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University of
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INFORMATION BOOKLET FOR UNDERGRADUATE STUDIES

Fifth Edition

Department of Civil Engineering

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DISCLAIMER

PREFACE

The Information Booklet for Undergraduate Studies, in its fifth edition, has been modified, updated and extended from its previous version. Although the current edition of the booklet retains the overall characteristics of its pervious versions, efforts have been made to incorporate most of the information that an undergraduate student of the department vis-à-vis his/her adviser may need to know for smoothly carrying out their academic activities. Special care has been taken in Chapter 3 where, apart from reproducing articles from *Rules and Regulations for Course System* (May, 1999), all the amendments that were subsequently made to it (up to the end of 2004) have been incorporated in the booklet.

As with the practice of any Course System, it is likely that some of the rules and regulations published in this booklet may be modified in the future. Students are, therefore, strongly advised to be in touch with their advisers regarding modifications, if any, may be introduced by the university at a later stage.

It is hoped that the information booklet will be of beneficial use to the undergraduate students as well as the student advisers of the Department of Civil Engineering.

Dhaka
May, 2005

Dr. Sk. Sekender Ali
Professor and Head
Department of Civil Engineering

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Chapter 1

General Information

1.1 HISTORICAL BACKGROUND

Bangladesh University of Engineering and Technology, abbreviated as BUET, is the oldest institution for the study of Engineering and Architecture in Bangladesh. The history of this institution dates back to the days of Dhaka Survey School which was established at Nalgola in 1876 to train surveyors for the then Government of Bengal of British India. As the years passed, the Survey School became the Ahsanullah School of Engineering offering three-year diploma courses in Civil, Electrical and Mechanical Engineering. In 1948, the School was upgraded to Ahsanullah Engineering College (on its present premises) as a Faculty of Engineering under the University of Dhaka, offering four-year bachelor's courses in Civil, Electrical and Mechanical Engineering with a view to meeting the increasing demand for engineers in the country and to expanding the facilities for advancement of engineering education. In order to create facilities for post graduate studies and research, Ahsanullah Engineering College was upgraded to the status of a University under the name of East Pakistan University of Engineering and Technology in the year 1962. After independence of Bangladesh in 1971, it was renamed as the Bangladesh University of Engineering and Technology. Starting with two faculties, the university has now been enlarged into five faculties. The faculty of Civil Engineering, opened in 1980, is now the largest faculty with about 830 undergraduate and 320 postgraduate students.

The BUET campus is in the heart of the city of Dhaka. It has a compact campus with halls of residence within walking distances of the academic buildings. The physical expansion of the University over the last few years has been impressive with construction of new academic buildings, auditorium complex, students halls of residences, medical centre, etc.

1.2 ACADEMIC ACTIVITIES

Undergraduate courses in the faculties of Engineering, Civil Engineering, Electrical and Electronic Engineering and Mechanical Engineering usually extend over four years and lead to a B.Sc. Engineering degree in Civil, Water Resources, Electrical & Electronic, Mechanical, Industrial & Production, Chemical, Material and Metallurgical, Computer Science & Engineering and Naval Architecture & Marine Engineering. In the faculty of Architecture and Planning the degree of Bachelor of Architecture is usually obtained in five years and the degree of Bachelor of Urban & Regional Planning in four years.

The B.Sc. Engg. degree offered by the Civil Engineering Department is recognised generally all over the world.

Postgraduate studies and research are now among the primary functions of this University. Most of the departments under the different faculties offer M.Sc.Engg. and M.Engg. degrees and some departments have started Ph.D. courses. Postgraduate degrees in Architecture (M.Arch.) and in Urban and Regional Planning (MURP) are offered by the Faculty of Architecture and Planning. In addition to its own research programmes, the University undertakes research programmes sponsored by outside organizations, e.g. UN Organizations, Commonwealth Secretariat, University Grants Commission (UGC). The expertise of the University teachers and the laboratory facilities of the University are also utilised to solve problems of and to provide up-to-date engineering and technological knowledge to the various organisations of the country. The University is persistent in its effort to improve its research facilities, staff position and courses and curricula to meet the growing technological challenges confronting the nation.

1.3 FACULTIES AND TEACHING DEPARTMENTS

The University has sixteen teaching departments under five faculties. All departments, with the exception of the department of Humanities, offer degree programmes; however, some of them offer postgraduate (PG) degrees only. Faculty wise list of the departments with the

status of the degrees offered is given below:

Faculty of Civil Engineering

Department of Civil Engineering:	UG and PG
Department of Water Resources Engineering:	UG and PG

Faculty of Architecture and Planning

Department of Architecture:	UG and PG
Department of Urban and Regional Planning:	UG and PG
Department of Humanities:	No degree offered

Faculty of Electrical and Electronic Engineering

Department of Electrical and Electronic Engineering:	UG and PG
Department of Computer Engineering:	UG and PG

Faculty of Engineering

Department of Chemical Engineering:	UG and PG
Department of Material and Metallurgical Engineering:	UG and PG
Department of Petroleum and Mineral Resources Engineering:	PG
Department of Chemistry:	PG
Department of Mathematics:	PG
Department of Physics:	PG

Faculty of Mechanical Engineering

Department of Industrial and Production Engineering:	UG and PG
Department of Mechanical Engineering:	UG and PG
Department of Naval Architecture and Marine Engineering:	UG and PG

1.4 UNIVERSITY ADMINISTRATION

Vice Chancellor:	Dr. Md. Alee Murtuza

List of Administrative Officers

Registrar:	Md. Shahjahan
Controller of Examinations:	Dr. Abu Siddique
Comptroller:	K.M. Anisur Rahman Khan
Director of Students Welfare:	Dr. Md. Fazlul Bari
Director, Advisory, Extension & Research Services:	Dr. Maksud Helali
Director, Bureau of Research, Testing & Consultation :	Dr. Abdul Muqtadir
Director of Planning & Development:	Dr. AMM Taufiqul Anwar
Librarian:	Mohammad Zahirul Islam

Deans of Faculties

Dean of Civil Engineering :	Dr. Md. Hossain Ali
Dean of Architecture & Planning :	Dr. Md. Shahidul Ameen
Dean of Electrical & Electronic Engineering :	Dr. M. M. Shahidul Hasan
Dean of Mechanical Engineering :	Dr. S. M. Nazrul Islam
Dean of Engineering :	Dr. Abu Syed Wais Kurny

Provosts of Residential Halls

Provost, Ahsanullah Hall :	Dr. Md. Rafique Ullah
Provost, Chattri Hall :	Dr. Md. Sadiqul Baree
Provost, Nazrul Islam Hall :	Dr. Md. Saifur Rahman
Provost, Shahid Smrity Hall :	Dr. Gazi Md. Khalil
Provost, Sher-e-Bangla Hall :	Dr. M. Saiful Alam Siddiquee
Provost, M.A. Rashid Hall :	Dr. Ishtiaque Ahmed
Provost, Shohrawardy Hall :	Dr. T. M. Al-Hussaini
Provost, Titumir Hall :	Dr. Md. Abdur Rashid Sarker

Chapter 2

The Faculty of Civil Engineering

2.1 INTRODUCTION

The Faculty of Civil Engineering consists of two academic departments: the Department of Civil Engineering and the Department of Water Resources Engineering.

The Department of Civil Engineering comprises four major divisions: viz. Environmental Engineering, Geotechnical Engineering, Structural Engineering and Transportation Engineering. The divisions offer basic and advanced optional courses in the above disciplines. Research on the above fields is extremely important in the national context. These include areas like behaviour of available building and road materials with emphasis on indigenous materials, engineering soil properties of various regions of the country, low-cost cyclone resistant housing, seismic zoning of Bangladesh, waste management, environmental pollution control, environmental impact assessment, traffic simulation, transport system modeling, traffic safety studies, etc. The results of some of these research works have been incorporated in the Bangladesh National Building Code completed in 1993. Some research projects of more fundamental nature viz. application of finite element techniques in tackling engineering problems, dynamic behaviour of multistoried buildings, soil-structure interaction, concrete technology etc. pursued in this department have greatly contributed to advancement of knowledge. To meet the national demand, the Department of Water Resources Engineering trains engineers specializing in hydrology, hydraulics, river morphology, salinity intrusion, irrigation, drainage, flood control, land reclamation, bank protection, river stabilization, ground water, sedimentation problems and coastal engineering.

2.2 LIST OF FACULTY MEMBERS OF DEPARTMENT OF CIVIL ENGINEERING

Professor & Head

Sk. Sekender Ali: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; Ph.D., University of NewCastle, Australia (Structural Engineering)

Professors

Alamgir Habib: B.Sc.Engg. (Civil), BUET; M.Engg., Carleton University, Canada; Ph.D., Carleton University, Canada. (Structural Engineering)

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M. Feroze Ahmed: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; Ph.D., University of Strathclyde, U.K. (Environmental Engineering)

A. M. M. Safiullah: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; Ph.D., University of Strathclyde, U.K.(Geotechnical Engineering).

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Md. Mujibur Rahman: B.Sc.Engg. (Civil), BUET; M.Eng.Sc., University of Melbourne, Australia; Ph.D., University of Adelaide, Australia (Environmental Engineering)

A.M. M. Taufiqul Anwar: M.Sc.Engg., Leningrad Civil Engineering Institute, U.S.S.R.; Ph.D., Leningrad Civil Engineering Institute, U.S.S.R. (Structural Engineering)

K. A. M. Abdul Muqtadir: B.Sc.Engg. (Civil), BUET; M.S. , VPI & SU, U.S.A.; Ph.D., University of Arizona, U.S.A. (Geotechnical Engineering)

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Rupak Mutsuddy: B.Sc.Engg. (Civil), BUET (Structural Engineering)

Senior Instructors

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Md. Alauddin Sikdar: Diploma in Surveying Technology, Barisal Polytechnic Institute, Barisal; Dip. in Tech. Education (Civil Technology), Technical Teachers' Training College, Dhak**a.**

Md. Kafiluddin Mahmud: Diploma in Engineering, Civil Technology, Sylhet Polytechnic Institute, Sylhet; B.A. (Pass), Dhaka University, Dhaka.

Chapter 3

Rules and Regulations for Course System

The following are the rules and regulations for administering undergraduate course curricula through the course system. This new system replaces the earlier administered annual system with failed students of the annual system being absorbed in the course system of the curricula. The following articles have been reproduced from *Rules and Regulations for Course System (May 1999)* after incorporating all the amendments that were subsequently made to it (up to January 2005).

A. Rules, Regulations, Course Offering Evaluation and Grading

1. Organisational Framework of the Bachelor's Degree Programmes the Course System

The undergraduate curricula at Bangladesh University of Engineering & Technology (BUET) is based on the course system. The salient features of the course system are:

(i) Reduction of the number of theoretical courses and examination papers around five in each term,
(ii) The absence of a pass or a fail on an annual basis,
(iii) Continuous evaluation of student's performance,
(iv) Introduction of Letter Grades and Grade Points instead of numerical grades,
(v) Introduction of some additional optional courses and thus enable students to select courses according to his interest as far as possible,
(vi) Opportunity for students to choose fewer or more courses than the normal course load depending on his/her capabilities and needs,

(vii) The flexibility to allow the student to progress at his own pace depending on his ability or convenience, subject to the regulations on credit and minimum Grade Point Average (GPA) requirements, and

(viii) Promotion of teacher-student contact.

In the curriculum for the undergraduate programmes, besides the professional courses pertaining to each discipline, there is a strong emphasis on acquiring a thorough knowledge in the basic sciences of Mathematics, Physics and Chemistry. Due importance is also given for the study of several subjects in Humanities and Social Sciences which, it is expected will help the student to interact more positively with the society in which he lives. Thus the course contents of the undergraduate programmes provide a harmonious blend of both basic sciences and their applications as well as their social relevance.

The first two terms of Bachelor's degree programmes consist of courses in basic sciences, mathematics, humanities and social sciences, basic engineering and architecture subjects. The third and subsequent terms build directly on the knowledge of the basic subjects gained in the first two terms and go on to develop competence in specific disciplines.

2. Student Admission

Students will be admitted in undergraduate curricula in the Departments of Architecture, Urban and Regional Planning, Chemical Engineering, Civil Engineering, Water Resources Engineering, Computer Science and Engineering, Electrical and Electronic Engineering, Mechanical Engineering, Industrial & Production Engineering, Materials and Metallurgical Engineering and Naval Architecture and Marine Engineering as per existing rules of the University. The Registrar's Office will continue to serve as Admissions Office and will deal with course registration in addition to student admission.

3. Number of Terms in a Year

There will be two terms (Term I and Term II) in an academic year. In addition to these two regular Terms there may be a Short Term in the intervening period between end of Term II and commencement of Term I. During this term students, those who need, may take additional courses either to make up deficiencies in credit and GPA requirements or to fulfil the credit requirements for bachelor's degree spending less time than the normal duration and other students may take vacation.

3.1 Duration of Terms

The duration of each of Term I and Term II will be 18 weeks which will be used as follows:

Classes	14 weeks
Recess before Term Final Examination	2 weeks
Term Final Examination	2 weeks
Total	18 weeks

The duration of the Short Term will be around 8 weeks of which about 7 weeks will be spent for class lectures and one week for Term Final Examination.

4. Course Pattern and Credit Structure

The entire undergraduate programme is covered through a set of theoretical and laboratory/ sessional/ studio courses.

