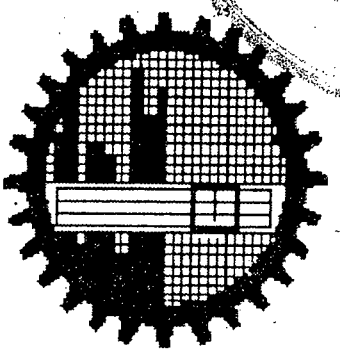

Bangladesh University of Engineering and Technology

Information Booklet for Undergraduate Students

First Edition (June, 2000)

Department of Water Resources Engineering

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PREFACE

It is a great pleasure to publish the first edition of the *Information Booklet for Undergraduate Students*. Efforts have been made to incorporate most of the information that an undergraduate student of the department as well as his/her adviser may need to know for smoothly carrying out their academic activities. All the courses that are expected to be offered in different terms are shown clearly in tabular form such that the selection of courses in different terms becomes easier. Special care has been made to incorporate the *Rules and Regulations for Course System (December 1998)*, all the amendments that were made *(up to the end of May 2000)* have been incorporated in the booklet.

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

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

Dr. Md. Monowar Hossain
Professor & Head
Department of Water Resources Engineering

Dhaka
June, 2000

Contents

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 postgraduate 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 1100 undergraduate and over 600 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 center, 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, 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.

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 Organisations, Commonwealth Secretariat, University Grants Commission (UGC). The expertise of the University teachers and the laboratory facilities of the University are also utilized to solve problems of and to provide up-to-date engineering and technological knowledge to the various organizations 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	Both UG and PG
Department of Water Resources Engineering	Both UG and PG
Faculty of Architecture and Planning	
Department of Architecture	Both UG and PG
Department of Urban and Regional Planning	Both UG and PG
Department of Humanities	No degree offered
Faculty of Electrical and Electronic Engineering	
Department of Electrical and Electronic Engineering	Both UG and PG
Department of Computer Engineering	Both UG and PG
Faculty of Engineering	
Department of Chemical Engineering	Both UG and PG
Department of Metallurgical Engineering	Both UG and PG
Department of Petroleum and Mineral Resources Engineering	PG only
Department of Chemistry	PG only
Department of Mathematics	PG only
Department of Physics	PG only
Faculty of Mechanical Engineering	
Department of Industrial and Production Engineering	Both UG and PG
Department of Mechanical Engineering	Both UG and PG
Department of Naval Architecture and Marine Engineering	Both UG and PG

1.4 University Administration

Vice Chancellor	Prof. Dr. Nooruddin Ahmed
Deans of Faculties	
Dean of Civil Engineering	Prof. Md. Azadur Rahman
Dean of Architecture & Planning	Prof. Khaleda Rashid
Dean of Electrical & Electronic Engineering	Prof. Md. Shamsul Alam
Dean of Mechanical Engineering	Prof. Amalesh Ch. Mandal
Dean of Engineering	Prof. Enamul Huq
List of Administrative Officers	
Registrar	Mr. Md. Shahjahan
Controller of Examination	Mr. Md. Asadullah Khan
Comptroller	Mr. K. M. Anisur Rahman Khan
Director of Students Welfare	Dr. Md. Zoynul Abedin
Director, Advisory, Extension & Research Services	Dr. Maglub-Al-Noor
Director, Bureau of Research, Testing & Consultation	Dr. Abul Fazal Md. Saleh
Librarian	Mr. Zahirul Islam

Chapter 2
Faculty of Civil Engineering

2.1 Introduction

Bangladesh University of Engineering and Technology (**BUET**) has 16 teaching departments under five faculties. Water Resources Engineering (**WRE**) and Civil Engineering (**CE**) are the two departments under the faculty of Civil Engineering.

2.1.1 Department of Water Resources Engineering

Land and water are the most important resources of Bangladesh. With the rapid growth of economy and civilization the need for the development of water resources has become more urgent than ever before. The importance and the need for planned development of water resources of Bangladesh can hardly be overemphasized. Being a deltaic country and situated at the mouth of three big rivers-the Ganges, the Brahmaputra and the Meghna, Bangladesh has been the natural outlet for an enormous amount of water and sediment over the annual cycle. This has made the country vulnerable to floods and pollution. On the other extreme too little water or drought is all too prevalent in the country. So the development of water resources is a central element of the strategy to improve the quality of life for the people in Bangladesh.

Department of Water Resources Engineering was established in 1974 to cater the needs of engineers trained to plan, design, construct, operate and maintain engineering works for the control and utilization of water resources of the country. But after 1981 the department had to stop under graduate programme. However, the department has resumed under graduate programme from the session 1996-97.There are about 90 under graduate students and 70 postgraduate students in the Department of Water Resources Engineering at present.

2.1.2 Department of Civil Engineering

The department of Civil Engineering comprises four major divisions: viz. Environmental Engineering, Geotechnical Engineering, Structural Engineering and Concrete Technology, 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.

2.2 List of faculty members

2.2.1 Department of Water Resources Engineering

Professor & Head

Md. Monowar Hossain: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; Ph.D., University of Strathclyde, U.K.

Professors

Md. Abdul Halim: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; Ph.D., University of Manchester, U.K.

Md. Khorshed Alam: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; Ph.D., University of Strathclyde, U.K.

M. Fazlul Bari: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; Ph.D., West Virginia University, U.S.A.

Md. Mirjahan Miah: B.Sc.Engg. (WRE), BUET; M.Sc.Engg., BUET; Ph.D., Utah State University, U.S.A.

