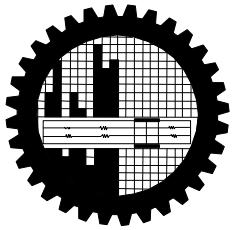

Bangladesh
University of
Engineering and
Technology

COURSE CURRICULUM FOR UNDERGRADUATE STUDIES

(New Syllabus applicable from L1TI of Session 2009-2010)

New Revised Edition

Department of Civil Engineering
July, 2009

Published by:
Department of Civil Engineering
Bangladesh University of Engineering and Technology
Dhaka 1000, Bangladesh.

Editorial Committee:
(For the new syllabus)

Publications of the old versions:

First Edition (Sept, 1993):
Head of the Department:
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Second Edition (May, 1994):
Head of the Department:
Dr. A. M. M. Safiullah

Third Edition (May, 1997):
Head of the Department:
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Fourth Edition (July, 2000)
Head of the Department:
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Fifth Edition (2005)
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encountered by its students or any other person or persons because of such changes.

PREFACE

All praises to Allah-Sobhano-Taala -the most Benevolent and Merciful. It gives me an immense pleasure to publish the new course curriculum for undergraduate studies of civil engineering. After an indefatigable effort for the last two years, the curriculum in its present style and content was passed by the academic council of BUET in its 364th meeting held on March 23, 2009. Credit hour distribution, course contents are modified and upgraded for some courses. The syllabuses of most of the courses are updated after 17 years.

I would like to express my thanks and gratitude to all my colleagues of the department, Heads of concerned departments, Deans of concerned faculties and the Chairman and Members of Academic Council. Mr. Raquibul Hossain and his team (all lecturers of the department in 2008), Dr. Md. Mizanur Rahman (BUGS secretary) and Dr. Charisma F. Choudhury (BIIS secretary) also deserve special thanks for their all out effort and help in different stages of preparation of this booklet.

Although the current booklet retains the overall characteristics of its previous versions, efforts have been made to incorporate the key information that an undergraduate student of the department vis-à-vis his/her Adviser may need to know for smoothly carrying out their academic activities. Special care has been taken in Chapter 3 where, apart from reproducing articles from *Rules and Regulations for Course System* (May, 1999), all the amendments that were subsequently made to it (up to June 2009) have been incorporated in the booklet.

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

It is hoped that the information provided in this booklet will be useful to the Advisers and undergraduate students of the Department of Civil Engineering.

Dhaka
July, 2009

Dr. Muhammad Zakaria
Professor and Head
Department of Civil Engineering

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 post graduate studies and research, Ahsanullah Engineering College was upgraded to the status of a University under the name of East Pakistan University of Engineering and Technology in the year 1962. After independence of Bangladesh in 1971, it was renamed as the Bangladesh University of Engineering and Technology. Starting with two faculties, the university has now been enlarged into five faculties. The faculty of Civil Engineering, opened in 1980, is now the largest faculty with about 830 undergraduate and 320 postgraduate students.

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

1.2 ACADEMIC ACTIVITIES

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

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

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

1.3 FACULTIES AND TEACHING DEPARTMENTS

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

status of the degrees offered is given below:

Faculty of Civil Engineering

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

Faculty of Architecture and Planning

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

Faculty of Electrical and Electronic Engineering

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

Faculty of Engineering

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

Faculty of Mechanical Engineering

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

1.4 UNIVERSITY ADMINISTRATION

Vice Chancellor:	Dr. A.M.M. Safiullah

List of Administrative Officers

Registrar:	Dr. A.K.M.A. Masud
Controller of Examinations:	Dr. Abu Siddique
Comptroller:	Md. Jashim Uddin Akanda
Director of Students Welfare:	Dr. Maglub Al Nur
Director, Advisory, Extension & Research Services:	Dr. Md. Quamrul Islam
Director, Bureau of Research, Testing & Consultation :	Dr. A.M.M. Taufiqul Anwar
Director of Planning & Development:	Dr. Md. Zoynul Abedin
Librarian (Acting):	Mrs. Suraiya Begum

Deans of Faculties

Dean of Civil Engineering :	Dr. M. Monowar Hossain
Dean of Architecture & Planning :	Prof. Khaleda Rashid
Dean of Electrical & Electronic Engineering :	Dr. S. Shahnawaz Ahmed
Dean of Mechanical Engineering :	Dr. Md. Abdur Rashid Sarkar
Dean of Engineering :	Dr. A. A. Md. Rezaul Haque

Provosts of Residential Halls

Provost, Ahsanullah Hall :	Dr. Khan Mahmud Amanat
Provost, Chattri Hall :	Dr. Md. Abdul Matin
Provost, Nazrul Islam Hall :	Dr. Md. Ehsan
Provost, Shahid Smrity Hall :	Dr. Sarwar Jahan Md. Yasin
Provost, Sher-e-Bangla Hall :	Dr. Moazzem Hossain
Provost, M.A. Rashid Hall :	Dr. Quazi Deen Mohd Khosru
Provost, Shohrawardy Hall :	Dr. Abdul Jabbar Khan
Provost, Titumir Hall :	Dr. Md. Zahurul Haq

Chapter 2

The Faculty of Civil Engineering

2.1 INTRODUCTION

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

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

2.2 LIST OF FACULTY MEMBERS OF DEPARTMENT OF CIVIL ENGINEERING

Professor & Head

Muhammad Zakaria: B.Sc.Engg. (Civil), BUET; M.Sc.Engg., BUET; Ph.D., University of Birmingham, U.K. Post Doctoral, University of Leeds, U.K. (Transportation Engineering)

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

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

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

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

K. A. M. Abdul Muqtadir: B.Sc.Engg. (Civil), BUET; M.S. , Virginia Polytechnic Institute and State University, U.S.A.; Ph.D., University of Arizona, U.S.A. (Geotechnical Engineering)

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Instrument Engineer:

Md. Alamgir Hossain : Diploma in Engineering, Civil Technology; Dhaka Polytechnic Institute, Dhaka

Instructor in CAD:

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

Instructor in Surveying:

Md. Abdul Alim: Diploma in Engineering, Civil Technology; Pabna Polytechnic Institute, Pabna.

Section Officer (office):

Md. Abdul Malek

Asstt. Tech. Officer (Drafting):

Palash Gupta

Chapter 3

Rules and 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 reproduced from R*ules and Regulations for Course System (May 1999)* after incorporating all the amendments that were subsequently made to it (up to June 2009).

A. Rules, Regulations, Course Offering Evaluation and Grading

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

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

(i) Reduction of the number of theoretical courses and examination papers to around five in each term,
(ii) The absence of a pass or a fail on an annual basis,
(iii) Continuous evaluation of student's performance,
(iv) Introduction of Letter Grades and Grade Points instead of numerical grades,
(v) Introduction of some additional optional courses and thus enable students to select courses according to his/her 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/her own pace depending on respective 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. Thus the course contents of the undergraduate programmes provide a harmonious blend of both basic sciences and their applications as well as their social relevance.

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

2. Student Admission

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

3. Number of Terms in a Year

There will be two terms (Term I and Term II) in an academic year.

The duration of each of Term I and Term II will be 18 weeks which will be used as follow[1]s:

[1] Amended Vide A.C Resolution dated 15.6.2008

Classes		*13 weeks*
Term-final examination (including preparatory leave and intervals between successive exams).		*5 weeks*
	Total	*18 weeks*

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

4. Course Pattern and Credit Structure

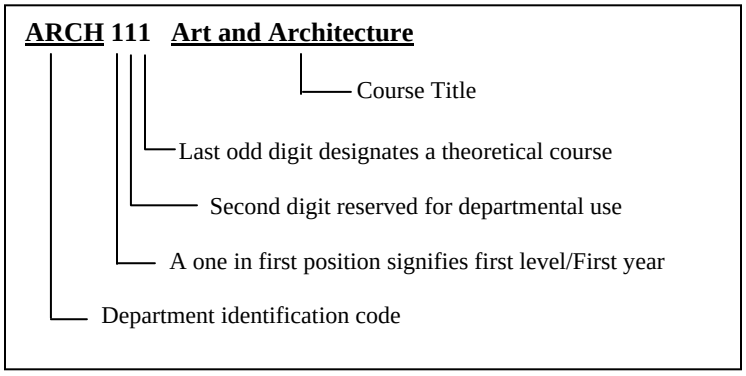
The entire undergraduate programme is covered through a set of theoretical and laboratory/ sessional/ studio courses.

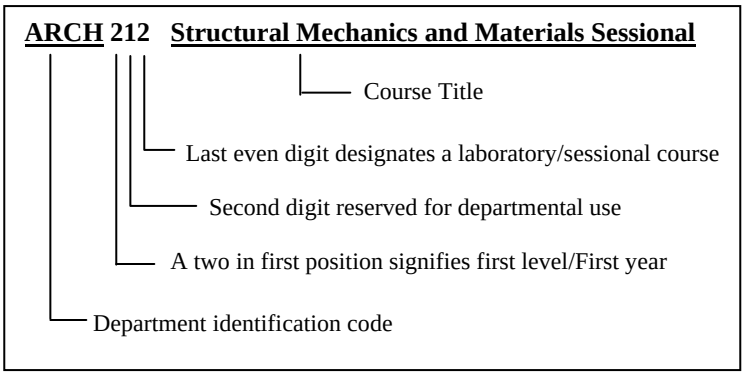
4.1 Course Designation and Numbering System

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

(a) The first digit will correspond to the year/level in which the course is normally taken by the students.
(b) The second digit will be reserved for departmental use for such things as to identify different areas within a department.
(c) The last digit will usually be odd for theoretical and even for laboratory or sessional courses.

The course designation system is illustrated by two examples.





4.2 Assignment of Credits

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

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

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

The curriculum does not demand the same rate of academic progress from all students for obtaining the degree but only lays down the pace expected from 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 less number of courses during a given term (subject to a minimum course load). He may keep pace with his class by taking during the Short Term those courses which he had dropped during the Regular Terms, or by covering the entire degree programme over an extended period without developing any feeling of inferiority complex.

5. Types of Courses

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

5.1 Core Courses

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

5.2 Pre-requisite Courses

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

5.3 Optional Courses

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

6. Course Offering and Instruction

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

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

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

7. Departmental Monitoring Committee

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

Board of Undergraduate Studies (BUGS) of each department will constitute a Departmental Monitoring Committee with three teachers of the department. This committee will monitor and evaluate the performance of the Course System within the department. In addition to other teachers of the department, the committee may also propose from time to time to the BUGS any changes and modifications needed for upgrading the Undergraduate Curriculum and the Course System[2].

8. Teacher Student Contact

The proposed system encourages students to come in close contact with teachers. For promotion of teacher-student contact, each student

[2] Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

is assigned to an Adviser and the student is free to discuss with his Adviser all academic matters, especially those related to courses taken and classes being attended by him. Students are also encouraged to meet with other teachers any time for help on academic matters.

9. Student Adviser

One Adviser would normally be appointed for a batch of student by the Undergraduate Board of Studies of the concerned department(s) who will advise each student on the courses to be taken by the student. Adviser will discuss with the student his/her academic programme and then decide the number and nature of courses for which he/she 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/she can register will be decided on the basis of his/her 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. The Advisor is also authorised to permit the student to drop one or more courses based on his/her academic performance and the corresponding categorization (see Art. 16 for details).

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

10. Registration Requirements

Any student who makes use of class room or laboratory facilities or faculty time is required to register formally. Being admitted to the University, each student is assigned to a student Adviser. The student

can register for courses he intends to take during a given term only on the basis of the advice and consent of his/her Adviser.

