University of Asia Pacific (UAP)

Department of Computer Science & Engineering

Prospectus (Undergraduate Program)

2015-2016

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Disclaimer

The information contained in this prospectus is subject to change at the discretion of the Department of Computer Science & Engineering, UAP.

Preface

University of Asia Pacific (UAP) was established in 1996 under the Private University Act 1992 as a private university with the vision of providing quality education and fulfilling the needs our motherland, Bangladesh. This university started its journey in 1996 and offered four years bachelor degree programs in **Computer Science & Engineering** and **Business Administration** only, thus the very step of publishing the eleventh edition of the prospectus for Undergraduate Studies of the **Department of Computer Science & Engineering** makes us proud.

This department established in 1996, with the full support of the Administration and the UAP Foundation Members, is thriving forward in disseminating knowledge in this emerging field. Such endeavor is not only helping in developing the human resources of this country but also in earning foreign exchange by exporting skilled manpower abroad. Till to date, B.Sc.Engg. Degree has been conferred on 2200 graduates and these graduates are making positive contributions in the field of Computer Science and Engineering.

To enhance the quality of education even further, the Department is planning to take some crush programs, some of which are mentioned below:

- Faculty Search Team has been formed to attract Senior Faculty Members in the CSE Department of UAP.
- Syllabus Committee has been made to modify the Course Curriculum according to the present needs.
- All the Programming Lab PCs are regularly updating with the latest computer configuration.
- Additional two computer labs with highly configured network devices will be established at UAP City Campus. Handsome amount allotments for the development of computer Labs have been proposed for 2015-2016 Budget.
- A project lab has already been established for project/research work.

CSE Department has Clubs namely **UAP Software and Hardware Club**, **Programming Contest Club**, **Cultural and Debating Club**, **Research and Publication unit** and **Sports Club** to integrate the students in different co-curricular and extra-curricular activities. The University authority always provides financial help for the Clubs to achieve goals.

UAP Software and Hardware Club aims to develop students' skills in software and hardware development and to produce marketable products. UAP Software and Hardware Club conduct training programs for students to prepare them to develop different attractive hardware/software projects. To improve analytical ability of the students, the Club arranges training programs and workshops. To improve programming skills of the students, UAP software and Hardware Club arranges Intra and Inter University Software and Competition with the participation of various universities as well as software companies.

Programming Contest Club works on developing students' skills in programming and prepares them for various programming contests across the globe, especially the ACM Programming Contest. Programming Contest Club conducts coaching and workshops to improve the problem solving ability of the students. Faculty attended in the ACM ICPC world final conducts these coaching. The Club arranges Intra UAP programming Contests on a regular basis and also planning to arrange an Inter University Programming Contests with the participation of all universities of the countries.

Cultural and Debating Club arranges cultural week in every semester to hunt talents in different cultural fields. In every semester there is a grand cultural show participated by the students and teachers.

Sports Club arranges sports week in every semester to arrange competitions in different events like Cricket, Bad Minton, Table Tennis, Football, etc.

The **Research & Publication Unit** arranges Seminar at least once in every month on various important topics on Science & Technology. Also, Research & Publication unit publishes International Journal of Computer and Information Technology (IJCIT). The first issue was published in August, 2010.

Department has also Masters Program '**Master in Computer Science & Engineering (MCSE**)'. Currently 75 students are continuing in our MCSE program. The Department also offers two other Masters Programs: Master in Computer Applications (MCA) and Master in Computer Science (MCS).

Formation of IEERD

(The Institute for Energy, Environment, Research and Development)

The Institute for Energy, Environment, Research and Development (IEERD) is established at University of Asia Pacific as a constituent research and academic institute or center with a separate administrative structure. The purpose of the "Institute" is to keep pace with regional and global research of development and education in energy including clean energy, increasing energy efficiency of equipments and appliances, work on quality of materials, environment, water resources and water management and other related fields at the University. The aims and objectives of the" Institute" are to undertake and promote research and teaching in the fields of energy with emphasis on new and renewable energy development, energy conservation and energy management, assessing quality of materials, environment, water resources, water management, development and to develop human resources in the relevant fields. The head of the "Institute" is the Director designated who is appointed by the Vice Chancellor. Director is appointed on a two year terms from among the Professors/Research Professors of UAP.

CISP (Center for IT Security and Privacy)

CISP is the first ever center of its kind in Bangladesh. The mission of CISP is to enhance and extend the university's existing technological strength in IT, with demonstrated potential for Bangladesh. In pursuing this mission the center will conduct interdisciplinary research on IT security, data privacy, and trusted systems; on software for fault tolerant and dependable systems; and on product reliability. The center will hold research seminars/meetings related to security and privacy, and work under collaborations with different domestic and international universities or research laboratories. Moreover, the center is willing to research with a view to developing effective cyber security and privacy policy for our country. Furthermore, CISP plans to offer security training services to government/non-government organizations and individuals.

IEB Affiliation

Department of CSE has received the Certificate of Accreditation from the Engineers Institution Bangladesh (IEB) for the BSc in CSE program starting from August 2014. Congratulations!

This will enable the CSE students to enjoy the privileges offered by Engineers Institution Bangladesh (IEB) including membership.

About

UAP

1. Introduction

University of Asia Pacific (UAP) was established in 1996 with a vision to enhance the opportunities for higher education in Bangladesh. The University, under the Private University Act 1992, started its operation in 1996 by offering four-year Bachelor Degree Programs in Computer Science & Technology and Business Administration only. Now UAP offers undergraduate programs in nine disciplines and post-graduate programs in five disciplines. Its curriculum has been approved by the University Grants Commission of the Government of the People's Republic of Bangladesh.

UAP is sponsored by University of Asia Pacific Foundation, a non-profitable, non-commercial organization based in Dhaka, Bangladesh. The Foundation has been established in 1995 by a group of eminent educationalists, Industrialists and administrators who share the same vision and social commitments to promote improve and innovative educational opportunities to the society. UAP is the project of such noble goals. Mr. A.K.M Kamaluddin Choudhury is the current Chairperson of this foundation.

1.1 Aim

The principal aim of this privately funded University is to provide quality education at undergraduate and post-graduate levels relevant to the needs of a dynamic society. The courses and curricula are so designed as to prepare a student with sound academic background either to enter into the competitive professional job market or to continue further higher academic studies at home or abroad. The overall academic goal of the University is to equip its students with the means to become skilled and productive resources of the community

1.2 University Administration

Vice-Chancellor Prof. Dr. Jamilur Reza Choudhury
B.Sc.(Engg.), Civil(BUET), M.Sc.(Engg.) (Advanced Structural Engineering), Ph.D.(University of Southampton), Doctor of Engineering (Honoris Causa) Manchester University, UK. Fellow, Bangladesh Computer Society, Fellow, Bangladesh Academy of Sciences.Fellow, Institution of Engineers (Bangladesh)
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Email: registrar@uap-bd.edu

Deputy Controller of Examinations Mr. Mohammad Zahirul Islam
M. Sc (Karlsruhe University,Germany), M.Sc (JU), B.Sc (Hons)
Email: zahirul.islam@uap-bd.edu , examctrl@uap-bd.edu

1.3 Schools and Departments

At present, UAP has five schools comprising of relevant departments:

School of Engineering
- Department of Computer Science and Engineering
- Department of Civil Engineering
- Department of Electrical and Electronic Engineering

School of Business
- Department of Business Administration

School of Environmental Science and Engineering
- Department of Architecture

School of Science
- Department of Pharmacy

School of Social Science and Arts
- Department of Law and Human Rights
- Department of Basic Science and Humanities
- Department of English
- Department of Mathematics

These departments are offering undergraduate degree programs in seven disciplines and post graduate programs in five disciplines at the moment.

1.4 Academic Programs

Undergraduate Studies

Currently UAP is offering undergraduate programs in the following seven disciplines

Architecture

Business Administration

Civil Engineering

Computer Science and Engineering

Electrical and Electronic Engineering

Law and Human Rights

Pharmacy

English

Basic Science and Humanities

Other than Architecture, all the courses are four-year programs. Architecture is a five-year course. Academic programs are conducted on semester basis. There are two semesters of 18 weeks each - Fall and Spring in each year. At present the University has about 5000 students, with a sufficient number of faculty members engaged in different departments on full time basis. Besides, a good number of renowned educationists of different disciplines are involved in teaching on part time basis. The faculty is a blend of senior teachers with wide experience both at home and abroad and Young teachers with fresh and innovative ideas.

Postgraduate Studies

The Department of Business Administration is presently offering an Executive MBA program in conjunction with US / Australian Universities. It is full time program of 60 credit hours spread over two years.

The Department of Pharmacy is now offering Masters Program in Pharmaceutical Technology (MS in Pharm. Tech.). It is a full time program of 24 credits having one- year duration.

The Department of Computer Science and Engineering is offering Masters in Computer Science, Masters in Computer Science and Engineering.

The Department of Civil Engineering is also offering Masters in Civil Engineering program.

1.5 Academic Council

Academic council is the highest academic body of the University. It is chaired by the Vice Chancellor of UAP and comprises of the departmental Heads, Deans and eminent academicians of the country.

1.6 The Campus

UAP Administration
74/A, Green Road, Dhaka - 1215
PABX: + 880-2-58157091- 4 , + 880-2-58157096
FAX : + 880-2-58157097
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Email: admission@uap-bd.edu, asst.reg-admission@uap-bd.edu

Department of Architecture
Block # E, House # 51, Road # 4A
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Telephone: 8612935, PABX: 8629368, 9664953 (Ext: 130,112)
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Department of Business Administration
R H Center , House # 74/B/1 ,Green Road , Dhaka.
Email: headba@uap-bd.edu

Department of Civil Engineering
Third Floor, Block # J, House # 8/A, Road # 7
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Telephone: 9673057 (Ext: 110)
Email: headce@uap-bd.edu

Department of Computer Science and Engineering
Block # D, Hous e# 52/1, Road # 3A
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Telephone: 9664951, PABX: 8629368, 9664953(Ext: 131,133)
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Department of Electrical and Electronic Engineering
Block # I , House # 54/1 & 53/1, Road # 4A ,
Dhanmondi R/A, Dhaka 1209
Telephone: 9673450, PABX: 8629368, 9664953 (Ext: 134,135)
Email: headeee@uap-bd.edu

Department of Law & Human Rights
R H Center , House # 74/B/1 ,Green Road , Dhaka.
Email: headlhr@uap-bd.edu

Department of Pharmacy
Block # A, House # 73/C, Road # 5A
Dhanmondi R/A, Dhaka 1209
Telephone: 8629367, PABX: 8629368, 9664953 (Ext: 108,132)
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Department of English
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Telephone: 9673057 (Ext: 116)
Email: headeng@uap-bd.edu

Department of Basic Science and Humanities
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Medical Center
Block # A, House # 73/C, Road # 5A
Dhanmondi R/A, Dhaka 1209
Telephone: 9664952, PABX: 8629368, 9664953(Ext:0)
Email: naim@uap-bd.edu

Land for permanent campus has been allotted by the government of Bangladesh at Purbachal. The City Campus at 74/A Green Road. Dhaka (opposite to Green Super Market) is currently under construction and is expected to be completed in 2015. Administration already shifted to the City Campus and the Department of CSE will shift to its new location as soon as it is completed.

1.7 Resources

Library

The University has a fairly well stocked central library. Adequate facilities exist with a large number of text books, reference books (currently more than 10,000), and journals, periodicals for study in the reading room of the library in a quiet and congenial environment. A number of local daily newspapers and international news magazines are also subscribed for the benefit of students. The library is being enriched day by day. Students can borrow books from the library. There is also CD library for the students. In addition to the central library some departments have their own seminar libraries. In the seminar library books and technical journals relevant to the respective disciplines are available.

Laboratory

UAP provide laboratory facilities for the students of respective departments. The laboratories are self-sufficient and rich in instruments and other facilities to carry out sessional / practical classes for different courses. Unlike many other private Universities, UAP does not depend on any other institutions for its laboratory classes. Other than sessional / practical classes, the faculties of UAP do their research work in these laboratories also.

Website and Internet Facility

University of Asia Pacific (UAP) provides twenty-four hour high-speed Internet facilities to its students. All the computers of lab and other places of each department of UAP are connected under a LAN and high-speed Internet line. There is a web site of UAP that contains important information about faculty members, ongoing research, admission, faculty search, exam of UAP etc., which is updated each week and URL is www.uap-bd.edu. Each student of UAP is given an individual email account at uap-bd.edu domain that recognizes the UAP students. Student can submit their assignments through Internet. The Internet facility provides services to seven different departments of UAP and two hundred users can browse simultaneously.

Other Facilities

The University runs a well-equipped Medical Center for medical consultation, free of cost for students. The University has its own canteen. Which provides hygienic foods at reasonable cost for the students, faculty and staffs. In near future, the University plans to provide transport facilities for students and also to provide residential facility, especially for female students.

1.8 Academic and Technical Collaborations

a. Foreign Academic and Technical collaborations

With increasing internationalization of education, particularly at the university level, there is a strong compulsion to promote interaction, especially with institution of higher education in the industrial countries. Such interaction provides access to ever-changing scenarios of modern education delivery system and the most up-to-date innovative developments in teaching-learning methodology. Recognizing this imperative, UAP has already initiated a number of collaborative programs with universities in the USA, Australia and Canada.

An agreement between the University of Baltimore, USA and University of Asia Pacific has already been signed to collaborate in a joint undergraduate studies program in Business Administration. The objective of this program is to offer a collaboration baccalaureate degree to students of UAP through a course of studies pursued at UAP and in the USA at the University of Baltimore.

