

# Undergraduate Prospectus-2023

Seventh Edition  
(January, 2023)

Chittagong University of Engineering & Technology  
(CUET)

# **Information Booklet and Course Catalog for Undergraduate Program**

Department of Water Resources Engineering

Chittagong University of Engineering & Technology

Chattogram-4349, Bangladesh

## **PUBLISHED BY**

### **DEPARTMENT OF WATER RESOURCES ENGINEERING**

Chittagong University of Engineering & Technology (CUET)  
Chattogram-4349, Bangladesh

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## **Disclaimer**

This information booklet is only for reference

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## Message from Vice-Chancellor

Congratulations on your decision to study at the Department of Water Resources Engineering (WRE) of Chittagong University of Engineering and Technology (CUET) and becoming a member of the CUET community. I am delighted to welcome you all to CUET.

CUET is one of the prominent and distinguished self-degree awarding universities in the engineering education section of Bangladesh. The Chittagong University of Engineering & Technology started its journey with the core mission of developing quality human resources in the field of engineering and technology to serve the nation and the world. This institution has a solemn objective to achieve excellence in quality education, research and advancement to address the present needs of the country as well as the South-Eastern region to make it as the “Center of Excellence”.

The Department of Water Resources Engineering (WRE) is relatively a new department in CUET, which has commenced to face the challenges in the sector of water resources management. A growing population and the need for clean water demands solutions that are environmentally sustainable and economically viable. Water Resources Engineering combines elements of other disciplines such as environmental engineering, geo-technical engineering, transportation engineering, structural engineering, planning and geography in a unique combination ideally suited to address society's concerns. Water resources engineers not only design the water management systems, but often oversee the construction and maintenance of these systems as well. Students enrolled in this degree will be broadly trained to undertake careers in water resources system design and will have the option to focus on surface water, ground water or watershed engineering.

I would like to take this opportunity to appraise the Department of Water Resources Engineering for coming up with this excellent idea of a departmental information handbook designed for the undergraduate students. This information booklet represents the heart and soul of what the department holds in promise for you.

**(Prof. Dr. Mohammad Rafiqul Alam)**

Vice-Chancellor  
Chittagong University of Engineering and Technology  
Chattogram-4349



## Message from Dean

I would like to congratulate the Department of Water Resources Engineering (WRE), Chittagong University of Engineering & Technology (CUET), for designing this informative booklet for the undergraduate program. The undergraduate students and the faculty members of this department will find this information booklet as an important tool for both academic and administrative purposes. I believe that the faculty members will make continuous improvements to the WRE education system in order to nurture students with advanced knowledge and intellectual stimulation to meet the challenges of the 21st Century.

The Department of Water Resources Engineering will be committed to academic excellence in undergraduate education and research in the field of Water Resources Engineering. This information booklet will provide necessary activities of the Department along with the course outline and syllabus of each course. This endeavor will build up the students' awareness and highlight the determination of the Department to keep up with the modern engineering practices, tools and technologies. I believe that the students of this Department will obviously prepare themselves to cope with the advanced knowledge to conceive, design, construct and operate physical structures, develop and utilize natural resources, and plan public works for the future.

It is hoped that the information booklet will be of much use to the undergraduate students of the Department of Water Resources Engineering

**Prof. Dr. Md. Moinul Islam**

Dean

Faculty of Civil Engineering

Chittagong University of Engineering & Technology

Chattogram-4349



## Message from Head

First of all, I would like to congratulate you and at the same time extend you a very special warm welcome for joining the department of Water Resources Engineering, Chittagong University of Engineering and Technology (CUET). You must feel fortunate for being among the very few students who got admission into our university this year.

Since Bangladesh is facing problems relating to water supply and sanitation, storm water drainage, river erosion, drought, flood, climate change etc., managing water resources has become one of our biggest challenges. CUET is vital to integrating water related research, extension, and education programs to help mitigate the current problems and develop practical long-term solutions. Along this line, the Water Resources Engineering department of CUET started its journey in 2015 as “Department of Civil and Water Resources Engineering (CWRE)”. In 2018 it was renamed as “Department of Water Resources Engineering (WRE)” and currently this department is offering undergraduate programs and has subsequent plans for offering higher studies.

This undergraduate handbook is a useful road map as you go ahead with your undergraduate studies. We have several important pieces of information here to steer you through your own way to success. Be sure to check this book often throughout your time at CUET as it is more than just a first-year guide, rather it is a four-year plan. It is to note that the undergraduate students will be furnished by following academic rules and regulations in this publication: admission procedure, course registration, credit structure, grading system, performance evaluation, degree completion requirements, etc. Finally, this brochure contains the detailed outlines of the courses offered in different levels and terms.

I can vouch on behalf of my faculty colleagues and staff that we will continue to strive for greater heights in teaching and research that is relevant and shall help in nation building. I am very happy to present a brief account of our engagements, achievements and aspirations in the following pages.

I would also like to thank the faculty members and all concerned for their excellent effort in publishing this booklet.

**Prof. Dr. Aysha Akter**

Head

Department of Water Resources Engineering  
Chittagong University of Engineering & Technology  
Chattogram-4349



***CHAPTER 1***  
***GENERAL INFORMATION***



## 1.1 INTRODUCTION

Chittagong University of Engineering & Technology abbreviated as CUET, is one of the prominent and prestigious degree awarding institutes in the field of engineering education in Bangladesh. Former Bangladesh Institute of Technology, Chattogram, abbreviated as BIT Chattogram is presently Chittagong University of Engineering & Technology (CUET). In fact this Institute was first created as an Engineering College, and that was established in 1968. In 1986, the college was converted into Bangladesh Institute of Technology (BIT), Chattogram. In 2003 BIT, Chattogram was again converted into a public university with the name of Chittagong University of Engineering & Technology (CUET). The honorable President of Bangladesh is the Chancellor of this University.



CUET is unique and incompatible due to its proximity to Chattogram, the major sea-port and the beautiful Hill city of the country. The University is situated by the side of the Chattogram-Kaptai road some 25 kilometers off from the center of Chattogram City. It is large, diverse, geographically dispersed but digitally well connected. The university premise is about 171 acres comprising pristine hills, plain lands and lakes. Furthermore, CUET comprises approximately 4500 students, more than 200 faculty members, 100 officers and 250 staff. The extended family also includes alumni who represent at the highest levels of government, corporate and professional life across the country and worldwide.

## 1.2 VISION

- To become a prominent and prestigious world-class University in Engineering and Technology offering state-of-the-art education and research for socio-economic development

## 1.3 MISSION

- To create and impart knowledge to develop highly qualified and committed professionals through teaching-learning and research in order to play a leading role in the innovation of engineering and technology for sustainable development of Bangladesh and global economy

#### **1.4 OBJECTIVES**

- To provide outcome based education for students in engineering and technology to become potential members of the society for building national capabilities and socio-economic development
- To undertake collaborative research to create opportunities for long-term interaction with academia and industries as well as outreach services to the society
- To promote good governance and strong leadership in all levels of the University administration
- To establish a campus life conducive to the exchange of knowledge, views, and innovative ideas among the students, faculty, staff and visiting scholars

#### **1.5 THE CAMPUS AND THE FACILITIES**

The Campus of CUET is remarkable for its natural beauty, attractively landscaped around the valley. The inter-relationship between the teachers, students, administrative officers and other employees are so cordial that it seems like a family. Students will find here a library, computer center, workshop and research laboratories for intensive learning. The halls of residence are only a short walk away and have their own gardens and recreational facilities including indoor games.



The university runs its own regular bus service to and from the city for the benefit of the few students residing there. The University has inside its boundaries a Central mosque, a bank, a post office, a DRMASS telephone exchange, a PABX, a phone and Fax center and a mini-mart wherein all general needs can be met with. The University Medical Center is equipped for primary care. Serious cases are referred either to local hospitals some 10 kilometers away or to the city hospital by the authority of the university. There is also an auditorium in the campus of capacity around 500 individuals. In addition, lots of development projects are currently ongoing.