10.1 Registration Procedure

Students must register for each class in which they want to participate in consultation with his/her Advisor. This can be done online within a specified deadline at http://biis.buet.ac.bd where a student can select courses in the online course registration form. The student is then **required** to meet his/her advisor to finalize and confirm the registration. Much counseling and advising is accomplished at the registration time. It is absolutely necessary that all students register at the specified time.

10.2 Limits on the Credit Hours to be Taken

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

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

Some courses involve pre-requisite courses. A student will be allowed to register in those courses subject to the 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/her attendance and grades in continuous assessment in the said pre-requisite course is found to be satisfactory.

[3] Added Vide A.C Resolution dated 28.8.97

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 within the 4th week after starting the classes 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 permission to complete the course registration procedure. For the First Year students, prior department-wise enrolment/admission is mandatory. An orientation programme will be conducted for them at the beginning of the first term when they will be handed over the registration package on producing enrollment slip/proof of admission.

10.4 Pre-registration[4]

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

10.5 Registration Deadline

Student must register for the courses to be taken before the commencement at a due date within the first 2 weeks after commencement of classes in each term and no late registration will be accepted after one 4th 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

[4] Currently not in practice

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.[5]

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. 500.00 (five hundred) only. This extra fee will not be waived whatever be the reason for late registration.

10.7 Course Adjustment Procedure

A student will have some limited options to Add or delete & Dropping courses from his/her registration list, within the first four weeks from the beginning of the term. However, minimum credit requirements mentioned in the Art. 10.2 need to be fulfilled after the adjustments. He/She may add courses only within the first four weeks of a regular Term and only the first week of Short Term. Incase of dropping a course a student will be allowed to do so within four weeks after the commencement of a regular Term and two weeks after commencement of a Short Term. Adjustment of initially registered courses in any term can be done by duly completing the **Course Adjustment Form.** These forms will normally be available in the Registrar's Office. For freshman students such forms can be included in the registration packet at the time of orientation.

Any student willing to add or drop courses will have to fill up a Course Adjustment Form in consultation with and under the guidance of his/her 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

[5] Amended Vide A.C Resolution dated 15.06.2008

and signed by the concerned persons. To add/drop a course respective teacher's consent will be required.

Late Registration Fee is not necessary in these cases.[6]

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 chose not to withdraw any laboratory / sessional / design course if the grade obtained in such a course is 'D' or better. The application must be supported by a medical certificate from the Chief Medical Officer of the University. The Academic Council will take the final decision about such application[7]

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 assignments, and a term final examination. The assessment in laboratory/sessional courses is made through observation of the student at work in class, viva-voce during laboratory hours, and quizzes. For architecture students, assessments in design sessionals would be done through evaluation of a number of projects assigned throughout the term. As discussed earlier, each course has a certain number of credits which describe its weightage. A letter grade with a specified number of grade points is awarded in each course for which a student is registered. A student's performance is measured by the number of credits that he/she has completed satisfactorily and the weighted average of the grade points that he/she has maintained. A minimum grade point average is required to be maintained for satisfactory progress. Also a minimum

[6] Amended Vide A.C Resolution dated 15.06.2008

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

number of earned credits should be acquired in order to qualify for the degree as prescribed under Art. 22.[8]

Letter grades and corresponding grade-points will be awarded in accordance with provisions shown below[9].

Numerical grade	Letter Grade		Grade Point
80% or above	A+	(A plus)	4.0
75% to less than 80%	A	(A regular)	3.75
70% to less than 75%	A-	(A minus)	3.5
65% to less than 70%	B+	(B plus)	3.25
60% to less than 65%	B	(B regular)	3.0
55% to less than 60%	B-	(B minus)	2.75
50% to less than 55%	C+	(C plus)	2.5
45% to less than 50%	C	(C regular)	2.25
40% to less than 45%	D		2.0
less than 40%	F		0.0
Continuation	X		-

(for project & thesis / design courses)

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. The duration of each term final examination will be 3 hours. The distribution of marks for a given course will be as follows[10] :

(i) Class participation 10%

[8] Amended Vide A.C Resolution dated 7.9.93 & 13.9.93
[9] Amended Vide A.C Resolution dated 7.9.93 & 13.9.93
[10] Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

(ii) Homework Assignment and Quizzes 20%
(iii) Final Examination (3 hours) 70%

Total 100%

Basis for awarding marks for class participation and attendance is generally as follows[11] :

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.

"The number of quizzes of a course shall be at least n+1, where n is the number of credits of the course. Evaluation of the performance in quizzes will be on the basis of the best n quizzes. The scheme of continuous assessment that a teacher proposes to follow for a course will be announced on the first day of classes".[12]

[11] Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

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

12. Earned Credits

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

The courses in which a student has obtained `D' or a higher Grade will be counted as credits earned by him/her. Any course on which a student has obtained `F' grade will not be counted towards his/her earned credits.

A student who obtains an `F' grade in any Core Course in any term, ~~he/she~~ will have to repeat the course.

If a student obtains a `F' grade in an Optional Course, he/she may choose to repeat the course or take a substitute course if available.

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

If a student obtains a grade other than 'F' in a course, he/she will not be allowed to repeat the course for the purpose of grade improvement.

Amended Vide A.C Resolution dated 14.3.96 & 16.4.96

The courses in which a student has obtained 'D' or a higher Grade will be counted as credits earned by him/her. Any course in which a student has obtained 'F' grade will not be counted towards his/her earned credits.

A student who obtains 'F' grade in a Core Course in any term will have to repeat the course.

If a student obtains 'F' grade in an Optional Course he / she may choose to repeat the Course or take a Substitute Course if available.

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

If a student obtains 'D' grade in a course, he/she will be allowed to repeat the course for the purpose of grade improvement by foregoing his/her earlier grade, but he/she will not be eligible to get a grade better than 'C' in such a course.

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

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

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

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

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

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

13. Honours

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

13.1 Dean's List

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

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

Vide A.C Resolution dated 9.3.94 & 11.4.94

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

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

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, G_3, G_4, and G_5, respectively then

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

14.1 A Numerical Example

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

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

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

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

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

15. Student Classification

For a number of reasons it is necessary to have a definite system by which to classify students as First Year Level 1, Second Year Level 2, Third Year/Level 3, and Fourth Year/ Level 4. At BUET, regular students are classified according to the number of credit hours earned towards a degree. The following classification applies to the students.

	Year/ Level	Earned credit Hours	
		Engineering/ URP	Architecture
Amended Vide A.C Resolution dated 07.07.2007	First Year / Level 1	0 to 36	0 to 34
	Second Year / Level 2	>36 to 72	>34 to 72
	Third Year / Level 3	>72 to 108	>72 to 110
	Fourth Year / Level 4	> 108	> 110 to 147
	Fifth Year / Level 5		> 147

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 previous 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 previous term. A student belonging to Category 3 is advised to take at least two courses less subject to registration for a minimum of 15 credits. However he will be required to register for such backlog courses as may be prescribed by the Adviser.

17. Performance Evaluation

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

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

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

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

18. Academic Progress, Probation and Suspension

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

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

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

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

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

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

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

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

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

19. Measures for Helping Academically Weak Students

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

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

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

Following criteria will be followed for determining academically weak students:

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

20. Special Courses

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

Amended Vide A.C Resolution dated 28.8.97

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

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

Amended Vide A.C Resolution dated 28.8.97

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

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

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

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

Amended Vide A.C Resolution dated 28.8.97.

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

Added Vide A.C Resolution dated 28.12.98

f) A Special Course Shall not be utilized for grade improvement purposes.

Added Vide A.C Resolution dated 19.06.2007

g) To finish the Backlog Courses, students are allowed to take 1 theory course in addition to the 5 theory courses in the term immediately before their Graduating Term.

21. Rules for Courses offered in a Short Term

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

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

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

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

22. Minimum Earned Credit and GPA Requirements for Obtaining Graduation

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

*Added vide A.C. Resolution Dated 16.11.1995	The minimum GPA requirement for obtaining a bachelor's degree in engineering, *URP or architecture is 2.20.
Amended Vide A.C Resolution dated 13.8.97	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.

22.1 Application for Graduation and Award of Degree

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93	A student who has fulfilled all the academic requirements for Bachelor's degree will have to apply to the Controller of Examinations through his/her Adviser for graduation. Provisional degree will be awarded on completion of credit and GPA requirements. Such provisional degrees will be confirmed by the Academic Council.

23. Industrial/Professional Training Requirements

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

Added Vide A.C Resolution dated 24.07.96 & 25.07.96

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

24. Time Limits for Completion of Bachelor's Degree

*Added vide A.C. Resolution Dated 16.11.1995

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

Added vide A.C. Resolution Dated 09.01.2005

For the degrees of B.Sc. Engineering and BURP, maximum allowable number of terms is 14 and for the degree of B. Arch it is 16 respectively. But an additional term may be granted after judging the merit of individual case. An amount of Tk. 1000/- per credit shall have to be paid as registration fee for that extra term.

25. Inclusion of Repeaters[13]

Repeater students from the old syllabus system (from session 2008 or earlier) will need to take the equivalent courses from the new syllabus system. The list of equivalent courses has been presented in Section 4.5.

The irregular/repeater students will be subjected to the following rules and regulations:

[13] Added Vide A.C Resolution 080230 dated 21.4.08

1. If the original course in the old syllabus has only one equivalent course in the new syllabus

An example of this is presented below:

Old Syllabus			Equivalent Course(s) in the New Syllabus		
Course No.	Description	Credit	Course No.	Description	Credit
CE 431	Environmental Engineering III	2.00	CE 433	Solid and Hazardous Waste Management	2.00

The following rules apply for such courses:

a. If he/she had received an 'F' or had not registered for the original course before, he/she has to complete the equivalent course as per the new syllabus and the earned credit will be equal to the credit of the equivalent course.
b. If the student had received an 'F' in the original course in the old syllabus, he/she can get at most 'B' in the equivalent course of the new syllabus. If he/she had not registered for the original course (of old syllabus) before, he/she can get 'A+' in the equivalent course of the new syllabus.
c. If the student had obtained a grade lower than 'B' in the original course and wants to retake the course for improvement, he/she has to register for the equivalent course as per the new syllabus (provided he/she fulfills the other conditions of registration).

2. If two or more of the original courses in the old syllabus have only one equivalent course in the new syllabus:

An example of this is presented below:

Old Syllabus			Equivalent Course(s) in the New Syllabus		
Course No.	Description	Credit	Course No.	Description	Credit

CE 311	Structural Analysis & Design I	3.00	CE 311	Structural Analysis and Design I	4.00
CE 313	Structural Analysis & Design II	3.00			

The following rules apply for such courses:

a. If the student had received an 'F' or had not registered for **one/both** of the original courses before, he/she has to complete the equivalent course as per the new syllabus.
b. The student will be considered to have completed the original courses if he/she has received passing grade in the equivalent course.
c. If the student had registered in **all** of the original courses and have received an 'F' in **one/more** of those, he/she can get at most 'B' in the equivalent course.
d. If the student had not registered for **at least one** of the original courses in the old syllabus before, he/she can get 'A+' in the equivalent course.
e. If the student had obtained passing grade in **all** of the original courses below and had received a grade lower than 'B' in one/more courses he may be allowed to retake the equivalent course for improvement (provided he/she fulfills the other conditions of registration).