4.1 Course Designation and Numbering System

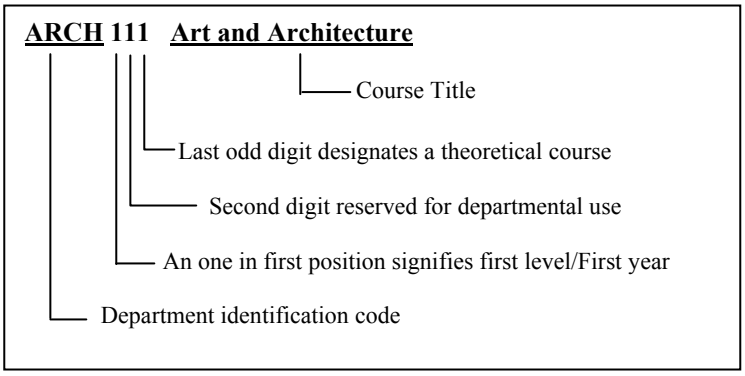
Each course is designated by a two to four letter word identifying the department which offers it following by a three digit number with the following criteria:

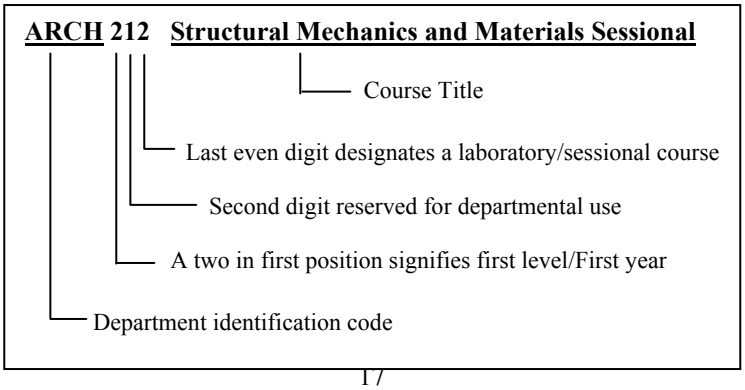
(a) The first digit will correspond to the year/level in which the course is normally taken by the students.

(b) The second digit will be reserved for departmental use for such things as to identify different areas within a department.

(c) The last digit will usually be odd for theoretical and even for laboratory or sessional courses.

The course designation system is illustrated by two examples.





4.2 Assignment of Credits

(i) Theoretical Courses
One lecture per week per term will be equivalent to one credit

(ii) Laboratory/ Sessional/ Design
Credits for laboratory/sessional or design courses will be half of the class hours per week per term

Credits are also assigned to project and thesis work taken by students. The amount of credits assigned to such work may vary from discipline to discipline.

The curriculum does not demand the same rate of academic progress from all students for obtaining the degree but only lays down the pace expected of a normal student. A student whose background or capacity for assimilation is lower will be permitted to complete the programme at a slower pace by studying a lesser number of courses during a given term (subject to a minimum course load). He may keep pace with his class by taking during the Short Term those courses which he had dropped during the Regular Terms, or by covering the entire degree programme over an extended period without developing any feeling of inferiority complex.

5. Types of Courses

The courses included in undergraduate curricula are divided into several groups as follows:

5.1 Core Courses

In each discipline a number of courses will be identified as core courses which form the nucleus of the respective bachelor's degree programme. A student has to complete all of the designated core courses for his discipline.

5.2 Pre-requisite Courses

Some of the core courses are identified as pre-requisite courses. A pre-requisite course is one which is required to be completed before some other course(s) can be taken. Any such course, on which one or more subsequent courses build up, may be offered in each of the two Regular Terms.

5.3 Optional Courses

Apart from the core courses, students will have to complete a number of courses which are optional in nature in that students will have some choice to choose the required number of courses from a specified group/ number of courses.

6. Course Offering and Instruction

The courses to be offered in a particular term will be announced and published in the Course Catalogue along with a tentative Term Schedule before the end of the previous term. Whether a course is to be offered in any term will be decided by the respective BUGS. Respective departments may arrange to offer one or more pre-requisite or core courses in any term depending on the number of students who dropped or failed the course in the previous term.

Each course is conducted by a teacher. The course teacher is responsible for maintaining the expected standard of the course and for the assessment of student's performance. Depending on the strength of registered students (i.e. the number of students) enrolled for course, the teacher concerned might have course associates and teaching assistants (TA) to help him in teaching and assessment.

For a course strength necessitating two or more parallel classes or sections, one of the course teachers or any other member of the teaching staff of the department be designated as course co-ordinator. He/she has the full responsibility for co-ordinating the work of the other members of the department involving in that course.

7. Departmental Monitoring Committee

Consistent with its resilient policy to keep pace with new developments in the filed of science and technology, the university will update its course curriculum at frequent intervals (at least every three years). Such updating aims not only to include the expanding frontiers of knowledge in the various fields but also to accommodate the changing social, industrial and professional need of the country. This can be done through deletion and modification of some of the courses and also through the introduction of new ones.

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93	BUGS of each department will constitute a Departmental Monitoring Committee with three teachers of the department. This committee will monitor and evaluate the performance of the Course System within the department. In addition to other teachers of the department, the committee may also propose from time to time to the Board of Undergraduate Studies any changes and modifications needed for upgrading the Undergraduate Curriculum and the Course System.

8. Teacher Student Contact

The proposed system encourages students to come in close contact with teachers. For promotion of teacher-student contact, each student is assigned to an Adviser and the student is free to discuss with his adviser all academic matters, especially those related to courses taken and classes being attended by him. Students are also encouraged to meet with other teachers any time for help on academic matters.

9. Student Adviser

One Adviser would normally be appointed for a batch of student by the Undergraduate Board of Studies of the concerned department(s) who will advise each student on the courses to be taken by a student.

Adviser will discuss with the student his academic programme and then decide the number and nature of courses for which he can register. However, it is the student's responsibility to keep contacts with his adviser who will review and eventually approve the student's specific plan of study and check on subsequent progress. The adviser should be in the rank of an Assistant Professor or above from the concerned department(s).

For a student of second and subsequent terms, the number and nature of courses for which he can register will be decided on the basis of his academic performance during the previous term. The advisor will advise the students to register for the courses during the next term within the framework of the guidelines in respect of minimum/maximum credit hours limits, etc. which are elaborated at appropriate places in this report. He is also authorised to permit the student to drop one or more courses based on his academic performance and the corresponding categorization (Art. 16).

Special provisions exist for academically weak students with regard to make-up courses (Art.19).

10. Registration Requirements

Any student who makes use of class room or laboratory facilities or faculty time is required to register formally. Being admitted to the University, each student is assigned to a student adviser. The student can register for courses he intends to take during a given term only on the basis of the advice and consent of his adviser.

10.1 Registration Procedure

Students must register for each class in which they will participate. Each student will fill up his/her Course Registration Form in consultation with and under the guidance of his adviser. The original copy of the Course Registration Form will be submitted to the Registrar's Office, and then the requisite number of photocopies will be made by the Registrar's Office for distribution. The date, time and

venue will be announced in advance by the Registrar's Office. Much counselling and advising are accomplished at registration time. It is absolutely necessary that all students present themselves at the registration desk at the specified time.

10.2 Limits on the Credit Hours to be Taken

A student must be enrolled in at least 15 credit hours. He may be allowed to enroll in up to a maximum of 24 credit hours if recommended by his/her Adviser. A student must enroll for the prescribed sessional/laboratory courses in the respective Term within the allowed credit-hour limits.

Added Vide A.C Resolution dated 28.8.97	In special cases where a student cannot be allotted the minimum required 15 credit hours in a Term, the relevant BUGS may approve a lesser number of credit hours to suit individual requirements. Such cases shall only be applicable to students needing less than 15 credits for graduation.

10.3 Pre-condition for Registration

A student will be allowed to register in those courses subject to the capacity constrains and satisfaction of pre-requisite courses. If a student fails in a pre-requisite course in any Term, the concerned BUGS may allow him to register for a course which builds on the pre-requisite course provided his attendance and grades in continuous assessment in the said pre-requisite course is found to be satisfactory.

Registration will be done at the beginning of each term. The Registration programme with dates and venue will be announced in advance. Late registration is, however, permitted during the first week on payment of a late registration fee. Students having outstanding dues to university or a hall of residence shall not be permitted to register. All students have, therefore, to clear their dues and get a clearance or no dues certificate, on the production of which, they will be given necessary Course Registration Forms and complete

the course registration procedure. Registration Forms will normally be available in the Register's Office. However, for the First Year students, prior department-wise enrolment/admission is mandatory. An orientation programme will be conducted for them at the beginning of the first term when they will be handed over the registration package on producing enrollment slip/proof of admission.

10.4 Pre-registration

Pre-registration for courses to be offered by the students in a particular term will be done on a specified dates before the end of the previous term. All students in consultation with their course adviser are required to complete the pre-registration formalities, failing which a fine of Tk. xx.xx (amount may be decided by the authority) will have to be paid before registration in the next term. Further a student who does not pre-register may not get the courses desired by him subsequently.

10.5 Registration Deadline

Student must register for the courses to be taken before the commencement of each term and no late registration will be accepted after one week of classes. Late registration after this date will not be accepted unless the student submits a written appeal to the Registrar through the concerned Head and can document extenuating circumstances such as medical problems (physically incapacitated and not able to be presented) or some other academic commitments which precluded enrolling prior to the last date of registration.

Amended Vide A.C Resolution dated 26.5.94	Student must register for the courses to be taken before the commencement of each term and no late registration will be accepted after one week of classes. Late registration after this date will not be accepted unless the student submits a written appeal to the Registrar through the concerned Head and can document extenuating circumstances such as medical problems (physically incapacitated and not able to be presented) from the Chief Medical Officer of the University or some other academic commitments

which precluded enrolling prior to the last date of registration.

10.6. Penalty for Late Registration

*Students who fail to register during the designated dates for registration are charged a late registration fee of Tk. **** (amount may be decided by the authority). This extra fee will not be waived whatever be the reason for late registration.*

Amended Vide A.C Resolution dated 26.5.94	Students who fail to register during the designated dates for registration are charged a late registration fee of Tk. 100.00 (One hundred) only. This extra fee will not be waived whatever be the reason for late registration.

10.7. Course Adjustment Procedure

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93	A student will have some limited options to add or delete courses from his/her registration list, within the first two weeks from the beginning of the term. He/She may add courses only within the first two weeks of a regular Term and only the first week of Short Term. Incase of dropping a course a student will be allowed to do so within four weeks after the commencement of a regular Term and two weeks after commencement of a Short Term. Adjustment of initially registered courses in any term can be done by duly completing the **Course Adjustment Form.** These forms will normally be available in the Registrar's Office. For freshman students such forms can be included in the registration packet at the time of orientation. Any student willing to add or drop courses will have to fill up a Course Adjustment Form in consultation with and under the guidance of his adviser. The original copy of the **Course Adjustment Form** will be submitted to the Registrar's Office, and then the requisite number of photo copies will be made by the Registrar's

Office for distribution to the concerned Adviser, Head, Dean, Controller of Examination and the student.

All changes in courses must be approved by the Adviser and the Head of the department concerned. The Course Adjustment Form will have to be submitted to the Registrar's Office after duly filled in and signed by the concerned persons. To **add/drop** a course respective teacher's consent will be required.

10.8 Withdrawal from a Term

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

If student is unable to sit for a Term Final Examination due to serious illness or serious accident, he/she may apply to the Head of the degree awarding department for total withdrawal from the Term within a week after the end of the Term Final Examination. The application must be supported by a medical certificate from the Chief Medical Officer of the university. The Academic Council will take the final decision about such applications.

Amended Vide A C Resolution dated 14.3.96 Shall be applicable from beginning of Course System with effect from 214th Meeting of A/C held on 30.9.,4.10 & 19.10.92

If a student is unable to complete the Term Final Examination due to serious illness or serious accident, he/she may apply to the Head of the degree awarding department for total withdrawal from the Term within a week after the end of the Term Final Examination. However, he/she may chose not to withdraw any laboratory / sessional / design course if the grade obtained in such a course is 'D' or better. The application must be supported by a medical certificate from the Chief Medical Officer of the University. The Academic Council will take the final decision about such application.

11. The Grading System

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

The total performance of a student in a given course is based on a scheme of continuous assessment. For theory courses this continuous assessment is made through a set of quizzes/in class evaluation, class participation, homework assignments, and a term final examination. The assessment in laboratory/sessional courses is made through observation of the student at work in class, viva-voce during laboratory hours, and quizzes. For architecture students, assessments in design sessionals would be done through evaluation of a number of projects assigned throughout the term. As discussed earlier, each course has a certain number of credits which describe its weightage. A letter grade with a specified number of grade points is awarded in each course for which a student is registered. 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 grade point average is required to be maintained for satisfactory progress. Also a minimum number of earned credits should be acquired in order to qualify for the degree as prescribed under article 22.

Letter grades and corresponding grade-points will be awarded in accordance with provisions shown below.

	Numerical grade	Letter Grade		Grade Point
	80% or above	A+	(A plus)	4.0
	75% to less than 80%	A	(A regular)	3.75
	70% to less than 75%	A-	(A minus)	3.5
Amended	65% to less than 70%	B+	(B plus)	3.25
Vide A.C	60% to less than 65%	B	(B regular)	3.0
Resolution	55% to less than 60%	B-	(B minus)	2.75
dated	50% to less than 55%	C+	(C plus)	2.5
7.9.93 &	45% to less than 50%	C	(C regular)	2.25
13.9.93	40% to less than 45%	D		2.0
	less than 40%	F		0.0
	Continuation (for project & thesis / design courses)	X		-

Note : All C^- grades awarded to students of First Year classes during the last academic year (1990-91) will be considered and recorded as C grades with a grade point of 2.25 and D grades will be considered and recorded to have a grade point of 2.00.