Muhammed Ali Bhuiyan: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; Ph.D., UPM, Saudi Arabia. (*On leave*)

Md. Abdul Matin: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; Ph.D., University of Strathclyde, U.K.

Associate Professor

M. R. Kabir: B.E. (Civil), UOR, India; M.Sc.Engg., BUET; P.G. Diploma (H & WRE), Anna University, India; Ph.D., Belgium.

Assistant Professors

Mobashwera: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET.

Ziaul Haider: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET. (*On leave*)

A. B. M. Farukuzzaman Bhuiyan: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET. (*On leave*)

A. H. M. Faisal Anwar: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; D.Engg., Nagoya University, Japan.

Umme Kulsum Navera: B.Sc.Engg. (Civil), BUET; M.Engg., AIT, Thailand. (*On leave*)

Lecturers

Ataul Hannan: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET. (*On leave*)

Md. Mahbub Alam: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET. (*On leave*)

Shikha Rahman: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET. (*On leave*)

Md. Sabbir Mostafa Khan: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET. (*On leave*)

Moniz Ahmmod Mukto: B.Sc.Engg. (Civil), BUET.

Fahmida Khatun: B.Sc.Engg. (Civil), BUET.

Md. Ataur Rahman: B.Sc.Engg. (Civil), BUET.

M.A. Faheem Sadeque: B.Sc.Engg. (Civil), BUET.

Md. Ashraful Islam: B.Sc.Engg. (Civil), BUET.

Biswajit Nandi: B.Sc.Engg. (Civil), BUET.

Shaheli Masoom: B.Sc.Engg. (Civil), BUET.

2.2.2 Department of Civil Engineering

Professor & Head

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

Professor

Sohrabuddin Ahmad: B.Sc.Engg. (Civil), BUET; M.Sc., University of Wales, U.K.; Ph.D., University of Wales, U.K. (Structural Engineering)

Jamilur Reza Choudhury: B.Sc.Engg. (Civil), BUET; M.Sc., University of Southampton, U.K.; Ph.D., University of Southampton, U.K. (Structural Engineering)

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

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Md. Alee Murtuza: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; Ph.D., University of Liverpool, U.K. (Structural Engineering)

Alamgir Mojibul Hoque: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; Ph.D., University of Leeds, U.K. (Transportation Engineering)

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)

M. Azadur Rahman: B.Sc.Engg. (Civil), BUET; M.Sc. in Bridge Engineering, University of Surrey, U.K.; Ph.D., University of Aston in Birmingham, U.K. (Structural Engineering)

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

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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)

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Raquib Ahsan: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; (Structural Engineering)

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Saif Abdullah Haroon: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; (Structural Engineering)

Syed Ishtiaq Ahmad: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; (Structural Engineering)

Rais Ahmad: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; (Structural Engineering)

Anwar Zahid: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; (Structural Engineering)

Tahmina Hossain: B.Sc.Engg. (Civil), BUET (Structural Engineering)

Shariful Islam: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; (Geotechnical Engineering)

Khandakar N. Ashfaque: B.Sc.Engg. (Civil), BUET (Environmental Engineering)

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Mahmud Ashraf: B.Sc.Engg. (Civil), BUET (Structural Engineering)

Md. Badre Enam: B.Sc.Engg. (Civil), BUET (Structural Engineering)

Syed Mizanur Rahman: B.Sc.Engg. (Civil), BUET (Structural Engineering)

Zia Wadud: B.Sc.Engg. (Civil), BUET (Structural Engineering)

Mahbuba Begum: B.Sc.Engg. (Civil), BUET (Structural Engineering)

Farzana Atique: B.Sc.Engg. (Civil), BUET (Structural Engineering)

Zahangir Alam: B.Sc.Engg. (Civil), BUET (Geotechnical Engineering)

Senior Instructors

Nasirul Haque Dhali: Diploma in Architecture, Dhaka Polytechnic Institute, Dhaka.

Md. Alauddin Sikdar

Chapter 3
Rules & Regulations for Course System

The following are the rules and regulations for administering undergraduate course curricula through the course system. The following articles have been produced from *Rules and Regulations for Course System (December 1998)* after incorporating all the amendments that were subsequently made to it (up to the end of May 2000). For annexure mentioned in these articles, readers are referred to the original document.

Rules, Regulations, Course Offering Evaluation and Grading

3.1 Organisational Framework of the Bachelor's Degree Programmes- The Course System

The undergraduate curricula at Bangladesh University of Engineering & Technology (BUET) are 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 enables 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 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.

3.2 Student Admission

Students will be admitted in undergraduate curricula in the Departments of Architecture, Urban and Regional Planning, Chemical Engineering, Civil Engineering, Computer Science and Engineering, Electrical and Electronic Engineering, Mechanical Engineering, Industrial and Production Engineering, Materials and Metallurgical Engineering, Water Resources 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. 3 Number of Terms in a year

There will be two terms (Term I & 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 fulfill the credit requirements for bachelor's degree spending less time than the normal duration and other students may take vacation.

3. 3.1 Duration of Terms

The duration 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 a 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.