3. If the original course in the old syllabus has two/more equivalent courses in the new syllabus:

An example of this is presented below:

Old Syllabus			Equivalent Course(s) in the New Syllabus		
Course No.	Description	Credit	Course No.	Description	Credit
CE 206	Computer Programming Sessional	2.50	CE 204	Computer Programming Sessional	1.50

			CE 206	Engineering Computation Sessional	1.50

The following rules apply for such courses:

a. If the student had received an 'F' or had not registered for the original course before, he/she has to complete **all** the equivalent courses as per the new syllabus.
b. If the student had registered for the original course before and have received an 'F' in the course, he/she can get at most 'B' in **all** of the equivalent courses.
c. If the student had not registered for the original course before, he/she can get 'A+' in any of the equivalent courses.
d. If the student had received a grade lower than 'B' in the original course he/she may be allowed to retake any of the equivalent courses for improvement (provided he/she fulfills the other conditions of registration).

4. Two/more courses of the old syllabus can not be regarded as equivalent to two/more courses in the new syllabus.

5. If the student is short of only one credit for graduation due to completion of courses from the new syllabus, he/she can be considered eligible for the receipt of the degree. But if the student is short of two/more credits for graduation due to completion of courses from the new syllabus, he/she needs to take one/more courses (based on suggestions from the Adviser) to be considered eligible for the receipt of the degree.

26. Attendance, Conduct, Discipline etc.

26.1 Attendance

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

26.2 Conduct and Discipline

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

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

27. Absence During Term

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

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

Chapter 4

Course Requirements for Undergraduate Civil Engineering Students

4.1 INTRODUCTION

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

4.2 COURSE REQUIREMENTS

A. BASIC SCIENCES

Requirement 12 credits (9+3)

Theoretical

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

Sessional

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

***** Subjects marked with asterisk(*) indicate compulsory courses

B. MATHEMATICS

Requirement 9 Credits (9+0)

Theoretical

* Math 137	Differential and Integral Calculus, Matrices	3 credits
* Math 139	Differential Equations and Statistics	3 credits
* Math 237	Laplace Transform and Vector Analysis	3 credits

C. HUMANITIES, SOCIAL SCIENCES AND BUSINESS

Requirement 9.5 Credits (8+1.5)

Theoretical

* Hum 185	English	2 credits
* Hum 217	Engineering Economics	2 credits
* Hum 353	Accounting	2 credits
Hum 355	Sociology	2 credits
Hum 375	Government	2 credits

Sessional

* Hum 274	Developing English Language Skills	1.5 credits

D. BASIC ENGINEERING

Requirement 48 Credits (30+18)

Theoretical

* CE 101	Analytic Mechanics	3 credits
* CE 103	Surveying	4 credits
* EEE 165	Basic Electrical Technology	3 credits
* CE 201	Engineering Materials	3 credits
* CE 203	Engineering Geology and Geomorphology	3 credits
* CE 205	Numerical Methods	2 credits
* CE 207	Applied Mathematics for Engineers	3 credits
* WRE 211	Fluid Mechanics	3 credits
* CE 211	Mechanics of Solids I	3 credits ***Prereq.*** CE 101

* CE 213	Mechanics of Solids II	3 credits ***Prereq.*** CE 211

Sessional

* CE 100	Civil Engineering Drawing	1.5 credits
* CE 102	Computer Aided Drafting	1.5 credits
* CE 104	Practical Surveying	1.5 credits
* Shop 132	Workshop Sessional	1.5 credits
* CE 200	Details of Construction	1.5 credits
* CE 202	Materials Sessional	1.5 credits
* WRE 212	Fluid Mechanics Sessional	1.5 credits
* CE 204	Computer Programming Sessional	1.5 credits
* CE 206	Engineering Computation Sessional	1.5 credits ***Prereq.*** CE 204
* CE 208	Quantity Surveying	1.5 credits
* CE 210	Architectural, Engineering and Planning Appreciation	1.5 credits
* CE 212	Structural Mechanics and Materials Sessional	1.5 credits

E. CIVIL ENGINEERING PRACTICE

Requirement 11.5 Credits (10+1.5)

Theoretical

* CE 301	Professional Practices and Communication	3 credits
* CE 401	Project planning and Construction Management	4 credits
CE 403	Socio-economic Aspects of Development Projects	3 credits
CE 405	Business and Career Development	3 credits

Sessional

* CE 302	Professional Practices and Communication Sessional	1.5 credits

F. STRUCTURAL ENGINEERING

Minimum Requirement 20.5 Credits (16+4.5)

Theoretical

* CE 311	Structural Analysis and Design I	4 credits ***Prereq.*** CE 213
* CE 315	Design of Concrete Structures I	3 credits
* CE 317	Design of Concrete Structures II	3 credits ***Prereq.*** CE 315
* CE 319	Design of Steel Structures	3 credits
* CE 411	Structural Analysis and Design II	3 credits ***Prereq.*** CE 311
CE 413	Introduction to Steel-Concrete Composite Structures	2 credits
CE 415	Prestressed Concrete	2 credits
CE 417	Design of Concrete Structures III	2 credits
CE 419	Introduction to Finite Element Method	2 credits
CE 421	Dynamics of Structures	2 credits

Sessional

* CE 316	Concrete Structures Design Sessional I	1.5 credits
* CE 320	Steel Structures Design Sessional	1.5 credits
* CE 410	Concrete Structures Design Sessional II	1.5 credits
* CE 400	Project and Thesis	4.5 credits
CE 412	Computer Aided Analysis and Design of Structures Sessional	1.5 credits

G. ENVIRONMENTAL ENGINEERING

Minimum Requirement 8.5 Credits (7+1.5)

Theoretical

* CE 331	Environmental Engineering I	3 credits
* CE 333	Environmental Engineering II	4 credits

CE 433	Solid and Hazardous Waste Management	2 credits
CE 435	Environmental Pollution Management	2 credits
CE 437	Environmental and Sustainable Management	2 credits

Sessional

* CE 332	Environmental Engineering Laboratory	1.5 credits
CE 400	Project and Thesis	4.5 credits
CE 432	Design of Water Supply, Sanitation and Sewerage Systems	1.5 credits

H. GEOTECHNICAL ENGINEERING

Minimum Requirement 8.5 Credits (7+1.5)

Theoretical

* CE 341	Principles of Soil Mechanics	4 credits ***Prereq.*** CE 203
* CE 441	Foundation Engineering	3 credits
CE 443	Earth Retaining Structures	2 credits
CE 445	Elementary Soil Dynamics	2 credits
CE 447	Soil-water Interaction	2 credits

Sessional

* CE 342	Geotechnical Engineering Laboratory	1.5 credits
CE 400	Project and Thesis	4.5 credits
CE 442	Geotechnical Engineering Design Sessional	1.5 credits

I. TRANSPORTATION ENGINEERING

Minimum Requirement 8.5 Credits (7+1.5)

Theoretical

* CE 351	Transportation Engineering I: Transportation Planning & Traffic Engineering	3 credits
* CE 451	Transportation Engineering II: Pavement Design and Railway Engineering	4 credits
CE 453	Transportation Engineering III: Traffic Engineering Design and Management	2 credits
CE 455	Transportation Engineering IV: Pavement Management, Drainage and Airport	2 credits
CE 457	Transportation Engineering V: Urban Transportation Planning and Management	2 credits

Sessional

CE 400	Project and Thesis	4.5 credits
* CE 452	Transportation Engineering Sessional I: Highway Materials and Traffic Engineering Design	1.5 credits
CE 454	Transportation Engineering Sessional II: Pavement Design and Traffic Studies	1.5 credits

J. WATER RESOURCES ENGINEERING

Minimum Requirement 8.5 Credits (7+1.5)

Theoretical

* WRE 311	Open Channel Flow	4 credits
* WRE 451	Hydrology, Irrigation and Flood Management	3 credits
WRE 405	Flood Mitigation and Management	2 credits
WRE 407	Ground Water Engineering	2 credits
WRE 409	River Engineering	2 credits
WRE 411	Hydraulic Structures	2 credits
WRE 413	Coastal Engineering	2 credits

Sessional

* WRE 312	Open Channel Flow Sessional	1.5 credits
WRE 412	Water Resources Engineering Sessional	1.5 credits

4.3 SUMMARY OF COURSE REQUIREMENTS FOR B.Sc. Engg. (CIVIL) DEGREE:

	Courses	Requirements (total credits to be offered)	
A.	Basic Science	12	(15)
B.	Mathematics	9	(9)
C.	Humanities	9.5	(11.5)
D.	Basic Engineering	48	(48)
E.	Civil Engineering Practice	11.5	(14.5)
F.	Structural Engineering	20.5	(36.5)
G.	Environmental Engineering	8.5	(20.5)
H.	Geotechnical Engineering	8.5	(20.5)
I.	Transportation Engineering	8.5	(20.5)
J.	Water Resources Engineering	8.5	(20)
Total		144.5	
Project and Thesis		4.5	
Optional Courses:**			
Theory		8.0 (40 in F to J, Max. 4 from each division/ WRE Dept.)	
Sessional		3.0 (7.5 in F to J)	
Grand Total		**160**	

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

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

Level	Term	Course No.	Course Title	Credit Hours	Status of Course	Selection Basis/ Remarks
1	I	CE 101	Analytic Mechanics	3.00	C	
		Chem 103	Chemistry I	3.00	C	
		Math 137	Differential and Integral Calculus, Matrices	3.00	C	
		Phy 101	Physical Optics, Waves and Oscillation, Heat and Thermodynamics	3.00	C	
		Hum 355	Sociology	2.00	O	Select one
		Hum 375	Government	2.00	O	
		CE 100	Civil Engineering Drawing	1.50	C	
		Chem 114	Inorganic Quantitative Analysis	1.50	C	
		Phy 102	Physics Laboratory	1.50	C	
			Total	**18.50**		

C: Compulsory
O: Optional

Level	Term	Course No.	Course Title	Credit Hours	Status of Course	Selection Basis/ Remarks
1	II	CE 103	Surveying	4.00	C	
		EEE 165	Basic Electrical Technology	3.00	C	
		Hum 185	English	2.00	C	
		Math 139	Differential Equations and Statistics	3.00	C	
		Chem 105	Chemistry II	3.00	O	Select one
		Phy 105	Structure of Matter, Electricity and Magnetism and Modern Physics		O	
		CE 102	Computer Aided Drafting	1.50	C	
		CE 104	Practical Surveying	1.50	C	
		HUM 274	Developing English Language Skills	1.50	C	
		Shop 132	Workshop Sessional	1.50	C	
			Total	**21.00**		

C: Compulsory
O: Optional

Level	Term	Course No.	Course Title	Credit Hours	Status of Course	Selection Basis/ Remarks
2	I	CE 201	Engineering Materials	3.00	C	
		CE 203	Engineering Geology and Geomorphology	3.00	C	
		CE 211 *	Mechanics of Solids I	3.00	C	
		Hum 353	Accounting	2.00	C	
		Math 237	Laplace Transform and Vector Analysis	3.00	C	
		CE 200	Details of Construction	1.50	C	
		CE 202	Materials Sessional	1.50	C	
		CE 204	Computer Programming Sessional	1.50	C	
		CE 210	Architectural, Engineering and Planning Appreciation	1.50	C	
			Total	**20.00**		

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

Level	Term	Course No.	Course Title	Credit Hours	Status of Course	Selection Basis/ Remarks
2	II	CE 205	Numerical Methods	2.00	C	
		CE 213 *	Mechanics of Solids II	3.00	C	
		Hum 217	Engineering Economics	2.00	C	
		CE 207	Applied Mathematics for Engineers	3.00	C	
		WRE 211	Fluid Mechanics	3.00	C	
		CE 206 *	Engineering Computation Sessional	1.50	C	
		CE 208	Quantity Surveying	1.50	C	
		CE 212	Structural Mechanics and Materials Sessional	1.50	C	
		WRE 212	Fluid Mechanics Sessional	1.50	C	
			Total	**19.00**		