11.1 Distribution of Marks

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

Thirty percent (30%) of marks shall be allotted for continuous assessment i.e, quizzes and homework assignments, in class evaluation and class participation. The remainder of the marks will be allotted to TERM FINAL examination which will be conducted centrally by the University. There will be internal and external examiners for each course in the term Final Examination of 3 hour duration. The distribution of marks for a given course will be as follows :

(i) Class participation	10%
(ii) Homework Assignment and Quizzes	20%
(iii) Final Examination (3 hours)	70%

-

Total 100%

Basis for awarding marks for class participation and attendance will be as follows :

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

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

For 2 credit courses 3 best out of 5, for 3 credit courses 4 best out of 6, and for 4 credit courses 5 best out of 7 quizzes may be considered for awarding grade. These may be considered as the minimum recommended number of quizzes for any course. If the number of quizzes administered in a course exceeds these suggested minimum numbers, then two-thirds best of all quizzes may be considered. The scheme of continuous assessment that a teacher proposes to follow for a course will be announced on the first day of classes.

Amended Vide A.C Resolution dated 28-12-98 (effective from 1998-99 session) for newly admitted students of Level I Term I)

"The number of quizzes of a course shall be at least n+1, where n is the number of credits of the course. Evaluation of the performance in quizzes will be on the basis of the best n quizzes. The scheme of continuous assessment that a teacher proposes to follow for a course will be announced on the first day of classes".

12. Earned Credits

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

The courses in which a student has obtained `D' or a higher Grade will be counted as credits earned by him/her. Any course in which a student has obtained `F' grade will not be counted towards his/her earned credits.
A student who obtains a `F' grade in any Core Course in any term, he/she will have to repeat the course.
If a student obtains a `F' grade in an Optional Course, he/she may choose to repeat the course or take a substitute course if available.
F grades will not be counted for GPA calculation but will stay permanently on the Grade Sheet and Transcript. When a student will repeat a course in which he/she previously obtained a F grade, he/she will not be eligible to get a grade better than C in such a course.
If a student obtains a grade other than 'F' in a course, he/she will not be allowed to repeat the course for the purpose of grade improvement.

Amended Vide A.C Resolution dated 14.3.96 & 16.4.96

The courses in which a student has obtained 'D' or a higher Grade will be counted as credits earned by him/her. Any course in which a student has obtained 'F' grade will not be counted towards his/her earned credits.
A student who obtains 'F' grade in a Core Course in any term will have to repeat the course.
If a student obtains 'F' grade in an Optional Course he / she may choose to repeat the Course or take a Substitute Course if available.

'F' grades will not be counted for GPA calculation but will stay permanently on the Grade Sheet and Transcript. When a student will repeat a course in which he / she previously obtained 'F' grade, he/she will not be eligible to get a grade better than 'C' in such a course.
If a student obtains 'D' grade in a course, he/she will be allowed to repeat the course for the purpose of grade improvement by foregoing his/her earlier grade, but he/she will not be eligible to get a grade better than 'C' in such a course.
If a student obtains 'C' or a better grade in any course, he/she will not be allowed to repeat the course

for the purpose of grade improvement.

Amended Vide A.C Resolution dated 28-12-98 (effective from the term commencing on 6.12.1998 and afterwards).

'F' grades will not be counted for GPA calculation but will stay permanently on the Grade Sheet and Transcript. When a student will repeat a course in which he/she previously obtained 'F' grade, he/she will not be eligible to get a grade better than "B" in such a course.

If a student obtains a grade lower than 'B' in a course, he/she will be allowed to repeat the course only once for the purpose of grade improvement by forgoing his/her earlier grade, but he/she will not be eligible to get a grade better than 'B' in such a course. A student will be permitted to repeat for grade improvement purposes a maximum of four courses in B.Sc Engg. and BURP programmes and a maximum of five courses in B Arch programme.

If a student obtains 'B' or a better grade in any course, he/she will not be allowed to repeat the course for the purpose of grade improvement."

উপরোক্ত সংশোধনী সমূহ এই বিশ্ববিদ্যালয়ে ১৯৯২ ইং সনে চালুকৃত কোর্স সিষ্টেম এর নিয়মাবলী যাহা সর্ব প্রথম ৩০/৯, ৪/১০, ১৯/১০/৯২ ইং তারিখে অনুষ্ঠিত ২১৪তম একাডেমিক কাউন্সিল অধিবেশনে অনুমোদিত হয় সেই সময় হইতে কার্যকর হইবে।

13. Honours

Candidates for Bachelor's degree in engineering and architecture will be awarded the degree with honours if their over all GPA is 3.75 or better.

13.1 Dean's List

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

As a recognition of excellent performance, the names of students obtaining an average GPA of 3.75 or above in two regular Terms in each academic year may be published in the Dean's List in each faculty. Students who have received F grade in any course during any of the two regular terms will not be considered for Dean's List in that year.

Vide A.C Resolution dated 9.3.94 & 11.4.94

(2) Term system নিয়মাবলীর 13.1 ধারায় যে সকল ছাত্রের ২টি নিয়মিত Term এর G.P.A কমপক্ষে 3.75 হইবে তাহাদের নাম Dean List এ প্রকাশ করার বিষয়ে উলেণ্ঢখ আছে। এই ক্ষেত্রে ব্যাখ্যা হইল ২টি টার্মের G.P.A দুইটির গড় 3.75 বা ততোধিক হইবে।

"The students whose G.P.A will fall below 2.20 will have to be notified so that the necessary remedial measures can be taken"

14 Calculation of GPA

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

Grade Point Average (GPA) is the weighted average of the grade points obtained in all the courses passed/completed by a student. For example, if a student passes/completes five courses in a semester having credits of C_1, C_2, C_3, C_4, and C_5 and his grade points in these courses are G_1, G_2, G_3, G_4, and G_5, respectively then

$$GPA = \frac{\sum C_i G_i}{\sum C_i}$$

14.1 A Numerical Example

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

Suppose a student has completed five courses in a Term and obtained the following grades:

Course	Credits	Grade	Grade points
EEE 203	3	A^+	4.00
EEE 205	3	B	3.00
EEE 207	3	A	3.75
Math 205	2	B^+	3.25
Hum 203	1	A^-	3.50

Then his GPA for the term will be computed as follows:

$$\text{GPA} = \frac{3(4.0) + 3(3.0) + 3(3.75) + 2(3.25) + 1(3.5)}{(3 + 3 + 3 + 2 + 1)} = 3.52$$

15. Student Classification

For a number of reasons it is necessary to have a definite system by which to classify students as First Year/Freshman, Second Year/Sophomore, Third Year/Junior and Fourth Year/Senior. At BUET, regular students are classified according to the number of credit hours earned towards a degree. The following classification applies to the students.

Year/Level	Earned Credit Hours	
	Engineering/ URP	Architecture
First Year/Freshman	0 to 36	* **0 to 34** *0 to 35*
Second Year/Sophomore	37 to 72	* > **34 to 72** *36 to 70*
Third Year/Junior	73 to 108	* > **72 to 110** *71 to 113*
Fourth Year/Senior	109 and above	*> **110 to 147** *114 to 154*
Fifth Year		*> **147** 155 and above

* Amended Vide A.C Resolution dated 23.1.2001

16. Registration for the Second and Subsequent Terms

A student is normally required to earn at least 15 credits in a term. At the end of each term, the students will be classified into the following three categories:

Category 1

Consisting of students who have passed all the courses prescribed for the term and have no backlog of courses. A student belonging to Category 1 will be eligible to register for all courses prescribed for the next term.

Category 2

Consisting of students who have earned at least 15 credits in the term but do not belong to Category 1. A student belonging to Category 2 is advised to take at least one course less in the next term subject to the

condition that he has to register for such backlog courses as may be prescribed by the adviser.

Category 3

Consisting of students who have failed to earn 15 credits in the term. A student belonging to Category 3 is advised to take at least two courses less subject to registration for a minimum of 15 credits. However he will be required to register for such backlog courses as may be prescribed by the adviser.

17. Performance Evaluation

The performance of a student will be evaluated in terms of two indices, viz. term grade point average, and cumulative grade point average, which is the grade average for all the terms. The term grade point average is computed dividing the total grade points earned in a term by the number of term hours taken in that term. The overall or cumulative grade point average (CGPA) is computed by dividing the total grade points accumulated up to date by the total credit hours earned. Thus a student who has earned 275 grade points in attempting 100 credit hours of courses would have an overall grade point average of 2.75.

Students will be considered to be making normal progress toward a degree if their cumulative or overall GPA for all work attempted is 2.20 or more. Students who regularly maintain Term GPA of 2.20 or better are making good progress toward their degrees and are in good standing with the University. Students who fail to maintain this minimum rate of progress will not be in good standing. This can happen when one or more of the following conditions exist:

(i) Term GPA falls below 2.20 or
(ii) Cumulative GPA falls below 2.20
(iii) Earned credits fall below 15 times the Number of Terms Attended/ Studied

All such students can make up deficiencies in GPA and credit requirements by completing courses in next term(s) and backlog courses, if there be any, with better grades. When GPA and credit requirements are achieved, the student is returned to good standing.

18. Academic Progress, Probation and Suspension

Academic Progress: Undergraduate students will be considered to be making normal progress toward a degree if their cumulative or overall GPA for all work attempted is not less than 2.20.

Probation and Suspension: Undergraduate students who regularly maintain Term GPA of 2.20 or better are making good progress toward their degrees and are in good standing with the University. Students who fail to maintain this minimum rate of progress may be placed on academic probation.

The status of academic probation is a reminder/warning to the student that satisfactory progress towards graduation is not being made. A student may be placed on academic probation when either of the following conditions exist:

(i) the Term GPA falls below 2.20 or
(ii) the cumulative GPA falls below 2.20

Students on probation are subject to such restrictions with respect to courses and extracurricular activities as may be imposed by the respective Dean of faculty.

The minimum period of probation is one Term, but the usual period is for one academic year. This allows the student an opportunity to improve the GPA through the completion of additional course work during the period that the student is on probation. The probation is extended for additional terms until the student achieves an overall GPA of 2.20 or better. When that condition is achieved the student is returned to good standing.

Academic probation is not to be taken lightly - it is a very serious matter. A student on academic probation who fails to maintain a GPA of at least 2.20 during two consecutive academic years may be suspended from this University. A student who has been suspended may petition the Dean of faculty, but this petition will not be considered until the student has been suspended at least one full term.

Petitions for reinstatement must set forth clearly the reasons for the previous unsatisfactory academic record and it must delineate the new conditions that have been created to prevent the recurrence of such work. Each such petition is considered individually on its own merits.

After consideration of the petition, and perhaps after consultation with the student, the Dean in some cases, reinstate the student, if this is the first suspension. However, a second suspension will be regarded as final and absolute.

19. Measures for Helping Academically Weak Students

The following provisions will be made as far as possible to help academically weak students to enable them to complete their studies within the maximum period of seven years in engineering and eight years in architecture students, respectively :

a) All such students whose cumulative grade point average (CGPA) is less than 2.20 at the end of a term may be given a load of not exceeding four courses in the next term.

b) For other academic deficiencies, some basic and core courses may be offered during the Short Term in order to enable the student to partially make-up for the reduced load during Regular Terms.

Following criteria will be followed for determining academically weak students:

a) CGPA falling below 2.20.
b) Term grade point average (TGPA) falling below 2.20 points below that of previous term.
c) Earned credit falling below 15 times the number of terms

attended.

20. Special Courses

a) *These courses, which include self-study courses, will be from amongst the regular courses listed in the course catalog, a special course can be run only in exceptional cases with the approval of the Syndicate.*

Amended Vide A.C Resolution dated 28.8.97

a) These courses, which include self-study courses, will be from amongst the regular theory courses listed in the course catalog, a special course can be run only in exceptional cases.

b) *Whether a course is to be floated as a special course will be decided by the Head of concerned department in consultation with the teacher/course co-ordinator concerned if it is required to be offered in Short Term.*

Amended Vide A.C Resolution dated 28.8.97

b) Whether a course is to be floated as a special course will be decided by the Head of concerned department in consultation with the teacher/course co-ordinator concerned. Decision to float a course as a special course shall be reported to the Academic Council.

c) The special course may be offered to any student in his/her last term if it helps him/her to graduate in that term. It will be offered only if the course is not running in that term as a regular course.

d) Normally no lecture will be delivered for the special course but laboratory/design classes may be held if they form a part of the course. The course coordinator/course teacher will also assign homeworks, administer quizzes and final examination for giving his or her assessments at the end of the term.

e) *A course of weightage up to 6 can be taken as a self-study course.*

Amended Vide A.C Resolution dated 28.8.97.

e) A student will be allowed to register for a maximum of two courses on self study basis.

Added Vide A.C Resolution dated 28-12-98	f) A Special Course Shall not be utilized for grade improvement purposes.

21. Rules for Courses offered in a Short Term

a) The courses to be run during the Short Term shall be decided on the recommendations of Departments on the basis of essential deficiencies to be made up by a group of students. Once floated, other students could be allowed to register in those courses subject to the capacity constrains and satisfaction of prerequisites.

b) Student will be allowed to register in a maximum of two courses during the Short Term.

c) A course may be given a weightage up to 6 credits in any Short Term following a graduating/final Term if he/she is short by a maximum of 6 earned credits only, on a self-study basis with no formal instruction. In a self-study course, there will be a Final Examination, beside the continuous assessment.

d) A fee of Tk. xx.xx for each credit hour to be registered to be borne by the students who enroll during Short Term.