An exchange program and academic cooperation agreement has been signed with Virginia Polytechnic Institute (VPI) and State University (SU), USA, which provides for exchange of students and visits of faculty members between UAP and VPI, SU; transfer of credits for courses taken by UAP students: undertaking joint research programs and joint supervision. Under the agreement, UAP students may pursue their studies as exchange students or seek transfer to VPI and SU after studying two years at UAP. Similar agreements for academic collaboration had been undertaken with South Dakota School of Mines and Technology (SDSMT) in the USA and University of Western Sydney and University of Canberra in Australia. An exchange program and academic cooperation agreement has already been signed with Griffith College Dublin, Ireland. Recently, another MOU has been signed with Purdue University Calumet, USA, to provide for an exchange of faculties and students and other collaborations.

Discussions are continuing with few other universities in Australia, Canada. UK and USA. It is expected that the arrangement for credit transfer, technical collaboration etc., with some of them will be finalized in near future.

b. National Academic and Technical collaborations

MEMORANDUM OF UNDERSTANDING ("MoU") is made on June 4th June between University of Asia Pacific and Bangladesh Computer Council, Govt, of Bangladesh (BCC) and Top-Up lT and Foundation Skills Project implementation Unit.

The purpose of this association is to enable Foundation Skills and Top up lT Training projects to be implemented at UAP for their students leveraging their facilities while for UAP the value proposition is to enable its students to get a quality employability enhancing training, with certification/ accreditation to a government/ industry body or university and enhance their employment opportunities through the job-connect component of the project. It will help UAP become a project partner for this program and also enhance faculty development opportunities for the university.

MoU signed between University of Asia Pacific and BRAC Bank

University of Asia Pacific (UAP) signed a Memorandum of Understanding (MoU) with BRAC Bank for cash collection service on July 24, with a view to expanding and introducing a more systematic, improved and efficient collection. Under the MoU, BRAC Bank — through its real-time online branch network and SME sales service centre network — will collect cash from the students of UAP. Cash deposit through BRAC Bank's own branch network and SME sales and service network will be instantly credited in the collection account of UAP, maintained with the bank.

UAP

Rules

&

Regulations

1. Academic Rules

To meet the growing technological challenges confronting the nation and the world as a whole, University of Asia Pacific has designed the curricula and syllabi of the subjects offered in the undergraduate courses accordingly. The curricula and syllabi are relevant to the current needs, and are responsive to the emerging challenges. The rules and regulations for undergraduate curricula through course system are applicable for all students.

Semester System

There will be two semesters- Fall and Spring Semester in an academic year. In addition to these two regular semesters, there may be a short semester (Summer) in the intervening period between the end of Spring Semester and commencement of Fall Semester.

Regular Semester	
Classes	15 Weeks
Recess before examination	1 Week
Semester final examination	2 Weeks
Total	18 Weeks

1.1 Course Pattern and Credit Structure

The entire undergraduate program is covered through a set of theoretical and laboratory courses, fieldwork, design and project/thesis work.

Assignment of Credits:

Theoretical Courses: One lecture per week per semester will be equivalent to one credit. Thus, a three (3) credit hour course will have three (3) lectures per week throughout the semester.
Laboratory/Field/Design/Project/Thesis Work: Credits for laboratory/field work or design work usually will be half of the class hours per week per semester. Credits are also assigned to project and thesis work taken by the students. The amount of credits assigned to each of these may vary from discipline to discipline.

Type of Courses:

Core Courses: In each discipline, a number of compulsory courses will be identified as core courses, which form the nucleus of the bachelor degree program.

Optional Courses: Apart form the core courses, students will have to complete a number of courses, which are optional in nature. Hence students may have some choices in selecting courses from a specific group or a number of courses.

2. Registration Process

2.1 For the Second and Subsequent Semester

A student is normally required to earn at least 15 credits (out of 17.5 to 20 credits) in a semester. At the end of each semester, the students will be classified into one of the following three categories:

Category 1:
Students, who have passed all the courses prescribed for the semester and have no backlog of courses. A student of Category-1 is eligible for registration in all courses prescribed for the next or following semesters.

Category 2:
Students, who have earned at least 15 credits in a semester but do not belong to Category 1. These students are advised to take at least one course less in the following semester than those offered for students of Category 1, subject to the condition that, they will register for such backlog courses as prescribed by the respective adviser.

Category 3:
Students, who have failed to earn 15 credits in a semester, belong to this category. Students of this category are advised to take at least two courses less in the following semester than those offered for students of Category -1 subject to the registration for a minimum of 15 credits and maximum 24 credit hours. However, they are required to register for such backlog courses as would be prescribed by the adviser.

2.2 For short Semester

The courses offered during the short semesters shall be decided on the recommendations of departments on the basis of essential deficiencies to be

made up by a group of students. Other students could be allowed to register in those courses, subject to capacity constraints and satisfying the prerequisites. Students will be allowed to register for a maximum of two courses during the short semester. A fee of each credit hour to be registered will have to be borne by the students who will enroll for the short semester. The courses in which a student has obtained a D or higher grade will be counted as credits earned by him/her. A student who obtains an F grade in any course in any semester will have to repeat the course for the purpose of grade improvement. F grades will not be counted for GPA calculation but shall be mentioned on the grade sheet and transcript.

3. Grading System

The total performance of a student in a given course is based on a scheme of continuous assessments. For theoretical courses this continuous assessment is made through homework, assignments, attendance, quizzes etc., a mid semester and a semester final examination of three/two hours duration. The distribution of marks for a given course is as follows:

Assessment	30%
Mid Semester	20%
Final Exam	50%
Total	**100%**

- The assessment in laboratory/field work courses is made by observing the student in the respective lab classes and also by taking viva-voce and quizzes.

Each course has a letter grade equivalent to a certain number of grade points. Letter grades and their corresponding grade points are as follows:

Numeric Grade	Letter Grade	Grade Point
80% and above	A+	4.00
75% to less than 80%	A	3.75
70% to less than 75%	A-	3.50
65% to less than 70%	B+	3.25
60% to less than 65%	B	3.00
55% to less than 60%	B-	2.75
50% to less than 55%	C+	2.50
45% to less than 50%	C	2.25
40% to less than 45%	D	2.00
Less than 40%	F	0.00
Incomplete Works	I	—
Satisfactory (only for 7th semester project/thesis)	S	—
Exempted (For credit transfer courses)	E	—

Grade 'F': If a student fails to achieve at least 40% marks in a course, he/she will get 'F' grade in that course. Besides, absence in final examination at the end of each academic semester will also result 'F' grade.

Grade 'E': A student transferred to UAP from another university or academic institution will earn 'E' grades in the courses exempted at UAP.

Grade 'I' : Grade 'I' may be given when a course, according to the syllabus is extended to two consecutive semesters and grade 'S' is given in the first semester to mean satisfactory progression.

GPA Calculation:

A student's performance is measured by the number of credits that he/she has completed satisfactorily and the weighted average of the grade points that he/she has maintained. A minimum GPA is required to be maintained for satisfactory progress and a minimum number of earned credits should be acquired in

$$GPA = \frac{\sum(GradePoints \times Credits)}{\sum Credits}$$

Where grade points are points against letter grades A+, A, A-, B+, B, B-, C+, C, D and F. Credits are only for those courses attempted at this university.

Attendance

All students are expected to attend classes regularly. The University of Asia Pacific believes that regular attendance is essential for effective learning. A student is required to attend at least 70% of all the classes held in every course in order to sit for the final examination.

Absence during Semester

A student shall not be absent in quizzes, tests, mid semester examinations etc., during the semester. Such absence will naturally lead to reduction in points/marks, which shall count towards the final grade. Absence in the final examination held at the end of each academic semester will result in F grades.

Performance Evaluation

The performance of a student will be evaluated in terms of semester GPA and cumulative grade point average (CGPA), which is the grade point average for the semesters under consideration. A candidate will be awarded a degree with honors if his/her CGPA is 3.75 or above. A student will be considered to be making normal progress towards a degree if his/her CGPA for all work attempted is 2.25 or better and is in good standing with the university.

Students who fail to maintain this minimum rate of progress will fail to be in good standing. Such circumstances may prevail under one or more of the following conditions:

- ✓ Semester GPA falls below 2.25,
- ✓ Cumulative GPA falls below 2.25.
- ✓ Earned credits fall below 15 times the number of semesters studied.

Conduct and Discipline

A student should conform to the highest standard of discipline and shall be herself/himself within and outside the premises of the university in a manner befitting the student of a university of national importance. She/he shall show due courtesy and consideration to the teachers and other employees of the university and render sincere co-operation to his/her fellow students. The students also pay due attention and courtesy to the visitors.

4 Examination Rules

4.1 Re-examination or Re-Scrutinization of Answer Scripts

Re-examination of final examination answer scripts may be permissible. A candidate can apply for re-examination of any answer script of final examination to the Controller of Examinations through their advisor and the head of the department on payment of Taka 200/- (Tk. Two Hundred) only per script within 7 (seven) working days from the publication of final results. No such application shall be entertained after the mentioned time. No such re- examination is allowed for practical/sessional courses. While re-examining such answer scripts the examiner shall re- examine the scripts thoroughly and shall award a grade, which shall be treated as final.

4.2 Rules for Repeat Examination

A student would be allowed to appear at the Repeat Examination in case s/he fails in three theory courses or less but not exceeding 10 credit hours. The results of Repeat Examinations would be published within three weeks from the date of publication of the results of the Semester Final Examination concerned. The respective departments would arrange such Repeat Examinations. Candidates willing to appear at such Repeat Examinations must apply to the respective heads of departments through the advisors stating their willingness to appear at the said examination with the receipt of payment @ Taka3000/- per course. Repeat examination would be held before next semester would start.

Repeat Examinations on theory courses would be held on 50 percent of marks for each course and the marks for Class Assessment and Mid Semester Examination would be carried. There shall be no repeat examinations for sessional courses. The maximum grade to be obtained by a student in a repeat examination would be 'B' (equivalent to 60%). The following grading system would be followed in the repeat examinations:

Numeric Grade	Letter Grade	Grade Point
60% and above	B	3.00
55% to less than 60%	B-	2.75
50% to less than 55%	C+	2.50
45% to less than 50%	C	2.25
40% to less than 45%	D	2.00
Less than 40%	F	0.00

Any student who fails to successfully complete any sessional course has to repeat that course in the following semester.

4.3 Provisions for Improvement of Grades:

4.3.1 Category – A

1. The Provision for Improvement of grades applies to those only who obtained a grade C or lower in any course. Such candidates may be allowed to improve their grades by surrendering the earlier grade obtained by him/her.

2. For grade improvement purpose, a student will be allowed to repeat a maximum of four courses.

3. For availing such provision of grade improvement, a candidate shall apply to the Controller of Examinations through the Head of the Department concerned with a fee @ Tk. 3000/- (Tk. Three Thousand) only per credit hour. A student may apply for such provision any time during his/her study period in the university but not beyond two weeks after the publication of his/her final semester results.

4.3.2 Category - B

1. A Cumulative Grade Point Average (CGPA) of minimum 2.25 is required for graduation. A candidate whose CGPA is below 2.25 shall have to increase his/her CGPA to the minimum requirement within two consecutive semesters failing which s/he shall be placed under academic probation.

2. Candidates requiring to increase their CGPA under this category (Category - B) shall apply to the Controller of Examinations through the head of the department concerned with a payment of @ Tk. 3000/- (Tk. Three Thousand) per credit hour.

5 Advising System

Department of Computer Science & Engineering has a strong student advisory system. One advisor will normally be appointed for a group of students by the concerned department. The advisors usually perform the following responsibilities:

1. Maintain regularly scheduled office hours for academic advising as needed throughout the semester.
2. Assists the students in selection of courses on a short-term and long-term basis.
3. Monitor advisees' academic progress as well as behavior, manner in the campus and initiate contact with advisees those are failing to progress satisfactorily.
4. Inform students the changes in academic policy, rules and curriculum in the university.
5. For students with excellent academic background and for needy students, advisor recommends to the higher authority for financial assistance.

5.1 Students' Responsibilities Regarding Advising

1. Participate in all scheduled pre-enrollment and orientation programs for incoming students at university.
2. Prepare in advance for academic advising meetings. Map out courses they want and need to take for their degree and present this to their concerned advisor.
3. Make and honor academic advising appointments.
4. Make advisor aware of any special needs or problems encounter at UAP. Concerned advisor is there to guide students through any problems that may hinder their academic success and continued enrollment in the following semester. Advisors are equipped with a plethora of resources to help the students.
5. Know academic policies, procedures, and regulations such as withdrawal, repeat & improvement examination, retakes, academic probation/dismissal, financial aid, etc.
6. Know degree requirements and remain informed about changes in their curriculum. Map out a plan of action for academic career and review it with concerned advisor.
7. Make the effort to get to know the advisor personally, the better they know one another and the more comfortable they will be.

6 Waiver Policy

3% of total seats are reserved for the children of Freedom Fighters and another 3% for meritorious but poor students from remote areas of Bangladesh. They will be offered full free education opportunity.

1. Top 3% students in each department will be offered 100% tuition waiver based on semester results.
2. Vice Chancellor's special tuition fee waiver will be offered in amount 10%-100% to poor but meritorious students.
3. 50% waiver for students with individual GPA of 5.00 in S.S.C and H.S.C.
4. 25% waiver for students with individual GPA of 4.50 in S.S.C and H.S.C.
5. 10% waiver for students with individual GPA of 4.00 in S.S.C and H.S.C.