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

Level	Term	Course No.	Course Title	Credit Hours	Status of Course	Selection Basis/ Remarks
3	I	CE 301	Professional Practices and Communication	3.00	C	
		CE 311 *	Structural Analysis and Design I	4.00	C	
		CE 315	Design of Concrete Structures I	3.00	C	
		CE 331	Environmental Engineering I	3.00	C	
		CE 341 *	Principles of Soil Mechanics	4.00	C	
		CE 302	Professional Practices and Communication Sessional	1.50	C	
		CE 332	Environmental Engineering Laboratory	1.50	C	
		CE 342	Geotechnical Engineering Laboratory	1.50	C	
			Total	**21.5**		

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

Level	Term	Course No.	Course Title	Credit Hours	Status of Course	Selection Basis/ Remarks
3	II	CE 317 *	Design of Concrete Structures II	3.00	C	
		CE 319	Design of Steel Structures	3.00	C	
		CE 333	Environmental Engineering II	4.00	C	
		CE 351	Transportation Engineering I: Transportation Planning & Traffic Engineering	3.00	C	
		WRE 311	Open Channel Flow	4.00	C	
		CE 316	Concrete Structures Design Sessional I	1.50	C	
		CE 320	Steel Structures Design Sessional	1.50	C	
		WRE 312	Open Channel Flow Sessional	1.50	C	
			Total	**21.5**		

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

Level	Term	Course No.	Course Title	Credit Hours	Status of Course	Selection Basis/ Remarks
4	I	CE 401	Project planning and Construction Management	4.00	C	
		CE 411 *	Structural Analysis and Design II	3.00	C	
		CE 441	Foundation Engineering	3.00	C	
		CE 451	Transportation Engineering II: Pavement Design and Railway Engineering	4.00	C	
		WRE 451	Hydrology, Irrigation and Flood Management	3.00	C	
		CE 452	Transportation Engineering Sessional I: Highway Materials and Traffic Engineering Design	1.50	C	
		CE 400 **	Project and Thesis	1.50	C	
			Total	**20.00**		

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

Level	Term	Course No.	Course Title	Credit Hours	Status of Course
4	II	CE 400	Project and Thesis	3.0	Compulsory
		CE 410	Concrete Structures Design Sessional II	1.5	
		CE 403	Socio-economic Aspects of Development Projects	3.0	Select one
		CE 405	Business and Career Development	3.0	
		CE 413	Introduction to Steel-Concrete Composite Structures	2.0	Select two (Structure)
		CE 415	Prestressed Concrete	2.0	
		CE 417	Design of Concrete Structures III	2.0	
		CE 419	Introduction to Finite Element Method	2.0	
		CE 421	Dynamics of Structures	2.0	
		CE 412	Computer Aided Analysis and Design of Structures Sessional	1.5	Structure
		CE 433	Solid and Hazardous Waste Management	2.0	Select two (Environment)
		CE 435	Environmental Pollution Management	2.0	
		CE 437	Environmental and Sustainable Management	2.0	
		CE 432	Design of Water Supply, Sanitation and Sewerage Systems	1.50	Environment

Level	Term	Course No.	Course Title	Credit Hours	Status of Course
4	II	CE 443	Earth Retaining Structures	2.0	Select two (Geotechnical)
		CE 445	Elementary Soil Dynamics	2.0	
		CE 447	Soil-water Interaction	2.0	
		CE 442	Geotechnical Engineering Design Sessional	1.5	Geotechnical
		CE 453	Transportation Engineering III: Traffic Engineering Design and Management	2.0	Select two (Transport.)
		CE 455	Transportation Engineering IV: Pavement Management, Drainage and Airport	2.0	
		CE 457	Transportation Engineering V: Urban Transportation Planning and Management	2.0	
		CE 454	Transportation Engineering Sessional II: Pavement Design and Traffic Studies	1.5	Transport.
		WRE 405	Flood Mitigation and Management	2.0	Select two (Water Resour.)
		WRE 407	Ground Water Engineering	2.0	
		WRE 409	River Engineering	2.0	
		WRE 411	Hydraulic Structures	2.0	
		WRE 413	Coastal Engineering	2.0	
		WRE 412	Water Resources Engineering Sessional	1.50	Water Resour.
			Total	**18.5**	

4.5 COURSE EQUIVALENCE TABLE FOR B.Sc. Engg. (CIVIL) DEGREE:

Equivalence rules as per AC resolution No. 080230 date 21.04.08 will be applicable.

Old Syllabus			New Syllabus		
Course No.	**Description**	**Credit**	**Course No.**	**Description**	**Credit**
CE 100	Civil Engg. Drawing I	1.50	CE 100	Civil Engineering Drawing	1.50
CE 101	Engineering Mechanics	4.00	CE 101	Analytic Mechanics	3.00
CE 102	Civil Engg. Drawing II	1.50	CE 102	Computer Aided Drafting	1.50
CE 103	Surveying	4.00	CE 103	Surveying	4.00
CE 104	Practical Surveying (3 weeks in field)	1.50	CE 104	Practical Surveying	1.50
CE 200	Details of Construction	1.50	CE 200	Details of Construction	1.50
CE 201	Engineering Materials	4.00	CE 201	Engineering Materials	3.00
CE 202	Materials Sessional	1.50	CE 202	Materials Sessional	1.50
CE 203	Engineering Geology and Geomorphology	3.00	CE 203	Engineering Geology and Geomorphology	3.00
CE 205	Numerical Methods	2.00	CE 205	Numerical Methods	2.00

Old Syllabus			New Syllabus		
Course No.	**Description**	**Credit**	**Course No.**	**Description**	**Credit**
CE 206	Computer Programming Sessional	2.5	CE 204	Computer Programming Sessional	1.50
			CE 206	Engineering Computation Sessional	1.50
CE 208	Quantity Surveying	1.50	CE 208	Quantity Surveying	1.50
CE 211	Mechanics of Solids I	3.00	CE 211	Mechanics of Solids I	3.00
CE 212	Structural Mechanics and Materials Sessional	1.50	CE 212	Structural Mechanics and Materials Sessional	1.50
CE 213	Mechanics of Solids II	3.00	CE 213	Mechanics of Solids II	3.00
CE 311	Structural Analysis & Design I	3.00	CE 311	Structural Analysis and Design I	4.00
CE 313	Structural Analysis & Design II	3.00			
CE 312	Structural Analysis and Design Sessional I	1.50	CE 320	Steel Structures Design Sessional	1.50
CE 315	Design of Concrete Structures I	3.00	CE 315	Design of Concrete Structures I	3.00
CE 316	Concrete Structures Sessional	1.50	CE 316	Concrete Structures Design Sessional I	1.50

Old Syllabus			New Syllabus		
Course No.	**Description**	**Credit**	**Course No.**	**Description**	**Credit**
CE 317	Design of Concrete Structures II	4.00	CE 317	Design of Concrete Structures II	3.00
CE 331	Environmental Engineering I	3.00	CE 331	Environmental Engineering I	3.00
CE 332	Environmental Engineering Sessional I	1.50	CE 332	Environmental Engineering Laboratory	1.50
CE 333	Environmental Engineering II	4.00	CE 333	Environmental Engineering II	4.00
CE 341	Geotechnical Engineering I	4.00	CE 341	Principles of Soil Mechanics	4.00
CE 342	Geotechnical Engineering Sessional I	1.50	CE 342	Geotechnical Engineering Laboratory	1.50
CE 343	Geotechnical Engineering II	3.00	CE 441	Foundation Engineering	3.00
CE 351	Transportation Engg. I :Transport & Traffic Design	3.00	CE 351	Transportation Engineering I: Transportation Planning & Traffic Engineering	3.00
CE 353	Transportation Engg. II : Highway design & Railways	4.00	CE 451	Transportation Engineering II: Pavement Design and Railway Engineering	4.00

Old Syllabus			New Syllabus		
Course No.	**Description**	**Credit**	**Course No.**	**Description**	**Credit**
CE 354	Transportation Engineering Sessional I	1.50	CE 452	Transportation Engineering Sessional I: Highway Materials and Traffic Engineering Design	1.50
CE 400	Project and Thesis	1.50	CE 400	Project and Thesis	1.50
CE 400	Project and Thesis	3.00	CE 400	Project and Thesis	3.00
CE 401	Project Planning& Management	3.00	CE 401	Project planning and Construction Management	4.00
CE 403	Professional Practices and Communication	2.00	CE 301	Professional Practices and Communication	3.00
CE 405	Socio-economic Aspects of Development Projects	2.00	CE 403	Socio-economic Aspects of Development Projects	3.00
CE 411	Structural Analysis and Design III	4.00	CE 411	Structural Analysis and Design II	3.00
CE 412	Structural Analysis and Design Sessional II	1.50	CE 410	Concrete Structures Design Sessional II	1.50
CE 413	Theory of Elasticity and Elastic Instability of Structures	2.00		NIL	
CE 415	Prestressed Concrete	2.00	CE 415	Prestressed Concrete	2.00

Old Syllabus			New Syllabus		
Course No.	**Description**	**Credit**	**Course No.**	**Description**	**Credit**
CE 416	Structural Analysis and Design Sessional III	1.50	CE 412	Computer Aided Analysis and Design of Structures Sessional	1.50
CE 417	Design of Steel Structures	2.00	CE 319	Design of Steel Structures	3.00
CE 419	Introduction to Finite Element Method	2.00	CE 419	Introduction to Finite Element Method	2.00
CE 421	Dynamics of Structures	2.00	CE 421	Dynamics of Structures	2.00
CE 431	Environmental Engineering III	2.00	CE 433	Solid and Hazardous Waste Management	2.00
CE 432	Environmental Engineering. Sessional II	1.50	CE 432	Design of Water Supply, Sanitation and Sewerage Systems	1.50
CE 433	Environmental Engineering IV	2.00	CE 435	Environmental Pollution Management	2.00
CE 435	Environmental Engineering V	2.00	CE 437	Environmental and Sustainable Management	2.00
CE 441	Geotechnical Engineering III	2.00	CE 443	Earth Retaining Structures	2.00
CE 442	Geotechnical Engineering Seasonal II	1.50	CE 442	Geotechnical Engineering Design Sessional	1.50
CE 443	Geotechnical Engineering IV	2.00	CE 445	Elementary Soil Dynamics	2.00

Old Syllabus			New Syllabus		
Course No.	**Description**	**Credit**	**Course No.**	**Description**	**Credit**
CE 445	Geotechnical Engineering V	2.00	CE 447	Soil-water Interaction	2.00
CE 451	Transportation Engg. III :Traffic Planning & Management	2.00	CE 453	Transportation Engineering III: Traffic Engineering Design and Management	2.00
CE 452	Transportation Engineering Sessional II	1.50	CE 454	Transportation Engineering Sessional II: Pavement Design and Traffic Studies	1.50
CE 453	Transportation Engg. IV :Highway Drainage & Airports	2.00	CE 455	Transportation Engineering IV: Pavement Management, Drainage and Airport	2.00
CE 455	Transportation Engg. V :Transport Projects and Operations	2.00	CE 457	Transportation Engineering V: Urban Transportation Planning and Management	2.00
EEE 165	Basic Electrical Technology	3.00	EEE 165	Basic Electrical Technology	3.00
EEE 166	Basic Electrical Technology Laboratory	1.50		NIL	
Shop 132	Carpentry Shop, Machine Shop and Welding Shop Sessional	1.50	Shop 132	Workshop Sessional	1.50