22. Minimum Earned Credit and GPA Requirements for Obtaining Graduation

Minimum credit hour requirements for the award of bachelor's degree in engineering and architecture will be decided by the respective Undergraduate Board of Studies. However, at least 157 credit hours for engineering and 190 credit hours for architecture must be earned to be eligible for graduation, and this must include the specified core courses.

*Added vide A.C. Resolution Dated 16.11.1995	The minimum GPA requirement for obtaining a bachelor's degree in engineering, *URP or architecture is 2.20.
	Completion of fulltime Studentship :
Amended Vide A.C Resolution dated 13.8.97	Students who have completed Minimum credit requirement for graduation for a Bachelors degree shall not be considered and registered as fulltime students.

A student may take additional courses with the consent of his/her adviser in order to raise GPA, but he/she may take a maximum of 15 such

additional credits in engineering and *URP and 18 such additional credits in architecture beyond respective credit-hour requirements for bachelor's degree during his/her entire period of study.

22.1 Application for Graduation and Award of Degree

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

A student who has fulfilled all the academic requirements for Bachelor's degree will have to apply to the Controller of Examinations through his/her Adviser for graduation. Provisional degree will be awarded on completion of credit and GPA requirements. Such provisional degrees will be confirmed by the Academic Council.

23. Industrial/Professional Training Requirements

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

Added Vide A.C Resolution dated 24.07.96 & 25.07.96

Letter grade 'S' may be used for Satisfactory
Letter grade 'U' may be used for Unsatisfactory
In case of Unsatisfactory Performance he/she has to repeat the Industrial/Professional Training until he/she has earned 'S' grade.

24. Time Limits for Completion of Bachelor's Degree

*Added vide A.C. Resolution Dated 16.11.1995

A student must complete his studies within a maximum period of seven years for engineering and *URP and eight years for architecture.

25. Inclusion of Repeater from Annual System in Course System

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93	Repeater students including Private students of Annual system will be included in the Course System of curricula as and when such situation will arise.

25.1 Equivalence of Courses and Grades

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

Equivalence of courses passed previously by any repeater student including Private students shall be determined by the respective BUGS for the purpose of:

(a) allowing course exemption, and conversion of numberical grades into letter grades in exempted courses..

25.2 Exemption of Courses

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

Repeater students including private students may be granted exemption in theoretical course(s) in which he secured 45% or more marks and in sessional/laboratory course(s) in which he secured 41% or more marks.

Amended Vide A.C Resolution dated 21.11.93

প্রস্তাবিত বিষয়ে বিস্তারিত আলোচনার পর সিদ্ধান্ত হয় যে, পুরাতন পদ্ধতিতে অকৃতকার্য্য হইয়া কোর্স পদ্ধতিতে অন্তর্ভূক্ত হওয়া ছাত্র/ছাত্রীগণ থিউরী/সেশনাল কোন বিষয়ে ৪০% বা ততোধিক নম্বর প্রাপ্ত হইলে তাহাদিগকে অব্যাহতি (Exemption) প্রদান করা যাইতে পারে। এই অব্যাহতির জন্য কোন আবেদনের প্রয়োজন হইবে না।

25.3 Time Limit for Completion of Bachelor's Degree

Time allowed for a student included in Course System form Annual System to complete studies leading to a bachelor's degree will be proportional to the remaining credits to be completed by him/her.

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93	A student in engineering, for example, having earned 40 credit hours through equivalence and exemption (of previously completed courses) out of a total requirement of 160 credits for bachelor's degree will get (7 yrs × 120/160 = 5.25) = 5½ years (rounded to next higher half-a-year) or 11 (eleven) Regular Terms to fulfill all requirements for bachelor's degree. For a student in architecture time allowed will be calculated in a similar way.

25.4 Relaxation of course registration for student transferred to course system from annual system

Amended Vide A.C Resolution dated 17-10-93 & 27-10-93	The requirement of registrations of a minimum 15 credit hours in a term shall be waived for only the terms of the level where he/she has been transferred in course system provided that he/she has been granted exemption in some of the courses offered in those terms.

26. Attendance, Conduct, Discipline etc.

26.1 Attendance

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93	All students are expected to attend classes regularly. The university believes that attendance is necessary for effective learning. The first responsibility of a student is to attend classes regularly, and one is required to attend at least 60% of all classes held in every course.

26.2 Conduct and Discipline

A student shall conform to a high standard of discipline, and shall conduct himself, within and outside the precincts of the university in a manner befitting the students of an university of national importance. He shall show due courtesy and consideration to the employees of the university and Halls of Residence, good

neighborliness to his fellow students and the teachers of the university and pay due attention and courtesy to visitors.

To safeguard its ideals of scholarship, character and personal behaviour, the university reserves the right to require the withdrawal of any student at any time for any reason deemed sufficient.

27. Absence During Term

A student should not be absent from quizzes, tests, etc. during the term. Such absence will naturally lead to reduction in points/marks which count towards the final grade. Absence in Term Final Examination will result in 'F' grades.

A student who has been absent for short periods, up to a maximum of three weeks due to illness should approach, the course teacher(s) or the course co-ordinator(s) for make-up quizzes or assignments immediately on returning to the classes. Such request should be supported by medical certificate from a University Medical Officer. The medical certificate issued by a registered medical practitioners (with the Registration Number shown explicitly on the certificates) will also be acceptable only in those cases where the student has valid reasons for his absence from the university.

Chapter 4

Course Requirements for Undergraduate Civil Engineering Students

4.1 INTRODUCTION

The undergraduate students of the Department of Civil Engineering have to follow the course schedule given below. The letter prefix in any course number indicates the department offering the course viz. CE for Civil Engineering, WRE for Water Resources Engineering, EEE for Electrical Engineering, ME for Mechanical Engineering, Chem for Chemistry, Phy for Physics, Math for Mathematics, Hum for Humanities and Shop for Workshops. The first digit in the number indicates the year/level for which the course is intended. Odd number courses are theory courses and even numbered courses are sessional courses.

4.2 COURSE REQUIREMENTS

A. BASIC SCIENCES

Theoretical

*	Phy	101	Physical Optics, Heat, Waves and Oscillation	3 credits
	Phy	105	Structure of Matter, Electricity and Magnetism and Modern Physics	3 credits ***Prereq.*** Phy 101
*	Chem	103	Chemistry I	3 credits
	Chem	105	Chemistry II	3 credits ***Prereq.***Chem103

Sessional

*	Phy	102	Physics Lab.	1.5 credits
*	Chem	114	Inorganic Quantitative Analysis (Sessional)	1.5 credits

Requirement 12 credits (9+3)

* Subjects marked with asterisk(*) indicate compulsory courses

B. MATHEMATICS

Theoretical:

*	Math 131	Mathematics I	3 credits	
*	Math 133	Mathematics II	3 credits	
	Math 231	Differential Equations	3 credits	
	Math 233	Fourier Analysis, Harmonic Functions and Laplace Transform	3 credits	
	Math 235	Vector Analysis and Statistics	3 credits	

Requirement 12 Credits (12+0)

C. HUMANITIES

Theoretical:

*	Hum 111	English	2 credits	
*	Hum 113	Economics	2 credits	
	Hum 207	Advanced English	2 credits	***Prereq.***Hum 111
	Hum 211	Sociology	2 credits	
	Hum 213	Government	2 credits	
	Hum 313	Principles of Accounting	2 credits	

Requirement 8 Credits (8+0)

D. ENGINEERING (BASIC)

Theoretical:

*	CE 101	Engineering Mechanics	4 credits	
*	CE 103	Surveying	4 credits	
*	EEE 165	Basic Electrical Technology	4 credits	
*	CE 201	Engineering Materials	4 credits	
*	CE 203	Engineering Geology and Geomorphology	3 credits	
*	CE 205	Numerical Methods	2 credits	
*	CE 211	Mechanics of Solids I	3 credits	***Prereq.*** CE 101
*	CE 213	Mechanics of Solids II	3 credits	***Prereq.*** CE 211
*	WRE 201	Fluid Mechanics	4 credits	

Sessional:

*	CE 100	Civil Engg. Drawing I	1.5 credits
*	CE 102	Civil Engg. Drawing II	1.5 credits
*	CE 104	Practical Surveying (3 weeks in field)	1.5 credits
*	Shop 132	Carpentry Shop, Machine Shop and Welding Shop Sessional	1.5 credits
*	EEE 166	Basic Electrical Technology Laboratory	1.5 credits
*	CE 200	Details of Construction	1.5 credits
*	CE 202	Materials Sessional	1.5 credits
*	CE 206	Computer Programming Sessional	2.5 credits
*	CE 208	Quantity Surveying	1.5 credits
*	CE 212	Structural Mechanics and Materials Sessional	1.5 credits
*	WRE 202	Fluid Mechanics Sessional	1.5 credits

Requirement 48.5 Credits (32+16.5)

E. CIVIL ENGINEERING PRACTICE

Theoretical:

*	CE 401	Project Planning & Management	3 credits	
	CE 403	Professional Practices and Communication	2 credits	
	CE 405	Socio-economic Aspects of Development Projects	2 credits	
	WRE 403	Integrated Water Resources Planning & Management		2 credits

Minimum Requirement 5 Credits (5 + 0)

F. STRUCTURAL ENGINEERING

Theoretical:

*	CE 311	Structural Analysis & Design I	3 credits	***Prereq.*** CE 213
*	CE 313	Structural Analysis & Design II	3 credits	***Prereq.*** CE 311

*	CE 315	Design of Concrete Structures I	3 credits	
*	CE 317	Design of Concrete Structures II	4 credits	***Prereq.*** CE 315
*	CE 411	Structural Analysis and Design III	4 credits	***Prereq.*** CE 313
	CE 413	Theory of Elasticity and Elastic Instability of Structures	2 credits	
	CE 415	Prestressed Concrete	2 credits	
	CE 417	Design of Steel Structures	2 credits	
	CE 419	Introduction to Finite Element Method	2 credits	
	CE 421	Dynamics of Structures	2 credits	

Sessional:

*	CE 312	Structural Analysis and Design Sessional I	1.5 credits
*	CE 316	Concrete Structures Sessional	1.5 credits
	CE 400	Project and Thesis	4.5 credits
*	CE 412	Structural Analysis and Design Sessional II	1.5 credits
	CE 416	Structural Analysis and Design Sessional III	1.5 credits

Minimum Requirement 21.5 Credits (17+4.5)

G. ENVIRONMENTAL ENGINEERING

Theoretical:

*	CE 331	Environmental Engineering I	3 credits
*	CE 333	Environmental Engineering II	4 credits
	CE 431	Environmental Engineering III	2 credits
	CE 433	Environmental Engineering IV	2 credits
	CE 435	Environmental Engineering V	2 credits

Sessional :

*	CE 332	Environmental Engineering Sessional I	1.5 credits
	CE 400	Project and Thesis	4.5 credits
	CE 432	Environmental Engineering. Sessional II	1.5 credits

Minimum Requirement 8.5 Credits (7+1.5)

H. GEOTECHNICAL ENGINEERING

Theoretical :

*	CE 341	Geotechnical Engineering I	4 credits	***Prereq.*** CE 203
*	CE 343	Geotechnical Engineering II	3 credits	
	CE 441	Geotechnical Engineering III	2 credits	
	CE 443	Geotechnical Engineering IV	2 credits	
	CE 445	Geotechnical Engineering V	2 credits	

Sessional:

*	CE 342	Geotechnical Engineering Sessional I	1.5 credits
	CE 400	Project and Thesis	4.5 credits
	CE 442	Geotechnical Engineering Seasonal II	1.5 credits

Minimum Requirement 8.5 Credits (7 +1.5)

I. TRANSPORTATION ENGINEERING

Theoretical:

*	CE 351	Transportation Engg. I : Transport & Traffic Design	3 credits
*	CE 353	Transportation Engg. II : Highway design & Railways	4 credits
	CE 451	Transportation Engg. III : Traffic Planning & Management	2 credits

CE 453	Transportation Engg. IV : Highway Drainage & Airports	2 credits	
CE 455	Transportation Engg. V : Transport Projects and Operations	2 credits	

Sessional:

* CE 354	Transportation Engineering Sessional I	1.5 credits	
CE 400	Project and Thesis	4.5 credits	
CE 452	Transportation Engineering Sessional II	1.5 credits	

Minimum Requirement 8.5 Credits (7+1.5)

J. WATER RESOURCES ENGINEERING

Theoretical:

*	WRE 301	Open Channel Flow	4 credits	***Prereq.*** WRE201
*	WRE 303	Hydrology	3 credits	
*	WRE 401	Irrigation and Flood Control	3 credits	
	WRE 405	Flood Mitigation and Management	2 credits	
	WRE 407	Ground Water Engineering	2 credits	
	WRE 409	River Engineering	2 credits	
	WRE 411	Hydraulic Structures	2 credits	
	WRE 413	Coastal Engineering	2 credits	

Sessional:

*	WRE 302	Open Channel Flow Sessional	1.5 credits
	WRE 400	Project and Thesis	4.5 credits
*	WRE 402	Irrigation and Flood Control Sessional	1.5 credits
	WRE 412	Water Resources Engineering Sessional	1.5 credits

Minimum Requirement 13.0 Credits (10+ 3)

4.3 SUMMARY OF COURSE REQUIREMENTS

	Courses	Requirements (total credits to be offered)
A.	Basic Science	12 (15)
B.	Mathematics	12 (15)
C.	Humanities	8 (12)
D.	Engineering (Basic)	48.5 (48.5)
E.	Civil Engineering Practice	5 (9)
F.	Structural Engineering	21.5 (37.5)
G.	Environmental Engineering	8.5 (20.5)
H.	Geotechnical Engineering	8.5 (20.5)
I.	Transportation Engineering	8.5 (20.5)
J.	Water Resources Engineering	13.0 (29)
Total		145.5
Project and Thesis		4.5
Optional Courses:**		
Theory		8.0 (38 in F to J, Max. 4 from each division/ WRE Dept.)
Sessional		3.0 (7.5 in F to J)
Grand Total		**161.0**

** Students specializing in an optional group, such as Structural, Geotechnical, Environmental, Transportation and Water Resources Engineering, shall take thesis and at least two optional courses and a corresponding sessional from that group and two more optional courses and another corresponding sessional from any other group.

