	Human computer Interaction	3	-		-	3
CSE-450	Human computer Interaction (Sessional)	-	-		0.75	0.75
CSE-451	Machine learnings	3	-	-	-	3
CSE-452	Machine learning (Sessional)	-	-	3/2	0.75	0.75

Level-4 Term-II B. Sc. Engineering(CSE)

Course No.	Course Title	Theory hrs/cycle	Cr	Sessional hrs/cycle	Cr	Total Credit
CSE-419	VLSI Design	3	3	-	-	3
CSE-421	Digital Systems Design	3	3	-	-	3
CSE-433	Software Engineering	3	3		-	3
CSE-457	Computer Graphics	3	3	-	-	3
CSE-422	Digital Systems Design (Sessional)	-	-	3	1.5	1.5
CSE-434	Software Engineering (Sessional)	-	-	3/2	0.75	0.75
CSE-458	Computer Graphics (Sessional)	-	-	3	1.5	1.5
CSE-400	Project & Thesis	-	-	6	3	3
	Option-II	3	3	-	-	3
	Total:	15	15	13 1/2	6.75	21.75

List of Optional Courses: Option -II

Course No.	Course Title	Theory hrs/cycle	Cr	Sessional hrs/cycle	Cr	Total Credit
EE-481	Control System Engineering	3	3	-	-	3
EE-485	Digital Signal Processing	3	3	-	-	3
CSE-413	Network Planning	3	3	-	-	3
CSE-455	Robotics and Computer Vision	3	3	-	-	3
CSE-435	Information Security and Control	3	3	-	-	3
CSE-459	Decision Support system	3	3	-	-	3
CSE-415	Knowledge Engineering	3	3	-	-	3
CSE-451	Digital Image Processing	3	3	-	-	3
CSE-443	Parallel & Distributed Processing	3	3	-	-	3
Phy-441	Semiconductor Physics & Devices	3	3	-	-	3

DETAILED OUTLINES OF COURSES

LEVEL-1 TERM -I

CSE-141□

Computer Basics and Programming□

Lectures: 3 hours/week

Credits: 3

Computer Basics:

Introduction to Computer fundamentals: Types and generation of computer, basic organization and functional units, input, output and memory devices, keyboard, mouse, OMR, OCR, MICR, CD ROM, Printers, CRT, microfilm, floppy disk, hard disk, magnetic tape etc. Software and application: Types of software, system software, operating systems commands, Text processing, Data Communications.

High level programming language:

Programming Algorithms and flow chart. Information representation in digital computers. Elements of computer structures and languages. Principles of programming. Structured programming concepts. Writing, debugging and running programs: Variables, Data Types, Operators and Expressions, Control flow, Procedures and Functions, Arrays, records, Pointers input/output system, Graphics.

ME-143□

Basic Mechanical Engineering□

Lectures: 3 hours/week

Credits: 3

Sources of energy: conventional and renewable; Introduction to IC engines, Refrigeration and Air-conditioning systems.

Statics of particles and rigid bodies; Forces in trusses and frames; Relative motion; Kinematics of particles: Newton's Second Law of Motion; Kinematics of rigid bodies.

Introduction to Robotics; Plane, rotational and spatial motion with applications to manipulators; Geometric configurations: structural elements, linkage, arms and grippers; Motion characteristics.

Math-141□

Differential Calculus and Integral Calculus□

Lectures: 3 hours/week

Credits: 3

Differential Calculus:

Limit, Continuity and differentiability, Differential co-efficient of explicit and implicit function; parametric equation, Significance of derivatives and differential, Successive differentiation use Leibnitz's theorem, Taylor's theorem, Mean value theorem and Rolle's theorem, Geometrical interpretation of the theorems.

Partial differentiation: Homogeneous function, Eulers theorem, Partial derivatives, Total derivatives and differential, Geometrical interpretation of Total and partial derivatives, Jacobian transformation.

Tangent and Normal: Tangent and Normal in polar coordinates, Sub-tangent and subnormal in cartesian and polar coordinates. Pedal equation. Tangent at origin.

Maxima and Minima: Determination of maximum and minimum value of the functions of more than one variables.

Indeterminate form: L. Hospital method.

Curvature: Curvature, radius, chord and centre of curvature, Envelope, Evolute and involute.

Integral Calculus:

Indefinite integral: Integration by various method, Integration by the method of successive reduction.

Definite integral: Definite integral as the limit of a sum, properties of definite integral, walli's formula. More reduction of definite integral, Properties of definite integral, Gamma and Beta functions and its properties, Area of the region enclosed by the curves in cartesian and polar co-ordinates, Volume of solid revolution form by the curtesian and polar coordinates. Volume of the solid revolution using papus theorem.

Phy-141□

Lectures: 3 hours/week

Physics□

Credits: 3

Heat & Thermodynamics: Pyrometry: Thermo electric thermometer; Review of the first law of thermodynamics and its application, Reversible irreversible process, Second Law thermodynamics, Carnot cycle; Efficiency of heat engines, Carnots

Theorem, entropy and disorder, thermodynamic functions; Maxwell relations; Clausius-Clapeyron Equation, Gibbs Phase Rule, Third Law of thermodynamics.

Structure of Matter: Crystalline & non-crystalline solids, single crystal and polycrystals solids, unit cell, crystal systems, co-ordinations number, crystal planes and directions, sodium chloride and Cs Cl structure, packing factor, Miller indices, relation between interplanar spacing and Miller indices, Bragg's Law, methods of determination of interplanar spacing from diffraction patterns; Defects in solids: point defects, line defects; Bonds in solids, interatomic distances, calculation of cohesive & bonding energy; Introduction to band theory: distinction between metal, semiconductor and insulator.