Old Syllabus			New Syllabus		
Course No.	**Description**	**Credit**	**Course No.**	**Description**	**Credit**
WRE 201	Fluid Mechanics	4.00	WRE 211	Fluid Mechanics	3.00
WRE 202	Fluid Mechanics Sessional	1.50	WRE 212	Fluid Mechanics Sessional	1.50
WRE 301	Open Channel Flow	4.00	WRE 311	Open Channel Flow	4.00
WRE 302	Open Channel Flow Sessional	1.50	WRE 312	Open Channel Flow Sessional	1.50
WRE 303	Hydrology	3.00	WRE 451	Hydrology, Irrigation and Flood Management	3.00
WRE 401	Irrigation and Flood Control	3.00			
WRE 402	Irrigation and Flood Control Sessional	1.50		NIL	
WRE 403	Integrated Water Resources Planning & Management	2.00		NIL	
WRE 405	Flood Mitigation and Management	2.00	WRE 405	Flood Mitigation and Management	2.00
WRE 407	Ground Water Engineering	2.00	WRE 407	Ground Water Engineering	2.00
WRE 409	River Engineering	2.00	WRE 409	River Engineering	2.00

Old Syllabus			New Syllabus		
Course No.	**Description**	**Credit**	**Course No.**	**Description**	**Credit**
WRE 411	Hydraulic Structures	2.00	WRE 411	Hydraulic Structures	2.00
WRE 412	Water Resources Engineering Sessional	1.50	WRE 412	Water Resources Engineering Sessional	1.50
WRE 413	Coastal Engineering	2.00	WRE 413	Coastal Engineering	2.00
WRE 400	Project and Thesis	4.50		NIL	
Chem 103	Chemistry I	3.00	Chem 103	Chemistry I	3.00
Chem 105	Chemistry II	3.00	Chem 105	Chemistry II	3.00
Chem 114	Inorganic Quantitative Analysis (Sessional)	1.50	Chem 114	Inorganic Quantitative Analysis	1.50
Hum 111	English	2.00	Hum 185	English	2.00
Hum 113	Economics	2.00	Hum 217	Engineering Economics	2.00
Hum 207	Advanced English	2.00		NIL	
Hum 211	Sociology	2.00	Hum 355	Sociology	2.00
Hum 213	Government	2.00	Hum 375	Government	2.00

Old Syllabus			New Syllabus		
Course No.	**Description**	**Credit**	**Course No.**	**Description**	**Credit**
Hum 313	Principles of Accounting	2.00	Hum 353	Accounting	2.00
Math 131 Math 133	Mathematics I OR Mathematics II	3.00 3.00	Math 137	Differential and Integral Calculus, Matrices	3.00
Math 231	Differential Equations	3.00	Math 139	Differential Equations and Statistics	3.00
Math 233	Fourier Analysis, Harmonic Functions and Laplace Transform	3.00		NIL	
Math 235	Vector Analysis and Statistics	3.00	Math 237	Laplace Transform and Vector Analysis	3.00
Phy 101	Physical Optics, Heat, Waves and Oscillation	3.00	Phy 101	Physical Optics, Waves and Oscillation, Heat and Thermodynamics	3.00
Phy 102	Physics Lab.	1.50	Phy 102	Physics Laboratory	1.50
Phy 105	Structure of Matter, Electricity and Magnetism and Modern Physics	3.00	Phy 105	Structure of Matter, Electricity and Magnetism and Modern Physics **Phy 105 is now Phy 151**	3.00

Chapter 5

Detail Outline of Undergraduate Courses

5.1 COURSES OFFERED BY THE DEPARTMENT OF CIVIL ENGINEERING:

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

Lines and lettering; plane geometry: drawing of linear and curved geometric figures, e.g. pentagon, hexagon, octagon, ellipse, parabola, hyperbola; solid geometry: concept of isometric view and oblique view, theory of projections; drawing of isometric view of 3d objects such as cube, prism, pyramid, cone and cylinder; projections of cube, prism, cone, cylinder; developments of cube, pyramid, cone, cylinder; plan, elevations and sections of one storied and duplex building.

CE 101: Analytic Mechanics
3.00 credits, 3 hrs/week

Coplanar and non-coplanar force systems; moments; analyses of two-dimensional frames and trusses; friction; flexible chords; centroids of lines, areas and volumes; moments of inertia of areas and masses; plane motion; principles of work and energy; impulse and momentum; virtual work principle for rigid bodies.

CE 102: Computer Aided Drafting
1.50 Credits, 3 hrs/week

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

CE 103: Surveying
4.00 credits, 4 hrs/week

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

CE 104: Practical Surveying
1.50 credits, 3 hrs/week

Linear and angular measurement techniques; traverse surveying; leveling and contouring; curve setting; tacheometry; project surveying; modern surveying equipment and their applications.

CE 106: Engineering Drawing
1.50 credits, 3 hrs/week. (For EEE Dept.)

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

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

Types of building, components of a building, design loads, framed structure and load bearing wall structure; foundations: shallow foundation and deep foundation, site exploration, bearing capacity of soil, standard penetration test; brick masonry: types of brick, bonds in brickwork, supervision of brickwork, brick laying tools, defects and strength on brick masonry, typical structures in brickwork, load bearing and non-load bearing walls, cavity walls, partition walls; lintels and arches: different types of lintels and arches, loading on lintels, construction of arches; stairs: different types of stairs, floors:

ground floors and upper floors; roofs and roof coverings; shoring; underpinning; scaffolding and formwork; plastering, pointing, painting; distempering and white washing; cement concrete construction; sound insulation: acoustics; thermal insulation; house plumbing: water supply and wastewater drainage.

CE 201: Engineering Materials
3.00 credits, 3 hrs/week

Properties and uses of aggregates, brick, cement; sand, lime, mortars; concrete; concrete mix design; wood structures and properties; shrinkage and seasoning; treatment and durability; mechanical properties; wood products; advanced fiber reinforced polymer (FRP) composites and its application to civil engineering; reinforcement types, basic property of FRP composites and available FRP composite products; definition of stress and strain; plane stress and strain condition; identification of strain components of elastic, elasto-plastic and elasto-visco-plastic materials; time dependent strain response of these materials due to different types of loadings; mathematical and simple rheological modeling for prediction of creep behavior; ferrocement: advantages and uses; corrosion and prevention of steel in RC structures, offshore structures and ground applications.

CE 202: Materials Sessional
1.50 credits, 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, initial setting time, soundness and fineness test of cement; direct tensile and compressive strengths of cement mortar; gradation of coarse and fine aggregates; design and testing of a concrete mix, sampling and testing of bricks for absorption, unit weight, efflorescence and compressive strength.

CE 203: Engineering Geology and Geomorphology
3.00 credits, 3 hrs/week
Minerals; identification of minerals, common rock forming minerals; physical properties of minerals; mineraloids rocks; types of rocks, cycle of rock change; earthquake and seismic map of Bangladesh.

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

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

CE 204: Computer Programming Sessional
1.50 credits, 3 hrs/week

Programming concepts and algorithms; internal representation of data; elements of structured programming language: data types, operators, expressions, control structures, functions, pointers and arrays, input and output; concept of Object Oriented Programming (OOP): encapsulation, inheritance, polymorphism and abstraction.

CE 205: Numerical Methods
2.00 credits, 2 hrs/week

Systems of linear algebraic equations; interpolation and curve fitting; roots of equations; numerical differentiation; numerical integration; initial value problems; two-point boundary value problems; finite differences.

CE 206: Engineering Computation Sessional
1.50 credits, 3 hrs/week
Prereq. CE 204

Introduction to hi-level computational programming tools; application to numerical analysis: basic matrix computation, solving systems of linear equations, non-linear equations, differential equations, interpolation and curve fitting, numerical differentiation, numerical integration; application to engineering problems: solving problems related to mechanics, numerical solution of equation of motion etc.

CE 207: Applied Mathematics for Engineers
3.00 credits, 3 hrs/week

Review of differential equations; power series solution of differential equations and their applications: Frobenius method, Legendre's polynomials, gamma function, Bessel's function; integral form of differential equation and its application to engineering problem solving.

Fourier series and its properties, application to engineering problem solving; Fourier integral; Fourier transforms and their uses in solving boundary value problems; diffusion equation, wave equation, Laplace equation and their applications.

Application of statistical methods to engineering problems:
Random variables; discrete and continuous probability distributions; functions of random variables and derived distributions; expectation and moments of random variables; point estimation of distribution parameters: methods of moments and maximum likelihood, Bayesian analysis; confidence intervals; hypothesis tests; nonparametric statistical tests; simple and multiple linear regression and model selection; uncertainty and reliability analysis; project level decision making and quality control.

CE 208: Quantity Surveying
1.50 credits, 3 hrs/week

Earthwork excavation for roadway, earthwork computation from spot levels; estimation for residential building: estimation of slab, beam, column, footing; analysis of rates, specifications, costing of residential building; estimation and costing of septic tank; estimation and costing of underground water reservoir; estimation and costing of retaining wall; estimation and costing of slab culvert; estimation and costing of bridges; highways construction; estimation of steel truss; computer aided quantity estimation; construction site survey and estimation.

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

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

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

CE 210: Architectural, Engineering and Planning Appreciation
1.50 credits, 3 hrs/week

Appreciation of architecture, mechanical engineering, urban and regional planning; environmental issues.

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

Concepts of stress and strain, constitutive relationships; deformations due to tension, compression and temperature change; beam statics: reactions, axial force, shear force and bending moments; axial force, shear force and bending moment diagrams using method of section and summation approach; elastic analysis of circular shafts, solid non-circular and thin walled tubular members subjected to torsion; flexural and shear stresses in beams; shear centre; thin walled pressure vessels.

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

Tension, direct shear and impact tests of mild steel specimen; slender column test; static bending test; hardness test of metals; helical spring test; determination of shear centre; study of structural models: truss, beam frame.

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

Symmetric and unsymmetric bending of beams; stress transformation, failure criteria; beam deflection by direct integration and moment area method; buckling of columns; elastic strain energy and external work; cable and cable supported structures; bolted, riveted and welded joints.

CE 221: Mechanics of Solids I
3.00 credits, 3 hrs/week. (For WRE Dept.)
Prereq. WRE 101

Concepts of stress and strain, constitutive relationships; deformations due to tension, compression and temperature change; beam statics: reactions, axial force, shear force and bending moments; axial force, shear force and bending moment diagrams using method of section and summation approach; elastic analysis of circular shafts, solid non-circular and thin walled tubular members subjected to torsion; flexural and shear stresses in beams; shear centre; thin walled pressure vessels.

CE 222: Structural Mechanics and Materials Sessional
1.50 credits, 3 hrs/week. (For WRE Dept.)

Tension, direct shear and impact tests of mild steel specimen; slender column test; static bending test; hardness test of metals; hellical spring test; determination of shear centre; study of structural models: truss, beam frame.

CE 223: Mechanics of Solids II
3.00 credits, 3 hrs/week. (For WRE Dept.)
Prereq. CE 221

Symmetric and unsymmetric bending of beams; stress transformation, failure criteria; beam deflection by direct integration and moment area method; buckling of columns; elastic strain energy and external work; cable and cable supported structures; bolted, riveted and welded joints.

CE 265: Structure I: Mechanics
2.00 credits, 2 hrs/week. (For Arch. Dept.)