4.4 COURSES OFFERED IN DIFFERENT TERMS FOR B.Sc.Engg. (CIVIL) DEGREE

Level	Term	Course Number, Title and Credit Hour/Week	Status of Course	Selection Basis/Remarks
1	**I**	Phy 101: Physical Optics, Heat, Waves and Oscillation (3.0)	C	
		Chem 103: Chemistry I (3.0)	C	
		Math 131: Mathematics I (3.0)	C	
		Hum 111: English (2.0)	C	Sec. A & B
		Hum 113: Economics (2.0)	C	Sec. C
		CE 101: Engineering Mechanics (4.0)	C	
		Phy 102: Physics Lab. (1.5)	C	
		Chem 114: Inorganic Quantitative Analysis (1.5)	C	Total **19.5** credits
		CE 100: Civil Engineering Drawing I (1.5)	C	

C: Compulsory

Level	Term	Course Number, Title and Credit Hour/Week	Status of Course	Selection Basis/Remarks
1	**II**	Phy 105 *: Structure of Matter, Electricity and Magnetism, and Modern Physics (3.0) Chem 105 *: Chemistry II (3.0)	O O	Select One
		Hum111: English (2.0). Hum 113: Economics (2.0)	C C	Sec. C Sec. A & B
		Math 133: Mathematics II (3.0) CE 103: Surveying (4.0) EEE 165: Basic Elec. Tech. (4.0) CE 102 : Civil Engineering Drawing II (1.5) Shop 132: Carpentry shop, Machine shop and Welding shop sessional (1.5) EEE 166: Elec. Tech. Lab (1.5)	C C C C C C	Total **20.5** credits

C: Compulsory
O: Optional
*: Registration of this course requires obtaining minimum F grade in its pre-requisite course.

Level	Term	Course Number, Title and Credit Hour/Week	Status of Course	Selection Basis/Remarks
2	**I**	Hum 211: Sociology (2.0) Hum 213: Government (2.0) Hum 313: Principles of Accounting (2.0)	O O O	Select One
		Math 231: Differential Equation (3.0) CE 201: Engineering Materials (4.0) CE 203: Engineering Geology & Geomorphology (3.0) CE 211 *: Mechanics of Solids I (3.0) CE 200: Details of Construction (1.5) CE 202: Materials Session (1.5) CE 212: Structural Mechanics & Materials Sessional (1.5)	C C C C C C C	Total **19.5** credits

C: Compulsory
O: Optional
*: Registration of this course requires obtaining minimum F grade in its pre-requisite course

Level	Term	Course Number, Title and Credit Hour/Week	Status of Course	Selection Basis/Remarks
		Math 233: Fourier Analysis, Harmonic Functions & Laplace Transforms (3.0)	O	Select One
		Math 235: Vector Analysis & Statistics (3.0)	O	
2	**II**	Hum 211: Sociology (2.0)	O	Select One
		Hum 213: Government (2.0)	O	
		Hum 313: Principles of Accounting (2.0)	O	
		CE 205: Numerical Methods (2.0)	C	
		CE 213*: Mechanics of Solids II (3.0)		
		WRE 201: Fluid Mechanics (4.0)	C	
		CE 206: Computer Programming	C	
		Sessional (2.5)	C	
		CE 208: Quantity Surveying (1.5)		
		WRE 202: Fluid Mechanics	C	
		Sessional (1.5)	C	Total **19.5** Credits

C: Compulsory
O: Optional
*: Registration of this course requires obtaining minimum F grade in its pre-requisite course

Level	Term	Course Number, Title and Credit Hour/Week	Status of Course	Selection Basis/Remarks
3	**I**	CE 311 *: Structural Analysis and Design I (3.0) CE 315: Design of Concrete Structures I (3.0) CE 331 : Environmental Engineering I (3.0) CE 341 *: Geotechnical Engineering I (4.0) WRE 301 *: Open Channel Flow (4.0) CE 312 : Structural Analysis & Design Sessional I (1.5) CE 342 : Geotechnical Engineering Sessional (1.5) WRE 302: Open Channel Flow Sessional (1.5)	C C C C C C C C	Total **21.5** credits

C: Compulsory
*: Registration of this course requires passing of its pre-requisite course

Level	Term	Course Number, Title and Credit Hour/Week	Status of Course	Selection Basis/Remarks
3	**II**	CE 313 *: Structural Analysis and Design II (3.0) CE 317 *: Design of Concrete Structures II (4.0) CE 343: Geotechnical Engineering II (3.0) CE 353: Transportation Engineering II: Highway Design & Railways (4.0) WRE 303: Hydrology (3.0) CE 316: Concrete Structures Sessional (1.5) CE 332: Environmental Engineering Sessional I (1.5) CE 354: Transportation Engineering Sessional I (1.5)	C C C C C C C C	Total **21.5** credits

C: Compulsory
*: Registration of this course requires obtaining minimum F grade in its pre-requisite course

Level	Term	Course Number, Title and Credit Hour/Week	Status of Course	Selection Basis/Remarks
4	**I**	CE 333 : Environmental Engineering II (4.0) CE 351 : Transportation Engineering I -Transport & Traffic Design (3.0) CE 401 : Project Planning & Management (3.0) CE 411 *: Structural Analysis and Design III (4.0) WRE 401: Irrigation and Flood Control (3.0) WRE 402: Irrigation and Flood Control Sessional (1.5)	C C C C C C	
		CE 400 **: Project and Thesis (1.5)	C	Total **20.0** credits

C: Compulsory
*: Registration of this course requires passing of its pre-requisite course
**: To register in division of specialization from Structural, Environmental, Geotechnical, Transportation, and Water Resources Engineering.

Level	Term	Course Number, Title and Credit Hour/Week	Status of Course
4	**II**	CE 400 Project and Thesis (3.0) CE 412 Structural Analysis & Design Sessional II (1.5)	Compulsory
		CE 403 Professional Practices and Communication (2.0) CE 405 Socio-economic Aspects of Development Projects (2.0)	Select One
		CE 413 Theory of Elasticity and Elastic Instability of Structures (2.0) CE 415 Prestressed Concrete (2.0) CE 417 Design of Steel Structures (2.0) CE 419 Introduction of Finite Element Method (2.0) CE 421 Dynamics of Structures (2.0)	Select Two (Structure)
		CE 416 Structural Analysis & Design Sessional III (1.5)	Structure
		CE 431 Environmental Engineering III (Solid Waste Management) (2.0) CE 433 Environmental Engineering IV (Environmental Pollution Control) (2.0) CE 435 Environmental Engineering V (Environment & Development Projects) (2.0)	Select Two (Environment)

Level	Term	Course Number, Title and Credit Hour/Week	Status of Course
		CE 432 Environmental Engineering Sessional II (1.5)	Environment
		CE 441 Geotechnical Engineering III (2.0) CE 443 Geotechnical Engineering IV (2.0) CE 445 Geotechnical Engineering V (2.0)	Select Two (Geotechnical)
4	**II**	CE 442 Geotechnical Engineering Sessional II (1.5)	Geotechnical
		CE 451 Transportation Engineering III (2.0) CE 453 Transportation Engineering IV : Highway Drainage & Airports (2.0) CE 455 Transportation Engineering V : Transport Projects and Operations (2.0)	Select Two (Transport.)
		CE 452 Transportation Engineering Sessional II (1.5)	Transport.
		WRE 407 Groundwater Engineering (2.0) WRE 409 River Engineering III (2.0) WRE 411 Hydraulic Structures (2.0) WRE 413 Coastal Engineering (2.0)	Select Two (Water Resour.
		WRE 412 Water Resources Engineering Sessional (1.5)	Water Resour.
		Total 17.5 credits	

Chapter 5

Detail Outline of Undergraduate Courses

5.1 COURSES OFFERED BY THE DEPARTMENT OF CIVIL ENGINEERING:

CE 100 : Civil Engineering Drawing
1.50 credit, 3 hrs/week.

Introduction - Lines and lettering, ; Plane geometry: drawing of linear and curved geometric figures, e.g. pentagon, hexagon, octagon, ellipse, parabola, hyperbola. Solid geometry: Projections of cube, prism, prism, prism, prism, cone, cylinder; developments, true shapes and sections of cube, pyramid, cone, prism; ; isometric and oblique drawings of cube, pyramid, cone. Plan, elevations and sections of one storied buildings and bridges.

CE 101 : Engineering Mechanics
4.00 credit, 4 hrs/week.

Introduction to SI Units; coplanar concurrent forces; moments and parallel coplanar forces; non-concurrent non-parallel coplanar forces; non-coplanar forces; centroids; moment of inertia of areas; moment of inertia of masses. Friction; flexible cords; plane motion; force systems that produce rectilinear motion, work, kinetic energy; power, impulse and momentum.

CE 102 : Computer Aided Drawing
1.50 credit, 3 hrs/week.

Introduction to computer usage. Introduction to CAD packages and computer aided drafting: drawing editing and dimensioning of simple objects. Plan, elevations and sections of multi-storied buildings; reinforcement details of beams, slabs, stairs etc. Plan and section of septic tank; Detailed drawings of roof trusses; Plans, elevations and sections of culverts, bridges and other hydraulic structures; Building services drawings.

CE 103 : Surveying
4.00 credit, 4 hrs/week.

Reconnaissance survey; linear measurements; traverse survey; levelling and contouring; calculation of areas and volumes; problems on heights and distances; curves and curve ranging, transition curve, vertical curves. Tacheometry: introduction, principles and problems on tacheometry. Astronomical surveying: definition, instruments, astronomical corrections, systems of time. Photogrametry: introduction of terrestrial photography, aerial photography, reading of photo mossaic, scale; project surveying; errors in surveying; remote sensing; introduction to global positioning system (GPS).

CE 104 : Practical Surveying
1.50 credit, 3 hrs/week.

3 weeks of field work.

CE 152 : Engineering Drawing (For EEE students)
1.50 credit, 3 hrs/week.

Introduction - lettering, numbering and heading; instrument and their use; sectional views and isometric views of solid geometrical figures. Plan, elevation and section of multistoried buildings; building services drawings; detailed drawing of lattice towers.

CE 200 : Details of Constructions
1.50 credit, 3 hrs/week.

Foundations; different types of foundations; brick masonry; framed structures and bearing walls; arches and lintels; details of floors and roofs; pointing; plastering and interior finishing; scaffolding, staging; shoring and underpinning; thermal insulation and acoustics; House plumbing.

CE 201 : Engineering Materials
4.00 credit, 4 hrs/week.

Properties and uses of bricks, efflorescence; cement, cement chemistry, aggregates, cement and lime mortars, concrete, standard tests of bricks, Cement and concrete, salinity problem in concrete, corrosion and its prevention, paints, varnishes, metallic coating.

Design of concrete mixes; atomic structure and bonding; crystal structures, mechanical properties, yielding, fracture, elasticity, plasticity, properties and uses of rubber, timber and plastics. Concrete for special purposes. Ferrocement.

CE 202 : Materials Sessional
1.50 credit, 3 hrs/week.

General discussion on preparation and properties of concrete. Test for specific gravity. Unit weight, voids and bulking of aggregates; moisture content and absorption of coarse and fine aggregates; normal consistency and initial setting time of cement; direct tensile and compressive strengths of cement mortar; gradation of coarse and fine aggregates; design and testing of a concrete mix.

CE 203 : Engineering Geology and Geomorphology
3.00 credit, 3 hrs/week.

Minerals; identification of minerals, common rock forming minerals; physical properties of minerals; mineraloids rocks; types of rocks, cycle of rock change; earthquake and seismic map of Bangladesh.

Structural geology; faults; types of faults; fold and fold type; domes; basins; erosional process; quantitative analysis of erosional land forms.

Channel development; channel widening; valley shape; stream terraces; alluvial flood plains; deltas and alluvial fans; channel morphology; channel patterns and the river basin; geology and geomorphology of Bangladesh;

CE 205 : Numerical Methods
2.00 credit, 2 hrs/week.

Numerical solution of algebraic and transcendental equations; solution of systems of linear equations; linear and non-linear curve-fitting by least square regression; finite differences; divided differences; interpolation; numerical differentiation and integration; numerical solution of differential equations.

CE 206 : Computer Programming Sessional
2.50 credit, 5 hrs/week.

Programming concepts and algorithms. Number systems; internal representation of data. Elements of structured programming language: data types, operators, expressions, control structures, functions, pointers and arrays, input and output. Concept of Object Oriented Programming (OOP): encapsulation, inheritence, polymorphism and abstraction. Template functions and classes. Development of programs related to Civil Engineering.

CE 208 : Quantity Surveying
1.50 credit, 3 hrs/week.