Waves & Oscillations: Differential equation of a simple harmonic oscillator, total energy and average energy, combination of simple harmonic oscillations, Lissajous figures, spring-mass system, calculation of time period of torsional pendulum, damped oscillation, determination of damping co-efficient, forced oscillation, resonance, two-body oscillations, Reduced mass, differential equation of a progressive wave, power and intensity of wave motion, stationary wave, group velocity and phase velocity, architectural acoustics, reverberation and Sabine's formula.

Physical Optics: Theories of light; Interference of light, Young's double slit experiment; Displacements of fringes and its uses; Fresnels Bi-prism, interference at wedge shaped films, Newton's rings, interferometers; Diffraction of light: Fresnel and Fraunhofer 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 and analysis of polarized light, Brewster's law, Malus law, Polarization by double refraction, retardation plates, Nicol prism, optical activity, polarimeters, polaroid.

LASER: Properties of laser beams, metastable state, population inversion, stimulated emission, optical pumping, principle of laser, three and four level lasers: Ruby laser, He-Ne gas laser, semiconductor laser and application of lasers.

Hum-141□

Lectures: 2+2 hours/week

English & Economics□

Credit: 4

English:

Sentence structure, Transformation, Synthesis and Analysis of sentences, Common grammatical mistakes, Construction of paragraphs on scientific and other themes, Technical and Scientific vocabulary, Rules of syntax, Phrases and idioms, Prefixes and suffixes, Precis writing, Technical and official correspondence, Technical report writing, Research paper writing, Tender notice, Free composition.

Economics:

Fundamental Concepts: Definition and scope, demand and supply and their elasticity, market equilibrium, consumer behavior, and producer behavior, cost theory, price theory under different market structure, market economy and mixed economy.

Introduction to Income Determination: Demand and supply side equilibrium, fiscal policy effects on demand and monetary policy effects on demand and supply in the labour market.

Development Economics Models and Methods: GNP, GDP, growth vs. development, input-output analysis, saving, investment, consumption, saving, investment, consumption, inflation devaluation, fiscal and monetary policy their applicable in Bangladesh, share market of Bangladesh, foreign currency reserves of Bangladesh, development problems related to technology, agriculture industry and population of Bangladesh, characteristics of current five years plan of Bangladesh.

International Economics: The pure theory of international trade, theory of commercial policy and theory of economic integration.

CSE-142□ Contact hour: 3 hours/week

Computer Basics and Programming (Sessional)□ Credits: 1.5

Sessional based on CSE-141

ME-144□ Contact hour: 3/2 hours/week

Basic Mechanical Engineering (Sessional)□ Credits: 0.75

Sessional based on ME-143

Phy-142□ Contact hour: 3 hours/week

Physics (Sessional)□ Credits: 1.5

1. To determine the frequency of a tuning fork by Melde's Experiment

2. To calibrate a polarimeter and hence to determine the specific rotation of sugar solution by means of a polarimeter.

3. To determine the Radius of Curvature of a lens by Newton's ring Experiment.

4. (a) To Find Grating Constant of a Plane diffraction grating.

(b) To determine the wavelengths of various spectral lines by spectrometer using plane diffraction grating.

5. To determine the Mechanical equivalent of heat 'j' by Electrical Method.

6. To determine the Modulus of Rigidity of a wire by the method of Oscillation (Dynamical method).

7. To find the variation of tuning fork with the length of a Sonometer ($n-1$ curve) under given tension and hence to determine the unknown frequency of tuning fork.

8. To determine the spring constant and effective mass of a given spiral spring and hence to calculate the rigidity modulus of the material of the spring.

9. Indexing of powder diffraction pattern and hence to determine the cell constant.

10. To determine the threshold frequency for photo-electric effect of a photo cathode and the value of the Planck's constant by using a photo-electric cell.

LEVEL-1 TERM -II

CSE-143□

Lectures: 3 hours/week

Object Oriented Programming□

Credits: 3

Concepts of object oriented programming, Classes, Friend functions: Objects, isomorphism, polymorphism, inheritance, parameterized constructors, multiple inheritance, passing object to functions, arrays of objects, pointer to objects.

Function and operator overloading, overloading constructor functions, references, virtual functions, Exception Handling, streams, Dynamic allocation, Static class members, Multi threaded programming.

EE-181□

Lectures: 3 hours/week

Basic Electrical Engineering□

Credits: 3

Fundamental concepts, laws of electrical circuits and methods of network analysis, Principle of D.C., measuring apparatus, Laws of magnetic fields and methods of solving simple magnetic circuits.

Alternating current-instantaneous and r.m.s Current, Voltage and Power, Analysis of various combinations of R,L,C circuits, Phasor representation of sinusoidal quantities, Single and Polyphase A.C. circuit analysis, Resonance.

Math-143□

Lectures: 3 hours/week

Co-ordinate Geometry & Ordinary Differential Equation□

Credits: 3

Co Ordinate Geometry:

Two dimension: Transformation of coordinates, Pair of Straight lines, General equation of 2nd degree:

(Reduced to standard form, properties of the equation parabola, ellipse, Hyperbola, Pair of tangents, Chord of contact, equation of chord in terms of middle point) Equation of the conic in polar form.

Three dimension: System of coordinates, distance between two points, section formula, direction cosines and ratio's, projection.

Plane: Equation of plane, angle between two planes, condition for perpendicularity and parallelism.

Straight lines: Equation of straight lines, standard form, symmetric form, angle between two lines, condition for perpendicularity and parallelism, condition for co-planarity; Shortest distance between two straight lines, Equation of sphere, equation of tangent plane; condition for tangency.

Ordinary differential equation:

Definition, classification, formation, degree, order of D.E.