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

CE 267: Structure II: Basic Mechanics of Solids
2.00 credits, 2 hrs/week. (For Arch. Dept.)

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

CE 271: Building Services I: Plumbing
2.00 credits, 2 hrs/week. (For Arch. Dept.)

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

CE 290: Details of Construction
1.50 credits, 3 hrs/week. (For WRE Dept.)

Types of building, components of a building, design loads, framed structure and load bearing wall structure; foundations: shallow foundation and deep foundation, site exploration, bearing capacity of soil, standard penetration test; brick masonry: types of brick, bonds in brickwork, supervision of brickwork, brick laying tools, defects and strength on brick masonry, typical structures in brickwork, load bearing and non-load bearing walls, cavity walls, partition walls; lintels and arches: different types of lintels and arches, loading on lintels, construction of arches; stairs: different types of stairs; floors: ground floors and upper floors; roofs and roof coverings; shoring; underpinning; scaffolding and formwork; plastering, pointing, painting; distempering and white washing; cement concrete

construction; sound insulation: acoustics; thermal insulation; house plumbing: water supply and wastewater drainage.

CE 291: Engineering Materials
3.00 credits, 3 hrs/week. (For WRE Dept.)

Properties and uses of aggregates, brick, cement; sand, lime, mortars; concrete; concrete mix design; wood structures and properties; shrinkage and seasoning; treatment and durability; mechanical properties; wood products; advanced fiber reinforced polymer (FRP) composites and its application to civil engineering; reinforcement types, basic property of FRP composites and available FRP composite products; definition of stress and strain; plane stress and strain condition; identification of strain components of elastic, elasto-plastic and elasto-visco-plastic materials; time dependent strain response of these materials due to different types of loadings; mathematical and simple rheological modeling for prediction of creep behavior; ferrocement: advantages and uses; corrosion and prevention of steel in RC structures, offshore structures and ground applications.

CE 292: Materials Sessional
1.50 credits, 3 hrs/week. (For WRE Dept.)

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, initial setting time, soundness and fineness test of cement; direct tensile and compressive strengths of cement mortar; gradation of coarse and fine aggregates; design and testing of a concrete mix, sampling and testing of bricks for absorption, unit weight, efflorescence and compressive strength.

CE 301: Professional Practices and Communication
3.00 credits, 3 hrs/week

Project, its characteristic feature, project life cycle; type of contracts; procurement regulations and law; documents for procurement of works, goods and services and their application; contract risk and contract responsibility; insurances; tender procedure; claims, disputes and arbitration procedure; measures for reducing fiduciary risks.

Introduction to communication concepts, modes of communication,

methods of effective communication; writing reports; oral presentation of reports; writing proposals; preparing effective business messages; conducting meetings; strategies for effective speaking and successful inter personal communication; job application process, interviews and follow-ups; an introduction to the code of ethics for engineers.

CE 302: Professional Practices and Communication Sessional
1.50 credits, 3 hrs/week

Application of communication theory and professional practice approaches in a controlled class room environment; this may include case study analysis, role playing, preparing small reports and proposals, class room presentations and individual reports etc.

CE 311: Structural Analysis and Design I
4.00 credits, 4 hrs/week
Prereq. CE 213

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

Wind and earthquake loads; approximate analysis of statically indeterminate structures: braced trusses, portal method, cantilever method and vertical load analysis of multi storied building frames; deflection of beams, trusses and frames by virtual work method.

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

Fundamental behavior of reinforced concrete; introduction to strength design and alternate design methods; flexural design of beams (singly reinforced, doubly reinforced, T-beam) using strength design method; shear, diagonal tension and torsion of beams; bond and anchorage; design of one way slabs; design of two-way edge supported slabs: using strip and alternate methods.

CE 316: Concrete Structures Design Sessional I
1.50 credits, 3 hrs/week

Analysis and design problems based on CE 315; design of slab bridge, balanced cantilever bridge and low-rise building.

CE 317: Design of Concrete Structures II
3.00 credits, 3 hrs/week
Prereq. CE 315

Design of column supported slabs; introduction to floor systems; design of columns under uniaxial and biaxial loading, introduction to slender column; structural design of footings, pile caps; seismic detailing; shear wall; structural forms; introduction to prestressed concrete; analysis and preliminary design of prestressed beam sections.

CE 319: Design of Steel Structures
3.00 credits, 3 hrs/week

Behavioral principles and design of structural steel; design of tension members, bolted and welded connections; compression members; residual stress, local buckling, effective length; flexural members; lateral torsional buckling; design of beam-columns; connection design, moment connections, column bases; detailing of steel structures.

CE 320: Steel Structures Design Sessional
1.50 credits, 3 hrs/week

Computer based analysis of steel structures e.g. roof truss and bridge truss; design of members and joints of roof and bridge truss.

CE 321: Structural Analysis and Design I
4.00 credits, 4 hrs/week. (For WRE Dept.)
Prereq. CE 223

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

Wind and earthquake loads; approximate analysis of statically indeterminate structures: braced trusses, portal method, cantilever method and vertical load analysis of multi storied building frames; deflection of beams, trusses and frames by virtual work method.

CE 322: Structural Analysis and Design Sessional
1.50 credits, 3 hrs/week. (For WRE Dept.)

Computer based analysis of steel structures: roof truss and bridge truss; design of members and joints of roof and bridge truss.

CE 323: Design of Concrete Structures I
3.00 credits, 3 hrs/week. (For WRE Dept.)

Fundamental behavior of reinforced concrete; introduction to strength design and alternate design methods; flexural design of beams (singly reinforced, doubly reinforced, T-beam) using strength design method; shear, diagonal tension and torsion of beams; bond and anchorage; design of one way slabs; design of two-way edge supported slabs: using strip and alternate methods.

CE 324: Concrete Structures Design Sessional I
1.50 credits, 3 hrs/week. (For WRE Dept.)

Analysis and design problems based on CE 323; design of slab bridge, balanced cantilever bridge and low-rise building.

CE 325: Design of Concrete Structures II
3.00 credits, 3 hrs/week. (For WRE Dept.)
Prereq. CE 323

Design of column supported slabs; introduction to floor systems; design of columns under uniaxial and biaxial loading, introduction to slender column; structural design of footings, pile caps; seismic detailing; shear wall; structural forms; introduction to prestressed concrete; analysis and preliminary design of prestressed beam sections.

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

Introduction to Environmental Engineering: ecology and environment; climate change; biodiversity.

Water Supply Engineering: introduction; water demands; water supply sources; ground water exploration: aquifer properties and ground water flow, well hydraulics, water well design, drilling,

construction and maintenance; water demand for rural communities; shallow hand tubewells, deep tubewells, deep set pumps and alternative water supplies for problem areas.

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

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

CE 332: Environmental Engineering Laboratory
1.50 credits, 3 hrs/week

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

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

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

Microbiology of wastewater; wastewater characteristics; wastewater treatment and disposal; treatment and disposal of industrial effluents; sludge treatment and disposal; sanitation and health; low cost sanitation technology; septic tank system.

Sustainability of water and sanitation services; participatory development approach in water and sanitation sector; community management of water and sanitation services.

Introduction to solid and hazardous waste management; environmental management and environmental impact assessment.

CE 341: Principles of Soil Mechanics
4.00 credits, 4 hrs/week
Prereq. CE203

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 behavior of soils; lateral earth pressure; stress distribution.

CE 342: Geotechnical Engineering Laboratory
1.50 credits, 3 hrs/week

Field identification tests of soils; 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; test of geotextiles.

CE 351: Transportation Engineering I: Transportation Planning and Traffic Engineering
3.00 credits, 3 hrs/week

Transportation engineering, transportation functions; transportation systems, functional components, factors in transportation development, transportation modes, public transportation, emerging modes; intelligent transportation system: components and applications; transport planning: concepts, scope and hierarchy, process, goals and objectives, inventories, socio-economic activities, land use-transport interaction, travel demand forecasting; road safety and accident analysis.

Geometric design of highways: design controls and criteria, cross sectional elements, alignment, sight distance, intersection and interchange layouts, planning and design of bicycle and pedestrian facilities; traffic engineering: fundamentals of traffic engineering, vehicle and traffic characteristics, traffic control devices and systems, traffic studies, planning and design of parking facilities, roadway lighting; transportation in Bangladesh: transportation modes and networks, constraints and challenges, transport demand and modal share, road classification and design standards.

CE 361: Elements of Solid Mechanics
3 credits, 3 hrs/week. (For URP Dept.)

Force, resultants and components, moments and parallel coplanar forces, centroids, moment of inertia; fundamental concepts of stress and strain; mechanical properties of materials: stress and strain in members subjected to tensile, compressive and shear forces; bending moment and shear force diagrams for statically determinate structures.

CE 363: Elements of Civil Engineering Structures
3 credits, 3 hrs/week. (For URP Dept.)

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

CE 365: Structure III: Mechanics of Solids
2.00 credit, 2 hrs/week. (For Arch Dept.)

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

CE 367: Structure IV: Steel and Timber Structures
2.00 credits, 2 hrs/week. (For Arch Dept.)

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

CE 371: Environmental Engineering
4.00 credits, 4 hrs/week (For WRE Dept.)

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

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

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

CE 372: Environmental Engineering Sessional
1.5 credits, 3 hrs/week. (For WRE Dept.)

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

CE 381: Principles of Soil Mechanics
4.00 credits, 4 hrs/week. (For WRE Dept.)

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 behavior of soils; lateral earth pressure; stress distribution.

CE 382: Geotechnical Engineering Laboratory
1.50 credits, 3 hrs/week. (For WRE Dept.)

Field identification tests of soils; 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; test of geotextiles.

CE 391: Transportation Engineering
4.00 credits, 4 hrs/week. (For WRE Dept.)

Introduction to transportation engineering; elements and modes of transportation system; considerations in the planning, financing and development of transportation system; traffic safety issues; 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 392: Transportation Engineering Sessional
1.5 credits, 3 hrs/week. (For WRE Dept.)

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

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

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

CE 401: Project planning and Construction Management
4.00 credits, 4 hrs/week

Project planning and evaluation; feasibility reports; cash flows, pay back period, internal rate of return; benefit-cost ratio; cost-benefit analysis case studies;

Planning and scheduling, PERT, CPM; resource scheduling; linear programming and application.

Principles of management; construction management: principles, project organization, methods and practices, technology, management of materials and equipments, site management, contracts and specifications, inspection and quality control, safety, economy.

Conflict management; psychology in administration: human factors in management; human resource management.

Demand forecasting; inventory control; stores management; procurement; legal issues in construction; environmental regulations.

CE 403: Socio-economic Aspects of Development Projects
3.00 credits, 3 hrs/week

Economics and social structure; development and economic growth; socio-economic indicators; concept of human development, human development index; gender related human development index; human poverty and human poverty index; poverty reduction strategies in Bangladesh; concepts of sustainable development; MDGs.

Characteristics of development projects; human interest related aspects; population displacement; resettlement and rehabilitation strategy;

Productivity; land loss, land use and land ownership patterns; fisheries and aquaculture; deforestation and afforestation; communication, commerce, industries and other economic benefits; water supply, sanitation, health and nutrition; inequalities in distribution of benefits and losses;

Socio-economic impact assessment approach; socio-economic survey; case studies.

CE 405: Business and Career Development
3.00 credits, 3 hrs/week

Techniques of effective communication in professional environment; writing techniques of modern business letters, memos and reports; human resource management: source of manpower, methods of selection and recruitment, development and motivating the workforce, appraisal procedures, employee compensation and benefits; basic marketing management, segmentation and market analysis, marketing strategies and use of marketing tools; branding, choosing brand elements, brand extension and its advantages and disadvantages; introduction to operations management, basic production decisions of an organization, quality control within operations process.