## 1.6 ADMINISTRATION

The honorable President of the People’s Republic of Bangladesh is the Chancellor of the University. A Syndicate headed by the Vice Chancellor appointed by the President is the highest policy making and administrative authority. The Academic Council, the Finance Committee and the Planning and Development Committee, etc. assist the Syndicate. The Academic Council is the apex educational authority of the university. It comprises the faculty of CUET and also other external expert members.

## 1.7 ACADEMIC PROGRAMS

The University has fifteen engineering departments under five faculties. All departments except the department of Humanities offer degree programs; however, some of them offer only postgraduate (PG) degrees. Faculty based list of the departments with the currently offered degree programs is given below:

### Faculties & Teaching Departments:

Departments	Offering Degree Program
<b>Faculty of Civil Engineering</b> <ul style="list-style-type: none"> <li>▪ Department of Civil Engineering</li> <li>▪ Department of Water Resources Engineering</li> <li>▪ Department of Disaster &amp; Environmental Engineering</li> </ul>	UG and PG UG PG
<b>Faculty of Mechanical Engineering</b> <ul style="list-style-type: none"> <li>▪ Department of Mechanical Engineering</li> <li>▪ Department of Petroleum &amp; Mining Engineering</li> <li>▪ Department of Mechatronics and Industrial Engineering</li> </ul>	UG and PG UG UG
<b>Faculty of Electrical &amp; Computer Engineering</b> <ul style="list-style-type: none"> <li>▪ Department of Electrical &amp; Electronics Engineering</li> <li>▪ Department of Computer Science &amp; Engineering</li> <li>▪ Department of Electronics &amp; Telecommunication Engineering</li> <li>▪ Department of Biomedical Engineering</li> </ul>	UG and PG UG and PG UG UG
<b>Faculty of Architecture &amp; Planning</b> <ul style="list-style-type: none"> <li>▪ Department of Architecture</li> <li>▪ Department of Urban &amp; Regional Planning</li> <li>▪ Department of Humanities</li> </ul>	UG UG ---
<b>Faculty of Engineering &amp; Technology</b> <ul style="list-style-type: none"> <li>▪ Department of Physics</li> <li>▪ Department of Chemistry</li> <li>▪ Department of Mathematics</li> <li>▪ Department of Material Science and Engineering</li> </ul>	PG PG PG UG

<ul style="list-style-type: none"> <li>Department of Nuclear Engineering</li> </ul>	PG
<b>Institutes</b> <ul style="list-style-type: none"> <li>Institute of Energy Technology</li> <li>Institute of Earthquake Engineering Research (IEER)</li> <li>Institute of Information and Communication Technology (IICT)</li> </ul>	PG PGD PGD
<b>Centers</b> <ul style="list-style-type: none"> <li>Language Center</li> <li>Center for River, Harbor &amp; Landslide Research</li> <li>Center for Industrial Problems Research (CIPR)</li> <li>Center for Environmental Science Engineering and Research</li> </ul>	---- ---- ---- ----

In addition to its own research programs, the university undertakes research programs sponsored by outside organizations. The expertise of the University teachers and the laboratory facilities of the University are also utilized to solve problems and to provide up-to-date Engineering and technological knowledge to the various organizations of the country. The University is persistent in its effort to improve its research facilities, staff position, courses and curriculum to meet the growing technological challenges.

### 1.8 INTERNATIONAL COLLABORATION

One of the prime objectives of CUET is to develop research links, partnership and collaboration programs for finding optimum technological solutions of problems and promote higher education and research. Thus, the university signed agreements with the University of Kassel, and University of Stuttgart, Germany; the University of Ulsan, Korea and the Yamagata University and Saga University of Japan, Asian Institute of Technology, Thailand to accelerate the higher education and research activities. In addition, CUET joined with the International Forum of Strategic Technology (IFOST), a forum of 11 universities comprising 8 nations and South East Asia Network for Disaster & Environmental Engineering (SEAN-DEE). Moreover, the university started a program with joint collaboration with the IHE-UNESCO, Netherlands. The (IEER), CUET started joint collaboration and research programs with the Institute of Earthquake Engineering & Engineering Seismology (IZIIS) of University St. Cyril and Methodius, Skopje, Macedonia.



*Chapter 2*  
*Department of Water Resources Engineering*



Civil Engineering Building (Academic Building-I)



Teachers Students Cafeteria(TSC)

## **2.1 INTRODUCTION**

The Department of Water Resources Engineering (WRE) was established in 2015 as “Department of Civil and Water Resources Engineering (CWRE)” under the Faculty of Civil Engineering. Then in 2018 it was renamed as “Department of Water Resources Engineering (WRE)”. Undergraduate teaching is the top priority of the Department. The Undergraduate Program in the Department of Water Resources Engineering is preparing to be a leader in innovative approaches to understanding and solving water problems, both in scholarly and practical terms.

The Department envisions a need for broadly-educated Water Resources Engineers with strong foundations in a wide variety of sub-disciplines, and excellent development of professional skills. In order to provide the best education possible, we wish to develop more emphasis on hands-on learning with field-based experiences at different industries or institutions.

Water Resources Engineering presents practical methods to solve problems commonly encountered by practicing engineers in day- to- day work in the fields of hydrology, hydraulics, groundwater, hydraulic design, hydropower, environmental impact assessment and remedial investigations. Water Resources Engineering combines elements of other disciplines such as basic engineering, environmental engineering, geotechnical engineering, transportation engineering, planning and communication in a unique combination ideally suited to address society's concerns and needs for surrounding water. The curriculum of this department is addressed to students who wish to be distinguished as senior and top executives in the private and public sector, while the graduates play an important role in the country's wider economic, social and political aspects. Our graduates can play important roles in the water sector all over the world, and their educational experience in CUET will assist them in becoming outstanding professionals. Many will go on to become hydrologists, process engineers, hydro-geologists, consultants and water resources managers. Others will pursue an academic career within prestigious universities.

In the academic year of 2015-2016, this department started its journey with 30 undergraduate students. Currently Professor Dr. Aysa Akter holds the position of the Departmental Head and Professor Dr. Md. Moinul Islam holds the position of the Dean of the Faculty of Civil Engineering.

## **2.2 PROGRAM OBJECTIVES**

Consistent with the stated mission of the University, the objectives of the Water Resources Engineering program are to provide students with a broad and thorough education so that the graduates should be well versed in several areas of Water Resources Engineering and are able to identify, formulate, and solve a wide range of Water Resources Engineering problems using modern engineering tools and techniques that incorporate a broad range of considerations such as economic, environmental, ethical, social, and policy implications and for continuing their studies at the graduate level.

## 2.3 PROGRAM OUTCOMES

Each student in the department of Water Resources engineering is expected to demonstrate the following attributes by the time of graduation:

<b>PLO 1</b>	Engineering knowledge: Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in K1 to K4 respectively to the solution of complex engineering problems.
<b>PLO 2</b>	Problem analysis: Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (K1 to K4)
<b>PLO 3</b>	Design/development of solutions: Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (K5)
<b>PLO 4</b>	Investigation: Conduct investigations of complex problems using research-based knowledge (K8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
<b>PLO 5</b>	Modern tool usage: Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering problems, with an understanding of the limitations. (K6)
<b>PLO 6</b>	The engineer and society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (K7)
<b>PLO 7</b>	Environment and sustainability: Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (K7)
<b>PLO 8</b>	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (K7)
<b>PLO 9</b>	Individual work and teamwork: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings



<b>PLO 10</b>	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
<b>PLO 11</b>	Project management and finance: Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
<b>PLO 12</b>	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## 2.4 COURSE CURRICULUM

An academic year or session is generally divided into three terms, two of which are regular terms and one is short term. The Department of Water Resources Engineering offers a wide range of courses to the students. The WRE Department has a carefully designed curriculum which offers a wide range of knowledge aiming at the integrated education and training of future leaders in the private and public sector. Particular emphasis is given on familiarizing students with new technologies through courses that also include a sessional part. The department currently offers only one program to the students, Undergraduate Degree Program. In every academic year approximately 30 students get admitted into this program through an admission test, which is arranged centrally by the university. The total academic calendar of the Undergraduate degree program is segmented into four levels and eight terms.