1st order 1st degree differential equation: Solution of D.E. (Variable separable, Homogeneous, Reduced to homogeneous, Linear differential equations, Brnoulli's equation, Exact differential equation); Differential equation with constant co-efficient: Solution of D.E. with constant co-efficient of 2nd and higher order. (Homogeneous, non-homogeneous); Cauchy's-Euler's equation.; Solution of Linear differential equation by the method of variation of parameters, method based on factorization of operators; Application of D.E. (Growth, decay, chemical reactions, falling bodies and motion problems, mechanical vibrations, electric networks).

Chem-141□**Chemistry□**

Lectures: 3 hours/week

Credits: 3

A. Inorganic Chemistry

1. Chemistry of Semiconductor Materials: Physical and Chemical Properties of Boron, Silicon, Gallium, Germanium, Arsenic and Antimony. Preparation of Pure Silicon, Intrinsic Semiconductor, Extrinsic Semiconductor.
2. Chemical Bonding: Different Types of Bond, Valence Bond Theory (VBT), Hybridization, Resonance, Molecular Orbital Theory (MOT), Linear Combination of Atomic Orbital (LCAO) Method. Metallic Bond, Hydrogen Bond, Dipole Bond, Vander Waal's Forces.

B. Physical Chemistry

3. Conductivity of Electrolytic Solution: Type of Conductors, Conductance, Specific Conductance, Equivalent Conductance, Mechanism of Electrolytic Conductance, Factors Influencing Conductivity, Arrhenius Theory, Law of Independent Migration of Ions and its Applications, Determination of Transport Number, Abnormal Conductance, Conductometric Titration.
4. Electromotive Forces: Electrochemical Cell, Cell Reaction, Cell Potential, Cell Representation, Measurement of EMF of a Cell, Relation Between EMF and Free Energy, Electrode Potential, Electrochemical Series, Nernst's Equation, Different Types of Reference Electrodes and pH Measurement, Overpotential, Lithium ion battery, fuel cell its latest development.

C. Industrial Chemistry

5. Polymer: Classification, Bonding in Polymer, Thermosetting and Thermoplastic Polymer, Synthesis, Properties and Uses of Some Polymers-Polyethylene, PVC, Bakelite, and Melamine, Liquid crystal, resin.

6. Rubber: Structure of Rubber, Compounding and Vulcanization of Rubber, Synthetic Rubber-Uses of Buna S Rubber and Neoprene Rubber.

D. Analytical Chemistry

7. Instrumental Analysis: Electromagnetic Radiation, Radiation and Matter Interaction, UV-Visible Spectroscopy, Beer-Lambert's Law, IR Spectroscopy, Basic Components of Spectrometer-Radiation Sources, Wavelength Selectors, Radiation Detectors, Signal Processors.

Hum-143□

Lectures: 3 hours/week

Sociology & Government□

Credits: 3

Sociology:

Introducing Sociology: Definition, Scope, Methods.

Basic Sociological Terms: Society, Group, Association, Institution, Community, Rob, Status, Social Structure.

Social Charge: Meaning, Factors, Social Evolution, Social Progress, Industrial, Revolution, Occidental & Oriental Societies.

Urbanization & Industrialization: Impact on Social Life, Urban Ecology.

The Family: Patterns, Functions & Transformation.

Culture & Civilization: Elements, Norms & Values, Cultural Lag, Variation, Integration & Change.

Social Problems: Nature, Deviance & Crime, Social Disorganization, Some Major Contemporary Social Problems.

Government:

Basic concepts: State, Government, Local Government, Federation & Confederation, Civil Society, Pressure, groups, Socialism, fascism, UNO.

State: Forms, Organs, Elements, Constitution. Government: Organs, Forms, Democracy. Political Parties: Functions & Role. Bureaucracy: Nature, Types & Role.

CSE-144	Contact hour: 3 hours/week
Object Oriented Programming (Sessional)	Credits: 1.5
Sessional based on CSE-143	
EE- 182	Contact hour: 3 hours/week
Basic Electrical Engineering (Sessional)	Credits: 1.5
Sessional based on EE-181	
ME-146	Contact hour: 3 hours/week
Engineering Drawing (Sessional)	Credits: 1.5
Introduction, First and third angle projections; Orthographic drawings; Isometric views; Missing lines and views; Sectional views and conventional practices; Auxiliary views, Auto CAD and drawing of engineering objects using Auto CAD.	
Chem-142	Contact hour: 1.5 hours/week
Chemistry (Sessional)	Credit: 0.75
1. Standardization of Potassium Permanganate Solution by Standard Sodium Oxalate Solution.	
2. Determination of Ferrous Ion with Standard Potassium Permanganate Solution.	
3. Standardization of Sodium Thiosulphate Solution by Standard Potassium Dichromate Solution.	
4. Determination of Copper with Standard Sodium Thiosulphate Solution.	
5. Determination of Calcium in Calcium Carbonate.	

LEVEL-2 TERM -I

CSE-221□**Digital logic Design□**

Lectures: 3 hours/week

Credits: 3

Number systems & codes, Digital logic: Boolean algebra, De-Morgan's Theorems, logic gates and their truth tables, canonical forms, combinational logic circuits, minimization technique, Arithmetic and data handling logic circuits, decoders and encoders, multiplexes and demultiplexers, Combinational circuit design, Flip-flops, race around problems; Counters: asynchronous counters, synchronous counters and their applications; PLA design; Synchronous and asynchronous logic design; State diagram, Mealy and Moore machines; State minimization's and assignments; Pulse mode logic; Fundamental mode design.

CSE-241□**Data Structure□**

Lectures: 3 hours/week

Credits: 3

Concepts and examples of elementary data objects, elementary data structures, array, stacks and queues. Lists, Trees, Graphs, heaps, B-trees, Fibonacci heaps, Recursion, Memory management, Sorting and searching, hash techniques.

EE-281□**Electronic Devices and Circuits□**

Lectures: 3 hours/week

Credits: 3

Semiconductors, Junction diode characteristics, Bipolar transistor characteristics, Small signal low frequency h-parameter model, hybrid pie model, Amplifiers, Darlington pairs, Introduction to Oscillators, differential amplifiers, Linear application of Op-Amp, gain, input and output impedances, offset null adjustment, frequency response and noise.