Quantity estimates of items of civil works e.g. building, bridge, truss and highway. Analysis of rates; use of software in quantity surveying; Specifications of materials of construction projects.

CE 209 : Construction Materials and Civil Engineering Structures
2.00 credit, 2 hrs/week. (For BURP Dept.)

Types, preparation, properties and uses of materials - such as stone, brick, cement, sand, concrete, timber, soil, ferrous and non-ferrous metals and plastics.

Introduction to different types of civil engineering structures, including foundation: buildings, roads, bridges, irrigation, flood control and drainage structures - their types and functions; evaluation of approximate costs.

CE 210 : Civil Engineering Drawing and Quantity Surveying
1.50 credit, 3 hrs/week. (Special Course)

Analysis of rates; detailed estimate of all items of works of a building, a truss, a highway etc. Specifications of materials for above constructions.

Plan and section of septic tanks; detailed drawing of a roof truss; plan, elevation and sections of culverts; Building services drawings; introduction to Computer Aided Drafting (CAD).

CE 211 : Mechanics of Solids I
3.00 credit, 3 hrs/week.
Prereq. CE 101

Fundamental concepts of stress and strain. Mechanical properties of materials; strain energy; stresses and strains in members subjected to tension, compression, shear and temperature changes; bending moment and shear force diagrams of beams and frames; flexural and shearing stresses in beams; shear centre; thin walled pressure containers; rivetted and welded joints.

CE 212 : Structural Mechanics and Materials Sessional
1.50 credit, 3 hrs/week.

Tension, direct shear and impact tests of mild steel specimen, compression test of timber specimen, slender column test; static bending test; hardness test of metals; helical spring tests; determination of shear centre; load-deflection behavior of simple beam.

CE 213 : Mechanics of Solids II
3.00 credit, 3 hrs/week.
Prereq. CE 211

Torsional stresses in shafts and tubes; Compound stresses; Helical springs; Transformation of stresses; deflection of beams by direct integration, moment area, elastic load and conjugate beam methods; buckling of columns.

CE 223 : Structure I: Mechanics
2.00 credit, 2 hrs/week. (For Arch. Dept.)

Force; equilibrium; free body diagrams; resultants and components; coplanar concurrent forces; moments and parallel coplanar forces; centroids; moment of inertia of areas; Maximum and minimum forces; friction; flexible chords; calculation of bar forces for simple trusses.

CE 225 : Structure II: Basic Mechanics of Solids
2.00 credit, 2 hrs/week. (For Arch. Dept.)

Fundamental concepts of stress and strain; mechanical properties of materials; stresses and strains in members subjected to tension compression, shear and temperature changes; Joints - welded and riveted; shear force and bending moment diagrams for statically determinate beams and frames.

CE 231 : Building Services I: Plumbing
2.00 credit, 2 hrs/week. (For Arch. Dept.)

Introduction to plumbing, water requirements, water sources; water supply and distribution in buildings. Sewage and sewer system, building sewer and drainage system, sewage disposal; plumbing of multistoried buildings; rural sanitation programmes in Bangladesh.

CE 311 : Structural Analysis and Design I
3.00 credit, 3 hrs/week.
Prereq. CE 213

Stability and determinacy of structures; analysis of statically determinate trusses and arches; influence lines; moving loads on beams, frames and trusses; cables and cable supported structures.

CE 312 : Structural Analysis and Design Sessional I
1.50 credit, 3 hrs/week.

Analysis of steel structures e.g. truss, plate girder; design of members and joints of structures; use of software in analysis and design problems.

CE 313 : Structural Analysis and Design II
3.00 credit, 3 hrs/week.

Prereq. CE 311

Wind and earthquake loads; approximate analysis of statically indeterminate structures. e.g. braced trusses, portal frames, mill bent and multi storied building frames; deflection of beams, trusses and frames by virtual work method; space trusses; analysis of statically indeterminate structures by consistent deformation.

CE 315 : Design of Concrete Structures I
3.00 credit, 3 hrs/week.

Fundamental behavior of reinforced concrete; introduction to WSD and USD methods; analysis and /design of singly reinforced, doubly reinforced and T-beams according to WSD and USD methods; diagonal tension; bond and anchorage according to WSD and USD methods; one way slabs.

CE 316 : Concrete Structures Sessional
1.50 credit, 3 hrs/week.

Analysis and design problems based on CE315; design of a slab bridge, simple girder bridge and a low-rise building.

CE 317 : Design of Concrete Structures II
4.00 credit, 4 hrs/week.
Prereq. CE 315

Two-way slabs; columns; footings; retaining walls, reinforced concrete floor and roof systems. Review of codes; yield line method; introduction of prestressed concrete. Analysis and preliminary design of prestressed beam section.

CE 321 : Structure III: Mechanics of Solids
2.00 credit, 2 hrs/week. (For Arch. Dept.)

Flexural and shearing stress in beams; principal stresses; direct integration and Area Moment methods for finding slopes and deflections in statically determinate beams. Indeterminate beam analysis; buckling of columns.

CE 323 : Structure IV: Steel and Timber Structures
2.00 credit, 2 hrs/week. (For Arch. Dept.)

Introduction: allowable stresses; different types of trusses; wind and static load analysis of trusses; design of truss sections; design of steel beams, columns; timber structures.

CE 327 : Elements of Solid Mechanics
3 credit, 3 hrs/week. (For BURP Dept.)

Force, resultants and components, moments and parallel coplanar forces, centroids, moment of inertia; fundamental concepts of stress and strain.

Mechanical properties of materials: stress and strain in members subjected to tensile, compressive and shear forces; bending moment and shear force diagrams for statically determinate structures.

CE 329 : Elements of Civil Engineering Structures
3 credit, 3 hrs/week. (For BURP Dept.)

Structural forms and systems for buildings, bridges, communication and transmission structures; types of structural materials - steel, reinforced and prestressed concrete; loads on structures; types of foundation, concept of bearing capacity and settlement.

Introduction to design in steel, reinforced and prestressed concrete; design codes.

CE 331 : Environmental Engineering I
3.00 credit, 3 hrs/week.

Water Supply Engineering: introduction; water demands; water supply sources; ground water exploration: aquifer properties and ground water flow, well hydraulics, water well design, drilling, construction and maintenance; water demand for rural communities; shallow hand tubewells and deep set Tara pumps for problem areas.

Surface water collection and transportation; head works; pumps and pumping machineries; water distribution system; analysis and design of distribution network; fire hydrants; water meters; leak detection; unaccounted for water.

Water quality requirements; water treatment - plain sedimentation, flocculation and settlement, filtration, disinfection; miscellaneous treatment methods; low cost treatment methods for rural communities.

CE 332 : Environmental Engineering Sessional I
1.50 credit, 3 hrs/week.

Water and wastewater sampling techniques, sample preservation, physical, chemical and biological tests of water and wastewater; breakpoint chlorinating, alum coagulation, sampling and laboratory analysis of air, sampling and laboratory analysis of solid waste.

CE 333 : Environmental Engineering II
4.00 credit, 4 hrs/week.

Wastewater Engineering: introduction; water supply, sanitation and health; estimation of wastewater; wastewater collection systems; hydraulics of sewer; design, construction and maintenance of sanitary sewer and storm drainage system; sewer appurtenances; plumbing system.

Microbiology of sewage and waste water; wastewater characteristics; preparatory, primary and secondary treatment methods and disposal; treatment and disposal of industrial effluents; sludge treatment and disposal; sanitation for low income communities - on-site sanitation systems for rural communities; low cost small bore sewerage for small townships; design and construction of septic tanks, soak wells and subsurface drain fields; rural sanitation in Bangladesh.

Sustainability of water and sanitation services; participatory development approach in water and sanitation sector; community management of water and sanitation services; introduction to environment, environmental pollution; environment protection and management.

CE 335 : Environmental Engineering VI
4.00 credit, 4 hrs/week (For WRE Dept.)

Introduction to environmental engineering. Water supply: water requirement, water sources, water quality; treatment and distribution systems, design concepts of water treatment plants. Wastewater engineering: wastewater characteristics, treatment and disposal, on site sanitation systems. Solid waste management.

Introduction to environmental pollution; water, air, soil and noise pollution; effects of pollution.

Introduction to environmental management: environmental policy, legislation and environmental quality standards; introduction to environmental impact assessment.

CE 336 : Environmental Engineering Sessional III
1.5 credit, 3 hrs/week. (For WRE Dept.)

Sample collection, preservation and storage; physical, chemical and bacteriological tests of water and wastewater; alum coagulation and break point chlorination, preliminary design of water supply and sewerage system.

CE 341 : Geotechnical Engineering I
4.00 credit, 4 hrs/week.
Prereq. CE 203

Introduction to geotechnical engineering; formation, type and identification of soils; soil composition; soil structure and fabric; index properties of soils; engineering classification of soils; soil compaction; principles of total and effective stresses; permeability and seepage; stress-strain-strength characteristics of soils; compressibility and settlement behaviour of soils; lateral earth pressure; stress distribution.

CE 342 : Geotechnical Engineering Sessional I
1.50 credit, 3 hrs/week.

Field identification tests; grain size analysis by sieve and hydrometer; specific gravity test; atterberg limits test; permeability tests; unconfined compression test; compaction test; relative density test; direct shear tests; consolidation tests.

CE 343 : Geotechnical Engg. II
3.00 credit, 3 hrs/week.

Soil investigation techniques; settlement computation; types of foundations; bearing capacity of shallow and deep foundations; settlement and distortion of foundations; design and construction of footings, rafts and piles; slope stability analyses.

CE 351 : Transportation Engg I: Transport & Traffic Design
3.00 credit, 3 hrs/week.

Introduction to transportation engineering; development of transportation systems; elements of transportation system; transportation in Bangladesh; modal share; transportation planning concepts: collection, study and analysis of basic data; highway location and surveys; geometric design of highways: elements of design, cross-section elements, curves and sight distances; road intersections; traffic engineering: the road/traffic system, vehicle and traffic characteristics, traffic control devices, traffic studies, parking and roadway lighting; waterways and terminals.

CE 353 : Transportation Engg II: Highway Design & Railways
4.00 credit, 4 hrs/week.

Highway materials; subgrade, subbase and base courses; soil stabilization and soil aggregates in road constructions; low-cost roads; production, properties and uses of bituminous materials and mix design methods; design, construction and maintenance of flexible and rigid road pavements; equipments; railways: general requirements, alignment, permanent way, station and yards, signalling, points and crossings, maintenance.

CE 354 : Transportation Engineering Sessional I
1.50 credit, 3 hrs/week.

Tests of bituminous materials, tests on subgrade, sub-base and base materials; bituminous mix design; roadway capacity analysis; application of analytical, simulation and statistical packages.

CE 355: Transportation Engineering
4.00 Credit, 4 hrs/week

Introduction to transportation engineering; elements and modes of transportation system; considerations in the planning, financing and development of transportation system; highways: highway types, geometric design of highways; traffic characteristics, traffic studies and traffic control devices; highway materials; design, construction and maintenance of low cost pavements, rigid pavements and bituminous pavements; railways: introduction, characteristics, alignment, permanent way, stations and yards, points and crossings; airports: introduction, airport site selection, airport configurations, geometric design of landing area; introduction to waterways and terminals.

CE 356: Transportation Engineering Sessional
1.5 Credit, 3 hrs/week

Tests on bituminous materials; tests on sub grade and base materials; roadway capacity studies; problems on the design of roadway geometry and pavements, application of analytical, simulation and statistical packages.

CE 400 : Project and Thesis
4.50 credit, 9 hrs/week.

Experimental and theoretical investigation of various topics in structural engineering, concrete technology, environmental engineering, transportation engineering and geotechnical engineering. Individual or group study of one or more topics from any of the above fields. The students will be required to submit thesis/project report at the end of the work.

CE 401 : Project Planning and Management
3.00 credit, 3 hrs/week.

Principles of management; principles of construction management; construction contracts and specifications; inspection and quality control; construction safety; construction planning and scheduling: PERT, CPM, case studies, resource scheduling; PERT: a cost accounting system, linear programming. Psychology in administration; materials management; demand forecasting; inventory

control; stores management; procurement. Project planning and evaluation; feasibility reports, cash flow, pay back period, internal rate of return. Benefit-cost ratio, construction equipments and plants. Replacement studies.

CE 403 : Professional Practices and Communication
2.00 credit, 2 hrs/week.

The project cycle; project proposal; contractual provisions; techniques of specification writing; evaluation of bids; project evaluation.

Interpretation of literature, documents etc.; communicating; preparation of report; industrial and labour relations; professional ethics in Civil Engineering.

CE 405 : Socio-Economic Aspects of Development Projects
2.00 credit, 2 hrs/week.

Economic and social structure; development and economic growth; socio-economic indicators; population, prosperity and poverty; employment of workforce; population displacement; rehabilitation strategy; productivity, landloss, landuse and land ownership patterns; fisheries and aquaculture; deforestation and afforestation; communication, commerce, industries and other economic benefits; water supply, sanitation, health and nutrition; inequalities in distribution of benefits and losses; socio-economic survey; case studies.

CE 411 : Structural Analysis and Design III
4.00 credit, 4 hrs/week. Prereq. CE 313

Analysis of statically indeterminate structures by displacement method; slope deflection, moment distribution, stiffness matrix; member stiffness; stiffness transformations; assembly of stiffness matrices and solution for beams, frames and trusses. Flexibility matrix. Influence lines for statically indeterminate beams, frames, arches and grids. Structural forms and their applications.

CE 412 : Structural Analysis and Design Sessional II
1.50 credit, 3 hrs/week.