3.4 Course Pattern and Credit Structure

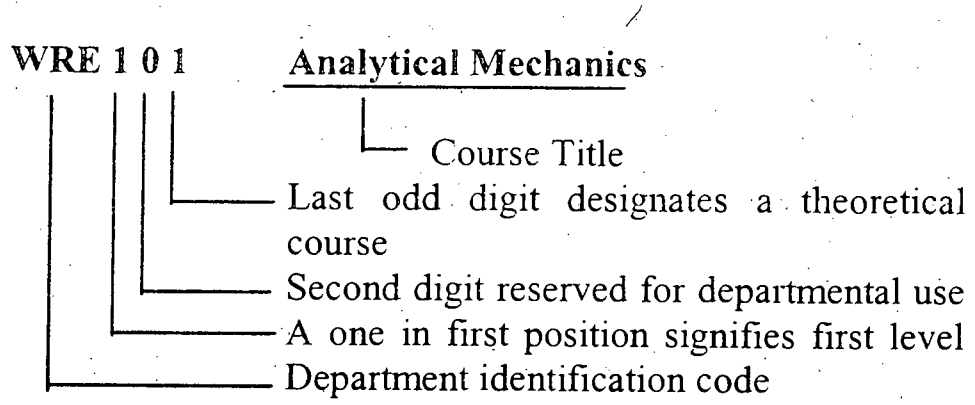
The entire undergraduate programme is covered through a set of theoretical and laboratory/sessional/studio courses.

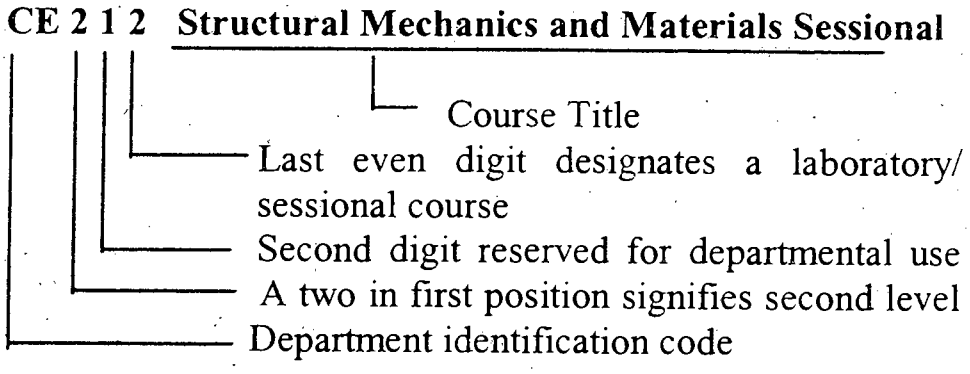
3.4. 1 Course Designation and Numbering System

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 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 of sessional courses.

The course designation system is illustrated by two examples.





3.4. 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.

3.5 Types of Courses

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

3.5. 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.

3.5. 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.

3.5. 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.

3.6 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 (Annexure 2) 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.

3.7 Departmental Monitoring Committee

Consistent with its resilient policy to keep pace with new developments in the field 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.

BUGS of each department will constitute a Departmental Monitoring Committee with three teachers of the

department. The 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.

3.8 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.

3.9 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 authorized 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).

3.10 Registration Requirements

Any student who makes use of classroom or laboratory facilities of 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.

3.10. 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 counseling and advising are accomplished at registration time. It is absolutely necessary that all students present themselves at the registration desk at the specified time.

3.10. 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.
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

3.10. 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 (Annexure 3) 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 enrolled slip/proof of admission.

3.10. 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. All students in consultation with their course adviser are required to complete the pre-registration formalities, failing which a fine of it. 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.

3.10. 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) from the Chief Medical Officer of the University or some other academic commitments which precluded enrolling prior to the last date of registration.

3.10. 6 Penalty for Late Registration

Students who fail to register during the designated dates for registration are charged a late registration fee of Tk.100.00 (one hundred) only. This extra fee will not be waived whatever be the reason for late registration.

3.10. 7 Course Adjustment Procedure

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 during the first week of Short Term. In case 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 (Annexure 4).** 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.

3.10. 8 Withdrawal from a Term

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 choose 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.

3.11 The Grading System

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 assignment, and a term final examination. The assessment in laboratory/sessional course 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 weight age. A latter 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+	(plus)	4.00
75% to less than 80%	A	(A regular)	3.75
70% to less than *75%*	A-	(A minus)	3.50
65% to less than 70%	B+	(B plus)	3.25
60% to less than *65%*	B	(B regular)	3.00
55% to less than 60%	B-	(B minus)	2.75
50% to less than *55%*	C+	(plus)	2.50
45% to less than *50%*	C	(regular)	2.25
40% to less than *45%*	D		2.00
less than 40%	F		0.00
Continuation (for project & thesis/design courses)	X		-

3.11. 1 Distribution of Marks

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:

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)

"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".

3.12 Earned Credits

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.

Amended Vide A.C Resolution dated 28-12-98 (effective from 1997-98 session)
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."

3.13 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.

3.13. 1 Dean's List

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.
"The student whose GPA will fall below 2.20 will have to be notified so that the necessary remedial measures can be taken".