## 2.5 LABORATORY FACILITIES

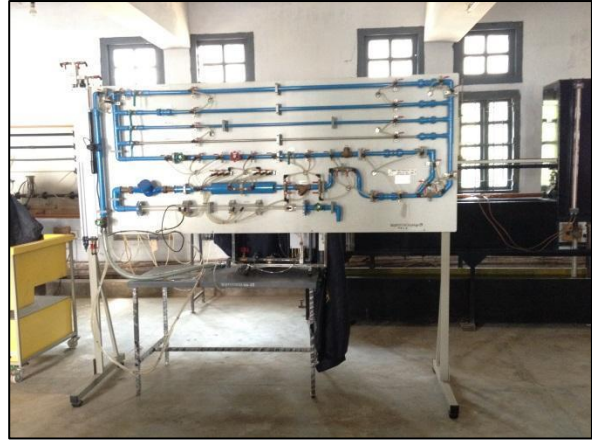
In order to conduct sessional and hands-on practices the department has following laboratory facilities available for the students and faculty members:

### 2.5.1 HYDRAULIC ENGINEERING LABORATORY

This laboratory covers an area of 2400 sq. ft. Various multidisciplinary issues in planning, design, implementation, operation and maintenance of different hydraulic structures are important aspects of the laboratory. The largest section of the hydraulic laboratory is employed for experimental work on open channel flow, sediment transport, wave motion, river and estuary models and hydraulic structures. The hydraulic Engineering Laboratory is also well equipped with fluid friction apparatus, Venturimeter, sluice gate, Bernoulli's apparatus, surface tension determination, jet impact, flow meter demonstration rig, Peloton impulse turbine models of different projects. There is a 20x1.5x1.5m long Multi-purpose Tilting Flume having a wide range of experiment options in connection with open flumes, such as weirs, overflows and sluice gates, oceanography and offshore engineering. It is designed for experiment, research and training purposes and equipped with state-of-the-art facilities.



Multipurpose Tilting Flume



Fluid Friction Apparatus

**2.5.2 STRENGTH OF MATERIALS LABORATORY** (Shared with Department of Civil Engineering)

In order to design and construct safe, economic structures, engineers must stay up-to-date with the latest methods of structural analysis, new structural modeling concepts for computation, advanced structural design, and structural material technology.

The strength of the materials laboratory provides comprehensive modern facilities for research and teaching in structural engineering, solid mechanics and construction materials. The Engineering Materials laboratory and Strength of Materials laboratory are spread over approximately 5000 square ft. of floor area.



Analog Compression Testing Machine



Digital Compression Testing Machine



Hardness Tester

Test facilities include tests on general properties of concrete, tests for specific gravity, unit weight, moisture content, absorption capacity of coarse and fine aggregate, FM of coarse and fine aggregate, different tests on brick mortar and cement, direct tensile and compressive strength of cement mortar, tests on stress-strain and mechanical properties of materials: tension, direct shear and impact tests of mild steel specimens, slender column tests, static bending tests, hardness tests of metals, torsional tests of different types of materials, helical spring tests.

Among the instruments available, the universal testing machine, spring testing machine, hardness testing apparatus, compression (crushing) testing apparatus, brick cutter and capping apparatus etc. are mostly used for different tests.



Impact Machine



Flexural Testing Machine



Universal Testing Machine

### 2.5.3 GEOTECHNICAL ENGINEERING LABORATORY (Shared with Department of Civil Engineering)

Geotechnical Engineering provides an understanding of the behavior of soils and rocks, and application to problems of design and construction in Civil Engineering, resources development and man-made hazard mitigation. The relevant courses include mechanics of soils; exploration, testing and instrumentation in soil engineering; foundation engineering, earth structures, engineering geology.

The Geotechnical Engineering Laboratory covers a floor area of approximately 2100 square ft. The state-of-the-art laboratory is equipped with advanced facilities to support both undergraduate teaching and postgraduate research. Field test facilities include Field Identification Test, Specific Gravity Test, Atterberg Limit Test, Grain size Analysis by sieve and hydrometer, Relative density test, Field density test, Permeability test, Compaction test, unconfined compression test, Direct shear test and consolidation tests.



Direct Shear Test Machine



Consolidation Test Apparatus



C.B.R. Compaction Machine

The following are some of the special equipment in this laboratory: Consolidation testing machine, CBR compaction machine, Direct shear test machine, Triaxial testing apparatus, unconfined compression test machine, Electric mixing apparatus, sample injector, hydrometer jar bath, water bath etc.

#### 2.5.4 ENVIRONMENTAL ENGINEERING LABORATORY (Shared with Department of Civil Engineering)

Environmental Engineering plays a leading role in fields such as contaminated sediment transport; innovative physical, chemical and biological water and wastewater treatment processes, mathematical models for environmental quality management; mixing and transport phenomena of pollutants in natural and man-made systems and water resources management and engineering. The Environmental Engineering Laboratory, covering an area of 2200 square ft., is fully equipped with modern instrumentation. Physical, chemical and bacteriological tests of water and wastewater, design of water supply system are available.



Temperature Incubator

Sophisticated instrumentation includes Atomic Adsorption Spectrophotometer, TOC analyzer and research microscopes etc. Plus a full range of standard equipment for performing routine environmental analysis such as pH, DO, BOD, COD, N, Hardness, Conductivity, Alkalinity, Bacteriological analyses etc. Numerous complete and functional water and wastewater treatment facilities are available for teaching and research purposes.

### **2.5.5 TRANSPORTATION ENGINEERING LABORATORY (Shared with Department of Civil Engineering)**

Coursework and research provide knowledge and skills in transportation planning and economics, traffic engineering and design of highway and other transportation facilities essential for infrastructure development.



Digital Penetrometer



Marshall Test Machine

The Transportation Engineering Laboratory enables experiments to be conducted for the design of bituminous and concrete pavements, tests on subgrade, sub base and base materials. Bituminous mix design and roadway capacity studies are also available. Equipment is available for the identification and determination of the properties of bituminous binders and asphalt mixtures. The following are some of the special equipment in this laboratory: Penetration testing machine, Los Angeles Abrasion testing apparatus, Impact testing apparatus, CBR testing apparatus, Ovens of different kinds etc.

### **2.5.6 ENGINEERING MATERIALS LABORATORY (Shared with Department of Civil Engineering)**

In order to test various types of engineering materials to ensure their desired quality we also have a modern engineering material lab with modern lab facilities. Through this lab we can determine almost all the properties of any construction material such as sand, cement, steel, aggregate, brick, timber, plastic, mortar, concrete etc.



Loss Angeles Abrasion Test Machine



Air Content measuring Instrument



Digital Oven

### 2.5.7 SURVEYING LABORATORY

Determination of relative positions of points on the surface of the earth by taking measurements in the horizontal & vertical plane is done by surveying.

We have a modern survey lab with all survey accessories including analog & digital instruments such as chain, steel tape, ranging rod, plumb bob, optical square, prismatic compass, plane table, spirit level, theodolite, digital level, leveling staff, etc.