CE 410: Concrete Structures Design Sessional II
1.50 credits, 3 hrs/week

Computer applications in the analysis of buildings and PC girder bridges; design of multistoried RCC frame residential building and simple span PC girder bridge.

CE 411: Structural Analysis and Design II
3.00 credits, 3 hrs/week
Prereq. 311
Analysis of statically indeterminate beams and frames by moment distribution, consistent deformation/flexibility and stiffness methods; algorithms for implementing direct stiffness method in computer; influence lines of statically indeterminate beams and frames.

CE 412: Computer Aided Analysis and Design of Structures Sessional
1.50 credits, 3 hrs/week

Computer aided analysis and design of various reinforced concrete and steel structures, e.g. high-rise building, modular bridge, water tower etc.

CE 413: Introduction to Steel-Concrete Composite Structures
2.00 credits, 2 hrs/week

Introduction to composite structures; advantages of composite construction; interaction between steel and concrete, shear connectors, elastic analysis of composite beams, beam-column connections, behavior of different types of composite columns, axial load capacity and interaction diagrams for composite columns.

CE 415: Prestressed Concrete
2.00 credits, 2 hrs/week

Prestressed Concrete: concepts of prestressing; materials; anchorage systems; loss of prestress; analysis of sections for flexure, shear, bond and bearing; analysis of end block and composite sections; beam deflections; cable layout; partial prestress.

Design of prestressed concrete beams for simple and continuous spans; ideas about use of AASHTO – PCI sections for standard spans; design considerations for prestressed concrete pipes, piles, poles and railway sleepers.

CE 417: Design of Concrete Structures III
2.00 credits, 2 hrs/week

Analysis and design for torsion; design of one way and two way joist slabs with or without beam on the column line; design and detailing of lateral load resisting components: shear wall, lift cores, diaphragm etc.; design of reinforcement at joints.

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

Introduction to finite element method as applied to stress analysis problems; basic equations in elasticity, matrix displacement formulation, element shapes, nodes, nodal unknowns and coordinate system, shape functions, strain displacement matrix, methods for assembling stiffness equations e.g. direct approach, Galerkin's method, virtual work method, principle of minimum potential energy; introduction to isoparametric formulation; discritization of a structure and mesh refinement, one dimensional stress-deformation and two dimensional plane stress and plane strain analysis of stress-deformation problems; numerical integration and computer application.

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

Single degree of freedom system, formulation of equation of motion; free vibration response; response to harmonic, impulse and general dynamic loading; vibration analysis by Rayleigh's method; response spectra; two degrees of freedom system.

CE 424: Concrete Structures Design Sessional II
1.50 credits, 3 hrs/week. (For WRE Dept.)

Computer applications in the analysis of buildings and PC girder bridges; design of multistoried RCC frame residential building and simple span PC girder bridge.

CE 425: Structural Analysis and Design II
3.00 credits, 3 hrs/week. (For WRE Dept.)
Prereq. 321

Analysis of statically indeterminate beams and frames by moment distribution, consistent deformation/flexibility and stiffness methods; algorithms for implementing direct stiffness method in computer; influence lines of statically indeterminate beams and frames.

CE 432: Design of Water Supply, Sanitation and Sewerage Systems
1.50 credits, 3 hrs/week

Design of water supply and sewerage system: estimation of industrial, domestic and fire demands, designing deep tubewell and water distribution network; estimation of industrial, domestic and commercial wastewater generation, wastewater network design; household plumbing system design; design of water and wastewater treatment plant; computer application in environmental engineering; field visits and reporting.

CE 433: Solid and Hazardous Waste Management
2.00 credits, 2 hrs/week

Solid Waste Management: sources and types of solid wastes; physical and chemical properties of solid wastes; solid waste generation; on-site handling, storage and processing; collection of solid wastes; transfer stations and transport; ultimate disposal methods; resources and energy recovery and recycling; soil pollution; industrial solid waste collection and disposal.

Hazardous Waste Management: identification, sources and characteristics of hazardous wastes; hospital waste management practices; legal aspects; auditing and prevention; methods of treatment and disposal – physical, chemical, biological and thermal treatment;

stabilization and solidification, engineering storage, incineration, landfill and deep burial.

CE 435: Environmental Pollution Management
2.00 credits, 2 hrs/week

Environmental pollution and its Control; water pollution: sources and types of pollutants; waste assimilation capacity of streams; dissolved oxygen modeling; ecological balance of streams; industrial pollution; heavy metal contamination; detergent pollution and eutrophication; groundwater pollution; marine pollution; pollution control measures: water quality monitoring and management.

Air pollution: sources and types of pollutants; effects of various pollutants on human health, materials and plants; air pollution meteorology; global warming, climate change and ozone layer depletion; acid rain; air pollution monitoring and control measures; introduction to air quality models.

CE 437: Environmental and Sustainable Management
2.00 credits, 2 hrs/week

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

CE 441: Foundation Engineering
3.00 credits, 3 hrs/week

Soil investigation techniques; 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 442: Geotechnical Engineering Design Sessional
1.50 credits, 3 hrs/week

Computer aided design of foundations: footing, pile and pile cap, pier, raft/mat foundations and caisson; retaining structures: shore pile, abutment, retaining walls; reinforced soils.

CE 443: Earth Retaining Structures
2.00 credits, 2 hrs/week

Foundation of structures subjected to lateral loads; rigid and flexible earth retaining structures; methods of construction: dewatering and slurry-wall construction, braced excavation, sheet piles, cofferdams, caissons.

CE 445: Elementary Soil Dynamics
2.00 credits, 2 hrs/week

Elementary vibrations; dynamic properties of soil; seismic response of soils: site effects, site amplification, liquefaction problems, remedial measures and earthquake hazards.

CE 447: Soil-water Interaction
2.00 credits, 2 hrs/week

Introduction to soil-water interaction problems: permeability, capillarity and soil suction; slopes subjected to water current, wave action etc; theories of filters and revetment design; geotechnical design of landfills.

CE 451: Transportation Engineering II: Pavement Design and Railway Engineering
4.00 credits, 4 hrs/week

Pavement materials: bituminous binders, cement, aggregates, embankment material, soil stabilization; mix design methods; low cost roads; flexible and rigid pavement: pavement components and functions, pavement design and construction, road maintenance; railway engineering: general requirements, rolling stock and tracks, stations and yards, points and crossings, signaling, maintenance operations.

CE 452: Transportation Engineering Sessional I: Highway Materials and Traffic Engineering Design
1.50 credits, 3 hrs/week

Testing and quality control of highway materials; bituminous mix design; roadway traffic and capacity analysis; computer models and application packages.

CE 453: Transportation Engineering III: Traffic Engineering Design and Management
2.00 credits, 2 hrs/week

Advanced concepts of traffic management, management strategies; analysis of traffic flow characteristics; traffic control devises; intersection control and design; grade separation and interchanges; computer application in traffic system analysis; introduction to micro simulation and ITS; NMT issues and road safety.

CE 454: Transportation Engineering Sessional II: Pavement Design and Traffic Studies
1.50 credits, 3 hrs/week

Design of flexible and rigid pavement and air field pavements; geometric design; road intersection design and interchanges; traffic studies.

CE 455: Transportation Engineering IV: Pavement Management, Drainage and Airport
2.00 credits, 2 hrs/week

Pavement management systems; evaluation and strengthening of pavements; drainage: highway drainage and drainage structures; airports: importance, advantages and trends in air transportation, planning and design of airports, aircraft characteristics related to airport design, types and elements of airport planning studies, airport configuration, geometric design of the landing area, terminal area, heliports, design of airport pavements, lighting, marking and signing, airport drainage.

CE 457: Transportation Engineering V: Urban Transportation Planning and Management
2.00 credit, 2 hrs/week

The urban transport problems and trends; road network planning; characteristics and operation of different transit and paratransit modes, planning transit network; estimating system costs and benefits, pricing and financing, evaluation, transit users attitude, policies and strategies for transit development in metropolitan cities; freight traffic planning and management; selected transport case studies, congestion management; safety management; environmental issues and sustainable transport.

CE 465: Structure V: Reinforced Concrete Design
2.00 credits, 2 hrs/week. (For Arch Dept.)

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

CE 467: Structure VI: Elements of Building Structure
2.00 credits, 2 hrs/week. (For Arch Dept.)

Reinforced concrete columns, stocky and long; preliminary analysis of column sections in multistoried buildings; grids, approximate analysis; approximate analysis of multistoried buildings for gravity and lateral loads; vierendeel truss; folded plates; introduction to shearwalls - preliminary design; introduction and preliminary design of arches, domes and shells; classification of shells; prestressed concrete: introduction, analysis and preliminary design of beam sections.

CE 471: Basic Environmental Engineering
3 credits, 3 hrs/week. (For URP Dept.)

Introduction to environmental engineering; human and environment interaction.

Water Supply: objectives and basic elements of water supply system; water requirements; population prediction and water demand

assessment; fire demand; planning of water supply systems - sources, abstraction, transmission, treatment and distribution.

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

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

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

CE 481: Foundation Engineering
3.00 credit, 3 hrs/week. (For WRE Dept.)

Soil investigation techniques; 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.

5.2 COURSES OFFERED BY THE DEPARTMENT OF WATER RESOURCES ENGINEERING

WRE 211: Fluid Mechanics
3.00 credit, 3 hrs/week

Fluid properties; fluid statics; kinematics of fluid flows; fluid flow concepts and basic equations- continuity equation, Bernoulli's equation, energy equation, momentum equation and forces in fluid flow; 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; pipe flow problems-pipes in series and parallel, branching pipes, pipe networks.

WRE 212: Fluid Mechanics Sessional
1.5 Credit, 3 hrs/week

Centre of pressure; proof of Bernoulli's theorem; flow through venturimeter; flow through orifice; coefficient of velocity by

coordinate method; flow through mouthpiece; flow over v-notch; flow over sharp-crested weir; fluid friction in pipe.

WRE 311: 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; principles of flow measurement and devices; concept of uniform flow, Chezy and Manning equations, estimation of resistance coefficients and computation of uniform flow; momentum equation and specific momentum; hydraulic jump theory and analysis of gradually varied flow; computation of flow profiles; design of channels.

WRE 312: Open Channel Flow Sessional
1.5 Credit, 3 hrs/week

Broad-crested weir; sluice gate; venturi flume; parshall flume; cutthroat flume; hydraulic jump; velocity distribution profile; Manning's roughness coefficient; specific force and specific energy.

WRE 451: Hydrology, Irrigation and Flood Management
3.00 Credit, 3 hrs/week

Hydrologic cycle; hydrologic measurement: precipitation, evaporation and stream flow; hydrographs; plant-soil-water relationship; consumptive use and estimation of irrigation water requirements; methods of irrigation; quality of irrigation water; problems of irrigated land; flood and its management.

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

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

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

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

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

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

Behavior of alluvial rivers; river channel pattern and fluvial processes; aggradation and degradation, local scours, river training and bank protection works; navigation and dredging sediment movement in river channels, bed form and flow regimes.

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

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

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

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

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

Coast and coastal features; tides and currents; tidal flow measurement; waves and storm surges; docks and harbours; forces of waves and tides in the design of coastal and harbour structures; coastal sedimentation processes; deltas and estuaries; shore protection works; dredging and dredgers.