Criteria for semester based tuition fee waiver (including Vice Chancellor's Special Tuition fee waiver)

a) Has to be regular throughout all the semesters(i.e. no break of studies or lower than acceptable credit hours enrolled un any semester)
b) Has a record of good conduct
c) Has no outstanding dues
d) Is not availing any other concession/waivers
e) Is not financially solvent
f) Has been recommended by the Head of the Department and Advisor
g) Has obtained one of the following GPAs

GPA	Percentage of Tuition fee waived
3.5-3.74	25%
3.75-3.89	50%
3.90-3.99	75%
4.0	100%

Students taking repeat exams or with "F" grade in previous semester, are not eligible for merit-based waiver/scholarship.

Department

Of

CSE

The ever-increasing needs and applications of computers in almost every walk of life need no overemphasis. Computers nowadays are being widely used in all fields conceivable. To keep pace with the advancement in computer science and engineering in more developed countries than Bangladesh it is essential that efforts are made both in the public and private sectors to develop human resources in this particular field.

Opportunities to pursue academic programs in computer engineering are rather limited in Bangladesh. The prime objective in establishing the Computer Science & Engineering Department at University of Asia Pacific is to make a concerted effort towards achieving the goal of providing quality education for the duration of 4 years at the undergraduate level. Later it is to be followed by higher academic degree programs such as MS/Ph. D.

The courses in the undergraduate programs are designed to give students a rigorous and comprehensive academic training on both the fundamental and advanced aspects of Computer Science & Engineering (CSE). It would concentrate both on software and hardware aspects. A student in CSE must not only have a sound basis in the fundamentals of computer but also should be aware of socio-economic problems of the country. Therefore, courses in science, humanities, economics, accounting, finance and management are also included in the curricula. The last two semesters will offer the students a number of alternatives to choose from and to specialize in a particular one. Theory and seasonal work will be supplemented by Project/Thesis work, Seminars and visits to relevant research and development organization.

1 Laboratory Facilities

1.1 Computer Laboratories

Computer Science & Engineering Department of University of Asia Pacific has three outstanding micro–computer labs and one project lab. These labs are networked with each other and the other PCs of the department through LAN. A server room is arranged to administrate the proper functioning of the lab and to accommodate LINUX server, Oracle Server, Windows 2000 server and other sophisticated resources like a scanner, a high resolution digital camera, etc. Each lab is equipped with twenty-five updated PCs. Department ensures reliable computing as each PC is attached with an UPS. There is a heavy-duty printer stationed in each lab to provide printing facility to the students. Each student is given separate account in CSELAB domain. Students have to logon to their respected accounts to avail the existing network resources. A student can browse from any PC free of charge for unlimited period. Wi-Fi internet access is available 24 hours for all .The Department has provided students with constant broadband Internet browsing facility also.. The department has already established a Project Lab for project work and research work. The lab is equipped with 7 PCs and a number of electrical and electronic trainer boards, D.C. power supplies, signal generator etc. There are in total 17 full-time faculty members in CSE department. Moreover, 9 faculty members are on study leave currently pursuing higher studies abroad. Each faculty member is provided with a PC and is networked through LAN. During office hour (a time slot earmarked for students), these PCs are used for attending from a small group of students; clarification of any point won the undergraduate projects of the students etc. Also, these PCs are used by the teachers to carry out the research work.

1.2 Electrical Circuit Laboratory

There is a rich circuit lab in CSE Department, which is equipped with modern tools. The purpose of this lab is to design various electrical and electronic circuits. Also this lab is used to study the behavioral characteristics of the different electrical and electronic projects. This lab has full-fledged 5 equipment set-ups so that 5 groups of students can carry on any electronic and electrical experiment and project simultaneously. Each equipment set-up includes modern Oscilloscope, dc generator, signal generator, trainer board, high-configured PC. This lab also has sufficient amount of all necessary electrical and electronic components including ICs (Digital and Analog), resistors, capacitors, inductors, transformer, variac etc. DSO card and electrical machines (motor-generators) are under procurement.

1.3 Microprocessor and Digital Laboratory

Digital lab has a number of highly sophisticated modern equipments such as trainer boards, 8086 microprocessor kits, digital IC tester, PC etc. Also it has a huge resource of digital and analog ICs and other electronic components. In this lab students can design and implement starting from small digital circuits to 8-bit microprocessor. Also, they can acquire the technical know-how of 8086 microprocessor and its peripherals. Furthermore, students can easily interface any personal computer with analog world for adaptive control and automation. This lab has also full-fledged 5 equipment set-ups so that 5 groups of students can carry on any digital and interfacing experiment and project simultaneously.

1.4 Other Laboratories

Besides the core labs, students of the CSE Department have to attend in two other labs: Physics Lab and English Language Lab. The Physics lab is used to perform the various experiments based on physics courses. The English Language lab is provided to enhance the skill of the students in both oral and written communication in English.

1.5 Departmental Library

There is a departmental library which has various book and journals. Different books related to the core subject and others related to interdepartmental courses are available in the library and also the different current journals and thesis books are there.

2. Clubs of CSE Department

Five (5) separate clubs have been formed to ensure and enhance students' involvements in different activities in an organized manner. Each club is headed by General Secretary and consists of convener and organized by some members along with advisory council.

2.1 Research and Publication Unit

Research and Publication Club publishes a national Journal each semester named **International Journal of Computer and Information Technology (IJCIT)**, ISSN 2078-5828. The IJCIT only publishes articles of the highest quality. It is scholarly, peer-reviewed journal that provides a forum to the academics, scholars and advanced level students for exchanging significant information and productive ideas associated with all Computer Science disciplines. It helps the students and faculty members to improve their research capability producing quality computer professionals who can make positive contribution in the development of this country. Most of the faculty members and students of UAP are engaged to publish their researches at IJCIT.

2.2 Sports Club

Aim:

- To promote and develop individual interests in various sports and recreational activities.
- In addition to the development of specific skills, Sport Clubs are designed to be a learning experience for their members and, through involvement in leadership, responsibility, decision-making, public relations, organization, and fiscal management.
- Uphold the name and fame of the CSE department as well as UAP by promoting the excellence of the students in different sports competitions.
- Develop the skills of the students in teamwork, critical thinking, quick decision-making and prompt logical response to arguments.

Activities:

The Activities of this club are as follows:

- The Club arranges at least one intradepartmental sports competition in an academic year on regular basis.
- This club usually selects the participants from the CSE department for UAP Sports Competitions or any Sports event outside the university.
- The Club arranges training for the participants of both indoor and outdoor games if required.

2.3 Cultural and Debating Club

Aim:

University is the highest seat of learning. A university student is to learn socio-interaction, etiquette, exercise tolerance towards the opinions of the others and as a whole promote the intellectual ability beyond the domain of his/her main study.

Apart from the rigorous CSE subjects, extracurricular activities like Cultural programs and Debate will broaden students' minds and

enhance their worth appreciating qualities that will ultimately express the excellence of the CSE Department in particular and the UAP in general.

With a pragmatic view to encouraging extracurricular activities, creating and sustaining a congenial environment for such activities, the CSE Department of the UAP has formed the CSE Cultural & Debating Club.

The prime objectives of the CSE Cultural & Debating Club are to:

- Uphold the name and fame of the UAP by promoting the excellence of the students in cultural programs and debate.
- Promote the cultural spirit and social etiquette among the students
- Develop the skills of the students in stage performance, speaking for or against a motion by articulating their respective views.
- Develop the skills of the students in teamwork, critical thinking, quick decision-making and prompt logical response to arguments.
- Enhance their ability to defend and prove their ideas through reasoning, improvising and presence of mind.
- Exercise the tolerance towards the arguments of the others
- Pave the way for being interested all the more in their study by surmounting the monotony of the rigorous CSE subjects

Activities:

- Whenever a national event is to be observed on behalf of the UAPCC, the CSE Cultural and Debating club will represent the Department.
- Arrangement of the Orientation program on behalf of the department in every semester.
- This club will reserve the right to select cultural/debating participants from the CSE department for competitions to be held both inside/outside the university.
- Arranging Inter/ Intra department debating competitions on regular basis in the department.
- Arranging Workshop or Training program on cultural/debating activities to enhance the relevant talents of the student members.
- Arranging various cultural festivals on the basis of demand.

2.4 Programming Contest Club

Aim:

Having a considerable skill in programming is essential for every student studying in CSE. Programming Contests present a great opportunity for the students to exhibit and at the same time enhance their programming skills and creativity. During the last decade programming contest has become one of the most challenging and prestigious events in Computer Science arena throughout the world. The ACM International Collegiate Programming Contest (ICPC) is undoubtedly the most honored and spectacular event among all. Since 1998 universities from Bangladesh have participated in all the ICPC World Finals, which is certainly an outstanding feat. Achievements in international arena have led to a surge of enthusiasm regarding programming contests in our country. Now-

a-days national level programming contests are arranged regularly exposing a great deal of healthy competitions among the universities.

The goal of this club is to encourage students of UAP to improve their programming skills, to prepare them for participating in different national and international contests and to arrange programming contests of both national and international level in the UAP campus.

Activities:

To achieve the goal, the club will undertake following activities:

- Arrange weekly training sessions for junior and senior students..
- Arrange both individual and team practice contests using an online judge installed on a dedicated server maintained by the club.
- Arrange intra-department programming contests on regular basis.
- Prepare selected students for participating in different National and International level programming contests.
- Arrange inter-university programming contests in the UAP premises.

2.5 Software and Hardware Club

Aim:

- The aim of the Club is to develop and improve student skills through the developments of various Software and Hardware projects regularly.
- The Club will collect and preserve all the academic projects (current and previous ones) developed by the students of the department that include Term Projects, Lab Projects, Research Projects etc. and will further work on some selected projects make them compliant to the industry standards. The Club will also work on the development of new projects with the help of the member students.
- The Club will arrange at least one Software Fair per year with the developed projects. Through this, it aims to
  - Give the students of the department the exposure to the outside world and the job market presenting their developed projects before the various Firms and Organizations.
  - Enhance the University image in education sector.
  - Introduce students before the latest and more recent technologies in the market.

Activities:

UAP Software & Hardware Club initiated several programs to achieve its goal. Till now the club organized the following events

- CSE Carnival May 2011.
- Three-day workshop on C and C++ before midterm examination of Fall – 2009 in order

to help junior students to strengthen their knowledge in programming language.

- Software & Hardware Fair on CSE – DAY 2009.
- Oracle Certified Programmer (OCP) training course to make students more competitive in job market.

Developments and progress achieved during last 5 years

For the last 5 years, the Department has emerged as one of the important Departments in the UAP as well as CSE Departments of other Universities. Recently CSE alumni has been formed where more than 250 students have registered (out of 1200 students graduated).Except the graduates of the last semester, none of the students are jobless. Some of the students are well employed in different mobile and software companies. This reflects the quality of students being produced by UAP. A good number of students are pursuing higher studies in Italy, UK, USA, Sweden, Japan, Germany and Korea. Starting from 4 students in 1996 the Department has experienced a massive intake of students since the year 1999-2000. At present, there are around 369 undergraduate and graduate students in the Department. For the last five years, new programming labs with brand machines (1 Student: 1 Computer) have been established, circuit lab and digital lab have been restructured and reinforced with latest equipments and computers, new project lab has been established to encourage the students to take practical hardware & software oriented projects. A departmental library is also formed with huge course related books and magazines. All class rooms are air conditioned with multimedia projector support.

Industry-Institution Interaction

We have got the Spectrum Engineers Consortium and Plasma Plus involved with us. Similar articulation with some other organizations is still underway. This collaborative effort will include training students, guiding students' projects and industry-related suggestions to be incorporated while developing programs and curricula. The above organizations have come up with their suggestions and training programs. To enhance the quality of education even further, Department of CSE of UAP has established an Industry-Academia Collaboration with QUBEE, Augere Wireless Broadband Bangladesh Ltd (AWBBL). As part of the collaboration, following activities are performed by the two parties on a regular basis:

1. UAP-CSE visits selected Hub Sites, Aggregation Sites and Access Sites with the final year students as part of a one-day long Industrial Tour (twice in a year). A representative from QUBEE demonstrates the practical side of the theoretical aspects.
2. UAP-CSE invites QUBEE delegates in some of the Networking and Security related seminars, workshops and conferences organized by UAP.
3. Network and Communication Research Group (NCRG) of CSE Department is conducting research on real-life, industry-oriented problems. QUBEE will share necessary relevant information, if any. The outcome of the research can be accessed by both parties.

3 Faculty Members

3.1 Full Time Faculty

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Aloke Kumar Saha is Associate Professor and Head of Computer Science and Engineering Department of University of Asia Pacific (UAP), Dhaka, Bangladesh. He joined UAP on March 1999 as a Lecturer. Before, he was a Lecturer at Queens University from June 1997 to March 1999. He completed B.Sc. (Hons.) in Applied Physics & Electronics from the University of Dhaka in 1995. He received his M.Sc.(Thesis) in Computer Science from University of Dhaka in 1997. And he is now pursuing his Ph.D. from Jahangirnagar University, Savar, Dhaka, Bangladesh. He has twenty two (22) Journal publications and sixteen (16) Conference publications. He usually teaches courses on Digital Logic Design, Numerical Methods, Data Structures, Discrete Mathematics, Computer Graphics and Basic Electrical Engineering. His current research interests are Algorithm, Artificial Intelligence and Universal Networking Language (UNL). For more than 18 (Eighteen) years, he is working with the undergraduate and master's students of UAP as a supervisor or co-researcher of their project and thesis works. He is Chief of Organizing Committee of International Journal of Computer and Information Technology (IJCIT), published by department of CSE, UAP. He is also Convener of Departmental Quality Assurance Unit (DQAU) of the department of CSE, UAP. He is Member of Academic Council UAP, Chairman of Examination Committee of CSE, Advisor of Research & Publication unit, Programming Contest club, Hardware& Software Club, Sports Club and Cultural & Debating Club of the department of CSE, UAP.