Digital Theodolite



Digital Level



Total Station



Plane Table

### **2.5.8 GIS & NUMERICAL SIMULATION LABORATORY**

Geographic information system (GIS) and remote sensing (RS) concepts and technologies are used extensively in modern water resources engineering planning, design, and operations practice. GIS and remote sensing technology is evolving rapidly in the field of water resource engineering to allocate the surface and subsurface water resources optimally for different purposes. The remote sensing is helpful to acquire the data over a wide area regularly and GIS can be used to process the data to obtain the desired results. To store, retrieve, manage, display, and analyze all types of geographic and spatial data, Department of Civil & Water Resources Engineering has a GIS & Numerical Simulation Laboratory consisting of 30 computers with GIS and numerical simulation software installed. In this laboratory, the students get a hands-on learning exercise in mapping, interpretation, analysis and processing of geographic data, and use of modern numerical modeling software for application in the water resources sector. This laboratory is designed to keep the students up to date with the latest advances in water resources engineering practices.



CONDUCTING COMPUTER PROGRAMMING SESSIONAL

### **2.5.9. IRRIGATION LABORATORY**

The irrigation laboratory will serve the purpose of research and analysis in events such as investigation of rainfall/run-off relationships for dry, saturated and impermeable catchments of various slopes (surface run-off only), effect of interflow on outflow hydrograph surface runoff (plus groundwater flow simulation of multiple and moving storms, measurement of cone of depression-for a single well and comparison with theory interaction of cones of depression for two adjacent wells, dewatering of excavation sites by use of wells, flow from a well in a confined aquifer, demonstration of watersheds for a simulated island with rainfall and well flows, sediment transport and meanders in simulated rivers, demonstration of erosion caused by water through flow.



Hydrology and Rainfall Apparatus



Flow Meter Calibration



Orifice



Multipurpose Tilting Flume (5 Meter)



The following are some of the special equipment in this laboratory: Multi-purpose Tilting Flume (5 Meter), Infiltration Apparatus, Ground Water Flow Unit, Acoustic Digital Current (ADC) Meter, Digital Water Leakage Detector, Ground Water Level Sensor, Water Pipe Leakage Survey, Flow Channel, Fluid Friction Apparatus, Drain Parameter, Hydraulic Bench TQ, Acoustic Digital Velocity (ADV) Meter, Flow Through Orifice Apparatus, Flow Meter Calibration etc.

## **2.6 RESEARCH & OUTREACH:**

Department of Civil & Water Resources Engineering looks forward to working in collaboration with various public & private organizations and institutes to expand its research and educational activities. To promote research in the water resources engineering sector at the national level, the Department of WRE has organized its First National Conference on Water Resources Engineering (NCWRE) in 2018. The NCWRE focuses on bringing together academicians, scientists, researchers, managers, administrators, engineers, architects and planners interested in water resources planning, engineering and management to exchange and share their experiences and research.

The conference was based on the following themes:

- River Engineering, dredging and navigation
- Port, harbor and coastal engineering
- Application of modeling in WRE
- GIS and remote sensing in WRE
- Impacts of climate change
- Irrigation and groundwater management
- Urban hydrology and drainage
- Water and wastewater treatment
- Water supply, sanitation and health
- Integrated water resources management
- Sustainable development

The Department of WRE looks forward to organizing similar activities in the upcoming academic years to broaden the outlook, research and interest of the students beyond the academic course curriculum and play a vital role in promoting and keeping up-to-date with the latest advances in the water resources engineering sector.

## 2.7 PHOTO GALLERY



**Students of WRE 2020 Batch**



**Students of WRE 2019 Batch**



**Students of WRE 2018 Batch**



**Study Tour-2020 at Kaptai Hydroelectric Power Plant**



INAUGURATION CEREMONY OF NCWRE, 2018

WORLD WATER DAY 2021 WEBINAR ON 'VALUING WATER'

## 2.8 LIST OF FACULTY MEMBERS AND STAFFS

### PROFESSOR & HEAD



#### Dr. Aysha Akter

B.Sc. Engg. (Civil), KUET;  
M. Engg. (Environment), BUET;  
M.Sc Engg. (WEM), AIT (Thailand);  
PhD (WRE), HWU (UK)  
Email: [aysha\\_akter@cuet.ac.bd](mailto:aysha_akter@cuet.ac.bd), [aysha\\_akter@yahoo.com](mailto:aysha_akter@yahoo.com)

**Research Interest:** River Engineering; Physical model to mimic field cases; Analytical study to assess river flow requirements; Developing or using commercial numerical model on river engineering; Environmental engineering; Quality and supply of drinking water; Integrated features of both solid and liquid waste management.

### ASSISTANT PROFESSOR



#### Farhana Chowdhury (On leave)

B.Sc. Engg. (Civil), BUET;  
M.Sc. Engg. (Resources Engineering), KIT (Germany);  
Email. [farahshahin135@yahoo.com](mailto:farahshahin135@yahoo.com)

**Research Interest:** Water quality; Surface water groundwater interaction; Groundwater remediation; Integrated water resources management.



#### Md. Samiun Basir

B.Sc. Engg. (WRE), BUET  
M.Sc. Engg. (WRE), BUET  
Email: [msbasirwre@cuet.ac.bd](mailto:msbasirwre@cuet.ac.bd)

**Research Interest:** River Morphology & Sediment Transport; River Engineering & River Bank Protection; Coastal Engineering; Hydrodynamic Modelling; GIS & Remote Sensing Application in Water Resources Related Problems.



#### Pollen Chakma

B.Sc. Engg. (Civil), CUET  
M.Sc. Engg. (CE), CUET (Ongoing)  
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## ***Chapter 3***

### ***Rules and Regulation under Course System***





OLD LIBRARY BUILDING



NEW LIBRARY BUILDING

**Academic Rules and Regulations for the Undergraduate Students**  
**[Effective from the Level-1, Term-I of Session 2012-13 and onwards.]**  
**CONDUCT OF ACADEMIC PROGRAMS**  
**(For undergraduate studies)**

**1.0 Definitions:**

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

- 1.1 “University” means the Chittagong University of Engineering & Technology abbreviated as CUET;
- 1.2 “Rules and Regulations” means Academic rules and regulations;
- 1.3 “Syndicate” means the Syndicate of the University;
- 1.4 “Academic Council” means the Academic Council of the University;
- 1.5 “Academic Committee” means Academic Committee for the Undergraduate Studies of Degree Awarding Departments as provided in Article 26 of the Act as well as Article (3) of the First Statutes;
- 1.6 “Vice-Chancellor” means the Vice-Chancellor of the University;
- 1.7 “Dean” means the Head of a Faculty of the University;
- 1.8 “Registrar” means the Registrar of the University;
- 1.9 “Department” means concerned Academic Department of the University;
- 1.10 “Head” means the Head of the Academic Department;
- 1.11 “Chairman” means the Chairman of the Examination Committee of a department of the University;
- 1.12 “Controller” means the Controller of Examinations of the University;
- 1.13 “Equivalence Committee” means the Equivalence Committee of the University;
- 1.14 “Level” means an academic year, consisting of Term-I and Term-II.
- 1.15 “Term” means Term-I or Term-II consisting of 18 weeks in each Term.
- 1.16 “Self Study Examination” means an examination is given for conducting examination of failed courses after one week of Term-II final examination results.
  
- 1.17 “Student” means a student admitted in any Degree awarding Department of the University.
- 1.18 “Course system” means pass or fail on a course basis.
- 1.19 “Failed courses” means the courses registered but not appearing at the examination or not passed after appearing at the examination.
- 1.20 “Discontinuity” means failure to appear in all courses (theory and sessional) in a particular semester/level.