Introduction of JFET, MOSFET, NMOS and CMOS, Biasing and application in switching circuits, SCR, TRIAC, DIAC, UJT, characteristics and applications, Introduction to rectifiers, active filters, regulated power supply, Stabilizer and UPS, Basic ideas about IC fabrication techniques.

Math-241□**Vector, Matrix and Fourier Analysis□**

Lectures: 3 hours/week

Credits: 3

Vector Analysis:

Introduction to vectors, Linear dependence and independence of vectors, Differentiation and integration of vectors together with elementary application, Definitions of line, surface and volume integrals, Gradient of a scalar function, Divergence and curl of a vector function, Integral forms of gradient, divergence and curl, divergence theorem, Stoke's theorem, Green's theorem and Gauss's theorem.

Matrix:

Definition of Matrix, Matrix operations, Transpose of matrices and inverse of matrix, Rank of matrices.

Fourier Analysis :

Real and complex form, Finite transform, Fourier integral, Fourier transforms and their uses in solving boundary value problems, Application in engineering problems.

Hum-241□ Lectures: 4 hours/week
Industrial Management and Accountancy□ Credits: 4

Industrial Management:

Administration, Management and organization, Authority and responsibility, Management theories, Organization structure, organization chart, Span of control, Selection and recruitment of employees, wage system and incentive, Job evaluation and merit ratings, Plant layout of physical facilities, Transportation and storage, Material handling, Maintenance, maintenance policy, Production control in intermittent and continuous manufacturing industry, functions of production control, Purchasing procedures, Factory act-1965: Various laws working hours, health, safety and other conditions, Laws governing labor relation: CBA, Trade Union, Lay off, Lockout, Strike, Labor court, Marketing management, Inventory-need and methods of control, Factors affecting inventory building-up, Economic lot size and reorder point.

Accountancy:

Basic accounting principles, Cash book, Trial Balance, Balance Sheet, Bank Reconciliation statement, Cost Accounts and objective, Elements of costs, Direct cost, Overhead allocation, Preparation of a cost sheet, Computation of break even point, Standard costing, job order costing, Process costing, Cost Variance.

CSE-222□ Contact hour: 3 hours/week
Digital logic Design (Sessional)□ Credits: 1.5
Sessional based on CSE-221

CSE-242□ Contact hour: 3/2 hours/week
Data Structure (Sessional)□ Credits: 0.75
Sessional based on CSE-241

EE-282□ Contact hour: 3 hours/week
Electronic Devices and Circuits (Sessional)□ Credits: 1.5
Sessional based on EE-281

LEVEL-2 TERM -II**CSE-211□**

Lectures: 3 hours/week

Discrete Mathematics□

Credits: 3

Mathematical logic: Set theory, Sets, Relations, Partial Ordered sets, Functions, Generating functions, Mathematical reasoning and proof techniques, Prepositional calculus, Predicate calculus, Graph theory: Graphs, Paths, Trees. Algebraic Structures, Binary operations, Semi-graphs, Groups, Permutation Groups, Rings and Fields, Lattices, Morphism of algebraic structures.

CSE-223□

Lectures: 3 hours/week

Digital Electronics & Pulse Techniques□

Credits: 3

Diode logic gates, transistor switches, transistor gates, MOS gates; Logic Families: TTL, ECL, IIL and CMOS logic with operation details; Propagation delay, product and noise immunity, Open collector and high impedance gates, Electronic circuits for flip-flops, counters and register, memory systems, PLA's; A/D and D/A converters with applications; S/H circuits, LED, LCD and optically coupled oscillators, Non-linear applications of OP AMPs; Analog switches.

Linear wave shaping: Diode wave shaping techniques, clipping and clamping circuits, comparator, circuits, switching circuits; pulse transformers, pulse transmission, pulse generation, monostable, bistable and astable multivibrations, Schmitt trigger, blocking oscillators and time-base circuit; Timing circuits, Simple voltage sweeps, linear current sweeps.

CSE-243□

Lectures: 3 hours/week

Algorithms Design and Analysis□

Credits: 3

Techniques for analysis of algorithms, methods for design of efficient algorithms: divide and conquer, greedy method, dynamic programming, backtracking, branch and bound. Basis search and traversal techniques, Topological sorting, Connected components, spanning trees, shortest paths, Flow algorithms, Approximation algorithms, Parallel algorithms, Algebraic simplification and transformations; Lower bound theory; NP-completeness, NP-hard and NP-complete problems.

EE-283□

Lectures: 3 hours/week

Electrical Drives and Instrumentation□

Credits: 3

Control rectifier, AC voltage controller, inverter, DC machine, transformers, induction motor, synchronous machine, universal and stepper motors.

Instrumentations amplifiers: Differential, logarithmic and chopper amplifiers; Frequency and Voltage measurements using digital techniques; Recorders and display devices, spectrum analyzers and logic analyzers. Transducers: Terminology, types, principles and application of photovoltaic, piezoelectric, thermoelectric, variable reactance and opto-electronic transducers, Noise reduction in instrumentation.

Math-243□

Lectures: 3 hours/weeks

Complex Variables and Laplace Transformations□ Credits: 3**Complex Variables:**

Complex number system, General functions of a complex variable, Limits and continuity of a function of complex variable and related theorems, Complex 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, Contour integration and conformal mapping, Application in engineering problems.

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, Solutions of differential equations by Laplace transforms, Evaluation of improper integrals, Application in engineering problems.