Design of various reinforced concrete structures, e.g. cantilever bridge and multistoried building.

CE 413 : Theory of Elasticity and Elastic Instability of Structures
2.00 credit, 2 hrs/week.

Introduction to theory of elasticity; plane stress and plane strain conditions; Two-dimensional problems in rectangular and polar coordinates; torsion of circular and non-circular shafts; instability of structures; stability functions.

CE 415 : Prestressed Concrete
2.00 credit, 2 hrs/week.

Prestressed concretes: materials; prestressing systems; loss of prestress; analysis of sections for flexure, shear, bond and bearing; beam deflections and cable layout; partial prestress.

Design of prestressed sections for flexure, shear, bond and bearing.

CE 416 : Computer Aided Analysis and Design of Structures
1.50 credit, 3 hrs/week.

Use of structural analysis and design software; design of various reinforced concrete structures, e.g. building, water tower, folded plate roof.

CE 417 : Design of Steel Structures
2.00 credit, 2 hrs/week.

Behaviour of structural steel members and steel frames; code requirements; design of tension and compression members by WSD and LFD methods; design of beam, beam-columns; Joint design.

CE 419 : Introduction to Finite Element Method
2.00 credit, 2 hrs/week.

Introduction to finite element method as applied to Civil Engineering problems. One dimensional stress deformation and time dependent flow problem. Two dimensional plane stress and plane strain analysis of stress deformation problems.

CE 421 : Dynamics of Structures
2.00 credit, 2 hrs/week.

Formulation of equation of motion; free vibration response; SDOF and MDOF systems; response to harmonic and impulse loading and vibration analysis by Rayleigh's method.

CE 423 : Structure V Reinforced Concrete Design
2.00 credit, 2 hrs/week. (For Arch. Dept.)

Fundamentals of reinforced concrete design; working stress design method; analysis of reinforced beams by WSD; design of slabs, one-way and two-ways. Preliminary analysis of flat slabs, flat plates, waffle slabs, ribbed slabs; introduction to ultimate strength design (USD).

CE 425 : Structure VI: Elements of Building Structure
2.00 credit, 2 hrs/week. (For Arch. Dept.)

Reinforced concrete columns, stocky and long. Preliminary analysis of column sections in multistoried buildings. Grids, approximate analysis. Approximate analysis of multistoried buildings for gravity and lateral loads. Vierendeel truss. Folded plates. Introduction to shearwalls - preliminary design. Introduction and preliminary design of arches, domes and shells. Classification of shells. Prestressed concrete: introduction, analysis and preliminary design of beam sections.

CE 431 : Environmental Engineering III
2.00 credit, 2 hrs/week.

Solid Waste Management: sources and types of solid wastes; physical and chemical properties of solid wastes; solid wastes generation; on-

site handling, storage and processing; collection of solid wastes; transfer stations and transport; ultimate disposal methods; resources and energy recovery; soil pollution.

Industrial solid waste collection and disposal; hazardous waste management.

CE 432 : Environmental Engineering Sessional II
1.50 credit, 3 hrs/week.

Design of water supply and sewage system; design of water and wastewater treatment plant; computer application in environmental engineering, field visits and reporting.

CE 433 : Environmental Engineering IV
2.00 credit, 2 hrs/week.

Environment Pollution and Its Control: water pollution - sources and types of pollutants; waste assimilation capacity of streams; dissolved oxygen modelling; ecological balance of streams; industrial pollution; heavy metal contamination; detergent pollution and eutrophication; ground-water pollution ; marine pollution; pollution control measures - water quality monitoring and management.

Air pollution - sources and types of pollutants; effects of various pollutants on human health, materials and plants; air pollution meteorology; global warming and greenhouse effects ; air pollution monitoring and control measures.

CE 435 : Environmental Engineering V
2.00 credit, 2 hrs/week.

Environment and Development Projects: environment and sustainable development; environmental policies and legislation; environmental implication of sectoral development; environmental quality standards; environmental issues and priorities; environmental impact assessment of development schemes - baseline studies, assessment methodologies; economics of environmental management; special topics.

CE 439 : Basic Environmental Engineering
3 credit, 3 hrs/week. (For BURP Dept.)

Introduction to environmental engineering; man and environment interaction.

Water Supply: objectives and basic elements of water supply system; water requirements; population prediction and water demand assessment; fire demand; planning of water supply systems - sources, abstraction, transmission, treatment and distribution.

Sanitation: urban and rural sanitation; low-cost sanitation technologies; elements of a conventional waterborne sewerage system - collection, transportation, treatment and disposal; planning of sanitation systems.

Solid waste management: sources and classification; on-site storage and handling; collection, transportation and disposal; sanitary land filling method; waste recycling and reuse.

Environmental pollution - air, water and soil; noise pollution.

CE 441 : Geotechnical Engineering III
2.00 credit, 2 hrs/week.

Foundation for structures subjected to lateral loads; retaining walls and abutments; operation and methods of construction, dewatering and slurry-wall construction.

Flexible earth retaining structures, sheet piles, cofferdams, caissons; machine foundations- elementary vibrations, shear modulus and elastic constants, foundation design for vibration, fundamentals of soil liquefaction.

CE 442 : Geotechnical Engineering Sessional II
1.50 credit, 3 hrs/week.

Computer aided design of foundations, retaining walls and reinforced soils, slope stability analysis, techniques of soil improvement, use of computer in geotechnical engineering.

CE 443 : Geotechnical Engineering IV
2.00 credit, 2 hrs/week.

Introduction to critical state soil mechanics, SHANSEP and stress path methods; Stress deformation and failure of soil masses. One, two and three dimensional consolidation problems; pore pressure coefficients; soil structure-interaction; earthquake and liquefaction problems; soil improvement; numerical solution of geotechnical engineering problems.

CE 445 : Geotechnical Engineering V
2.00 credit, 2 hrs/week.

Introduction to soil-water interaction problems. Permeability, capillarity and soil suction. Seepage analysis, stability of natural, man made slopes and excavations subjected to seepage, water current, wave action etc. Theories of filters and revetment design; hydraulic fills.

CE 451 : Transportation Engg III: Traffic Planning & Management
2.00 credit, 2 hrs/week.

The transportation planning process; traffic management concepts; traffic accident investigations; city road and street networks: grade separation and interchanges, pedestrian and bicycle facilities. The urban bypass; environmental aspects of highway traffic and transportation projects; elements of traffic flow.

CE 452 : Transportation Engineering Sessional II
1.50 credit, 3 hrs/week.

Design of rigid and flexible highway and air field pavements; geometric design: road intersections and interchanges; capacity calculations; traffic studies and design.

CE 453 : Transportation Engg IV: Highway Drainage & Airports
2.00 credit, 2 hrs/week.

Highways drainage and drainage structures. Evaluation and strengthening of pavements; importance, advantages and trends in air transportation; planning and design of airports; aircraft characteristics related to airport design; types and elements of airport planning studies; airport configuration; geometric design of the landing area; Terminal area; heliports; design of airport pavements; lighting, marking and signing; Airport drainage.

CE 455 : Transportation Engg V: Transport Projects and Operations
2.00 credit, 2 hrs/week.

Highway needs study; highway planning, economics and financing; evaluation and analysis of transportation projects. management, monitoring; organization and implementation of transportation projects; selected case studies; traffic engineering administration and legislation; urban public transportation and freight movement.

5.2 COURSES OFFERED BY THE DEPARTMENT OF WATER RESOURCES ENGINEERING

WRE 201: Fluid Mechanics
4.00 Credit, 4 hrs/week.

Development and scope of fluid mechanics. Fluid properties. Fluid statics. Kinematics of fluid flow. Fluid flow concepts and basic equations- continuity equation, Bernoulli's equation, energy equation, momentum equation and forces in fluid flow. Similitude and dimensional analysis. Steady incompressible flow in pressure conduits, laminar and turbulent flow, general equation for fluid friction. Empirical equations for pipe flow. Minor losses in pipe flow.

Fluid measurement: Pitot tube, orifice, mouthpiece, nozzle, venturimeter, weir. Pipe flow problems -pipes in series and parallel, branching pipes, pipe networks.

WRE 202: Fluid Mechanics Sessional
1.5 Credit, 3 hrs/week.

Centre of pressure. Proof of Bernoulli's theorem. Flow through Venturimeter. Flow through orifice. Coefficient of velocity by coordinate method. Flow through mouthpiece. Flow over V-notch. Flow over sharp- crested weir. Fluid friction in pipe.

WRE 301: Open Channel Flow
4.00 Credit, 4 hrs/week.
Prereq. WRE 201

Open channel flow and its classification. Velocity and pressure distributions. Energy equation, specific energy and transition problems.

Critical flow and control. Principles of flow measurement and devices. Concept of uniform flow, Chezy and Manning equations, estimation of resistance coefficients and computation of uniform flow. Momentum equation and specific momentum. Hydraulic jump. Theory and analysis of gradually varied flow. Computation of flow profiles. Design of channels.

WRE 302: Open Channel Flow Sessional
1.5 Credit, 3 hrs/week.

Broad-crested weir. Sluice gate. Venturi flume. Parshall flume. Cut-throat flume. Hydraulic jump. Velocity distribution profile. Manning's roughness coefficient. Specific force and specific energy.

WRE 303: Hydrology
3.00 Credit, 3 hrs/week.

Hydrologic cycle. Weather and Hydrology. Precipitation, Evaporation and transpiration. Infiltration. Streamflow. Application of telemetry

and remote sensing in hydrologic data acquisition. Rainfall-runoff relations. Hydrographs, unit hydrographs. Hydrologic routing. Statistical methods in hydrology.

WRE 400: Project and Thesis
4.5 Credit, 9 hrs/week.

Experimental and theoretical investigation of various topics in Water Resources Engineering. Individual or group study of one or more topics. The students will be required to submit a thesis/project report at the end of the work.

WRE 401: Irrigation and Flood Control
3.00 Credit, 3 hrs/week.

Importance of irrigation. Sources and quality of irrigation water. Soil-water relationship. Consumptive use and estimation of irrigation water requirements. Methods of irrigation. Design of irrigation canal system. Irrigation structures. Irrigation pumps. Problems of irrigated land. Flood and its control.

WRE 402: Irrigation and Flood Control Sessional
1.5 Credit, 3 hrs/week.

Soil-water relationship: soil properties, use of tensiometer, infiltration rate. Losses in irrigation system. Irrigation requirement and scheduling. Aquifer characteristics and estimation of yield from irrigation wells. Analysis of hydrologic data for irrigation and flood control. Design of irrigation and drainage canal network. Pumps in series and parallel. Pump characteristics. Flow through canal regulating structures.

WRE 403: Integrated Water Resources Planning and Management
2.00 Credit, 2 hrs/week.

Basic concepts in integrated water resources management. Economic, environmental and institutional aspects. Participation of beneficiaries. Formation of users' group. Fisheries management. Strategic planning. System analysis approach. Conceptual framework and models.

Analytical techniques. Operation and maintenance of water resources systems.

WRE 405: Flood Mitigation and Management
2.00 Credit, 2 hrs/week.

Flood and its causes. Methods of flood management: structural and non- structural measures such as reservoirs, levees and flood walls, channel improvement, interior drainage, floodways, land management, flood proofing, flood zoning, flood hazard mapping, flood forecasting and warning.

Economic aspects of flood management: flood risk and vulnerability analysis, direct and indirect losses of flood, flood damage assessment, flood damage in urban and rural areas.

WRE 407: Groundwater Engineering
2.00 Credit, 2 hrs/week.

Groundwater in hydrologic cycle and its occurrence. Physical properties and principles of groundwater movement. Groundwater and well hydraulics. Groundwater resource evaluation. Groundwater levels and environmental influences. Water mining and land subsidence. Groundwater pollution and contaminant transport. Recharge of groundwater. Saline water intrusion in aquifers. Groundwater management

WRE 409: River Engineering
2.00 Credit, 2 hrs/week.

Behaviour of alluvial rivers. River channel pattern and fluvial processes. Aggradation and degradation, local scours, river training and bank protection works. Navigation and dredging Sediment movement in river channels, bed forms and flow regimes.

WRE 411: Hydraulic Structures
2.00 Credit, 2 hrs/week.

Principles of design of hydraulic structures, types of hydraulic structures. Design of dams, barrages, weirs, spillways, energy dissipators and spillway gates. Cross drainage works.

WRE 412: Water Resources Engineering Sessional
1.5 Credit, 3 hrs/week.

Design of hydraulic structures, river training works. Groundwater resource assessment and water well design.

WRE 413: Coastal Engineering
2.00 Credit, 2 hrs/week.

Coast and coastal features. Tides and currents. Tidal flow measurement. Waves and storm surges. Docks and harbours. Forces of waves and tides in the design of coastal and harbour structures. Coastal sedimentation processes. Deltas and estuaries. Shore protection works. Dredging and dredgers.

5.3 COURSES OFFERED BY THE DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING :

EEE 165 : Basic Electrical Technology
3.00 Credit, 3 hrs/week.

Electrical units and standards, Electrical network and circuit solution series, parallel and mesh current methods. Instantaneous current, voltage and power, effective current and voltage, average power. Sinusoidal single phase RLC circuits: phasor algebra, balanced three phase circuits. Electrical wiring for residential and commercial loads. Introduction to transformers and induction motors.

EEE 166 : Basic Electrical Technology
1.50 Credit, 3 hrs/week.

Laboratory experiments based on EEE 165.

5.4 COURSES OFFERED BY THE DEPARTMENT OF PHYSICS:

Phy 101: Physical optics, Heat, Waves and oscillation
3.00 Credit, 3 hrs/week.