**2.0 Departments:**

**2.1 Degree Awarding Departments (According to Department Code):**

The University shall have the following Degree Awarding Departments:

- (i) Department of Civil Engineering (01);
- (ii) Department of Electrical & Electronic Engineering (02);
- (iii) Department of Mechanical Engineering (03);
- (iv) Department of Computer Science & Engineering (04);
- (v) Department of Urban and Regional Planning (05);
- (vi) Department of Architecture (06);
- (vii) Department of Petroleum and Mining Engineering (07);
- (viii) Department of Electronics and Telecommunication Engineering (08);
- (ix) Department of Mechatronics and Industrial Engineering (09)
- (x) Department of Water Resources Engineering (10)

## **2.2 Teaching Departments:**

The University shall have the following Teaching Departments:

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

## **2.3 Degrees to be Offered:**

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

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

### **3.0 Student Admission, Equivalence and Admission on Transfer:**

- 3.1 The four academic years of study for the degree of B. Sc. Engineering and BURP shall be designated as Level-1 class, Level-2 class, Level-3 class and Level-4 class in succeeding higher Levels of study. The five academic years of study for the degree of B. Arch shall be designated as Level-1 class, Level-2 class, Level-3 class, Level-4, and Level-5 class in succeeding higher Levels of study. Students shall be admitted into the Level-1 class.
- 3.2 An Admission Committee shall be formed in each academic session by the Academic Council for admission into Level-1 B. Sc. Engineering, BURP and B. Arch class, vide Article 42 of the University Act.
- 3.3 According to Article 42(2) of this University Act, candidates for admission into the Level-1 class must have passed the H.S.C. Examination from a Higher Secondary Education Board in Bangladesh (after 12 years of schooling) with Physics, Chemistry and Mathematics as his/her subjects of Examination or any examination in Higher Secondary Level of examination recognised as Equivalent thereto, and must also fulfill all other requirements as may be prescribed by the Admission Committee.
- 3.4 As specified in Article 42(1) of this University Act, the rules and conditions for admission into various courses of studies of Departments shall be framed by the Academic Council on the recommendation of the Admission Committee.
- 3.5 All candidates for admission into the courses of B. Sc. Engineering, BURP and B. Arch. must be the citizens of Bangladesh unless the candidate is against the seats which are reserved for foreign students. Candidates for all seats, except the reserved ones, if any, shall be selected on the basis of merit. The rules for admission into the reserved seats (for foreign students & tribal), if any, shall be framed by the Academic Council on the recommendation of the Admission Committee.
- 3.6 No candidate shall be admitted in the Level-1 class after the beginning of the corresponding session, i.e., when the classes start.
- 3.7 List of newly admitted students shall be notified in the University notice Board as well as in the University Website before commencement of the classes.
- 3.8 If any newly admitted student fails to register the courses and to attend the classes within the first two weeks time after the start of classes, he/she will not be allowed to attend his/her classes at Level-1 course(s) but his/her admission into the Level-1 of the respective academic session will remain valid up to six weeks.
- 3.9 If any student fails to report within the first six weeks after the start of classes, his/her admission shall be canceled.

### **4.0 Method of offering Course and Instruction:**

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

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

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

## 5.0 Academic Calendar:

- 5.1 Number of Terms in an Academic Year (Level):

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

- 5.2 Eligibility for Self Study Examination:

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

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

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

A. Term-I	
Classes	13 weeks
Mid Term Break (Generally after 50% of the Term duration)	1 week
Preparatory Leave for Examination	1 week
Term Final Examination Duration (6 days interval/course)	*4 weeks 1 day
<b>Total-A</b>	<b>19 weeks 1 day</b>
B. Inter Term Break**	<b>1 week</b>
C. Term-II	
Classes	13 weeks
Mid Term Break (Generally after 50% of the Term duration)	1 week
Preparatory Leave for Examination	1 week
Term Final Examination Duration (6 days interval/course)	*4 weeks 1 day
<b>Total-C</b>	<b>19 weeks 1 day</b>
D. Inter Level Break including Publication of Results & course registration for Self Study Examination	<b>3 weeks</b>
E. Ramadan, Puja, Winter Vacation*** and other Vacations throughout the Academic Year	<b>8 weeks 5 days</b>
F. Compensatory Class (es)	<b>1 week</b>
 <b>Total (A+B+C+D+E+F) =</b>	 <b>52 weeks</b>

(\*Designed for 05 theory courses)

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

\*\*\*10 working days for winter vacation will be scheduled in the month of December considering the academic calendar declared in advance every year.

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

The student shall also be allowed to register 2 (two) extra failed subjects as a backlog in any other regular term and as self study in short term/self study examinations.

Therefore, a student will be allowed to appear in examinations of 17 subjects in total in one academic year. This clause will not be applicable after the completion of final examination of Level-4, Term-2 i.e. after the completion of Level-4, Term-2 examination. There will be no embargo regarding the registration of 17 subjects in each academic year.

- 5.5 The maximum grade obtainable in any course by a student in the Self Study examination shall be 'B'.
- 5.6 A student not eligible for appearing at the Self Study Examination shall have to register the failed courses in regular Term. He/she shall repeat the course(s) like a regular student with prior application to the Head of the Department concerned. In that case, the maximum grade obtainable in any course by the student shall be 'B'.
- 5.7 The Head of the Department will propose through the Dean of the respective Faculty an academic schedule for all academic Levels to the Academic Council for approval and will announce the same before the starting of the classes.
- 5.8 In case a student fails in a sessional course(s) he/she shall have to register the same as a regular student. In that case, the maximum grade obtainable in any course by the student shall be 'B'.

#### **6.0 Duration of Course and Course Structure:**

- 6.1 The B. Sc. Engineering and BURP courses shall extend over a period of four academic Levels, however, the B. Arch. courses shall extend over a period of five academic years.
- 6.2 The curricula of the B. Sc. Engineering, BURP and B. Arch. degree in the different Departments shall be, as proposed by the Academic Committee for Undergraduate Studies and approved by the Syndicate on recommendation of the Academic Council.
- 6.3 The Academic Committee for Undergraduate Studies shall review the curricula at least once in every academic Level and put forward the recommendations to the Academic Council.
- 6.4 Contact hour(s) of the teaching load(s) shall have to counted according to the following guidelines:

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

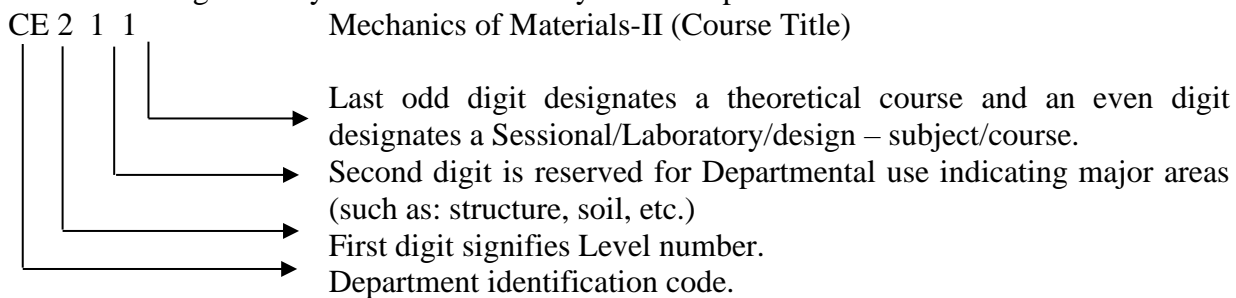
- 6.5 Field work (Survey)/Industrial Training/ Professional Training should be completed within the time allowed for the Term. For that, if necessary, rescheduling of classes can be done in consultation with the Dean of the respective Faculty.
- 6.6 Minimum credit hour requirements for the awards of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

## **7.0 Course Designation and Numbering System:**

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

- 7.1 The first digit shall represent the Level in which the course is taken by the students.
- 7.2 The second digit shall be reserved for Departmental use for such things as to identify different areas within a Department.
- 7.3 The last digit shall represent a theoretical course when it is an odd digit and a Sessional/Laboratory/Design-Subject/course when it is even.