CSE-224□

Contact hour: 3 hours/week

Digital Electronics & Pulse Techniques (Sessional)□Credits:1.5

Sessional based on CSE-223

CSE-244□

Contact hour: 3 hours/week

Algorithms Design and Analysis (Sessional)□

Credits: 1.5

Sessional based on CSE-243

EE-284□

Contact hour: 3 hours/week

Electrical Drives and Instrumentation (Sessional)□Credits: 1.5

Sessional based on EE-283

LEVEL-3 TERM -I

CSE-323□

Lectures: 3 hours/week

Applied Statistics & Queuing Theory□

Credits: 3

Introduction, mean, standard deviation and measures of dispersion, Moments, Skewness and Kurtosis, Elementary probability theory, Characteristics of distributions, Elementary sampling theory, Estimation, Hypothesis testing and regression analysis.

Probability distribution and expectations, discontinuous probability distribution, e.g. binomial, Poission and negative binomial, Continuous probability distributions, e.g. normal and exponential.

Stochastic processes, Discrete time Markov Chain and continuous time Markov chain, birth death process in queuing.

Queuing models: M/M/1, M/M/C, M/G/1, M/D/1, G/M/1 solution of network of queue-closed queuing models, approximate solution methods, Application of queuing models in Computer Science.

CSE-331□

Lectures: 2 hours/week

Theory of Computing□

Credits: 2

Language theory, Finite automata: Deterministic finites automata, nondeterministic finite automata, equivalence and conversion of deterministic and nondeterministic finite automata, pushdown automata, Context free languages; context free grammars; Turing Machines; basic machines, configuration, computing with turing machines, combining turing machines, Undecidability.

CSE-333□

Lectures: 3 hours/week

Microprocessors and Assembly Language Programming□

Credits: 3

Introduction to 8-bit, 16-bit and 32-bit microprocessors, architecture, addressing modes, instruction set, interrupts, multi-tasking and virtual memory, memory interface, Bus interface, Arithmetic co-processor, Microcontrollers, Integrating microprocessor with interfacing chips.

CSE-341□

Lectures: 3 hours/week

Numerical Analysis□

Credits: 3

Introductin; Solution of algebraic and transcendental equations: method of iteration, False Position method, Newton-Raphson method; Solution of simultaneous linear equations: Cramers's rule, Iteration method, Gauss-Jordan Elimination method, Choleski's process; Interpolation; diagonal and horizontal difference, differences of a polynomial, Newton's formula for forward and backward interpolation, Spline interpolation, Integration: General quadrature formula,

Trapezoidal rule, Simpson's rule, Weddle's rule, Solution of ordinary differential equations: Euler's method, Picards method, Milne's method, Taylor's series method, Runge-Kutta method, Least squares approximation of functions: linear and polynomial regression, fitting exponential and trigonometric functions.

CSE-351□ Lectures: 3 hours/week
Data Base Management Systems□ Credits: 3

Database Concepts: Files and Databases, Database Management systems, Data models, Relational data model: Relations, Domains, Attributes and Tuple, Anomalies, Functional Dependency, First, Second and Third normal forms, Boyce-Codd normal form, Relational calculus based languages-SQL and QBE, Relational algebra and Set operational, Relational database design: Relational design criteria, Losses decomposition, decomposition algorithms and synthesis algorithms.

Advance Database Concepts: Fourth and Fifth normal forms, Entity-Relationship (ER) approach: The ER model and its constructs, ER modeling in logical database design, Transformation of the ER model to SQL, Distributed database design, The MAM technique: Fact types, Uniqueness constraints, Arty Checking, General constraints, Conceptual schema transformations, Relational implementation, Distributed data base concurrency control, Security system, Recovery management, Quarry optimization, Data Base administration multimedia and Object oriented data base concepts.

CSE-334□ Contact hour: 3 hours/week
Microprocessors and Assembly Language Programming (Sessional)□ Credits: 1.5
Sessional based on CSE-333

CSE-342□ Contact hour: 3 hours/week
Numerical Analysis (Sessional)□ Credits: 1.5
Sessional based on CSE-341

CSE-352□ Contact hour: 3 hours/week
Data Base Management Systems (Sessional)□ Credits: 1.5
Sessional based on CSE-351

LEVEL-3 TERM -II

CSE-313□**Data Communication□**

Lectures: 3 hours/week

Credits: 3

Introduction to AM, FM, PM, and their performance in presence of noise. ASK, FSK, PSK co-relators, Pulse modulation, Pulse amplitude modulation, Pulse width modulation and pulse position modulation, Pulse code modulation, Quantization, Delta modulation: TDM, FDM, OOK, FSK, PSK, QPSK. Representation of noise, Threshold effects in PCM and FM.

Probability of error for pulse systems, channel coding and capacity, Asynchronous and synchronous communication, Hardware interfaces: Multipliers, Connectors and buffers, Communication medium, Fiber optics.

CSE-321□**Computer Architecture□**

Lectures: 3 hours/week

Credits: 3

Information representation, Measuring performance; Instructions and data access methods: operations and operands of computer hardware, representing instruction, addressing styles, Arithmetic Logic Unit (ALU) design: arithmetic and logical operations, floating point operations, designing ALU; Processor design: datapaths-single cycle and multicycle implementations; Control Unit design-hardware and microprogrammed, Hazards; Exceptions, Pipeline: pipelined datapath and control, superscalar and dynamic pipelining, Memory organization: cache, virtual memory; channels; DMA and Interrupts, Buses, Multiprocessors: types of multiprocessors, performance, single bus multiprocessors, multiprocessors connected by network, clusters.

CSE-335□**Operating Systems□**

Lectures: 3 hours/week

Credits: 3

Assembler-General design procedures, Table processing, Macro language and Macro-processor, Loaders-Design of absolute loader and direct link loader, Linkers, Translators, Evolution of Operating Systems: Early Operating Systems,

Improvements in System Utilization, Spooling, Interrupts and Interrupt Handling, Multi-programming and Time sharing: Sharing of space and Time, Protection and Integrity.