3.14 Calculation of GPA

Grade Point Average (GPA) is the weighted average of the grade points obtained in all the courses passed/completed by a student. 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, (13, G_4 and G_5 respectively then,

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

3.14.1 Numerical Example

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

Course	Credits	Grade	Grade points
WRE 101	4.00	A+	4.00
Phy 101	3.00	B+	3.25
Chem 103	3.00	B	3.00
Math 131	3.00	A	3.75
Hum 111	2.00	A-	3.50

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

$$GPA = \frac{4(4.0)+3(3.25)+3(3.0)+3(3.75)+2(3.5)}{(4+3+3+3+2)}$$

$$= 3.53$$

3.15 Student Classification

For a number of reasons it is necessary to have a definite system by which to classify students as First Level/ Freshman, Second Level/Sophomore, Third Level/Junior and Fourth Level/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.

Level	Earned Credit Hours
First Level/ Freshman	0 to 36
Second Level/Sophomore	37to 72
Third Level/Junior	73 to 108
Fourth Level/Senior	109 and above

3.16 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.

3.17 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, or
(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.

3.18 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 exists:

(i)The Term GPA falls below 2.20, or
(ii)The Cumulative GPA falls below 2.20

Students on probation are subjected 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 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.

3.19 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:

1. CGPA falling below 2.20.
2. Term Grade Point Average (TGPA) falling below 2.20 points below that of previous term.

3. Earned credit falling below 15 times the number of terms attended.

3.20 Special Courses

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

II. 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 coordinator concerned. Decision to float a course as a special course shall be reported to the Academic Council.

III. 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.

IV. 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 homework, administer quizzes and final examination for giving his or her assessments at the end of the term.

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

VI. A Special Course shall not be utilized for grade improvement purposes.

3.21 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 weight-age up to 6 credits in any Short Term following a graduation/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.

3.22 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.

The minimum GPA requirement for obtaining a bachelor's degree in engineering, URP or architecture is 2.20.

3.22.1 Completion of fulltime Studentship :

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.

3.22. 2 Application for Graduation and Award of Degree

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.

3.23 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.

3.24 Time Limits for Completion of Bachelor's Degree

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

3.25 Inclusion of repeater from Annual System in Course System

Repeater Students including Private students of Annual System will be included in the Course System of curricula as when such situation will arise.

3.25. 1 Equivalence of Courses and Grades

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

b) conversion of numerical grades into letter grades in exempted courses.

3.25.2 Exemption of Courses

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.

3.25. 3 Time Limit for Completion of Bachelor's Degree

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

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 x 120/160 =5.25) = 5'2 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.

3.26 Attendance, Conduct, Discipline etc.

3.26. 1 Attendance

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.

3.26. 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 to attention and courtesy to visitors.

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

3.27 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-ordination(s) for a 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 Water Resources Engineering Students

4.1 Introduction

The under graduate students of different years of the Department of Water Resources Engineering have to follow the course schedule given below. The letter prefix in any course number indicates the department offering the course viz. WRE for Water Resources Engineering, CE for Civil Engineering, EEE for Electrical 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 numbered 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 Modem Physics	3 credits *Prereq.* Phy 101
* Chem 103	Chemistry – I	3 credits
Chem 105	Chemistry – II	3 credits *Prereq* Chem 103

Sessional:

* Phy 102	Physics Lab	1.5 credits
* Chem 114	Inorganic Quantitative Analysis	1.5 credits

REQUIREMENT 12 CREDITS (9+3)

Note: Subjects marked * 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 & 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:

WRE 101 Analytical Mechanics	4 credits
WRE 103 Surveying	4 credits
EEE 165 Basic Elec. Tech.	4 credits
WRE 201 Fluid Mechanics	4 credits
WRE 203 Geology and Geomorphology	3 credits
WRE 205 Computer Programming and Numerical Methods	3 credits
CE 201 Engineering Materials	4 credits

CE 211 Mechanics of Solids – I 3 credits *Prereq.* WRE 101
CE 213 Mechanics of Solids – II 3 credits *Prereq.* CE 211

Sessional:

* WRE 100 Engineering Drawing – I 1.5 credits
* WRE 102 Engineering Drawing – II 1.5 credits
* WRE 104 Practical Surveying (3 weeks of field work) 1.5 credits
* Shop 132 Workshops 1.5 credits
* EEE 166 Elec. Tech Lab. 1.5 credits
* WRE 202 Fluid Mechanics Sessional 1.5 credits
* WRE 206 Computer programming Sessional 1.5 credits
* WRE 208 Estimating and Cost Analysis 1.5 credits
* CE 200 Details of Construction 1.5 credits
* CE 202 Materials Sessional 1.5 credits
* CE 212 Structural Mechanics & Materials Sessional 1.5 credits

REQUIREMENT 48.5 Credits (32+16.5)

E. Engineering Practice (WRE)

* WRE 415 Planning and Management of Water Resources Development Project 3 credits
* WRE 421 Professional Practices and Communication 2 credits

REQUIREMENT 5 Credits (5+0)

F. Water Resources Engineering

Theoretical:

* WRE 301 Open Channel Flow 4 credits *Prereq.* WRE 201
* WRE 303 Hydrology 3 credits
* WRE 411 Hydraulic Structure 2 credits
* WRE 413 Coastal Engineering 2 credits

*	WRE 417	Ground Water Engineering	2 credits
*	WRE 419	Irrigation and Drainage Engineering	3 credits
*	WRE 423	River Engineering and Flood Mitigation	3 credits
*	WRE 425	Hydraulic Machinery	2 credits
	WRE 427	GIS and Remote Sensing	2 credits
	WRE 429	Port and Harbour Engineering	2 credits
	WRE 431	Climatology	2 credits
	WRE 433	Waterways Engineering	2 credits

Sessional:

*	WRE 302	Open Channel Flow Sessional	1.5 credits
*	WRE 404	Computer Applications in Water Resources Problems	1.5 credits
*	WRE 406	Design of Hydraulic Structures	1.5 credits
*	WRE 420	Irrigation and Drainage Sessional	1.5 credits

REQUIREMENT 29 Credits (23+6)

G. Structural Engineering

Theoretical:

*	CE 311	Structural Analysis and Design - I	3 credits *Prereq.* CE 213
*	CE 313	Structural Analysis and 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	4 credits *Prereq.* CE 313

Sessional:

* CE 312 Structural Analysis and Design Sessional - I — 1.5 credits
* CE 316 Concrete Structures Sessional — 1.5 credits
* CE 412 Structural Analysis and Design Sessional - II — 1.5 credits

REQUIREMENT 21.5 Credits (17+4.5)

H. Environmental Engineering

Theoretical:

* CE 335 Environmental Engineering — 4 credits

Sessional:

* CE 336 Environmental Engineering — 1.5credits

REQUIREMENT 5.5 Credits (4+1.5)

I. Geotechnical Engineering

Theoretical:

*CE 341 Geotechnical Engineering-I 4 credits ***Prereq.*** WRE 203
*CE 343 Geotechnical Engineering-II 3 credits ***Prereq.*** CE 341

Sessional:

*CE 342 Geotechnical Engineering Sessional-I 1.5 credits

REQUIREMENT 8.5 Credits (7+1.5)

J. Transportation Engineering

Theoretical:

* CE 355 Transportation Engineering — 4 credits

Sessional:

* CE 356 Transportation Engineering — 1.5 credits

REQUIREMENT 5.5 Credits (4+1.5)

Project and Thesis

* WRE 400 Project and Thesis 4.5 credits

4.3 Summary of Course Requirements

	Courses	Requirements (credits)
A.	Basic Science	12
B.	Mathematics	12
C.	Humanities	8
D.	Engineering (basic)	
	WRE courses	27
	CE courses	14.5
	Other courses	7
	Sub-Total	48.5
E.	Engineering practice (WRE)	5
F.	Water Resources Engineering	29
G.	Structural Engineering	21.5
H.	Environmental Engineering	5.5
I.	Geotechnical Engineering	8.5
J.	Transportation Engineering	5.5
Total		155.5
	Project and Thesis	4.5
Grand Total		**160**

4.4 Course Curriculum in Different Terms for B.Sc. Engineering (WRE) Degree

LEVEL-1 TERM-1

Course no.	Course name	Cr. hr.	Status	Prereq Course	Remarks	Total Credits
WRE 101	Analytical Mechanics	4.0	C			Theory = 15.0 Cr.
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			
WRE 100	Engineering Drawing-I	1.5	C			Sessional = 4.5 Cr.
Phy 102	Physics Laboratory	1.5	C			
Chem 114	Organic Quantitative Analysis	1.5	C			

Total = 19.5 Cr.

Note: C - Compulsory
O - Optional
* - Registration requires satisfying pre-requisite course

LEVEL-1 : TERM-2

Course no.	Course name	Cr. hr.	Status	Prereq-Course	Remarks	Total Credits
Phy 105*	Structure of Matter, Electricity and Magnetism and Modem Physics	3.0	O	Phy 101	Select one	Theory = 16.0 Cr.
Chem 105*	Chemistry-II	3.0	O	Chem 103		
Hum 113	Economics	2.0	C			
Math 133	Mathematics-II	3.0	C			
WRE 103	Surveying	4.0	C			
EEE 165	Basic Electrical Technology	4.0	C			
EEE 166	Electrical Technology Laboratory	1.5	C			Sessional = 4.5 Cr.
Shop 132	Carpentry shop, Machine shop and Welding shop Sessional	1.5	C			
WRE 102	Engineering Drawing-H	1.5	C			
WRE 104	Practical Surveying	1.5	C			Subtotal = 20.5 Cr.

Total = 22.0 Cr.

LEVEL-2 TERM-1

Course no.	Course name	Cr. hr.	Status	Prereq-Course	Remarks	Total Credits
Hum 211	Sociology	2.0	O		Select one	Theory = 15.0 Cr.
Hum 213	Government	2.0	O			
Hum 313	Principles of Accounting	2.0	O			
Math 231	Differential Equation	3.0	O		Select one	
Math 233	Fourier Analysis, Harmonic Functions and Laplace Trans	3.0	O			
Math 235	Vector Analysis and Statistics	3.0	O			
CE 201	Engineering Materials	4.0	C			
WRE 203	Geology and Geomorphology	3.0	C			
CE 211*	Mechanics of Solids-I	3.0	C	WRE 101		
CE 200	Details of Construction Materials Sessional	1.5	C			Sessional = 4.5 Cr.
CE 202	Structural Mechanics and Materials Sessional	1.5	C			
CE 212		1.5	C			

Total = 19.5 Cr.