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



Ex. CE 2 1 1 means or CE 2 1 2	<table border="0"> <tr> <td style="padding-right: 10px;">CE</td> <td style="padding-right: 10px;">for</td> <td>Civil Engineering</td> </tr> <tr> <td style="padding-right: 10px;">2</td> <td style="padding-right: 10px;">for</td> <td>2<sup>nd</sup> Level</td> </tr> <tr> <td style="padding-right: 10px;">1</td> <td style="padding-right: 10px;"></td> <td>for Structure</td> </tr> <tr> <td style="padding-right: 10px;">1(odd)</td> <td style="padding-right: 10px;">for</td> <td>Theory courses</td> </tr> <tr> <td style="padding-right: 10px;">2 (Even)</td> <td style="padding-right: 10px;">for</td> <td>Sessional/Laboratory/Design– Subject/course</td> </tr> </table>	CE	for	Civil Engineering	2	for	2 <sup>nd</sup> Level	1		for Structure	1(odd)	for	Theory courses	2 (Even)	for	Sessional/Laboratory/Design– Subject/course
CE	for	Civil Engineering														
2	for	2 <sup>nd</sup> Level														
1		for Structure														
1(odd)	for	Theory courses														
2 (Even)	for	Sessional/Laboratory/Design– Subject/course														

### 8.0 Course Offering and Instruction:

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

### 9.0 Registration Requirements:

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

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

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

- i) A student shall be allowed to register course(s) up to one week after starting classes of the Term with a late fine of Tk. 500.00.
- ii) For a period of more than one week but less/equal to two weeks after starting classes of the Term, a student shall be allowed to register course(s) with a late fine of Tk. 1000.00.
- iii) A fine of Tk. 2000.00 shall have to be paid by a student who will be registering course(s) in the period of more than two weeks but less/equal to 40% of the Term duration.
- iv) A student shall not be allowed for registration of any course after 40% of the Term period elapsed. But, this may be relaxed for students completing Level 4 Term-II for B. Sc. Engineering and BURP, and Level 5 Term-II for B. Arch. final examination with recommendation from the Adviser and Head of the Department, and a late fine of Tk. 5000.00 for each such registration.

b) If a student of Level-1 fails in all theory courses registered by him/her and obtains “F” grade in each of the courses and fails to earn any credit against theory courses but may/may not earn credit against sessional course/courses, he/she shall have to register the same theory course(s) in Level-1 of the next Academic Session. The maximum grade obtainable by a



student in any re-registered theory course will be “B”. However, grades obtained in sessional courses/courses will be retained. For the re-registration of these courses an elapse of time for previous Academic Year equivalent to one Academic Year will be considered and this period will be deducted from the total period of time allowed for the completion of B. Sc. Engineering, BURP and B. Arch. degrees as mentioned in article 13.0 of the Academic Ordinance.

c) Registration for Self Study Students:

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

9.2 Appointment of Adviser:

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

9.3 Limits on the Credit Hours:

A student must be enrolled for the requisite number of credits as mentioned in article 6.6 and 6.7.

9.4 Withdrawal from a Semester:

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

9.5 Striking off the Names:

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

9.5.1 Withdrawal of names from the rolls of the University after having cleared all University fees, Hall and other dues to the University.

9.5.2 Failure to earn required credits for graduations as outlined in the respective curriculum and/or to earn CGPA requirement as per 11.4 within the maximum allowed time of seven (7) academic years for B.Sc. Engineering and BURP and eight (8) academic years for B. Arch.

9.5.3 Admission of a newly admitted student in the Level-1 class will be canceled, if he/she fails to report within the first six consecutive weeks after the beginning of the class.

**10.0 Grading System:**

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

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

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

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

10.3 Calculation of GPA:

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

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

where,

**n** is the number of courses passed by the student;

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

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

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

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

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

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

(i) **Theory courses:**

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

**(ii) Laboratory/Sessional/Design–subject/work courses:**

a) B.Sc Engineering

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

b) BURP

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

c) B.Arch.

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

**(iii) Project/Thesis:**

a) B. Sc. Engineering and BURP:

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

b) B. Arch.:

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

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

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

10.6 Class Tests:

- 10.6.1 The number of Class Tests of a course shall be 'n+1', where 'n' is the number of credits of the course. Evaluation of the performance in the class test will be on the basis of the best 'n' number of class tests.
- 10.6.2 Duration of each Class Test shall not exceed 20 minutes.
- 10.6.3 For convenience of conducting the Class Tests a half an hour time slot should be kept at the beginning of each working day.
- 10.6.4 The dates for the Class Tests shall be fixed by the Course Coordinator and shall be announced accordingly.
- 10.6.5 All Class Tests shall be of equal value. The result of each individual Class Test shall be posted to the Display Board for information of the students before the next Class Test is held.
- 10.6.6 The marks of the Class Tests shall be submitted to the Head of the Department before beginning of preparatory leave.

**11.0 Earned Minimum CGPA for awarding Degree:**

- 11.1 The courses in which a student has obtained 'D' or a higher in theory and 'C' or higher in sessional/laboratory/Project/ Thesis/ Field work/ Industrial Training Grade will be counted as credits earned by him/her. Any course in which a student has obtained 'F' grade will not be counted towards his/her earned credits.
- 11.2 A student, who obtains an 'F' grade in any course(s) in any Term, will have to repeat the course(s). If a student obtains an 'F' in an optional course(s), he/she may choose to repeat the course(s) or take substitute course(s), if available.
- 11.3 'F' grades will not be counted for GPA calculation. 'F' grades shall not be reflected in Transcript.
- 11.4 The minimum CGPA requirement for the award of Bachelor of Engineering and URP Degrees is 2.25 and that for Bachelor of Architecture is 2.20. Candidates for Bachelor's degree in Engineering, URP and Architecture shall be awarded Honors if he/she obtained CGPA 3.75 or higher.

**12.0 Award for Academic Excellence:**

12.1 Chancellor's Award

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

## 12.2 Dean's Award

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

### **13.0 Time Limits for the Completion of Bachelor's Degree:**

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

### **14.0 Industrial/Professional Training Requirements:**

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

### **15.0 Publication of Results:**

- 15.1 A student who successfully completes the prescribed courses of all the Terms and all academic requirements for fulfillment of degrees of Bachelor's will have to apply to the Controller of Examinations through the Head of the Department for Graduation.
- 15.2 The Controller of Examinations shall publish the result.
- 15.3 Provisional degree will be awarded on completion of credit and CGPA requirement, by the Academic Council.
- 15.4 Students of regular batch who have completed their all courses in regular Level-4/ Level-5 Term-II examination or in respective Level-4/ Level-5 self Study examination, will be eligible to be included in the merit list of concerned academic session, provided that they must have completed and passed their project/thesis course within 45 days from the last day of Level-4/ level-5 Self Study examination. The irregular or included students from the previous academic rules and regulations shall not be considered as regular students.



***Chapter 4***



***Ordinance Relating to the Student's Discipline***



Bangabandhu Mural at CUET Campus



Shaheed Minar at CUET Campus

## A. ORDINANCE REGARDING GENERAL DISCIPLINE

1. According to the provisions laid down in Article 32 of the Chittagong University of Engineering & Technology Act, there shall be a Students' Discipline Committee to supervise and control the residence and discipline of the students of the University.