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Shaila Rahman completed her masters in Computer Science from DU. She joined in UAP after her graduation. She secured 4th position in M.Sc. She also secured the 4th position in B.Sc (Hons) in Applied Physics & Electronics from the same institution.

Shaila Rahman teaches several courses on Computer Networks, Data Communications, Information Systems, Microprocessors, Assembly Language, Computer Interfacing, Digital System Design, C/C++, Data Structure and Algorithms. She has conducted the courses Mobile Communications, Advanced Networking and thesis in Masters Program of CSE (MCSE),.

Her current research interest includes Computer Networks and Distributed System, Wireless Networks, Wireless Ad hoc network, Sensor Network, Network Security, IPV6 network etc. She supervised the thesis works of several undergraduate students at UAP. It is praiseworthy to mention that more than thirty thesis groups in undergraduate level completed successfully under her acute supervision. Her research works published in IEEE, ICCIT, NCCPB, ICCPB, IJCIT conference and journal papers. Ms. Rahman has also published two journals on Cryptography, Outsourcing and location management.

Ms. Rahman serves as acting head when the head of the department remains on leave. She also serves as an external examiner in the CSE department of Dhaka University. Moreover, She is the convener of the Cultural and Debating club. She is also advisor of other departmental Clubs. She is member of UAP Central Cultural Committee, Convocation Volunteer committee and Complain Committee.

Kazi Chandrima Rahman,

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KaziChandrimaRahman has been serving as an Assistant Professor at the Department of Computer Science and Engineering (CSE), University of Asia Pacific since October 2009. She joined UAP on October 2005 as a Lecturer. Before, she was a Lecturer at BRAC University from September 2003 to September 2005. She also worked as a Software Developer in Grameen Solutions from May 2002 to January 2003.

She Completed her B.Sc. (Hons) and M.Sc. in Computer Science from University of Dhaka. Ms. Chandrima has experience to compete in ACM-ICPC programming contest and she secured 2nd position in that international programming contest. She also achieved certificate of appreciation in recognition of outstanding service as a Project Supervisor of UAP Research and Development Exposition 2012, organized by IEERD.

She has research papers on Research and Educational Network, Sensor Network, Social network and TCP Congestion Control, Social Network, MANET etc. on ICCIT, IJCIT, and IJENS-IJECS, IOSR, IJSAT etc. Her research interests are on Sensor network, Network Security, Distributed and Parallel Networking, Wireless Network, Ambient Intelligence etc.

She has been selected as a Potential Invitees of Emerging Research and Education Network for South Asia Region for her research work on Research and Educational Network. She is an advisor and reviewer of IJCIT (international Journal of Computer and Information Technology: ijcit.org), Technical Journals Online: www.technicaljournalsonline.com and International Journal of Communication Networks and Distributed Systems (IJCNDS). She is also a reviewer of Journal of Communications and Networks—Co sponsored by IEEE.

Ms. Chandrima is a member of several professional associations, like: - International Association of Engineers (IAENG), International Association of Computer Science andInformation Technology (IACSIT) and Internet Society—ISOC. She is also a member of Executive Committee of Alumni Association, Computer Science and Engineering, University of Dhaka. Her website:chandrima.me.

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Shammi Akhtar is currently working as an assistant professor at the department of computer science and engineering of the University of Asia Pacific, Bangladesh. She joined UAP in 2003 as lecturer after obtaining her B.Sc. degree in computer Science & Engineering with Honors from the University of Asia Pacific. She completed her M.Sc. degree in computer Science & Engineering from the same university. She teaches courses on Operating system, Assembly Language, Computer Architecture, Computer Graphics, Data structure, Information System Design, Compiler Design, Microprocessor, Basic Electrical Engineering, Digital System Design, and Computer Interfacing. Her research interests include Computer Network, Graph theory, E-Commerce & Web performance Technologies, Data Mining.

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Nahida Sultana Chowdhury joined the department of Computer Science and Engineering of the University of Asia Pacific (UAP), Bangladesh on October 2013 as a lecturer. She has completed her B.Sc. in April 2008 (Vice Chancellor's Gold Medalist) from University of Asia Pacific, Bangladesh and successfully completed M.Sc. in August 2012 from Kyungpook National University, South Korea. In her undergraduate and graduate program major was Computer Science and Engineering. She has been awarded for Korean Government Scholarship Graduate Program (2009-2012) by National Institute for International Education (NIIED) for his academic excellence. After completing her M.Sc. she joined National ICT Research Centre of Australia (NICTA), University of New South Wales, Sydney; as a research engineer of Software System Research Group from September 2012 to August 2013. She has five Journal publications and tow Conference publications and one Poster. Her research interests include Safety Critical Systems, Software and Hardware Verification, Artificial Intelligence, Software Engineering, Operating System, Computer Programming I, Computer Programming II, Assembly Language Programming, Algorithm, Software Development, Database Systems, Information Systems.

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Molla Rashied Hussein is currently working as a Lecturer at the Department of Computer Science and Engineering (CSE) in University of Asia Pacific (UAP), Dhaka, Bangladesh. He completed his Bachelor of Science in Computer Engineering (BSCE) from North South University (NSU), Dhaka, Bangladesh in 2007. Then he worked for a Danish-Bangladeshi software firm, followed by the IT Division of a reputed private bank of Bangladesh. After that, he went to USA to pursue Master of Engineering in Computer Engineering (ME CpE) from Old Dominion University (ODU), Norfolk, Virginia, USA in 2011. Then he worked for IT Division of a reputed marketing company in USA. After that, he came back to Bangladesh and joined UAP as a Lecturer. He has taught courses on Artificial Intelligence, C Programming, Computer Networking and Computer Graphics. His research interests include but not limited to Knowledge and Data Engineering (KDE), Data Mining and Gamification. He is an active member of International Association of Computer Science and Information Technology (IACSIT), Membership # 80345500.

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Mr.Md. Anit Khan has been acting as a Lecturer in the Department of Computer Science and Engineering (CSE) at University of Asia Pacific (UAP) since November, 2014. He received his Masters by Research in Information Technology from Monash University, Australia and completed his B.Sc.(Engg.) in Computer Science and Engineering from Bangladesh University of Engineering and Technology. He has hands on experience in system analysis and software development as he previously worked in renowned IT institutions. Also, he performed as a teaching assistant in Monash University Australia while he had been a postgraduate research student over there. His research interests include but not limited to Cluster Based Routing in Wireless Sensor Networks (WSNs), Cloud Computing, Internet Security, Security of WSNs. He is now member of Research and Public group, Sports club as well as Hardware and Software club.

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Ahmed Sayeed Faruk is a Lecturer at the Department of Computer Science and Engineering (CSE), University of Asia Pacific (UAP) since April 2015. He graduated from BUET in July, 2014. His research interest includes Computational Geometry, Artificial Intelligence, Probability, Algorithm and Data Structure. Right now he teaches courses on Software Development,Algorithm.

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Jahir Ibna Rafiq is currently working for UAP as a lecturer in the CSE department. He has completed his undergraduate degree from University of Surrey, UK. Academic excellence and proactive engagement have earned him multiple scholarships from Bangladesh Government, University of Cincinnati, USA and University of Surrey, UK. Formerly worked as a software engineer at a reputed UK financial software company; possessing strong interpersonal and varied knowledge of the industries across first world countries. His Research interest includes Network Security, Software Design, Quality Assurance, Embedded systems and Sensors.

Md. Mohaimenul Hossain
M.Sc. in PERCCOM, Erasmus Mundus, 2015
B.Sc.Engg (hons) in CSE, IUT, 2012
Email: mohaimen@uap-bd.edu

Md. Mohaimenul Hossain is currently working as a Lecturer at the Departme4nt of Computer Science and Engineering (CSE) of the University of Asia Pacific (UAP), Dhaka, Bangladesh. He completed his M.Sc. in Pervasive Computing and Communication for sustainable development (PERCCOM) under Erasmus Mundus Program. Erasmus Mundus is a joint Masters Mobility program around Europe. He completed his B.Sc. (Engg) from Islamic University of Technology in the year 2012. He worked as a Lecturer in Prime University for the duration of nine months (2013). His research interests include green networking, cloud computing, wireless sensor network, Internet of Things, human computer and interaction and artificial intelligence.

3.2 Faculty Members on Study Leave

Name	Designation
Md. Rashedul Islam	Assistant Professor
Hasan Mahmood Aminul Islam	Lecturer
Ferdous Ahmed Kawsar	Lecturer
Tania Rahman	Lecturer
Shebuti Rayana	Lecturer
Mohammad Majharul Islam	Lecturer
Abdullah-Al-Mamun	Lecturer
Md. Anowarul Abedin	Lecturer

3.3 Guest Faculty

Name	Designation
Dr. Jugal Krishna Das	Professor, JU
Dr. Sadia Sharmin	Associate Professor, BUET
Sukarna Barua	Assistant Professor, BUET
Jamil Siddiquee	MBA (Shefield)
Md Ataur Rahman	Assistant Professor, The Higher Institute of Electronics, Libya

Supporting Office Staff

Md. Faruk Hossain
Sr. Administrative Officer

Md. Abdul Matin
Lab. Assistant

Md. Mofizur Rahman
Lab. Assistant

Md. Anowar Hossain
Lab. Assistant

Md. Sharif Hossen
Lab. Assistant

Md. Abdul Ali
Messenger

Rebaka Nesa
Messenger

Tapon
Cleaner

Yousuf
Cleaner

Mollah Hasanul Kabir
Office Assistant

Md. Amir Hossain
Lab. Attendant

Md. Suzauddoula
Library Attendant

4 Summary of Undergraduate Courses

The undergraduate students of different years of the Department of Computer Science and Engineering have to follow the course schedule given below. The letter prefix in any course number indicates the discipline/subject offering the course viz. HSS for Humanities and Social Science, Business, Management Studies, Language etc., PHY for Physics, MTH for Mathematics and CSE for Computer Science and Engineering. The first digit in the number indicates the year/level for which the course is intended; the second digit is assigned by the department and the last digit, if odd, indicates a theory course and if even, indicates a laboratory course.

4.1 Core Courses

First Year First Semester

Course Code	Course Title	Credits
HSS 101	English I	3.00
HSS 111(A)	Bangladesh Studies: Society and Culture	2.00
HSS 111(B)	Bangladesh Studies: Bangladesh History	2.00
PHY 101	Physics I	3.00
MTH 101	Math I	3.00
CSE 101	Computer Fundamentals	3.00
PHY 102	Physics Lab	1.50
CSE 102	Computer Fundamentals Lab	1.50
	Total:	**19.00**

First Year Second Semester

Course Code	Course Title	Credits
HSS 103	English II	3.00
PHY 103	Physics II	3.00
MTH 103	Math II	3.00
CSE 103	Computer Programming I	3.00
CSE 105	Discrete Mathematics	3.00
ECE 101	Basic Electrical Engineering	3.00
CSE 104	Computer Programming I Lab	1.50
ECE 102	Basic Electrical Engineering Lab	1.50
	Total:	**21.00**

Second Year First Semester

Course Code	Course Title	Credits
ACN 201	Principles of Accounting	2.00
MTH 201	Math III	3.00
ECN 201	Principles of Economics	2.00
CSE 203	Computer Programming II	3.00
CSE 205	Data Structures	3.00
ECE 201	Electronic Devices and Circuits	3.00
CSE 204	Computer Programming II Lab	1.50
CSE 206	Data Structures Lab	0.75
ECE 202	Electronic Devices and Circuits Lab	1.50
	Total:	**19.75**

Second Year Second Semester

Course Code	Course Title	Credits
IMG 201	Principles of Management	2.00
MTH 203	Math IV	4.00
CSE 207	Algorithm	3.00
CSE 209	Numerical Methods	3.00
CSE 211	Assembly Language Programming	2.00
CSE 231	Digital Logic Design	3.00
CSE 208	Algorithm Lab	0.75
CSE 212	Assembly Language Programming Lab	0.75
CSE 232	Digital Logic Design Lab	1.50
	Total:	**20.00**

Third Year First Semester

Course Code	Course Title	Credits
MTH 301	Statistics and Probability	2.00
ECE 301	Electrical Drives and Instrumentation	3.00
ECE 303	Digital Electronics and Pulse Techniques	3.00
CSE 321	Database Systems	3.00
CSE 331	Computer Architecture I	3.00
CSE 300	Software Development	1.50
ECE 302	Electrical Drives and Instrumentation Lab	1.50
ECE 304	Digital Electronics and Pulse Techniques Lab	1.50
CSE 322	Database Systems Lab	1.50
	Total:	**20.00**

Third Year Second Semester

Course Code	Course Title	Credits
CSE 303	Operating System	3.00
CSE 305	Information Systems	3.00
CSE 315	Data Communication	3.00
CSE 333	Microprocessors	3.00
CSE 335	Digital System Design	3.00
CSE 304	Operating System Lab	1.50
CSE 306	Information Systems Lab	0.75
CSE 334	Microprocessors Lab	1.50
CSE 336	Digital System Design Lab	1.50
	Total:	**20.25**

Fourth Year First Semester

Course Code	Course Title	Credits
CSE 401	Software Engineering	3.00
CSE 403	Complier Design	3.00
CSE 421	Computer Network	3.00
CSE 431	Computer Graphics	3.00
CSE …	Option I	3.00
CSE 400	Project/ Thesis	3.00
CSE 404	Complier Design Lab	0.75
CSE 422	Computer Network Lab	1.50
CSE 432	Computer Graphics Lab	1.50
	Total:	**21.75**

Fourth Year Second Semester

Course Code	Course Title	Credits
CSE 407	Artificial Intelligence and Expert System	3.00
CSE 411	VLSI Design	3.00
CSE 435	Computer Interfacing	3.00
CSE …	Option II	3.00
CSE 400	Project/ Thesis	3.00
CSE 408	Artificial Intelligence and Expert System Lab	1.50
CSE 412	VLSI Design Lab	1.50
CSE 436	Computer Interfacing Lab	1.50
CSE …	Option II Lab	0.75
	Total:	**20.25**

Option I

Course Code	Course Title	Credits
CSE 405	Simulation and Modeling	3.00
CSE 423	Computer System Performance Evaluation	3.00
CSE 433	Computer Architecture II	3.00

Option II

Course Code	Course Title	Credits
CSE 425	Fault Tolerant Systems	3.00
CSE 437	Pattern Recognition	3.00
CSE 445	Multimedia Technology	3.00

Option II Lab

Course Code	Course Title	Credits
CSE 426	Fault Tolerant System Lab	0.75
CSE 438	Pattern Recognition Lab	0.75
CSE 446	Multimedia Technology Lab	0.75

Course

Outline

(Core)

5. Core Course Outline

5.1 First Year First Semester

Course Code: CSE 101
Course Title: Computer Fundamentals
Credits: 3.00

Introduction: Computer Basics, Operating System, Programming Concepts, Programming Languages, Number System. C Programming Language: Data types, Identifiers and keywords, Variables and Constants, Operators and Expressions, Data input and output. Program Control Structures: Flow control mechanisms, Flow Chart, if / switch statements, for/while/do statements, Flags, Conditional operators and expressions. Arrays: Array initialization, Processing, Passing arrays to a function, Strings, Multidimensional arrays. Functions: Defining and accessing a function, Prototypes, Parameters and Arguments, Local variables, Returning values, Function calls, Global, automatic and static variables. Structures: Concepts, Accessing members, Arrays of structures.