LEVEL-2 TERM-2

Course no.	Course name	Cr. hr.	Status	Prereq-Course	Remarks	Total Credits
Hum 211	Sociology	2.0	O		Select one	Theory = 15.0 Cr.
Hum 213	Government	2.0	O			
Hum 207*	Advanced English	2.0	O	Hum 111		
Hum 313	Principles of Accounting	2.0	O			
Math 231	Differential Equation	3.0	O		Select one	
Math 233	Fourier Analysis, Harmonic Functions and Laplace Trans.	3.0	O			
Math 235	Vector Analysis and Statistics	3.0	O			
CE 213*	Mechanics of Solids—II	3.0	C	CE211		
WRE 201	Fluid Mechanics	4.0	C			
WRE 205	Computer Programming and Numerical Methods	3.0	C			
WRE 202	Fluid Mechanics Sessional	1.5	C			Sessional = 4.5 Cr.
WRE 206	Computer Programming Sessional	1.5	C			
WRE 208	Estimating and Cost Analysis	1.5	C			

Total = 19.5 Cr.

LEVEL-3 : TERM-1

Course no.	Course name	Cr. hr.	Status	Prereq-Course	Remarks	Total Credits
CE 311*	Structural Analysis and Design - I	3.0	C	CE 213		Theory = 18.0 Cr.
CE 315	Design of Concrete Structures - I	3.0	C			
CE 335	Environmental Engineering	4.0	C			
CE 341*	Geotechnical Engineering - I	4.0	C	WRE 203		
WRE 301*	Open Channel Flow	4.0	C	WRE 201		
CE 312	Structural Analysis and Design Sessional-I	1.5	C			Sessional = 4.5 Cr.
CE 336	Environmental Engineering Sessional	1.5	C			
CE 342	Geotechnical Engineering Sessional-I	1.5	C			

Total = 22.5 Cr.

LEVEL-3 TERM-2

Course no.	Course name	Cr. hr.	Status	Prereq-Course	Remarks	Total Credits
CE 313*	Structural Analysis and Design – II	3.0	C	CE 311		
CE 317*	Design of Concrete Structures – II	4.0	C	CE 315		
CE 343*	Geotechnical Engineering – II	3.0	C	CE 341		Theory = 17.0 Cr.
CE 355	Transportation Engineering	4.0	C			
WRE 303	Hydrology	3.0	C			
CE 316	Concrete Structures Sessional	1.5	C			
CE 356	Transportation Engineering Sessional	1.5	C			Sessional = 4.5 Cr.
WRE 302	Open Channel Flow Sessional	1.5	C			

Total = 21.5 Cr.

LEVEL-4 TERM-1

Course no.	Course name	Cr. hr.	Status	Prereq-Course	Remarks	Total Credits
WRE 400	Project and Thesis	1.5	C			Pr. = 1.5 Cr.
CE411*	Structural Analysis and Design-III	4.0	C	CE 313		Theory = 14.0 Cr.
WRE 415	Planning and Management of Water Resources Development Project	3.0	C			
WRE 417	Ground Water Engineering	2.0	C			
WRE 419	Irrigation and Drainage Engineering	3.0	C			
WRE 421	Professional Practices and Communication	2.0	C			
CE 412	Structural Analysis and Design Sessional - II	1.5	C			Sessional = 3.0 Cr.
WRE 420	Irrigation and Drainage Sessional	1.5	C			

Total = 18.5 Cr.

LEVEL-4 : TERM-2

Course no.	Course name	Cr. hr.	Status	Prereq-Course	Remarks	Total Credits
WRE 400	Project and Thesis	3.0	C			Pr. = 3.0 Cr.
WRE 411	Hydraulic Structure	2.0	C			
WRE 413	Coastal Engineering	2.0	C			
WRE 423	River Engineering and Flood Mitigation	3.0	C			
WRE 425	Hydraulic Machinery	2.0	O		Select two	Theory = 11.0 Cr.
WRE 427	GIS and Remote Sensing	2.0	O			
W1t$ 429	Port and Harbour Engineering	2.0	O			
WRE 431	Climatology	2.0	O			
WRE 433	Waterways Engineering	2.0	O			
WRE 404	Computer Applications in Water Resources Problems	1.5	C			Sessional = 3.0 Cr.
WRE 406	Design of Hydraulic Structures	1.5	C			

Total = 17.0 Cr.

Chapter 5
Detail Outline of Undergraduate Courses

5.1 Courses Offered by the Department of Water Resources Engineering :

WRE 100: Engineering Drawing — I
1.50 Credit, 3hrs. /week
Introduction — lettering, numbering and heading; plane geometry — pentagon, hexagon, octagon, ellipse, parabola, hyperbola. Projection (Solid Geometry) — cube, triangular prism, square prism, pentagonal prism, hexagonal prism, cone, cylinder. Development — cube, pyramid, cone, prism; section and true shape — cube, pyramid, cone, prism. Isometric Drawing — cube, pyramid, cone. Oblique Drawing — cube, pyramid, cone. Interpretation of Solids. Plan, elevation and section of simple hydraulic structures.

WRE 101: Analytical Mechanics
4.00 Credit, 4 hrs/week
Resultants and Components of forces; coplanar concurrent forces; moments and parallel coplanar forces; non-concurrent non-parallel coplanar forces; friction; non-coplanar forces. Centroids; moments of inertia of areas; moments of inertia of masses; plane motion; force systems that produce rectilinear motion; kinetic energy, power; impulse and momentum.

WRE 102: Engineering Drawing—II
1.50 Credit, 3hrs. /week
Plan, elevation and sections of regulator, bridges, siphon, aqueduct and other hydraulic structures with reinforcement details; layout and cross sections of irrigation canals and embankments; plan, elevation and sections of buildings; reinforcement details of beams, columns, slabs, stairs etc.