The Committee shall consist of the following members:

- |  |                  |
|--|------------------|
| (i) The Vice-Chancellor  | Chairman         |
| (ii) Pro-Vice Chancellor   | Member           |
| (iii) Two Deans, to be nominated by the Academic Council.  | Members          |
| (iv) Two Heads of Departments to be nominated by the Academic Council.                                   | Members          |
| (v) Two Provosts to be nominated by the Academic Council.  | Members          |
| (vi) One member of the Syndicate not receiving salary from University, to be nominated by the Syndicate. | Member           |
| (vii) The Director of Students' Welfare (DSW)  | Member-Secretary |
2. The Chairman shall convene the meeting of the Committee as and when required and five members shall form a quorum. The term of nominated members shall be two years, but shall continue till successors are nominated.
  3. Members of the Committee other than the ex-officio members shall ordinarily hold office for two academic sessions but they shall continue to be members till their successors are nominated and they shall be eligible for reappointment.
  4. (a) All incidents which appear to be acts of indiscipline and misconduct committed by any student including immediate action taken, if any, shall be reported to the Vice-Chancellor by the Provosts through the Director of Students' Welfare in respect to indiscipline and misconduct in the Halls of Residence and their premises; and by the Heads of Department in respect of indiscipline and misconduct in class rooms, laboratories, workshops, library and all parts of the Academic premises, by the invigilator through the Chief Invigilator in respect of indiscipline and misconduct in the examination halls/rooms; and by the person concerned from among the students and teachers, officers and employees of the University in respect of misconduct committed outside the Halls or academic premises but within the campus or outside the University.  
(b) All acts of indiscipline / misconduct, whether reported verbally or in written form or even heard by any authority, as mentioned in article 4 (a) of this ordinance shall be taken into due



consideration and shall be settled by the respective authority within a maximum period of 3 (three) weeks. All authorities except the first three as described in column 1 of 5(b) (Students' Discipline Committee, Vice-Chancellor and Director of Students' Welfare) shall take immediate action against acts of indiscipline/misconduct within their respective jurisdiction after proper verification. All such individual or minor cases/incidence(s) shall be reported to the DSW for proper recording as well as for reporting to the Students' Discipline Committee.

5. (a) A student who neglects his studies, disobeys and/or denounces orders, regulations, statutes, ordinances and Acts of the University, shows misbehavior towards the members of the staff or officers or teachers of the University or commits any other offense which will be deemed by the Vice-Chancellor or Director Students' Welfare or Teachers of the University as misconduct and breach of discipline, will be liable to disciplinary action which may range from warning, imposition of fines, suspension to expulsion for good from the University, depending on the magnitude of the offense as will be deemed fit by the authorities competent to take disciplinary action as defined in 5(b).

(b) Authorities to take disciplinary action with their respective powers to the extent to which they can impose punishment on any student or group of students are:

<b>Column-1</b>	<b>Column-2</b>	<b>Column-3</b>
<b>Authority for taking disciplinary Action</b>	<b>Power</b>	<b>Appellate Authority</b>
Students' Discipline Committee	Warning, imposing fine, suspension for any length of time, expulsion for good.	Academic Council
Vice-Chancellor	Warning, imposing fine, suspension up to six months.	Students' Discipline Committee
Director of Students' Welfare	Warning, imposing fine up to Tk. 500/-, suspension and expulsion from the Halls.	Vice-Chancellor
Provosts (On students of his Hall of Residence)	Warning, imposing fine up to Tk. 500/-, suspension and expulsion from the Hall for a period of one year.	Director of Students' Welfare
Heads of Department (On students of his Department)	Warning, imposing fine up to Tk. 500/- with a report to the Director of Students' Welfare for record.	Vice-Chancellor
Assistant Provost	Warning, imposing fine up to Tk. 100/- with a report to the Director of Students' Welfare for record.	Director of Students' Welfare.
Teachers & Director of Physical Education	Warning with a report to the concerned Head & Director of Students' Welfare respectively.	Head of the concerned Department & Director of Students' Welfare respectively.

6. If the Vice-Chancellor feels that the action taken against a student or a group of students by any of the above authorities other than Students' Discipline Committee on an offense brought to him is not appropriate or that no action has been taken on any offense observed by him, he will take appropriate disciplinary action against a student or a group of students. If, however, in any case of breach of discipline the Vice-Chancellor is of the opinion that a punishment more than a suspension of six months may be required, he shall refer the matter to the Students' Discipline Committee for a decision.
7. A student or a group of students against whom an action has been taken by appropriate authority mentioned in Column 1 of Section 5(b) may prefer an appeal to the appropriate appellate

authority mentioned in column 3 of Section 5(b). The appeal shall have to be lodged within 15 days of the imposition of disciplinary action.

8. The Director of Students' Welfare (DSW) will be responsible for enforcement of the disciplinary action taken against a student or a group of students. He shall maintain a register and shall record therein all actions taken against a student for indiscipline and misconduct and also shall record in all character certificates issued by the Director of Students' Welfare to offenders, those actions taken against them if so indicated by the Vice-Chancellor and the Students' Discipline Committee unless allowed to be expunged/condoned by the Syndicate on written prayer from the offenders.
9. The Director of Students' Welfare shall not record the punishment like warning, undertaking of the student and/or the guardian imposed by any authority. The monetary fines imposed by any authority except the Students Discipline Committee shall not be recorded in the character certificate of the offended student(s).
10. In an emergency, the Director of Students' Welfare may request any teacher, officer & employees of the University to help him in the discharge of his duties in the University or outside at all hours and it shall be the duty of the teachers, officers or employees concerned to give him every reasonable assistance.
11. No student or students of the University shall declare a strike at the University nor shall a student interfere with the free movement of the University students willing to attend classes, laboratories, library and field work; nor shall students organize and/or stage any demonstration in any part of the University campus or its neighborhood.  
A student or a group of students found guilty of violation of the provisions of this Section will be liable to disciplinary actions including expulsion from the University. Students absenting themselves from the classes on the days of strike will lose their percentage of attendance and will be liable to forfeiture of their scholarships and stipends and to other disciplinary actions as the authorities may think fit.
12. The Vice-Chancellor at any time may stop temporarily or permanently publication of any journal or magazine or any printed or cyclostyled matter which he thinks detrimental to the general interest of the University.
13. A student who willfully destroys or damages or defaces University property shall be called upon to make good the loss to the University and will also be liable to other penalties, such as fines and forfeiture of caution money.
14. Any student found (by any of the Teachers, Provosts, Director Students' Welfare or Vice-Chancellor) guilty of misconduct towards any person within the University campus shall be subject to appropriate disciplinary action ranging from fine to expulsion for good from the University as may be decided by the appropriate authority of the University mentioned in the above sections.
15. Any student found by the Students' Discipline Committee guilty of moral turpitude shall ordinarily be expelled from the University for good. The Academic Council on appeal from the delinquent student may show mercy to deserving cases by imposing less severe punishment.
16. The University authority shall have the right to take disciplinary action against any student for any act considered as unethical and/or social crime in the eyes of law of the country.

## **B. ORDINANCE REGARDING DISCIPLINE AT EXAMINATION HALLS**

17.
  - (i) The Chief Invigilator shall be responsible for maintenance of discipline in the examination halls.
  - (ii) An invigilator on duty in the examination hall shall report to the Chief Invigilator in case of breach of discipline in the examination hall. The Chief Invigilator may expel the examinee concerned from the hall debarring him from appearing at that particular examination.
  - (iii) Breach of discipline in the examination halls shall be reported by the invigilator to the Vice-Chancellor through the Chief Invigilator.
  