Course Code: CSE 102
Course Title: Computer Fundamentals Lab
Credits: 1.5

Laboratory work based on CSE 101.

5.2 First Year Second Semester

Course Code: CSE 103
Course Title: Computer Programming I
Credits: 3.00

Character Strings: Variable length character strings, String manipulation, Dynamic memory allocation. Pointers: Fundamentals, Declarations, Pointers and structures/functions/arrays, Operations on pointers, Pointers to functions, Pointers and memory addresses, Arrays of pointers. File Operations: Opening and closing a file, Operations on files, Binary I/O, Random access. Additional features: Low level programming, Bitwise operations, The preprocessor, Compiler directives, Command line arguments, C++: Introduction to C++, Object Oriented Programming Concepts, Encapsulation, Polymorphism, Inheritance, Class, Object, Namespace, Constructors and Destructors, Function Overloading, Operator Overloading, Friend function, Multiple Inheritance, Reference, Returning objects, Virtual Function, Run-time polymorphism, Generic Functions and other important features of C++.

Course Code: CSE 105
Course Title: Discrete Mathematics
Credits: 3.00

Algebras: Structure, Varieties of algebra, Homomorphism, Congruence relations. Mathematical Models & Foundations: Logic, Proposition, Propositional Equivalence, Predicates and Quantifiers. Sets: Set theory, Relations between sets, Operations on sets, Induction, the natural numbers, Set operations. Functions: Basic properties, Special classes of functions. Mathematical Reasoning: Methods of proof, Mathematical Induction, Recursive Definition. Counting: The basics of Counting, The Pigeonhole principle, Permutations and Combinations, Discrete Probability, Probability Theory. Advanced Counting Techniques: Recurrence Relations, Solving Recurrence Relations, Generating Functions. Relations: Relations and Their Properties, Representing Relations, Composition of relations, Closures of Relations, Closure operations on relations, Equivalence Relations, Partial Orderings. Graphs: Introduction of graphs, Representing Graphs and Graphs Isomorphism, Euler and Hamilton Circuits and Paths and their Properties, Digraphs, Graph theory, Trees, Application of Trees. Boolean Algebras: Boolean Functions, Representing Boolean Functions. Modeling Computation: Languages and Grammars, Finite State Machine with Output and No output.

Course Code: ECE 101
Course Title: Basic Electrical Engineering
Credits: 3.00

Basic concepts: current, voltage, emf, Ohm's law, Kirchoff's Current and Voltage Laws, Current and voltage divider rules, types of sources, source conversion methods, equivalent resistance, star-delta conversion; Network analysis and theorems: loop and nodal analysis, Superposition, Thevenin's, Norton's and Maximum Power transfer theorems; Introduction to Faraday's Law, Lenz's Law, Fleming's Left Hand and Right Hand Rules, Inductor and Capacitor; AC fundamentals: Amplitude, frequency, phase, power, Form factor, Crest factor, power factor, average value and effective value;

AC analysis using phasor algebra; DC Transient analysis in RL and RC circuits; Magnetic circuits: Basic concepts; concept of 3-φ system.

Course Code: CSE 104
Course Title: Computer Programming-I Lab
Credits: 1.50

Laboratory work based on CSE 103.

Course Code: ECE 102
Course Title: Basic Electrical Engineering Lab
Credits: 1.50

Laboratory work based on ECE 101.

5.3 Second Year First Semester

Course Code: CSE 203
Course Title: Computer Programming II: Java Programming
Credits: 3.00
Prerequisite: CSE 103

The Java Revolution, Object-Oriented Fundamentals, Java Language Introduction. Types, Operators, Flow Control, Classes, Packages and Interfaces, String Handling, Exception Handling, Threads and Synchronization, Utilities, Input/Output, Networking, Applets.

Course Code: CSE 205
Course Title: Data Structures
Credits: 3.00
Prerequisite: CSE 103, CSE 101

Data Structures: Concept of data types, a abstract data types, Arrays: Maximization, ordered lists, sparse matrices representation of arrays. Stacks, Queues and Recursion: Fundamentals' Different types of stack and Queues, Recursion: direct and indirect recursion; simulation of recursion; depth of recursion; removal of recursion; Linked lists: Different types of linked list and their operation. Trees: Basic terminology, binary trees representations binary tree traversal Path lengths. Huffman codes/ algorithm; threaded binary trees, binary trees. Presentation of trees; Application Trees: Set representation decision trees. game trees counting binary trees tree:

Definition of B-trees basic operations of B-tree. binomial Heaps: Binomial tree and binomial heap, Operations on binomial heaps. Fibonacci heaps: structure of Fibonacci heaps, Merge able heap operations Disjoint sets: Disjoint set operations. Linked representation. Disjoint set forests, Analysis s of union by rank with path compression. Red-Black tree: Properties of R-B tree, operations on R-B tree. Graph: Introduction, definitions and terminology, graph representation traversals, connected components and spanning trees, shortest path and transitive closure, activity net works, topology sort and critical paths, enumerating all paths. Hash Tables: Hashing functions overflow handling, theoretical evaluation of overflow techniques. Indexing. Techniques: Cylinder + surface indexing, hashed indexes tree indexing-B-trees; Tree indexing.

Course Code: ECE 201
Course Title: Electronic Devices & Circuits I
Credits: 3.00
Prerequisite: ECE 101

Introduction to semiconductors; Diode: characteristics, rectification; Zener diode: characteristics and applications; Bipolar Junction Transistor: characteristics, biasing, introduction to hybrid model, ac analysis; Field Effect Transistor: Characteristics; Operational amplifier: linear applications, dc performance, ac performance; Design of Active filters: low pass, high pass and band pass; Introduction to MOSFET, Power electronics: SCR, DIAC, TRIAC, UJT & PUT.

Course Code: CSE 204
Course title: Computer Programming II Lab
Credits: 1.50

Laboratory work based on CSE 203.

Course Code: CSE 206
Course Title: Data Structure Lab
Credits: 0.75

Laboratory work based on CSE 205.
Course Code: ECE 202
Course Title: Electronic Devices and Circuits I Lab
Credits: 1.50

Laboratory work based on ECE 201.

5.4 Second Year Second Semester

Course code: CSE 207
Course Title: Algorithms
Credits: 3.00
Prerequisite: CSE 203, CSE 205

Algorithm and complexity, asymptotic notations, orders, Designing worst case and average-case
Summation formulas and properties, bounding summations. Recurrence relations : Substitution method, iteration method, master method. Discrete random variables: Geometric and Binomial distributions, The tails of binomial distributions. Divide and Conquer: Basic idea, control structure properties of D & C, applications of D & C. Dynamic Programming: Elements of Dynamic Programming, Comparison with D & C. Application of Dynamic programming in: Optimal binary search tree, 0/1 Knapsack problem. Greedy Method Elements of greedy method basic control structure Comparison with Dynamic programming and D & C Application of Greedy method in : Minimum cost spanning tree, Huffman code, Job sequencing with deadline. Backtracking. Basic idea behind backtracking, control structure. Application of backtracking in: graph coloring problem, n -queens problems.
Branch and Bound: Basic idea and control structure of Branch and Bound. FIFO branch and Bound, LC Branch and Bound, the l5-puzzle problem. Graph related algorithms: Breadth First search, Depth First search, Topological sort, Dijkstra's shortest path algorithm, The Bellman-Ford algorithm for single source shortest path, The Floyd-War shall algorithm for all pair shortest path, Johnson's algorithm for sparse graph Number theory algorithms: Elementary number theory notions solving modular equations. NP-Completeness: Polynomial time, polynomial time verification, NP-completeness and reducibility, NP- completeness proofs, NP complete problems.

Course Code: CSE 209
Course Title: Numerical Methods
Credits: 3.00

Errors and Accuracy: Truncation, rounding off and algorithmic errors, absolute and relative errors, propagation of errors, error estimation. Iterative process: Solution of f(x)=0, existence and convergence of a root, convergence of the iterative method, geometrical representation, Aitken's Δ^2-process of acceleration. System of Linear Equations: Cramers rule, Gauss elimination method, Gauss- Jordan elimination, Triangularisation method of factorization process (Choleski's process), Iterative methods- Jacobi's method, Gauss- Seidel method, Comparison of various methods. Solution of Non – Linear equations: Interval Bisection Method, Newton-Raphson method, Secant method, Regula- Falsi method, Newton- Raphson method for polynomial evaluation, Nested multiplication. Finite Differences and Interpolation: Difference Operators, Factorial Notation, Differences of zero Definition and Differences of $x^{(-n)}$, Forward and Backward Differences, Shift Operator, Central Difference Operators, Averaging Operator, Divided Differences, Finite differences and differentiation, Errors in a difference table.
Finite difference Interpolation – Newton's forward interpolation formula, Newton – Gregory formula for backward interpolation, Newton's formula for Divided Differences, Lagrange's polynomial Interpolation. Gauss forward and backward formula for central differences, Stirling's formula, Bessel's formula, Everett's formula, Choice of interpolation formula, Errors in interpolation. Numerical Differentiation: Differentiation based on equal- interval interpolation, Second-order derivatives using Newton's backward difference formula, Derivatives using central difference formula, Differentiation based on Lagrange's interpolation formula. Numerical Integration: General Quadrature formula, Trapezoidal rule, Simpson's rule, Three- eights rule, Weddle's rule, Errors in Quadrature methods, Romberg Integration, Gauss Quadrature formula, Lobatto's formula, Central Difference Quadrature formula, Use of the quadrature formula.
Differential Equations: Taylor's series method, Picard's method, Euler's method, Improved Euler method, Euler's predictor- corrector method, modified Euler method, Runge-Kutta method, Extensions of Runge-Kutta method.

Course Code: CSE 211
Course Title: Assembly Language Programming
Credits: 2.0

Micro-computer systems, Representation of numbers and characters, Organization of the IBM computer, Introduction to IBM PC assembly language, the processor status and the flag registers, Flow control instructions, Logic, shift and rotate instructions, The stack and introduction to procedures, Multiplication and division instructions, Arrays and addressing modes, The string instructions, text display and keyboard programming, Macros, BIOS and DOS interrupts, Disk and file operations, Memory management.

Course Code: CSE 231
Course Title: Digital Logic design
Credits: 3.00

Boolean Algebra: truth tables, canonical and standard forms of functions, logic operations; Simplification of functions: Karnaugh map, SOP and POS methods, nondegenarate terms, don't care conditions, tabulation method; Logic gates: AND, OR, NOT and universal gates, NAND, NOR, wired-OR and wired-AND implementation; Combinational logic: half and full adder and subtractor, binary parallel adder, BCD adder, encoder and decoder, multiplexer and demultiplexer, Boolean function implementation using decoder and multiplexer; design and implementation of logic circuits; Sequential logic: latches, flip flops, flip flop excitation table; Registers: SISO, SIPO, PISO, PIPO and universal shift register, combinational shift register; Counters: asynchronous and synchronous binary and BCD counters, Johnson counters and ring counters; Synchronous sequential circuits: state diagrams, state tables, state equations, Mealy and Moore type circuits, state reduction, state assignment, incompletely specified diagrams; Asynchronous Sequential circuits: fundamental and pulse mode circuits, race and cycles, methods of secondary assignment.

Course Code: CSE 208
Course Title: Algorithms Lab
Credits: 0.75

Laboratory work based on CSE 207.

Course Code: CSE 212
Course Title: Assembly Language Programming Lab
Credits: 0.75

Laboratory work based on CSE 211.

Course Code: CSE 232
Course Title: Digital Logic Design Lab
Credits: 1.50

Laboratory work based on CSE 231.

5.5 Third Year First Semester

Course Code: ECE 301
Course Title: Electrical Drives & Instrumentation
Credits: 3.00
Prerequisite: ECE 101
Electrical Drives: 3-φ balanced and unbalanced circuit analysis, DC Generator: Principles, operations and characteristics study; DC Motor: Principles, operations and characteristics study, Transformer: Principles, operations and characteristics study, 3-φ induction motor: Principles, operations and characteristics study, Stepper motor: Principles, operations and characteristics study.
Instrumentation: Transducers, Measuring instruments: Ammeter, voltmeter, ohmmeter, wattmeter, and digital voltmeter.