WRE 103: Surveying
4.00 Credit, 4 hrs/week
Types of surveying; chain surveying; traverse surveying; leveling and contouring; calculation of areas and volumes;

problems of heights and distances; curves and curve ranging; uses of modem surveying equipments.
Tachometry: theory, field procedure, errors in tachometry.
Astronomical surveying: astronomical terms, co-ordinate systems, astronomical corrections, and systems of time.
Photogrametry: definitions related to photogrametry, terrestrial photogrametry, aerial photogrametry.
Remote sensing: introduction to global positioning system (GPS).
Hydrographic surveying: elements of hydrograph; acoustic measurements and investigations; hydrographic operations.

WRE 104: Practical Surveying
1.5 Credit, 3 hrs/week
3 weeks of field work based on WRE 103

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
Center of pressure; proof of Bernoulli's theorem; flow through venturimeter; flow through orifice; coefficient of velocity by co ordinate method; flow through mouthpiece; flow over V- notch; flow over sharp crested weir; fluid friction in pipe.

WRE 203: Geology and geomorphology
3.00 Credit, 3 hrs/week

Rocks and Minerals: identification of rocks and minerals; common rocks forming minerals; physical properties of minerals; mineraloids rocks; types of rocks, cycle of rock change.

Structural geology: faults; types of faults; fold and fold type; domes; basin, erosional process; quantitative analysis of erosional land forms; earthquake and seismic map of Bangladesh; geology of Bangladesh.

Fluvial processes in Geomorphology: channel development; channel widening; valley shape; stream terraces; alluvial flood plains; deltas and alluvial fans; fluvial deposits; coastal deposits; glacial deposits; lacustrine deposits and aeolian deposit, river basin; geomorphologic characteristics of rivers of Bangladesh.

WRE 205: Computer programming and Numerical Methods
3.00 Credit, 3 hrs/week

Basic components of computer system; introduction to programming languages; FORTRAN language; numerical solution of algebraic and transcendental equations; solutions of systems of linear equations; curve-fitting by least squares; finite differences; interpolation; numerical differentiation and integration; numerical solution of differential equations; Introduction to computer applications to Water Resources Engineering problems.

WRE 206: Computer programming Sessional
1.5 Credit, 3 hrs/week

Operating system for microcomputers; development of FORTRAN programs and solution of problems using a computer; Solution of Water Resources Engineering problems by microcomputers; introduction to spreadsheet and word processor.

WRE 208: Estimating and Cost Analysis
1.5 Credit, 3 hrs/week

Analysis of rates; detailed estimate of all items of work of a regulator, bridge, embankment, lined canals, Specifications

of materials for the above constructions.

WRE 301: Open Channel Flow
4.00 Credit, 4 hrs/week
Open channel flow and its classification. Velocity and pressure distributions. Energy equation, specific energy and transition problems.
Critical flow and control. Principle 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 channel.

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. Stream flow. 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 404: Computer Applications in Water Resources Problems
1.5 Credit, 3 hrs/week
Introduction to hydrodynamic modeling; model calibration; statistical analysis in hydrology; computation of flow profiles; water requirement in irrigation scheduling; recharge computation.

WRE 406: Design of Hydraulic Structures
1.5 Credit, 3 hrs/week
Types of hydraulic structures; principles of design; design of different types of hydraulic structures: regulators; dams; barrages; cross- drainage works; pump house, etc.

WRE 411: Hydraulic Structures
2.00 Credit, 2 hrs/week
Principle of design of hydraulic structures, types of hydraulic structures. Design of dams, barrages, weirs, spillways, energy dissipaters and spillway gates. Cross drainage works.

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.

WRE 415: Planning and Management of Water Resources Development Project
3.00 Credit, 3 hrs/week
Basic concepts in integrated water resources management; economic, environmental and industrial aspects, Participation of beneficiaries, formation of users' group. Fisheries management. Operation and maintenance of water resources systems. Principles of project 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 equipment and plants, replacement studies.

WRE 417: Ground Water 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; hand, shallow, deep set shallow and deep tube wells; their design, drilling, construction and maintenance; 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; groundwater exploration.

WRE 419: Irrigation and Drainage Engineering
3.00 Credit, 3 hrs/week
Importance of irrigation; sources and quality of irrigation water; soil-water relationship; consumptive use and estimation of water requirements; methods of irrigation; design of irrigation canal systems; irrigation structures; irrigation pumps; problems of irrigated land; irrigation water management; importance of land drainage; drainage systems and theft design.

WRE 420: Irrigation and Drainage Sessional
1.5 Credit, 3 hrs/week
Soil- water characteristics; infiltration; losses in irrigation canal; abstraction from a well in an unconfined aquifer; hydrograph analysis; pumps in series and parallel; pump characteristics; design of sub surface drainage system; design of irrigation and drainage network; flow through canal regulating structures.

WRE 421: 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 labor relations; professional ethics.

WRE 423: River Engineering and Flood Mitigation
3.00 Credit, 3 hrs/week

Behavior of alluvial rivers; river pattern and morphological processes; river training and bank protection works; navigation and dredging; sediment movement in river channels, bed forms and flow regimes; flood and its causes; methods of flood management; structural and non structural measures such as reservoirs, levees and flood walls, channel improvement, interior drainage, flood ways, land management, flood proofmg, flood zoning, flood hazard mapping, flood forecasting and warning; flood damage in urban and rural areas.