Multi-computer and Multi-computer system, Distributed Computing and Network based systems, Virtual systems: Virtual Memory, Paging and Segmentation, Virtual Devices and Generalization to Virtual Systems, Concurrency, Management: Erroneous Results from concurrent accesses, Concurrency on the Basis of an Operating System, cost evaluation of spooling, Long and Short Term Scheduling,

Round Robin and other scheduling policies, State space description of the operating system: Process creation and Removal, Samples of process life cycle and Bootstrapping, Layered concepts in operating systems, Kernel, memory manager, I/O system, File manager, Resource manager, Command interpreter and application programs.

CSE-345□ Lectures: 3 hours/week

Artificial intelligence□ Credits: 3

Introduction, Knowledge representation, Prepositional and first order logic, inference in first order logic, frame problem Search techniques in AI; Game playing, Planning; Probabilistic reasoning, Learning in symbolic and non-symbolic representation, Natural language processing.

CSE-353□ Lectures: 3 hours/week

System Analysis and Design□ Credits: 3

Different types of information, Qualities of information, Analysis of information requirements for modern organizations; Role, Tasks and attributes of a systems analyst; Sources of information; Information gathering techniques, Editing; Handling of missing information: Requirements specifications, Steps of systems analysis, Concepts of feasibility analysis; Analysis of technical facilities, Cost-benefit analysis; Design of an information system, Network models for project time estimation; Estimation of confidence level; Simplex method for minimization of project time; Project effort analysis methods, Designing of inputs and outputs,

Hardware and software analysis; Telecommunications requirements analysis; Project team organization, Database and files design, Project management and documentation, Analysis of system maintenance and upgrading Ethics and privacy, Control and security.

CSE-314□ Contact hour: 3/2 hours/week

Data Communication (Sessional)□ Credits: 0.75

Sessional based on CSE-313

CSE-336□ Contact hour: 3 hours/week

Operating Systems (Sessional)□ Credits: 1.5

Sessional based on CSE-335

CSE-346□ Contact hour: 3/2 hours/week

Artificial intelligence (Sessional)□ Credits: 0.75

Sessional based on CSE-345

CSE-354□ Contact hour: 3/2 hours/week

System Analysis and Design (Sessional)□ Credits: 0.75

Sessional based on CSE-353

LEVEL-4 TERM -I

CSE-411□**Computer Networks□**

Lectures: 3 hours/week

Credits: 3

Protocol hierarchies; Data link control: HLDC; DLL in Internet: DLL of ATM; LAN Protocols: Standards IEEE 802.*; Switches and Hubs, Bridges, FDDI, Fast Ethernet; Routing algorithm; Congestion control; Internetworking, WAN; Fragrsementation; Firewalls; IPV4, IPV6, ARP, RARP, Mobile IP, Network layer of ATM, Transport protocols, Transmission control protocol; connection management, transmission policy, congestion control, timer management; UDP; AAL of ATM; Network security; Cryptography, DES, IDEA, public key algorithm; Authentication; Digital signatures;

Gigabit Ethernet; Domain Name System: Name servers; Email and its privacy; SNMP; HTTP, World Wide Web.

CSE-431□**Compiler Design□**

Lectures: 3 hours/week

Credits: 3

Introduction to compiling, Basic issues; Lexical analysis; Syntax analysis; Syntax-directed translation; Semantic analysis; type-checking; Run-time environments; Intermediate code generation; Code generation; Code optimization.

CSE-437□**Computer Peripherals & Interfacing□**

Lectures: 3 hours/week

Credits: 3

I/O system; I/O devices, designing I/O systems; Programmable peripheral interface (interface to A/D and D/A converter); keyboard/display interface; Programmable timer; Programmable interrupt controller, DMA controller;; floppy and hard-disk controller, serial communication interface; Barcode reader; Sound card, MIDI interface; Printer interface; ISA, PCI, AGP, PS/2 and USB interfaces, Interfacing with power circuits, stepper motors, opto-isolation; controlling semiconductor power switches- MOSFET, BJT, SCR, Triac and Solinoids.

CSE-487□**Communication Engineering□**

Lectures: 3 hours/week

Credits: 3

Synchronous and asynchronous communications; Hardware interfaces, multiplexers, concentrators and buffers; Communication mediums and their characteristics; Data communication services: SMDS and ATM; Error control codes: linear block codes, cyclic codes, MLDC codes, convolution codes, Trellis code modulation; Digital switching: space and time division switching; Radio system design; Fiber optics communication: transmitter, receivers, network

components, WDM; Line coding, trunks, multiplexing, switching, ATM switches; Satellite communications: frequency bands and characteristics, types of satellites, multiple access techniques; Cellular communications: GSM, CDMA.

CSE-412□ Contact hour: 3/2 hours/week
Computer Networks (Sessional)□ Credits: 0.75
Sessional based on CSE-411

CSE-432□ Contact hour: 3/2 hours/week
Compiler Design (Sessional)□ Credits: 0.75
Sessional based on CSE-431

CSE-488□ Contact hour: 3/2 hours/week
Communication Engineering (Sessional)□ Credits: 0.75
Sessional based on CSE-487

CSE-438□ Contact hour: 3/2 hours/week
Computer Peripherals & Interfacings (Sessional)□ Credits: 0.75
Sessional based on CSE-437

CSE-400□ Contact hour: 2 hours/week
Project and Thesis□ Credits: 1.0
Study of problems in the field of Computer Science and Engineering.
N.B. The project and thesis topic selected in this course is to be continued in the course Project and Thesis-II.

CSE-402
Industrial Attachment□ Credits: 1.0
In the practical field of computer science and engineering application such as Telecommunication organizations; Software industries/company; Automated heavy and light industries; ISP; Banking sector; Transport sectors and others.