Physical Optics: theories of light: Huygen’s principle and construction. Interference of light: Young's double slit experiment,

Fresnel bi-prism, Newton's rings, interferometers. Diffraction of light: Fresnel and Fraunhoffer diffraction, diffraction by single slit, diffraction by double slit, diffraction gratings, polarization, production and analysis of polarized light, optical activity, optics of crystals.

Heat and Thermodynamics: Temperature, zeroth law of thermodynamics. Thermometers: constant volume, platinum resistance, thermocouple. First law of thermodynamics and its application, molar specific heats of gases, isothermal and adiabatic relations, work done by a gas. Kinetic theory of gases: explanation of gas laws, kinetic interpretation of temperature, equipartition of energy and calculation of ratio of specific heats, mean free path, Vander Waals equation of state, second law of thermodynamics: reversible and irreversible processes, Carnot cycle, efficiency, Carnot's theorem, entropy.

Waves and Oscillations. oscillations: Simple harmonic motion, damped simple harmonic oscillations, forced oscillations, resonance, vibrations of membranes and columns. Combination and composition of simple harmonic motions, Lissajous' figures. Transverse and longitudinal nature of waves, travelling and standing waves, intensity of a wave, energy calculation of progressive and stationary waves, phase velocity, group velocity. Sound waves: velocity of longitudinal wave in a gaseous medium. Doppler effect. architectural acoustics: Sabine's formula, requisites of a good auditorium.

Phy 102: Physics Lab.
1.50 Credit, 3 hrs/week.

Determination of the specific heat of a liquid by the method of cooling. Determination of the thermal conductivity of a bad conductor by Lee's method. Determination of the pressure co-efficient of air by constant volume air thermometer. Determination of the frequency of a tuning fork by Melde's apparatus. Determination of the focal length of concave lens by auxiliary lens method. Measurement of unknown resistance and verification of the laws of resistance by P.O. (Post Office) box. Comparison of the E.M.F's of two cells by potentiometer. Determination of the mechanical equivalent of heat by electrical method. Determination of the radius of curvature of a plano-convex lens by Newton's ring method. Determination of threshold frequency for the photoelectric effect of a photocathode

and the value of the Planck's constant. To plot thermo-electromotive force-temperature (calibration) curve for a given thermocouple. Determination of the melting point of a solid using the calibration curve. Determination of the specific rotation of sugar solution by a polarimeter. Determination of the temperature co-efficient of the resistance of the material of a wire. Determination of the refractive index of the material of a prism using spectrometer. Determination of the spring constant and the effective mass of a loaded spring.

Phy 105: Structure of matter, Electricity and magnetism and Modern physics

3.00 Credit, 3 hrs/week. Prereq. Phy 101

Structure Matter: States of matter: solid, liquid and gas. Classification of solids: amorphous, crystalline, ceramics and polymers. Atomic arrangement in solids. Different types of bonds in solids: metallic, Vander Waals, covalent and ionic bond, packing in solids, interatomic distances and forces of equilibrium, x-ray diffraction; Bragg's law. Plasticity and elasticity. Distinction between metal, insulator and semi-conductor.

Electricity and Magnetism: Electric charge, Coulomb's law. the electric field: calculation of the electric field strength, E; a dipole in an electric field, electric flux and Gauss's law, some application of Gauss's law; electric potential V, relation between E and V, electric potential energy. Capacitors; capacitance, dielectrics: an atomic view, dielectrics and

Gauss's law; current and resistance: current and current density, Ohm's law, resistivity: an atomic view, Ampere's law, Faraday's law, Lenz's law, self inductance and mutual inductance. Magnetic properties of matter: magnetomotive force, magnetic field intensity, permeability, susceptibility, classifications of magnetic materials, magnetisation curves.

Modern Physics. Michelson Morley's experiment, Galilean transformation, special theory of relativity, Lorentz-transformation, relative velocity, length contraction, time dilation, mass-energy relation. Photo-electric effect, Compton effect, de-Broglie wave, Bohr's atom model. Radioactive decay, half life, mean life, isotopes, nuclear binding energy, alpha, beta, gamma decay.

5.5 COURSES OFFERED BY THE DEPARTMENT OF CHEMISTRY:

Chem 103 : Chemistry - I
3.00 Credit, 3 hrs/week.

Atomic structure, periodic table, chemical bonds. Chemistry of cement, silicates and limes. Physical and chemical properties of water.

Different types of solutions, concentration units. Chemical equilibria and thermochemistry.

Chem 105 : Chemistry-II
3.00 Credit Hours, 3 hrs/week.
Prereq. Chem 103

Reactions kinetics: rate of chemical reactions; order and molecularity of reactions, different types of rate expressions, methods of determining rate and order, effect of temperature on reaction rate and energy of activation.

Colloid and colloidal solution: classification, preparation, purification, properties, protective action and application of colloids.

Chemical corrosion: introduction to chemical corrosion, corrosion of metals and alloys in dry and wet environments, mechanism of corrosion, atmospheric and soil corrosion and their protective measures.

Chemistry of environmental pollution: environment and its characteristics, chemistry of toxic metal and non-metal pollutants, analytical techniques used in the determination of pollutants, chemical concept of DO, BOD, COD and threshold odor number, chemistry involved in water treatment plants, quality of industrial waste water.

Polymers: chemistry of polymerization, different types of polymers and their properties, polymer degradation, elastomers and composite materials.

Paints and varnishes: introduction to paints and varnishes, pretreatment of the surface, metallic, non-metallic and organic

protective coating, types of paints and their uses.

Chem 114 : Inorganic Quantitative Analysis (Sessional)
1.5 Credit, 3 hrs/week.

Volumetric analysis: acid-base titration, oxidation-reduction titrations, determination of Fe, Cu and Ca volumetrically.

5.6 COURSES OFFERED BY THE DEPARTMENT OF MATHEMATICS:

Math 131: Mathematics -I
3.00 Credit, 3 hrs/week.

Differential Calculus:

Limit, Continuity and differentiability. n-th derivatives of standard functions. Leibnit'z theorem. Rolle's theorem, Mean value theorem. Expansion in finite and infinite forms. Indeterminate form. Partial differentiation. Euler's theorem. Tangent and Normal. Subtangent and subnormal in partial and polar co-ordinates. Maxima and minima of functions of single variables. Curvature.

Integral Calculus:

Integration by parts. Standard integrals. Integration by the method of successive reduction. Definite integrals. Improper integrals. Beta function. Gama function. Multiple integrals. Area, Volume of solids of revolution

Math 133: Mathematics-II
3.00 Credit, 3 hrs/week.

Matrices:

Definition of matrix. Algebra of matrices. Multiplication of matrices. Transpose of a matrix and inverse of matrix. Rank and elementary transformation of matrices. Solution of linear equations. Linear dependence and independence of vector. Quadratic forms. Matrix polynomials. Determination of characteristic roots and vectors. Null

space and nullity of matrix. Characteristic subspace of matrix.

Three Dimensional Co-ordinate Geometry:

System of co-ordinates. Projection. Direction Cosines. Equations of planes and lines. Angle between lines and planes. Distance from a point to a plane. Co-planar lines. Shortest distance between two given straight lines. Standard equation of conicoids; sphere ellipsoid. Hyperboloid of one sheet, hyperboloid of two sheets. Tangent planes. Normal lines. Condition of tangency.

Math 231: Differential Equations
3.00 Credit, 3 hrs/week.

Differential Equation: Definition. Formation of differential equations. Solution of first order differential equations by various methods. Solution of differential equation of first order and higher degrees. Solution general linear equations of second and higher orders with constant co-efficient. Solution of Euler's homogeneous linear equations. Solution of differential equations in series by the method of Frobenius. Bessel's functions, Legendre's polynomials and their properties.

Partial Differential Equation: Introduction. Equations of the linear and non-linear first order. Standard forms. Linear equations of higher order-. Equations of the second order with variable co-efficient.

Math 233 : Fourier Analysis, Harmonic Functions and Laplace Transform
3.00 Credit, 3 hrs/week.

Fourier Analysis: Real and complex form. Finite transform.
Fourier Integral. Fourier transforms and their uses in solving boundary value problems.

Harmonic functions: Definition of harmonics. Laplace equation in cartesian, polar cylindrical and spherical co-ordinates. Solutions of these equations together with applications. Gravitational potential due to a ring. Steady-state temperature. Potential inside or outside of a sphere. Properties of harmonic functions.

Laplace Transforms: Definition. Laplace transforms of some elementary functions. Sufficient conditions for existence of Laplace transforms. Inverse Laplace transforms. Laplace transforms of derivatives. The unit step function. Periodic function. Some special theorems on Laplace transforms. Partial fraction. Solutions of differential equations by Laplace transforms. Evaluation of improper integral.

Math 235 : Vector Analysis and Statistics
3.00 Credit, 3 hrs/week.

Vector Analysis: Scalars and vectors, equality of vectors. Addition and subtraction of vectors. Multiplication of vectors by scalars. Position vector of a point. Resolution of vectors. Scalar and vector product of two vectors and their geometrical interpretation. Triple products and multiple products. Application to geometry and mechanics. Linear dependence and independence of vectors. Differentiation and integration of vectors together with elementary applications. Definition of line, surface and volume integral. Gradient, divergence and curl of point functions. Various formulae. Gauss's theorem, stoke's theorem, Green's theorem and their applications.

Statistics: 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, poison and negative binomial. Continuous probability distributions, e.g. normal and exponential. Characteristics of distributions. Elementary sampling theory. Estimation. Hypothesis testing and regression analysis.

5.7 COURSES OFFERED BY THE DEPARTMENT OF HUMANITIES:

Hum 111: English
2 Credit, 2 hrs/week.

English phonetics: the places and manners of articulation of the English sounds. Vocabulary English grammar: construction of sentences, some grammatical problems. comprehension. Composition on current affairs. Precis writing. Report writing. Commercial

correspondence and tenders. Short stories written by some well known classic writers.

Hum 113 : Economics
2.00 Credit, 2 hrs/week.

Definition of Economics. Economics and Engineering.

Principles of Economics:

Micro economics: The theory of demand and supply and their elasticities. Price determination. Nature of an economic theory, applicability of economic theories to the problems of developing countries. Indifference curve technique. Marginal analysis. Optimization. Market. Production, Production function, types of productivity. Rational region of production of an engineering firm. The Short run and the Long run. Fixed cost and variable cost. Internal and external economics and diseconomies.

Macro - economics: Savings, investment. National income analysis. Inflation. Monetary policy, Fiscal policy and Trade policy with reference to Bangladesh. Planning in Bangladesh.

Hum 207 : Advanced English
2.00 Credit, 2 hrs/week. Prereq. Hum 101 or Hum 111

Antonyms and Synonyms. Words which often confuse us. Advanced grammar. Comprehension. Composition Dialogue writing. Selected short stories or novels written by some well known classic writers. Selected poems written by the Romantic poets: Wordsworth, Coleridge, Shelley, Keats and Byron. Writing research paper.

Hum 211: Sociology
2.00 Credit, 2 hrs/week.

Scope, some Basic Concepts. Social evolution and techniques of production, culture and civilization. Social structure of Bangladesh. Population and world resources. Oriental and Occidental societies, Industrial revolution. Family urbanization and industrialization, Urban Ecology, Co-operative and Socialist movements. Rural

Sociology.

Hum 213: Government
2.00 Credit, 2 hrs/week.

Some basic concepts of government and Politics. Functions, organs and forms of modern state and Government; socialism, Fascism, Marxism, U.N.O.

Government and politics of Bangladesh. Some major administrative systems of developed countries. Local self-government.

Hum 313 : Principles of Accounting
2.00 Credit, 2 hrs/week.

Principles of accounting: accounts, transactions, the accounting procedures and financial statements. Cost in general: objectives and classifications. Overhead costing. Cost sheet under job costing operating costing and process costing. Marginal costing: tools and techniques, cost-volume-profit analysis. Relevant costing: analyzing the profitability within the firm, guidelines for decision making. Long-run planning and control: capital budgeting.

5.8 COURSES OFFERED BY THE SHOPS:

Shop 132 : Carpentry shop, Machine shop and Welding shop sessional
1.50 Credit, 3 hrs/week.(For Civil Engg. Department)

Carpentry shop (3/2 hrs./week)

Wood working tools; Wood working machine: Band saw, scroll saw, circular saw, jointer, thickness planer, disc sander, wood lathe; Types of sawing; Common cuts in wood works; Types of joint; Defects of timber: Natural defects and artificial defects; Seasoning; Preservation; Substitute of timber; Commercial forms of timber. Characteristics of good timber; Use of fastening; Shop practice: Practical job, planning and estimating of a given job.

Machine shop (3/4 hrs/week)

Kinds of tools; Common bench and hand tools; Marking and layout tools, measuring tools, cutting tools, machine tools, bench work with job. Drilling, Shapar, Lathe and Milling Machines: Introduction, type, size and capacity, uses and applications.

Welding shop (3/4 hrs/week)

Methods of metal joints: Riveting, grooving soldering, welding; Types of welding joints and welding practice; Position of arc welding and polarty: Flat, vertical, horizontal, overhead; Electric Arc welding and its machineries; Welding of different types of materials: Low carbon steel, cast iron, brass, copper, stainless steel, aluminium; Types of electrode, fluxes and their composition; Arc welding defects; Test of Arc welding: Visual, destructive and non-destructive tests.

Types of gas welding system and gas welding equipment; Gases and types of flame; welding of different types of materials; Gas welding defects; test of gas welding.