Course Code: ECE 303
Course Title: Digital Electronics & Pulse Techniques
Credits: 3.00
Prerequisite: CSE 231

Digital Electronics: Basic terminology; TTL, NMOS and CMOS logic; Digital to analog converter: specifications, weighted and R-2R ladder; Analog to Digital converter: specifications, Flash, Successive Approximation, Dual-slope converters, etc.; Memory elements: ROM, static RAM and dynamic RAM, memory expansion.
Pulse Techniques: Square, triangular and saw tooth wave generation techniques, 555 timers and their applications, application of Schmitt triggers in wave shaping, application of diodes in clipping and clamping, application of inverter, chopper, rectifier, and switch mode power supply.

Course Code: CSE 321
Course Title: Database Systems
Credits: 3.00
Introduction: Purpose of DBMS, Entity-Relationship Model, Relational Model, Integrity Constraints: Referential Integrity, Functional Dependency, Relational Database Design: Decomposition and Normalization, Storage and File Structure: Database Backup and Recovery in Disaster, Indexing and Hashing, Structured Query Language (SQL), Procedural Language (PL), Stored Procedures (SP), Trigger, Cursor, Function, Transactions, Job Scheduling, Concurrency Control, Database Architecture: Parallel and distributed Databases, Security System, Database Servers Configuration, Data Transmission Services (DTS), Performance Tuning and Optimization.

Course Code: CSE 331
Course Title: Computer Architecture I
Credits: 3.00
Prerequisite: CSE 231

Fundamentals of computer Design: Introduction & definition of performance, quantitative principles of computer design, job of computer designer, fallacies and pitfalls, historical perspectives. Processor Design: Introduction, processor organization, information representation, number formats; Instruction Sets. Instruction formats, instruction types, Fixed Point Arithmetic: Addition subtraction multiplication, division ALU Design: Basic ALU organization, floating-point arithmetic, arithmetic processors; Stack computers. Control Design- Introduction, Instruction Sequence, and instruction interpretation. Hardware Control: Design methods, multiplier control unit, CPU control unit; Micro programmed Control: Basic concepts, control unit memory optimization, multiplier control unit nano-programmed computers. System organization: Communication, Introduction, bus control; To Systems: programmed TO, DMA and interrupts 10 processors. Parallel Processing; Basic Concepts: Introduction types of parallel processors, performance consideration; pipeline Processor and systolic Arrays: Pipeline structure vector supercomputers: Data flow computers; Multiprocessors; Multiprocessor architecture, fault-tolerant computers RISE Processor: Introduction, data addressing modes, condition codes, resister sets, brief study of a standard RISC processor. Input/output organization: Interrupt, polling, daisy chain, hardware for interrupts. The memory: RAM, Cache, performance, associatively.

Course Code: CSE 300
Course Title: Software Development
Credits: 3.00
Students are instructed to develop on real life oriented projects in this course. Web technologies (ASP. Net, PHP, Ajax, Java Script, Joomla, and so on) and Database (DB2, Oracle, SQL Server, MySQL, and so on) are preferred for the development. Documentation is also a major concern for the project to ensure the Software Quality Assurance (SQA). Hence at the end of semester students submit their projects including the documentation.

Course Code: ECE 302
Course Title: Electrical Drives and Instrumentation Lab
Credits: 1.50

Laboratory work based on ECE 301.

Course Code: ECE 304
Course Title: Digital Electronics and Pulse Techniques Lab
Credits: 1.50

Laboratory work based on ECE 303.

Course Code: CSE 322
Course Title: Database System Lab
Credits: 1.50
Prerequisite: CSE 206

Laboratory work based on CSE 321.

5.6 Third Year Second Semester

Course Code: CSE 303
Course Title: Operating Systems
Credits: 3.00
Prerequisite: CSE 331

Introduction: Definition of Operating Systems, Monitor/User Mode, System Calls, Buffering, Spooling, Multi-Programming, Time Sharing, Real Time Systems, Multi-Processor Systems.
Operating System Services: Types of Services, The User View. File Systems: File Concept, Operations on Files, Directory Systems, File Protection, and Allocation Methods. CPU Scheduling: Scheduling Concepts, Scheduling Algorithms. Memory Management: Protection Hardware, Relocation, Swapping, Fixed Partition, Variable Partition, Compaction, Paging, Shared Pages, Segmentation, Fragmentation, Segmented Paging, Paged Segmentation. Virtual Memory: Overlays, Demand Paging, Performance of Demand Paging, Virtual Memory Concepts, Page Replacement Algorithms, Thrashing, Pre-paging. Deadlocks: Necessary Condition of Deadlocks, Resource Allocation Graph, Deadlock Prevention, Deadlock Avoidance, and Recovery from Deadlock. Concurrent Processes: Concurrency Conditions, Critical Section Problem, Semaphores, Classical Process Coordination Problems, Inter Process Communication.

Course code: CSE 305
Course Title: Information Systems
Credits: 3.00
Prerequisite: CSE 321

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 in formation; 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 lime 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; Project team organization; Database and files design: Project management and documentation; Analysis of system maintenance and upgrading; Ethics and privacy: Control and security.

Course Code: CSE 315
Course Title: Data Communication
Credits: 3.00
Fourier Transforms; Modulation Techniques: AM, FM, PM, OOK, FSK, PSK, QPSK, DPSK, QAM; Pulse Modulation: PAM, PCM, PPM, PWM, PDM, DPCM, ADPCM, delta Modulation, adaptive delta modulation; Companding; Intersymbol interference; TDM, FDM; Satellite communications: FDMA, TDMA; Error due to noise; Concept of channel coding and capacity; M-ary communication, Introduction to Spread Spectrum systems: CDMA, frequency hopping; Introduction to statistical communication; Layered concept of computer network architecture.

Course Code: CSE 333
Course Title: Microprocessors
Credits: 3.00
Prerequisite: CSE 231
Microprocessors and Microcomputers, Evolution of microprocessors, Microprocessor applications. Architecture of a general purpose Microprocessor and its operation Common instruction types, addressing modes intel 8086 Microprocessor: Internal architecture, register structure, programming model, addressing modes, instruction set; I/O Pin diagram and Control signals; I/O port organization and accessing; Interrupts and Interrupt Handing system design using 8086. Architectural overview of Intel Family of general purpose Processors. Cache Memory, TLB Structure. Memory Management in Intel 80X86 Family; segmentation and Real Mode Memory Management: segmentation and segmented to physical address translation, segment wraparound; Protected Mode Memory Management; segmentation and virtual addressing, segment selectors segment descriptor tables, segment descriptor, Intel 80386 and 80486 segment register formats, Paged memory operation, page Directory and page table address translation. Linear to physical address translation. Interrupts and Exception in Intel 80 x 86 family of processors, type of Interrupts, Maskable and Non-maskable interrupts exception classes and processor defined exceptions. Interrupts in real mode and protected mode. Interrupt descriptor tables, Interrupt Gates and Trap Gates, Task Gates. Interrupts Priorities. Protection :Segment level, Page level, privileges. Task Switch Segment and Taste switching, virtual 86 Mode. Input and Output: I/O address spaces, Port organization, Memory mapped I/O, Handshaking I/O instruction, memory mapped I/O in protected mode, Protection issues in Intel 80x86 family-privilege levels, Microprocessor architecture, instructions and data representation, assembly and machine language programming 8/16 bit microprocessors with example. Microprocessor timings, interrupts

controllers and DMA interfacing ICs. System timing. Microprocessor busses memory organizations system, timing examples for memory and I/C read and write, use of poling and Interrupts. An overview of Pentium and alpha RISC processors.

Course Code: CSE 335
Course Title: Digital System Design
Credits: 3.00
Prerequisite: CSE 231

Design using MSI & LSI Components, Design the various Components of a Computer: ALU, Memory, Control Unit. Microprocessor Based design, Computer Bus structure: Standard bus Interface. Special Purpose Controllers: Interrupt Controller, DMA, Floppy disk controller, Digital controller system-Timer, Computer in telecommunication and control.

Course Code: CSE 304
Course Title: Operation Systems Lab
Credits: 1.50

Laboratory work based on CSE 303.

Course Code: CSE 306
Course Title: Information Systems Lab
Credits: 0.75

Laboratory work based on CSE 305.
Course Code: CSE 334
Course Title: Microprocessor Lab
Credits: 1.50

Laboratory work based on CSE 333.

Course Code: CSE 336
Course Title: Digital System Design Lab
Credits: 1.50

Laboratory work based on CSE 335.

5.7 Fourth Year First Semester

Course Code: CSE 401
Course Title: Software Engineering
Credits: 3.00
Prerequisite: CSE 321

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; Design patterns. Data-directed design techniques: Modular design; Introduction to OOAD, Iterative Development and Unified Process, Introduction to UML and its different notations, Use Case Modeling, Drawing System Sequence Diagram, Domain Model, Operation Contracts, Interaction Diagram, GRASP Patterns & assigning Responsibilities, Use Case realization with GRASP Patterns, Modeling Generalization, Refining the Domain Model. Design of automatic, redundant and defensive program; COCOMO model; Tree model; PNR curve; Statistical model; Zips laws and their application in computer languages; Halstead program length formula; Graphical analysis for complexity measures, Memory requirements analysis; Processing time 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 a 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

Course Code: CSE 403
Course Title: Compiler Design
Credits: 3.00
Prerequisite: CSE 201, CSE 205, CSE 211

Computer, lexical Analysis: Lexical Analysis, regular expressions, regular languages, syntax Analysis: syntax analysis, context free grammars, bottom-up parsing; LR (O) parsing SLR parsing, LR (I) paring, LALR (1) parsing, classification of context-free grammars and language, syntactic error recovery, syntax directed definitions, attributes evaluation, Abstract syntax trees, symbol Tables type checking, Semantic checks for

Inheritance) Sub typing and for overloading Generation of intermediate code. Generation of inter mediate code-translation of Boolean expression, switch/case statements, runtime structures, Back-patching. Generation of optimized target code. Advanced Topic: control flow graphs, live-variable analysis allocation optimization register allocation by graph coloring Available expression analysis, Global common expression elimination, Dominators, Loops in control flow graphs, Defuse & use-def chains, Loop invariant, code-notion, Partial redundancy elimination, constant propagation, optimizing Object-oriented programs, copy propagation, phase ordering of optimization, Instruction Scheduling optimizations for memory hierarchies.

Course Code: CSE 421
Course Title: Computer Networks
Credits: 3.00
Prerequisite: CSE 315

This course emphasis on the basic concept, design and implementation of computer networks. This includes the concept of data communications. An introduction to the basic concept of networking and its utility. The protocol hierarchy, design issues for data link, network layer, transport layer, and application layer protocol, end-to-end protocols, message handling protocols, terminal and file transfer protocols, Internet TCP/IP protocols. End-to-end data networks, congestion control networks, wireless networks, mobile computing, high-speed networks. Concurrent programming, data link layer, framing and error control, media access control. Models of distributed computation, management and resource control of networks and distributed operating systems, distributed file systems, caching, scheduling, process migration. Fault tolerance, network security and privacy, algorithm for deadlock detection. Synchronization and concurrency control in distributed systems.

Course Code: CSE 431
Course Title: Computer Graphics
Credits: 3.00
Prerequisite: MTH 203
Standard Graphics Primitives, Graphical User Interface; Graphics Hardware: Display devices, Raster refresh graphics display Use of frame buffer and look up table Coordinate convention: Device coordinate and wild coordinate system : Raster Scan Graphics : Mid-point Line and Circle Creation Algorithms, Animalizing : Polygons : Difference type of polygons, Point location, polygon filling, triangulation Windowing and Clipping • Window Viewpoint, Zooming, panning, line text and polygon, clipping. Transformation: Homogeneous coordination, Transformation matrices, Transformation in 2D. Translation, rotation, sealing, Transformation in 3D translation, rotation, scaling, Projection: Parallel and perspective, isometric projection; Three Dimensional Viewing and representation: Curves, surfaces and volumes with cubic and bi cubic spines, B-Reb, CSG, Spatial Occupancy Representations. Hidden Lines and Surface removal: Painter's algorithm, Z-Buffering. Rendering: Light Models, Shading Interpolation Technique constant, Ground and Phong, Ray Tracing. Image File Format: PPM file, BMP file. Introduction to Graphics Programming: The nature of computer animation, simulation, kinematics, barometries, dynamics, and metamorphosis.

Course Code: CSE 400
Course Title: Project/Thesis
Credits: 3.00
Prerequisite: CSE 205, CSE 207

Student will do research or project in-group or individually under supervision of a faculty member. Research work will be on different computer science and engineering related research problems/issues. Project work may be on developing software and/or hardware system using current technologies.

Course Code: CSE 404
Course Title: Compiler Design Lab
Credits: 0.75

Laboratory work based on CSE 403.

Course Code: CSE 422
Course Title: Computer Networks Lab
Credits: 1.50

Laboratory work based on CSE 421.
Course Code: CSE 432
Course Title: Computer Graphics Lab
Credits: 1.50

Laboratory work based on CSE 431.

5.8 Fourth Year Second Semester

Course Code: CSE 407
Course Title: Artificial Intelligence
Credits: 3.00
Prerequisite: CSE 201, CSE 207

Overview of AI, general concepts of knowledge, LISP and other Al programming languages; Review of Un-Informed Search Strategies and game playing; Informed search Strategies: A', Heuristic functions, Memory Bounded Search (IDA*, SMA*); Iterative improvement Search (Hill Climbing, Simulated Annealing), constraint satisfaction problems. Review of Propositional logic, first order Logic, Introduction to Planning, Partial Order Planning. Bayesian Rule and its use in probabilistic reasoning; Belief Networks and Decision Networks; Learning Decision Trees; Learning General Logical descriptions-Hypothesis, Examples, Current Best Hypothesis Search, Least Commitment Search; Learning Neural and Belief Networks ANN, Perceptions, MFFN (Back propagation, Applications of Neural Networks, Bayesian Methods for learning Belief Networks, Generic Algorithm, Reinforced learning.