List of Optional Courses: Optional-I (Select anyone of them)**CSE-441**□

Lectures: 3 hours/week

Simulation and Modeling□

Credits: 3

Simulation methods, Model building, random number generator, Statistical analysis of results, validation and verification techniques, Digital simulation of continuous systems.

Simulation and analytical methods for analysis of computer systems and practical problems in business and practice, Introduction to the development of simulation packages.

CSE-443□

Lectures: 3 hours/week

Pattern Recognition□

Credits: 3

Introduction to Fault Tolerant Systems and Architectures. Fault detection and location in combinational and sequential circuits; Fault test generation for combinational and sequential circuits; Digital simulation as a diagnostic tool. Automatic test pattern generator, Fault modeling, automatic test equipment, Faults in memory, memory test pattern and reliability. Performance monitoring, self checking circuits, Burst error correction and Triple modular redundancy; Maintenance processors.

CSE-445□

Lectures: 3 hours/week

Multimedia Theory□

Credits: 3

Multimedia systems- introduction; Coding and compression standards; Architecture issues in multimedia, Operating systems issues in multimedia-real-time OS issues, synchronization, interrupt handling, Database issues in multimedia-indexing and storing multimedia data, disk placement, disk scheduling, searching for a multimedia document; Networking issues in multimedia-Quality-of-service guarantees, resource reservation, traffic specification, haping and monitoring, admission control, Multicasting issues, Session directories, Protocols for controlling sessions; Security issues in multimedia-digital water-marking, partial encryption schemes for video streams; Multimedia application-audio and video conferencing, video on demand, voice over IP.

Concepts covered in lecture applied in computer laboratory assignments.

CSE-447□

Lectures: 3 hours/week

Neural Networks & Fuzzy Logic□

Credits: 3

Neural and fuzzy machine intelligence, neural dynamics, activation and signals, activation models, synaptic dynamics, unsupervised and supervised learning, architectures and equilibrium.

Fuzziness vs. probability, fuzzy associative memory, comparison of fuzzy and neural backer-upper control systems, fuzzy image transform coding comparison of fuzzy and filter, target-tracking control systems.

CSE-449□ Lectures: 3 hours/week

Human Computer Interaction□ Credits: 3

Introduction to Human-computer interaction (HCI), human information processing systems, Models of interaction, Approaches to HCI, User interface. User system interaction: analysis and design, User interface design, Interface technique and Technology, case studies.

CSE-451□ **Lectures: 3 hours/week**

Machine Learning□ **Credits: 3**

Introduction to machine learning; Supervised, unsupervised and reinforcement learning; Unsupervised learning algorithms; Attribute based and relational supervised learning algorithms; Neural network based learning algorithms; Genetic algorithm and genetic programming; Reinforcement learning algorithms; Computational learning theory.

CSE-442□ Contact hour: 3/2 hours/week

Simulation and Modeling (Sessional)□ Credits: 0.75

Sessional based on CSE-441

CSE-444□ Contact hour: 3/2 hours/week

Pattern Recognition (Sessional)□ Credits: 0.75

Sessional based on CSE-443

CSE-446□ Contact hour: 3/2 hours/week

Multimedia Theory (Sessional)□ Credits: 0.75

Sessional based on CSE-445

CSE-448□ Contact hour: 3/2 hours/week

Neural Networks & Fuzzy Logic (Sessional)□ Credits: 0.75

Sessional based on CSE-447

CSE-450□ Contact hour: 3/2 hours/week

Human Computer Interaction (Sessional)□ Credits: 0.75

Sessional based on CSE-449

CSE-452□ Contact hour: 3/2 hours/week

Machine Learning (Sessional)□ Credits: 0.75

Sessional based on CSE-451

LEVEL-4 TERM -II**CSE-419□
VLSI Design□**Lectures: 3 hours/week
Credits: 3

VLSI design methodology: top-down design approach, technology trends. NMOS, CMOS inverters, pass transistor and pass gates: dc and transient characteristics. Brief overview of fabrication process: NMOS, CMOS, Bi-CMOS process, NMOS and CMOS layout, stick diagram and design rules CMOS circuit characteristics and performance estimation: resistance and capacitance, rise and fall time, power estimation. Buffer circuit design, Introduction to Bi-CMOS circuits.

Complex CMOS gates, CMOS building block: multiplexer, barrel shifter, adder, counter, multipliers: Data Path and memory structures, Design style: FPGA and PLDs.

Introduction to HDL; basic digital design using VHDL.

**CSE-421□
Digital Systems Design□**Lectures: 3 hours/week
Credits: 3

Design using MSI and LSI components; Design of memory subsystem using SRAM and DRAM; Design of various components of a computer: ALU, memory and control unit-hardwired and microprogrammed Microprocessor based designs. Computer bus stander is design using special purpose controllers.

**CSE-433□
Software Engineering□**Lectures: 3 hours/week
Credits: 3

Concepts of software engineering; Software engineering paradigms; Different phases of software; Synthesis vs. iterative design; Top-down and bottom-up design; Different design tools; Structured and non-Structured programming; Data-directed design techniques; Modular design; Design of automatic, redundant and defensive programs; Influences of languages in design process; Concepts of complexity measures; COCOMO model; Tree model; PNR curve, Statistical model; Zipf's laws and their application in computer languages; Halstead program length formula; Graphical analysis for complexity measures; Memory requirements analysis; Processing time analysis; Testing philosophy; Test methods; Debugging Verification, Validation and certification, Choice of test data; Simulator; Arthur Laemmel's scheme; Concepts of software reliability and availability; Software repair, downtime, error and faults, specification and correction; New error generation hypothesis, Estimating number of bugs in computer program; Reliability models, Availability models; Quality assurance; Quality measures; Different cost estimation models

and their comparisons; Software maintenance; Maintenance-cost models; Growth dynamic models; Documentation; Software project organization; Management and communication skills.