WRE 425: Hydraulic Machinery
2.00 Credit, 2 hrs/week

Review of impulse-momentum principle; forces in fluid flow; principles of hydraulic machines; reciprocating pumps; similarity laws for turbo machines; centrifugal pumps; water turbines; testing of hydraulic machines; irrigation pumps used in Bangladesh.

WRE 427: GIS and Remote Sensing
2.00 Credit, 2 hrs/week

Basic principles of remote sensing: sensors; gamma radiation; aerial photography; multi spectral scanners; thermal sensors; microwave sensors; lasers; platforms and satellite systems; data reception; data processing; storage and dissemination; interpretation and analysis; flood monitoring; flood mapping; water quality evaluation and management; future developments; elements of GIS; data structures: vector and raster data; data acquisition and data management; mapping and analysis; application of GIS in water resources engineering.

WRE 429: Port and Harbour Engineering
2.00 Credit, 2 hrs/week
Port and tides; port planning and harbor layout; channel basin and berths; wharves jetties, dolphins and moorings; dry docks and shipway; cargo handling equipment; supporting facilities and ancillaries; navigation aids; port structures; construction materials and methods.

WRE 431: Climatology
2.00 Credit, 2 hrs/week
The global climate system: global heat and water balance; atmospheric and ocean circulation; interaction of ocean and atmospheric processes — annual cycle; monsoon circulation; tropical cyclones; ENSO (El Nino-Southern Oscillation) cycle; instrumentation and measurement of climate data; sources of climate data and information; climate models; climate variability and climate change; anthropogenic effects on climate- greenhouse warming and sea level changes.

WRE 433: Waterways Engineering
2.00 Credit, 2 hrs/week
introduction to waterways system; route classification; river types; causes of deterioration of waterways; measures of improving waterways; navigational aids; purpose; buoys; channel markers; light houses; radar reflectors etc.; river ports; facilities; developments and problems; island vessels; waterways of Bangladesh.

5.2 Courses Offered by the Department of Civil Engineering :

CE 200: Details of Construction
1.5 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. Ferro cement.

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 211: Mechanics of Solids I
3.00 Credit, 3 hrs/week
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 center; thin walled pressure containers; riveted 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 center; load-deflection behavior of simple beam.

CE 213: Mechanics of Solids II
3.00 Credit, 3 hrs/week
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 311: Structural Analysis and Design - I
3.00 Credit, 3 hrs/week
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
1.5 Credit, 3 hrs/week
Analysis and design problems; design of members and connection of steel structures; e.g. trusses and plate girders.

CE 313: Structural Analysis and Design -II
3.00 Credit, 3 hrs/week
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 behaviour 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
1.5 Credit, 3 hrs/week
Analysis and design problems based on CE *315;* 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
Two-way slabs; columns; footings;. retaining walls, reinforced concrete floor and roof systems. Review of codes; yield line method; introduction of pre-stressed concrete. Analysis and preliminary design of pre-stressed beam section.

CE 335: Environmental Engineering
4.00 Credit, 4 hrs/week
Introduction to environmental engineering. Water supply: water requirement, water sources, water quality, treatment and distribution systems, design concepts of water treatment plants. Water 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
1.5 Credit, 3 hrs/week
Sample collection, preservation and storage ; physical, chemical and biological tests of water and wastewater; alum coagulation and break point chlorination.

CE 341: Geotechnical Engineering - I
4.00 Credit, 4 hrs/week
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
1.5 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 Engineering - 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 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.

CE 411: Structural Analysis and Design - III
4.00 Credit, 4 hrs/week
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
1.5 Credit, 3 hrs/week
Design of various reinforced concrete structures, e.g. cantilever bridge and multistoried building.

5.3 Courses Offered by the Department of Electrical and Electronic Engineering :

EEE 165: Basic Electrical Technology
4.00 Credit, 4 hrs/week
Electrical units and standards, Electrical network and circuit solution series, parallel and mesh current methods. Measurement of electrical quantities current, voltage, resistance. Measuring instruments; ammeters, voltmeters, watt meters and multimeters.

Instantaneous current, voltage and power, effective current and voltage, average power.

Phasor algebra (as applied to A.C. circuit analysis), sinusoidal single phase RLC circuits, balanced three phase circuits, Introduction of electrical wiring for residential and commercial loads. Familiarization with different types of electrical machines such as D.C. generators and motors. A.C. alternators, motors, transformers. Working principles of transformers, induction motors, Introduction to electronics principles with simple applications.

EEE 166: Electrical Technology Laboratory
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 Laboratory
1.5 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 Piano-convex lens by Newton's ring method. Determination of threshold frequency for the photoelectric effect of a photo cathode 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 effective mass of a loaded spring.

Phy 105: Structure of Matter, Electricity and Magnetism and Modern Physics
3.00 Credit, 3 hrs/week

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: and 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: magneto motive force, magnetic field intensity, permeability, susceptibility, classifications of magnetic materials, magnetization curves.

Modem 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 thermo chemistry.

Chem 105: Chemistry -II
3.00 Credit, 3 hrs/week
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, DOD, COD and threshold odour 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, pre-treatment of the surface, metallic, non-metallic and organic protective coating, types of paints and their uses.

Chem 114: Inorganic Quantitative Analysis
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. Sub tangent 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 of 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 Transformation
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
2.00 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. Precise 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:

Microeconomics: 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 economies and diseconomies.

Macroeconomics: 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
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 form 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: analysing 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
1.5 Credit, 3 hrs/week

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, Shaper, 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 polarity: 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.