Course Code: CSE 411
Course Title: VLSI Design
Credits: 3.00
Prerequisite: ECE 303

Introduction to VLSI Design: Layout Design Rules, Stick Diagram, Mask Layout; MOS Transistor Theory: Threshold voltage, Basic DC equations, second order effects, MOS models, NMOS inverters, DC characteristics of complementary CMOS Inverter, Static load MOS inverters; Processing Technology: Silicon Semiconductor technology, Basic CMOS technology; Circuit Characterization and Performance estimation: Resistance and Capacitance estimation, Switching characteristics, power dissipation, Yield and Reliability; CMOS Circuit and Logic Design: Basic Physical design of simple logic gates, CMOS logic structures, Clocking strategy- single phase, two phase and four phase; CMOS subsystem design: data path operations-addition/subtraction, comparators, parity generators, zero/one detectors, binary counters, Boolean operations-ALUs, shifters, Sequential circuits: Static and dynamic flip flops, Programmable Logic Array, Memory elements-Read/write memory, Read Only memory, Control- Finite State machines, control logic implementation.

Course Code: CSE 435
Course Title: Computer Interfacing
Credits: 3.00
Prerequisite: CSE 231, CSE 331, CSE 333

Interface components and their characteristics; I/0 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 interlace; ISA. PCI, AGP, PS/2 and USB interface; interfacing with power circuits, stepper motors, opto-isolation; controlling semiconductor power switches MOSFET, BJT. SCR. Triac and Solenoids.

Course Code: CSE 400
Course Title: Project /Thesis
Credits: 3.00
Prerequisite: CSE 205, CSE 207

Students will work in groups or individually to produce high quality software in deferent languages. Students will write structured programs and use proper documentation. Advanced programming techniques in assembly language.

Course Code: CSE 408
Course Title: Artificial Intelligence Lab
Credits: 1.50
Laboratory work based on CSE 407.

Course Code: CSE 412
Course Title: VLSI Design Lab
Credits: 1.50
Prerequisite: ECE 304

Laboratory work based on CSE 411.

Course Code: CSE 436
Course Title: Computer Interfacing Lab
Credits: 1.50
Laboratory work based on CSE 435.

Course

Outline

(Optional)

Optional Course Outline

Fourth Year First Semester: Option I

Course Code: CSE 405
Course Title: Simulation and Modeling
Credits: 3.00
Prerequisite: MTH 301

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 simulation packages.

Course Code: CSE 423
Course Title: Computer System Performance Evaluation
Credits: 3.00
Prerequisite: CSE 303, CSE301

Review of system analysis, approaches to system development, feasibility assessment, hardware and software acquisition. Procurement, workload characterization, and the representation of measurement data, instrumentation: software monitors, hardware monitors, capacity. Planning bottleneck detection, system and program tuning simulation and analytical models and their applications, case studies.

Course Code: CSE 433
Course Title: Computer Architecture-II
Credits: 3.00
Prerequisite: CSE 331

Pipelined machines, Interleaved memory system, Caches, Hardware and architectural issues of parallel machines; Array processors, associative processors, Multiprocessors, Systolic processors. Dataflow computers and interconnection networks, High-level language concept of computer architecture.

Fourth Year Second Semester: Option II

Course Code: CSE 425
Course Title: Fault Tolerant Systems
Credits: 3.00
Prerequisite: CSE 335

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 modulator redundancy; Maintenance processors.

Course Code: CSE 437
Course Title: Pattern Recognition
Credits: 3.00
Prerequisite: MTH 203
Pattern Recognition: introduction, importance. Statistical and Neural Pattern Recognition: Bayesian classifier, Bayes decision theory, discriminate functions and decision surfaces, Bayesian classifier for normal distribution; Linear classifiers: discriminate functions and decision hyper planes, perception algorithm, least squares methods; Nonlinear classifiers: two and three layer perceptions, back propagation algorithm; Template matching: optimal path searching techniques. Dynamic programming methods, correlation methods; Context dependent classification: observable and hidden Markov models, Viterbi algorithm.

Course code: CSE 445
Course Title: Multimedia Technology
Credits: 3.00

Multimedia system-introduction; Coding and compression standards; Architecture issue 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 multimedia document; Networking issues in multimedia - Quality-of-service guarantees, resource reservation traffic specification, happing, and monitoring, admission control; Multicasting issues; Session directories; Protocols for controlling sessions; Security issues in multimedia -digital water – making partial encryption schemes for video streams; multimedia applications – audio and video conferencing, video on demand, voice over IP.

Fourth Year Second Semester: Option II Lab

Course Code: CSE 426
Course Title: Fault Tolerant System Lab
Credits: 0.75
Prerequisite: CSE 336

Laboratory work based on CSE 425.

Course Code: CSE 438
Course Title: Pattern Recognition Lab
Credits: 0.75

Laboratory work based on CSE 437.

Course Code: CSE 446
Course Title: Multimedia Technology
Credits: 0.75

Laboratory work based on CSE 445.

Course

Outline

(General- Basic Science, Humanities

and Other Engineering)

1 First Year First Semester

Course Code: HSS 101
Course Title: English I
Credits: 3.00

Oral & Written communication skills will include communicative expressions for: personal identification (name, occupation, nationality etc.); life at home; education and future career; travel, postal, telephonic and telegraphic purposes; health and welfare; food and drink; giving advice and opinion; instructions and directions; requests; complaints; apologies; describing objects, places, people; narration, comparison and contrast; process and sequencing; note taking/summarizing; story writing; paragraph writing; and phonetic sounds & symbols, homophones, anagrams, stress and intonation etc. Grammar items will emphasize: articles; numbers; some/any, much, many, few, little; affirmative, negative, and question formations; prepositions and adverb particles; etc.; adverbs of frequency; subject-verb agreement; capitalization; punctuation; modal verbs; tenses; personal pronouns; possessive pronouns; relative pronouns; uses of both, since/for, too/enough; simple passive voice constructions; conditionals; mass and unit.

Course Code: HSS 111
Course Title: Bangladesh Studies
Credits: 4.00

Society and Culture:
The Sociological Perspective: Definition, nature. Sociology as a scientific discipline, relation with other social sciences. Primary Concepts: Society, Community, Association, Institution, Group, Culture, Norms & Values. Social Structure and Process: Social Stratification Social classes, Caste system, Social Mobility. Social Institutions: Family, Marriage, Economic Institutions – Property, Ownership; Political Institutions – Forms of State and Forms of Government; Local Government; Religious and Cultural Institutions. Culture, Cultural diffusion and change, Bengali culture. Problems of Society, Social Problems of Bangladesh. Social Change, Theories of Social Change, Social Change in Bangladesh. Urbanization process and its impact on Bangladesh society.

History of Bengal:
The land: Geographical factors, the people. Historical perspectives: Ancient Bengal: Sasanka-Rise of the Palas – the Senas. Early Medieval Bengal: Coming of the Muslims. The Independent Sultanate of Bengal: Ilyas Shahi and Hossein Shahi Bengal. Development of Bengali language and Bengali literature. Late Medieval Bengal: the establishment of Mughal rule in Bengal – the Bara Bhuiyans: Subedars and Nawabs. Coming of the Europeans. New approach in Bengal architecture. Beginning of British rule in Bengal: Battles of Palassey and Buxar. Diwani (1765). The Dual government. Permanent Settlement (1793). Nineteenth century Bengali Renaissance: areas of social and religious reforms – Raja Rammohan Roy, Ishawar Chandra Vidyasagar, Titu Meer. Partition of Bengal (1905). Its annulments(1911). Partition of Bengal (1947). Language Movement (1952). Movement for autonomy; 6-point and 11 point programs. The 1970 election-military action, genocide in the then East Pakistan. The Liberation War: The emergence of Bangladesh as a sovereign independent state in 1971.

Course Code: PHY 101
Course Title: Physics I
Credits: 3.00

Mechanics: Measurements, Motion in One Dimension, Motion in a Plane, Particle Dynamics, Work & Energy, Circular Motion, Simple Harmonic Motion, Rotation of Rigid Bodies, Central Force, Structure of Matter, Mechanical Properties of Materials. Properties of Matter: Elasticity, Stresses & Strains, Young's Modulus, Bulk Modulus, Rigidity Modulus, Elastic Limit, Poisson's Ratio, Relation between Elastic constants. Bending of Beams. Fluid Motion, Equation of Continuity, Bernoulli's Theorem, Viscosity, Stokes Law. Surface Energy & Surface Tension, Capillarity, Determination of Surface Tension by Different Methods. Waves: Wave Motion & Propagation, Simple Harmonic Motion, Vibration Modes, Forced Vibrations, Vibration in Strings & Columns, Sound wave & its Velocity, Doppler Effect, Elastic waves. Ultrasonic, Practical Applications. Optics: Theories of Light, Huygen's Principle, Electromagnetic Waves, Velocity of Light, Reflection, Refraction, Lenses, Interference, Diffraction, Polarization. Heat & Thermodynamics: Temperature and Zeroth Law of Thermodynamic, Calorimetry, Thermal Equilibrium & Thermal Expansion, First Law of Thermodynamics. Specific Heat, Heat Capacities, Equation of State, Change of Phase, Heat Transfer, Second Law of Thermodynamics, Carnot Cycle, Efficiency, Entropy, Kinetic Theory of Gases.

Course Code: MTH 101
Course Title: Mathematics I
Credits: 3.00

Real Number System, Complex Numbers and their Elementary Properties. Rectangular Coordinates in Three Dimensions: The Equations of Plane and Straight Line, Sphere, Conicoids, Elementary Properties, Transformation of Axes. Vector Space, Vector in three Dimensions, Vector Algebra: Addition, Scalar Multiplication, Scalar and Vector Product, Multiple Products, Orthogonal Bases, Change of Orthonormal Bases. Calculus: Differential Calculus – Functions, Limit and Continuity, Differentiation, Successive Differentiation, Maclaurin's Theorem, Taylor's Theorem, Geometrical Meaning of Differential Coefficient. Integral Calculus – Method of Substition, Integration by parts, Integration of Rational Functions. Definite Integrals. Matrices: Definition; Algebra of matrices; Determinants; Adjoint of Square Matrices, Inverse of a Matrix, Rank of a Matrix. Elementary operations; Reduction to echelon form; Solution of a system of linear equations.

Course Code: PHY 102
Course Title: Physics Lab
Credits: 1.5

Laboratory work based on PHY 101.

2 First Year Second Semester

Course Course Code: HSS 103
Course Title: English II
Credits: 3.00
Prerequisite: HSS 101

Writing Skills : Basic Sentence Construction, Grammar Review. Paragraph : Topic Sentence, Supporting, Order of Development . From Paragraph to Essay : Making Outlines, Organizing Paragraphs, Learning – Introduction, Transition, Conclusion etc. Specific Applications, Formal Letter : Blocked, Semi – Blocked, Application, Complaint, Request/order, Resume / VC, Report
Memo: Reading. Students will read and interpret a variety of texts. They will be tested on their understanding as well as ability to express their analysis by answering question on the text.
Reading for Main Ideas, Using Contexts for Vocabulary, Scanning for Details, Making Inferences. Oral Presentations: Oral Reports, Interviews.

Course Code: PHY 103
Course Title: Physics II: Electricity and Magnetism and Modern Physics
Credits: 3.00

Electrostatics, Electric Charge, Coulomb's Law, Electric field & Electric Potential, Electric Flux Density, Gauss's Law, Capacitors and Dielectrics, Steady Current, Ohm's Law, Magnetostatics, Magnetic field, Biot - savart Law, Ampere's Law, Electromagnetic Induction Faraday's Law, Lenz's Law, Self Inductance and Mutual Inductance, Magnetic Properties of Matter, Permeability, Susceptibility, Diamagnetism, Paramagnetism & Ferromagnetism, Maxwell's equations of Electromagnetic Waves, Waves in Conduction & Non-Conduction Media, Total Internal Reflection, Transmission along wave Guides. Special Theory of Relativity, Length Contraction & Time Dilation, Mass-Energy Relation, Photo Electric Effect, Quantum Theory, X-rays and X-ray Diffraction, Compton Effect, Dual Nature of Matter & Radiation, Atomic Structure, Nuclear Dimensions, Electron Orbits, Atomic Spectra, Bohr Atom, Radioactive Decay, half-life, (and Rays, Isotopes, Nuclear Binding Energy), Fundamentals of Solid State Physics, Lasers, Holography.

Course Code: MTH 103
Course Title: Math II: Calculus
Credits: 3.00

Differential Calculus: Functions of one Variable; Limit, Continuity and Differentiability – Successive Differentiation, Leibnitz's Theorem; Rolle's Theorem, Mean Value Theorem; Taylor's Theorem and Maclaurin's Theorem, Lagrange's and Cauchy's Forms of Remainder; Expansion of Functions in Taylor's and Maclaurin's Series; Evaluation of Indeterminate Forms by L'Hospital's Rule; Determination of Maximum and Minimum Values of Functions; Points of Inflexion; Conic Sections; Tangent and Normal; Applications; Curvature, Radius of Curvature, Center of Curvature. Functions of More Than one Variable: Limit, Continuity, Differentialbility, Directional Derivative, Partial Derivatives; Euler's Theorem; Jacobians, Tangent Plane and Normal to Surfaces. Integral Calculus: Definition of Integration and its Properties; Primitives, Fundamental Theorem of Integral Calculus, Indefinite Integrals; Integration by Summation of Series; Standard Integrals; Integration by Substitution and Integration by Parts; Integration by Successive Reduction; Improper

Integrals; Beta and Gamma Functions; Evaluation of Areas and Arc-lengths, Intrinsic Equation; Volumes and Surface Areas of Solids of Revolution; Multiple Integration, Iterated Integration and Fubini's Theorem; Change of Variables.