CSE-457□ **Computer Graphics**□ Lectures: 3 hours/week
Credits: 3

Graphics hardware: display devices, input devices etc; Basic raster graphics algorithms for drawing 2D primitives; Two-dimensional and three dimensional viewing, clipping and transformations; Three-dimensional object representations: polygon surface, B-Spline curves and surfaces, BSP trees, Octrees, Fractal-Geometry methods; Visible surface detection methods; Z-buffer method, BSP tree method, Ray casting method; Illumination models; Surface rendering methods: Polygon rendering, ray tracing, terrain visualization with height mapping, modeling surfaces details with texture mapping; Color models; Computer animation.

CSE-422□ **Digital Systems Design (Sessional)**□ Contact hour: 3 hours/week
Credits: 1.5
Sessional based on CSE-421

CSE-434□ **Software Engineering (Sessional)**□ Contact hour: 3 hours/week
Credits: 1.5
Sessional based on CSE-433

CSE-458□ **Computer Graphics (Sessional)**□ Contact hour: 3 hours/week
Credits: 1.5
Sessional based on CSE-457

CSE-400□ **Project and Thesis**□ Contact hour: 6 hours/week
Credits: 3

Continuation of project and thesis topic undertaken in CSE-400

List of Optional Courses: Optional-II (Select anyone of them)**EE-481□**

Lectures: 3 hours/week

Control System Engineering□

Credits: 3

Introduction: Response of second and higher order systems to impulse, step, ramp and sinusoidal inputs, Root locus technique, Routh-Hurwitz and Nyquist stability criterion.

State variables and transition matrix, PI and PID controllers, Specifications in time and frequency domain, Series compensation-lead, lag and lag-lead compensations design using Bode plots, Nichol's Chart, Carrier control system, Introduction to sampled data control system.

EE-485□

Lectures: 3 hours/week

Digital Signal Processing□

Credits: 3

Discrete time description of signals and systems, Fourier transform of discrete tie signals, Discrete Fourier transform.

Z-transform, Digital filter structure, Infinite Impulse Response filter design techniques, Finite impulse response filter design techniques, finite precision effects, Inverse filtering.

CSE-413□

Lectures: 3 hours/week

Network Planning□

Credits: 3

Introduction to Networks, Network components, theoretical network, real world networks, designing the LAN, configuring network server and client.

Network administration, remote access, expanding the network, wide area network, network troubleshooting, major protocol suites, Internet and Intranets, Internet programming.

CSE-455□

Lectures: 3 hours/week

Robotics and Computer Vision□

Credits: 3

Robotics manipulation, direct kinematics: The arm equation, inverse kinematics, Solving the arm equation, work space analysis and trajectory planning differential motion and static manipulator dynamics, robot control, task planning.

Relationship between image and world structure, image representation, segmentation, pattern perspective transformation, camera calibration, shape analysis, object recognition and picture languages.

CSE-435□

Lectures: 3 hours/week

Information Security and Control□

Credits: 3

Introduction to information systems security, information system security management and analysis and management, physical and logical security, database and telecommunication security, systems security and controls.

Computer abuse, Internet and Electronic commerce, Special security consideration and Aspects, legal and Ethical issues, managerial issues, case studies.

CSE-459□

Lectures: 3 hours/week

Decision Support System□

Credits: 3

Introduction to decision support system (DSS), Decision making models, Under-layer framework for DSS, Hardware and Software for DSS, Use of decision tools.

Developments of DSS, issues of model management and interface design, DSS applications: Executive information system (EIS), Computer mediated communication within an organization and special aspects.

CSE-415□

Lectures: 3 hours/week

Knowledge Engineering□

Credits: 3

Knowledge engineering: basic knowledge representation and utilization, Production systems (PS), semantic networks, frames, logic, object-oriented paradigm, logic programming, probability theory, Dempster-Shafer theory, Fuzzy set theory.

Application: Diagnosis, Knowledge acquisition and machine learning, Problems of and Application to knowledge acquisition, knowledge acquisition support systems, Machine learning meta-reasoning and meta-knowledge, knowledge system development environmental languages, shells.

CSE-451□

Lectures: 3 hours/week

Digital Image Processing□

Credits: 3

Introduction, Digital image fundamentals, image transforms, image enhancement, image restoration, image compression.

Image segmentation, Representation and Description, Recognition and interpretation.

CSE-443□

Lectures: 3 hours/week

Parallel and Distributed Processing□

Credits: 3

Parallel processing: Importance, architecture, Hardware and software issues, Architectures for parallel processing-Classifications, comparative study of different architectures, hardware issues in parallel processing, parallel programming, Distributed processing: Definition, Impact of distributed processing on organizations, pitfalls in distributed processing.

Forms of distributed processing: Function distribution, Hierarchical distributed systems, Horizontal distributed systems, strategy: strategies for distributed data processing, control of complexity, problem of incompatibility, centralization vs. decentralization, cost and benefit analysis, design of distributed data: distributed data, location of data, multiple copies data, conflict analysis, database management, distributed databases and applications, software and network strategy: Software strategy, the ISO seven layers, architectural interfaces, physical link control, network management etc.

Phy-441□

Lectures: 3 hours/week

Semiconductor Physics and Devices□

Credits: 3

Carrier concentration carrier transport phenomena in semiconductors, continuity equation, origin of bands and band theory of solids, Hall effect, MOSFET, depletion and enhancement type n- and p- channels, characteristics and applications of optoelectronics, solar cells, phototransistors, LEDs, optocouplers high-frequency semiconductor deices, wave mechanics, time-dependent and time-independent Schrodinger wave equation and one-dimensional potential structures. Fundamentals underlying optical & electronic devices, the structure and growth of crystals, the energy band model for elemental and compound semiconductors, electronic and optical properties of semiconductors, electroluminescence and photoluminescence, the semiconductor in equilibrium.

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