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

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

Electrical units and standards; electrical network and circuit solution: series, parallel, node and mesh analysis; instantaneous current, voltage and power, effective current and voltage, average power; sinusoidal single phase RLC circuits: phasor algebra, balanced three phase circuits; electrical wiring for residential and commercial loads; introduction to transformers and induction motors.

5.4 COURSES OFFERED BY THE DEPARTMENT OF PHYSICS:

Phy 101 : Physical Optics, Waves and Oscillation, Heat and Thermodynamics
3.00 Credit, 3 hrs/week

Physical Optics: theories of light; Young's double slit experiment, displacement of fringes and its uses, Fresnel bi-prism, interference at wedge shaped films, Newton's rings, interferometers; diffraction of light; Fresnel and Fraunhoffer diffraction, diffraction by single slit, diffraction from a circular aperture, resolving power of optical instruments, diffraction at double slit and n-slits-diffraction grating; polarization; production and analysis of polarized light, Brewster's law, Malus law, polarization by double refraction, retardation plates, nicol prism, optical activity, polarimeters, polaroid.

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

Heat and Thermodynamics: principle of temperature measurements: platinum resistance thermometer, thermo-electric thermometer, pyrometer; kinetic theory of gases: Maxwell's distribution of molecular speeds, mean free path, equipartition of energy, Brownian motion, Vander Waal's equation of state, review of the first law of thermodynamics and its application, reversible and irreversible processes, second law of thermodynamics, Carnot cycle; efficiency of heat engines, Carnots theorem, entropy and disorder, thermodynamic functions, Maxwell relations, Clausius-Clapeyron equation, Gibbs phase rule, third law of thermodynamics.

Phy 102: Physics Laboratory
1.50 Credit, 3 hrs/week

Determination of line frequency by Lissajous figures using an oscilloscope and a function generator and verification of the calibration of time/div knob at a particular position for different frequencies; determination of frequency of a tuning fork by Melde's apparatus; determination of the spring constant and the effective mass of a loaded spring; to draw magnetic induction versus current curve for a circular coil using Biot-Savart law and hence to verify tangent law; determination of the moment of inertia of a fly-wheel about its axis of rotation; determination of rigidity modulus of the material of a wire by static method; determination of the pressure-coefficient of air by constant volume air thermometer; determination of the thermal conductivity of a bad conductor by lee's method; to plot the thermo-electromotive force vs temperature (calibration) curve for a given thermocouple (e5); determination of the melting point of a solid using the calibration curve obtained in experiment-e5; determination of the mechanical equivalent of heat by electrical method; determination of the focal length of (i) a convex lens by displacement method and (ii) a

concave lens by an auxiliary lens method; determination of the radius of curvature of a plano-convex lens by Newton's ring method; determination of specific rotation of sugar solution by a polarimeter; to verify Malus' law of polarization; determination of the threshold frequency for the material of a photocathode and hence find the value of the Planck's constant; determination of lattice constant by x-ray.

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

Structure of Matter : crystalline and non-crystalline solids, single crystal and polycrystal solids, unit cell, crystal systems, co-ordinations number, crystal planes and directions, NaCl and CsCl structure, packing factor, miller indices, relation between interplanar spacing and Miller indices, Bragg's law, methods of determination of interplanar spacing from diffraction patterns; defects in solids: point defects, line defects, bonds in solids, interatomic distances, calculation of cohesive and bonding energy; introduction to band theory: distinction between metal, semiconductor and insulator.

Electricity and Magnetism: coulomb's law, electric field (E), gauss's law and its application, electric potential (V), capacitors and capacitance, capacitors with dielectric, dielectric and atomic view, charging and discharging of a capacitor, ohm's law, kirchoff's law; magnetic field: magnetic induction, magnetic force on a current carrying conductor, torque on a current carrying loop, hall effect, faradays law of electromagnetic induction, lenz's law, self induction, mutual induction; magnetic properties of matter; hysteresis curve; electromagnetic oscillation: l-c oscillations and its analogy to simple harmonic motion.

Modern Physics: michelson-morley's experiment, galilean transformation, special theory of relativity and its consequences; quantum theory of radiation; photo-electric effect, compton effect, wave particle duality, interpretation of bohr's postulates, radioactive disintegration, properties of nucleus, nuclear reactions, fission, fusion, chain reaction, nuclear reactor.

5.5 COURSES OFFERED BY THE DEPARTMENT OF CHEMISTRY:

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

Atomic structure and quantum theory: Bohr's theory, Heisenberg's uncertainty principle, Schrödinger's wave equation, electronic configurations and properties of atoms;
Electronic configurations and properties of molecules: chemical bond, valence bond theory molecular orbital theory, shape of molecules, bond length, bond energy;
Chemistry of halogen, alkali metals, alkaline earth metals, non-metals and heavy metals;
Modern concepts of acids and bases;
Different types of solutions; properties of dilute solution; Thermo-chemistry; Electrochemistry: voltaic cells, electrolytic cells; Colloids and colloidal solution; Chemical and ionic equilibria; Chemistry of water; Chemistry of water pollution; Chemistry of cements, silicates and limes.

Chem 105 : Chemistry II
3.00 Credit Hours, 3 hrs/week

Reaction 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.

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 Preventive Measures.

Chemistry Of Environmental Pollution: Environment and Its Characteristics, Chemistry of Metal and Non-Metal Pollutants, Analytical Techniques used in Determination of Pollutants, Concepts of DO, BOD, COD and Threshold Odor Number, Chemistry Involved in Water Treatment Plants, Quality of Industrial Waste Water.

Polymers: Chemistry of Polymerization, Different Types of Polymers and Their Properties, Polymer Degradation, Elastomers and Composite Materials.

Paints and Varnishes: Introduction to Paints and Varnishes, Pretreatment of the Surface, Metallic and Non-Metallic and Organic Protective Coating and Their Uses.

Chem 114 : Inorganic Quantitative Analysis
1.5 Credit, 3 hrs/week

Volumetric Analysis: Acidimetry-Alkalimetry; Titrations involving redox reactions, Determination of Cu, Fe and Ca volumetrically; Determination of Ca and Mg in water.

5.6 COURSES OFFERED BY THE DEPARTMENT OF MATHEMATICS:

Math 137 : Differential and Integral Calculus, Matrices
3.00 Credit, 3 hrs/week

Differential Calculus: Limit, Continuity and differentiability; Successive differentiation and Leibnitz's theorem; Expansion of functions; Indeterminate forms; Partial differentiation; Euler's theorem; Tangent and Normal; Maxima and minima of functions of single variables.

Integral Calculus: Integration by parts; Standard integrals; Integration by the method of successive reduction; Definite integrals; Beta function; Gamma function; Multiple integrals.

Matrices: Definition of different kinds of matrices; Algebra of matrices; Inverse of matrix; Rank and elementary transformation of matrices; Solution of system of linear equations; Eigen values and eigen vectors; Cayley-Hamilton theorem.

Math 139 : Differential Equations and Statistics
3.00 Credit, 3 hrs/week

Ordinary Differential Equation: Formation of differential equations; Solution of first order differential equations by various methods; Solution of differential equation of first order but higher degrees; Solution of general linear equations of second and higher orders with constant co-efficient; Solution of Euler's homogeneous linear differential equations.

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

Statistics: Measures of central tendency and standard deviation; Moments, Skewness and Kurtosis; Elementary probability theory and discontinuous probability distribution; Continuous probability distributions, e.g. normal and exponential.

Math 237 : Laplace Transform and Vector Analysis
3.00 Credit, 3 hrs/week

Laplace Transforms: Definition of Laplace transforms, 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.

Vector Analysis: Scalars and vectors, equality of vectors; Addition and subtraction of vectors; Multiplication of vectors by scalars; Position vector of a point; Scalar and vector product of two vectors and their geometrical interpretation; Triple products and multiple products of vectors; Linear dependence and independence of vectors; Definition of line, surface and volume integral; Gradient, divergence and curl of point functions; Gauss's theorem, Stoke's theorem, Green's theorem and their applications.

5.7 COURSES OFFERED BY THE DEPARTMENT OF HUMANITIES:

Hum 185 : English
2 Credit, 2 hrs/week

Introduction: current approaches to learning english, communication today.

Phonetics: phonetics and correct english pronunciation.

Syntax: vocabulary, diction and english sentence; sentence variety and style; grammatical problems.

Reading skill: readability, reading strategies, generating ideas through purposive reading, reading of selected stories, comprehension.

Writing skill: principles of effective writing; generating ideas, planning, organization and development of writing; composition, précis.

Written communication: business communication, tenders and quotations, journal articles, report.

Oral communication: dialogue, technical and scientific presentation.

Hum 217 : Engineering Economics
2.00 Credit, 2 hrs/week

Economics and engineering; microeconomics and macroeconomics; theory of demand and supply and their elasticities; demand estimation; price determination; indifference curve technique; theory of production; theory of cost and cost estimation; market structure; national income accounting, depreciation; circular flow of income and expenditure; cost-benefit analysis; pay back period, NPV, IRR, inflation; economic feasibility of engineering undertakings.

Hum 274 : Developing English Language Skills
1.50 credit, 3 hrs/week

Reading skill: skimming, scanning, predicting, inferring; analysis and interpretation of texts; comprehension from literary and non-literary texts.

Writing skill: product approach, process approach: brain storming, self-evaluation, peer evaluation, revision/rewriting, teacher's evaluation; techniques of writing: comparison and contrast, problem and solution, cause and effect, classification, illustration; writing paragraph, essay and report.

Listening skill: listening to recorded texts; learning to take useful notes and answering questions.

Speaking skill: dialogue in peer work; participation in discussion and debate; extempore speech; narrating events; story telling; presentation.

Hum 353: Accounting
2.00 Credit, 2 hrs/week

Financial accounting: objectives and importance of accounting; accounting as an information system; basic accounting principles; accounting equation; recording system; accounting cycle; journal, ledger, trial balance; preparation of financial statements considering adjusting entries; financial statement analysis and interpretation.

Cost accounting: cost concepts and classification; cost-volume-profit analysis; contribution margin approach and its application, break-even analysis, target profit analysis, operating leverage; absorption costing vs variable costing; job order costing; capital budgeting; long run planning and control.

Hum 355: Sociology
2.00 credit, 2 hrs/week

Nature, scope and perspectives of sociology; stages of social research and research methods; culture and civilization; socialization and

personality development; globalization; media and individual; social organization and social problem; social stratification; industrial revolution, capitalism and socialism; work and economic life; environment and human activities; climate change and global risk; population and human society; urbanization and city development; social change and technology.

Hum 375: Government
2.00 Credit, 2 hrs/week

Basic concepts of government and politics: forms of government; organs of government- legislature, executive, judiciary; functions of government; democracy; socialism; welfare state; bureaucracy; good governance; e-government.

Government and politics of Bangladesh: major administrative reforms; major amendments to the constitution- non-party caretaker government; local government; public policies; non government organizations (NGOs); managing development project- planning, implementation, monitoring and evaluation; constitutional bodies- election commission, comptroller and auditor general, public service commission; foreign policy of Bangladesh.

Regional and international organizations: SAARC, ASIAN, UNO.

5.8 COURSES OFFERED BY THE SHOPS:

Shop 132: Workshop Sessional
1.50 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 polarty: Flat, vertical, horizontal, overhead; Electric Arc welding and its machineries; Welding of different types of materials: Low carbon steel, cast iron, brass, copper, stainless steel, aluminium; Types of electrode, fluxes and their composition; Arc welding defects; Test of Arc welding: Visual, destructive and non-destructive tests.

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