3 Second Year First Semester

Course Code: ACN 201
Course Title: Principles of Accounting
Credits: 2.00

Introduction to Accounting, Generally Accepted Accounting Principles (GAAP), Accounting Cycle, Accounting Information Processing, information user groups. Principles of Journal Entries, Ledger, Trial Balance, Adjusting Entries , Rectifying entries, Financial Statement(Income statement, Cash flow statement, Balance sheet). Bank reconciliation statement, objectives and procedure. Managerial and Cost Accounting : Introduction to Cost concepts, Job order costing , process costing(Including Contract Costing), Cost-Volume-Profit analysis, Costing for Decision making and reporting, Flexible budget and standard costing. Capital Budgeting. Analysis of Financial Statements.

Course Code: MTH 201
Course Title: Math III: Differential Equations and Linear Algebra
Credits: 3.00

Differential Equation: Ordinary Differential Equations: Formation of Differential Equations; Degree and Order of Differential Equations; Solutions of Ordinary Differential Equations of First Order by Various Methods; Linear Equations with Constant Coefficients, Homogeneous Linear Equations; Solutions by Variation of Parameters; Solution by Series; Applications.
Linear Algebra: Definition of Linear (Vector) space, subspace, Linear dependence and independence, Basis and Dimension, Linear transformation, Singular and Non-singular linear Transformation, Rank and Nullity, Representation of Linear Transformation by Matrices, Change Matrix, Determinant and Trace, Eigen Vector, Eigen Value and Eigen Space, Normal and Canonical form of Matrices, Matrix Polynomials.

Course Code: ECN 201
Course Title: Principles of Economics
Credits: 2.00

Introduction: Definition of economics. Micro and Macro economics and their relative importance in the formulation of national economic policies. Microeconomics: Demand Analysis – Law of diminishing marginal utility. Demand function, Demand curve, Law of demand, Elasticity of demand. Supply Analysis- Supply function, factors influencing supply. Law of supply, Elasticity of supply. Market Equilibrium : Equilibrium price and quantity. Indifference Curve(I-C) : Construction of I-C. Properties of I-C. Consumer's equilibrium with the help of I-C and budget line. Income effect, Price effect. Substitution effect. Production- Production function. Factors of production. Production possibility curve. Cost and Revenue- Total, average, marginal. Macroeconomics: National Income: GNP, GDP and NNP. Income circular flow diagram. Methods of measuring national income. Money: Function of money. Value of money. Inflation. International Trade: Terms of trade. Free trade and protection. Public Finance: Public income, Public expenditure, Public debt, Direct and indirect tax. Planning in Bangladesh.

4 Second Year Second Semester

Course Code Course Code: IMG 201
Course Title: Principles of Management
Credits: 2.00

General Topics: Introduction, Management Concept, Evolution of Management Thoughts, Managerial Constraints/Environment, Managerial Skills, Decision Making, Group Decision Making. Planning: Organizational Goals, Basics of Planning, Planning Tools & Techniques, Strategic Planning. Organizing & Staffing : Organization Theory, Foundations of Organizational Design, Authority & Power, Job Design & Staffing, Human Resource Management. Leading: Organizational Behavior, Motivating Communicating, Leadership. Controlling: Nature of Organizational Control, Control Techniques, Evaluating Organizational Performance, Management Information System. Management in International/Multinational Organizations, Management & Ethics, Time Management.

Course Code: MTH 203
Course Title: Math IV: Vector Analysis, Complex Variable, Laplace Transformations and Fourier Analysis
Credits: 4.00
Prerequisite: MTH 201

Vector Analysis: Limit, Continuity and Differentiability of Scalar and Vector Point Functions; Vector Integration; Line Surface and Volume Integrals; Gradient, Divergence and Curl of Point Functions; Various Formulae; Gauss's Theorem, Stokes Theorem and Green's Theorem.
Complex Variable : Limit, Continuity of a complex Variable; Complex Differentiation and Cauchy- Riemann Equations; Line Integral of a Complex function; Cauchy's Integral Theorem and Cauchy's Integral Formula; Liouville's Theorem; Taylor's and Laurent's Theorems; Singular Points; Residue; Cauchy's Residue Theorem; Evaluation of Residues; Contour Integration; Bilinear Mapping; Mappings by Elementary Functions; Conformal Mapping. Laplace Transforms: Definition; Transforms of Elementary Functions; Sufficient Conditions for Existence of Laplace Transforms; Inverse Laplace Transforms; Laplace transforms of Derivatives; Unit Step Function; Periodic Function; Some Special Theorems on Laplace Transforms; Partial Fraction; Solution of Differential Equations by Laplace Transforms; Evaluation of Improper Integrals. Fourier Analysis: Real and Complex Form; Finite Transform; Fourier Integral; Fourier Transforms and their Uses in Solving Boundary Value Problems.

5 Third Year First Semester

Course Code: MTH 301
Course Title: Statistics and Probability
Credits: 2.00

Frequency distribution. Mean, median, mode and other measures of central tendency. standard deviation and other measures of dispersion. Moments, skewness and kurtosis. Elementary probability theory and discontinuous probability distribution, e.g. binomial, Poisson and negative binomial. Continuous probability distributions, Hypothesis testing, Correlation and regression analysis. Sampling Methods.

Reference

Books

List of Reference Books for CSE Department

Course Code: CSE 101
Course Title: Computer Fundamentals

1. Teach Yourself C - Herbert Schildt
2. Programming in ANSI C – E. Balagurusamy
3. C - How to Program - Deitel & Deitel
4. The C Programming Language - Kernighan and Ritchie

Course Code: CSE 105
Course Title: Discrete Mathematics

1. Discrete Mathematics in Computer Science – Donald F. Stanat & David F. McAllister- Text.
2. Discrete Mathematical Structures – Bernard Kolman & Robert C. Busby & Sharon Ross- Ref
3. Elements of Discrete Mathematics (2^{nd} Edition) – C. L. Liu. – Ref.
4. Discremathematics, 2^{nd} Edition. 200 Solved Problems – Seymour Lips huts.

Course Code: CSE 103
Course Title: Computer programming I

1. Teach Yourself C++ - Herbert Schildt
2. C++ The Complete Reference – Herbert Schildt
3. C++ - How to Program - Deitel & Deitel
4. Programming in ANSI C – E. Balagurusamy

Course Code: ECE 101
Course Title: Basic Electrical Engineering

1. Electrical Technology – B. L. Thereja
2. Introductory Circuit Analysis – R.L. Boylestad.
3. Introduction to Electrical Engineering – R. P.WARD
4. Electrical Circuits – Richard A. Doff
5. Electrical Circuits – Schaum Series

Course Code: CSE 203
Course Title: Computer Programming II: Java Programming

1. The Compete Reference of JAVS – Patric Naughton and Herbert Schildt
2. How to Program JAVA – Deitel & Deitel

Course Code: CSE 205
Course Title: Data Structures

1. Date Structures – Schaum's Series
2. Data Structures – Edward M. Reingol & Wilfred T. Hanson
3. Data Structure with C – Kruse
4. Data Structure with C/C++ – Jannenbaum

Course Code: CSE 201
Course Title: Electronic Devices & Circuits I

1. Electronic Devices and Circuits Theory – Boylestad
2. Electronic Devices and Circuits – Millman & Helkias
3. Operational Amplifiers and Linear Integrated Circuits – Coughlin
4. Basic VLSI design – Eshragin & Puknel
5. Industrial Electronics – Schuler

Course Code: CSE 207
Course Title: Algorithms

1. Fundamentals of Computer Algorithms – Ellis Howrowuz & Sartaj Sahni
2. Fundamental Algorithms (Vol-I) (The Art of Computer Programming) – Donal E. Khuth
3. Algorithms – Cormen

Course Code: CSE 209
Course Title: Numerical Methods

1. Numerical Methods – S. Balachandra Rao & C.K. Shantha
2. Numerical Mathematical Analysis – James B. Scarborough

Course Code: CSE 231
Course Title: Digital Logic Design

1. Digital Logic and Computer Design – M. Morris Mano
2. Digital Design – A Pragmatic – Everret – I Johnson & Mohammad A. Karim
3. Switching and Finite Automata Theory – ZVI Kokavi
4. Digital Compute Electronics – Albert Paul Malvino & Jerald A. Brown
5. Digital Systems (6^{th} edition) – Ronald J. Tocci
6. Digital Fundamentals – Thomas L. Floyd

Course Code: CSE 211
Course Title: Assembly Language Programming

1. Assembly Language Programming – Kip R Lrvine
2. Assembly Language Programming and Organization of IBM PC – Yathu Yu & Charles Marut

Course Code: ECE 301
Course Title: Electrical Drives & Instrumentation

1. A Text Book of Electrical Technology II – B. L. Thereja
2. Alternating Current Circuit – Corcoran
3. Alternating Current Machines – Puchstein
4. Measurement & Instrumentation – Sawhry
5. Power Electronics – Rashid

Course Code: ECE 303
Course Title: Digital Electronics & Pulse Techniques

1. Digital System Principles and Applications – Ronald J. Tocci
2. Digital Integrated Electronics – Herbert Jaub/ Douald Schilling
3. Pulse Digital And Switching Waveforms – Jacob Millmanand Herbert Taub
4. Operational Amplifier Circuits – Fedrick Discroll

Course Code: CSE 321
Course Title: Database Systems

1. Database System Concepts – A. Silberschatz, H. F. Korth, S.Sudarshan
2. Principles of Database systems – J. D Ullamn

Course Code: CSE 331
Course Title: Computer Architecture-I

1. Computer Architecture and Organization – John P. Hayes (Third Edition)
2. Computer Organization and Design (2^{nd} edition) – John L. Hennessy & David A. Patterson
3. Computer Organization – V. Carl Hamacher, Zvonko G. Vranesic & Safwat G.Zaki

Course Code: CSE 300
Course Title: Software Development

Course Code: CSE 303
Course Title: Computer Fundamentals

1. Operating System Concepts – James L Peterson & Abraham Silberschatz
2. Operating System – Tannenbaum

Course Code: CSE 305
Course Title: Information Systems

1. System Analysis and Design – Elias M. Awad
2. System Analysis and Design (A case study approach) – Robert. J. Thierauf.
3. Information Systems – J.G.Burch Jr., F. R Strater and G. Grudnitski John Wiley, 1997,
4. Information Systems – Cyril H.P Broodes.
5. Basic System Analysis – A. Daniels and D. Yeats Galgotia, 1990

Course Code: CSE 315
Course Title: Data Communication

1. Data and Computer Communications – Willum Stallings
2. Computer Network – A. Tanenbaum
3. Introduction to Local Networks with Microcomputer Experiments – L. Reies
4. The Integrated Services Digital Network – J. Ronaync

Course Code: CSE 333
Course Title: Microprocessors

1. Microprocessors and Microprocessor based System Design- M. Rafiquzzaman, Universal Book Stall, 1990
2. Microcomputer Architecture and Programming – J. Wakerly, John Wiley
3. Microprocessor Architecture, Programming and Applications – Ramesh S.Gaonkar, 3rd Edition, New age International Publishers Limited, Wiley Eastern Limited
4. Microcomputer System : the 8086.8088 Family – Y. Liu and G. A. Gibson, Prentice-Hall, 1991
5. Microprocessors and Microprocessor based System Design – M.Rafiquzzaman, Universal Book Stall, 1990
6. Microprocessors Data Hand Book – BPB Publications
7. Microcomputer Architecture and Programming – J. Wakerly, John Wiley

Course Code: CSE 335
Course Title: Digital System Design

1. Computer Architecture and Organization – John P. Haq
2. Digital Logic and Computer Design – M.Morris Mono
3. Digital Compute Electronics- Malvino & Brown
4. Computer System Architecture – Marris Mono
5. Microprocessor and Microcomputer Based System Design – Mohammad Rafiquzzaman
6. Computer Architecture – Henessy
7. Computer Architecture – Robet J. Baron Lee Highie

Course Code: CSE 401
Course Title: Software Engineering

1. Software Engineering – Martyn L Shooman

Course Code: CSE 403
Course Title: Compiler Design

1. Principles of Compiler Design – Alfred V. Aho & Jeffrey D. Ullman

Course Code: CSE 421
Course Title: Computer Networks

1. Computer Network – Tannenbaum

Course Code: CSE 423
Course Title: Computer System Performance Evaluation

1. As Referred by the Course Instructor.

Course Code: CSE 405
Course Title: Simulation And Modeling

1. Simulation Modeling and Analysis – W.D. Kelton
2. Discrete Event Simulation – Kelton

Course Code: CSE 407
Course Title: Artificial Intelligence & Expert Systems

1. Artificial Intelligence – Eline Rich
2. Artificial Intelligence – Ranan B. Banerji

Course Code: CSE 411
Course Title: VSLI Design

1. Introduction to VLSI Design – Linada M. Breckenbury
2. Basic VLSI Design – Daughles Pucknell & Kamran Eshraghicen

Course Code: CSE 435
Course Title: Computer Interfacing

1. Computer Peripherals – Barry Wilinson
2. Microprocessors and Interfacing – Dauglas V Hall

Course Code: CSE 437
Course Title: Pattern Recognition

1. Pattern Recognition Principles – Julius T. Tou & Rafael C. Gonzalez