18. The candidates shall strictly follow the following instructions:
  - (i) Candidates are strictly forbidden to keep mobile phones and any other display device with their possession.
  - (ii) Candidates are strictly forbidden to write their names on the cover or any part of the answer script. If a candidate does so, his answer script will not be assessed.
  - (iii) Each candidate must write legibly his Examination Roll Number and Registration number on the first cover of scripts. If any candidate omits to write his Examination Roll Number and Registration Number on the cover of his answer script, the paper may not be assessed.
  - (iv) When more than one answer script is used, each additional script should be stitched to the first script immediately after it is supplied, and the Examination Roll Number and Registration Number should also be written by the candidate on the cover of the additional script or scripts immediately.
  - (v) No loose paper will be provided for scribbling and no paper is to be brought in for this purpose. Any candidate found with loose paper in his possession will be expelled from the examination hall. All works must be done in the scripts provided and pages must not be torn out. The scripts provided must be submitted, it cannot be replaced by another, if necessary, additional scripts will be given. All works intended for assessment by the examiner should be written on both sides of the paper.
  - (vi) Candidates are forbidden to write anything whatsoever on the question paper.
  - (vii) In any matter not specifically mentioned in these rules, candidates are required to abide by the decision of the invigilator in the examination hall/room.
  - (viii) No candidate will be allowed to leave the examination hall/room until one hour has elapsed from the time when the question papers are given out.
  
19. Disciplinary action will be taken against candidates reported to have violated the instructions under Section 18 or resorted to unfair means and/or acts of indiscipline at the different examinations as follows:
  - a. The term “whole examinations” in this article means all examinations of the theory courses (70%) registered by the candidate to appear at the respective Term Final examination but excluding Sessionals, Class Tests and Attendance, conducted during that academic term.
  - b. The term “writings in possession” in this article means writings in the possession of the examinee or in his apparels, in papers, calculator, any display device, drawing instruments and scales etc. found with him or off or near the desk, bench or chair etc.
    - (i) (a) Attempts to communicate with examinee or examinees in the examination hall:  
first time- warning which may be accompanied by a change of seats; second time-

deduction of 5% of the total marks of paper; third time-expulsion from the examination hall for that paper and reduction of a total of 10% of total marks on that paper.

- (b) Attempts to communicate/discuss with other examiners or examinees outside the examination hall during the period of examination: expulsion from the examination hall for that paper.
- (ii) (a) Possession of writings related to the particular subject of examination without attempting to copy: expulsion from examination hall and cancellation of whole examinations.
- (b) Possession of writings related to the particular subject of examination and attempts to communicate with other examiners or examinees: expulsion from examination hall and cancellation of whole examinations and expulsion from the University for a period of Half Academic Year (as defined in the Academic Regulations).
- (c) Possession of writings related to the particular subject of examination and attempts to copy or receive information from any other source (s): expulsion from examination hall and cancellation of whole examinations and also expulsion from the University for One Academic Year (as defined in the Academic Regulations).
- (d) Possession of writings related to the particular subject of examination or copying/receiving information from any other source (s): expulsion from examination hall and cancellation of whole examinations and also expulsion from the University for One and Half Academic Years (as defined in the Academic Regulations).
- (iii) Use of violent language and holding out threats to examiners and/or invigilators: expulsion from the whole examination and/or expulsion from the University for good.
- (iv) Attempts to get possession of the question paper or examination scripts before the examination: expulsion from the whole examinations and expulsion from the University for one to two academic years (as defined in the Academic Regulations).
- (v) Writings on loose papers not related to the examination (viz. blotting paper, question paper etc.): seizure of the writings and cancellation of the answer script and expulsion from the examination hall.
- (vi) Attempts to influence the examiner: cancellation of the paper.
- (vii) Impersonating or causing to be impersonated in the examination hall/rooms: expulsion from the University for good.
- (viii) Insertion in the examination scripts, answer to any question or questions written outside the examination and expulsion for one to Two Academic Years (as defined in the Academic Regulations).
- (ix) Having a question answered by someone else: cancellation of the whole examination and expulsion from the University for Two Academic Years (as defined in the Academic Regulations).

20. The invigilator is empowered to warn a student and deduct his mark up to 5% as mentioned in Section 19(i) above. The Chief invigilator is empowered to expel students from the examination room/hall if he is satisfied after an enquiry on the spot that the student is guilty of misconduct mentioned in Section 19 above. In all such cases the matter has to be reported to the Vice-Chancellor

with incriminating documents, of any. Decisions for cancellation of the examination and expulsion from the University for a period of not exceeding six months will be taken by the Vice-Chancellor. For expulsion for a period more than six months, the Vice-Chancellor shall refer the matter to the Students' Discipline Committee provided in Section 1.

21. Class tests including quiz, field test, viva-voce & such other similar examinations shall be considered as part of the final examination. The following disciplinary action (s) will be taken against the students violating discipline rules in the above-mentioned tests/examinations.

Column-1		Column-2	
Offense		Action	
i)	Attempts to communicate with other student(s).	i)	Cancellation of that class test by the concerned teacher.
ii)	Copying or trying to copy from the answer script of another student(s).	ii)	Cancellation of the class test of both the students, who copied and who helped in copying, by the concerned teacher.
iii)	Possessions of writings related to the subject of the class test, writing on loose papers, calculator, desk, chair, any part of the body, apparels, calculator, scale, drawing instruments etc. found with the student or, off or near his/her seat will be considered as writings in possession.	iii)	Cancellation of all the class tests of that particular course by the Head of the Department by notification.
iv)	Use of violent language, holding threats, creating obstruction in conducting class tests or for similar offenses.	iv)	Expulsion from the University for at least one Term by the Students' Discipline Committee depending on the severity of the case.
v)	Impersonating or causing to be impersonated in class tests.	v)	Expulsion for one academic year by the Students' Discipline Committee.

22. If a student wants to file an appeal against the actions as described in section 21 above, he/she can do so within 15 days after the imposition of punishment to the Head of the Department in case of (i) & (ii), to the Students' Discipline Committee in case of (iii) and to the Academic Council in case of (iv) & (v).

## **B. Drugs Prevention Policies, CUET -2016**



***Chapter 5***  
***Course Curriculum***

## 5.1 INTRODUCTION

The course requirement and the schedule of courses for undergraduate students of the Department of Water Resources Engineering are given below. The two to four letter prefix in any course number indicates the department offering the course viz. WRE for Water Resources Engineering, CE for Civil Engineering, EEE for Electrical and Electronic Engineering, Chem for Chemistry, Phy for Physics, Math for Mathematics, Hum for Humanities. The first of the three digits of the course number indicates the year/level for which the course is intended, the second digit is reserved for departmental use and the last digit being odd for theory courses and even for sessional courses.

## 5.2 COURSE REQUIREMENTS

### 5.2.1 SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR DEGREE IN WRE

<b>Courses</b>	<b>Requirement (Credits)</b>
<b>A</b> Basic Sciences	12
<b>B</b> Mathematics	12
<b>C</b> Humanities	9
<b>D</b> Basic Engineering	44.5
<b>E</b> Engineering Practices	7
<b>F</b> Water Resources Engineering	33
<b>G</b> Structural Engineering	18.5
<b>H</b> Environmental Engineering	5.5
<b>I</b> Geotechnical Engineering	8.5
<b>J</b> Transportation Engineering	5.5
<b>Total</b>	<b>155.5</b>
Thesis	4.5
<b>Grand Total</b>	<b>160</b>

### 5.2.2 CREDIT DISTRIBUTION IN DIFFERENT LEVELS AND TERMS

Level -1	Term- 1	19.5	39.5	<b>Total 160</b>
	Term- 2	20		
Level -2	Term- 1	19.5	38	
	Term- 2	18.5		
Level -3	Term-1	19	39.5	
	Term-2	20.5		
Level -4	Term-1	23	43	
	Term-2	19.0		

### 5.2.3 COURSE STRUCTURE

<b>Basic Sciences (Credit Requirement 9+3 = 12)</b>			
<b>Theoretical</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Remarks</b>
Phy-111	Physical Optics, Matters, Waves & Oscillation	3	
Phy-113	Solid State Physics, Modern Physics, Heat & Thermodynamics	3	
Chem-105	Chemistry	3	
<b>Sessional</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Remarks</b>
Phy-112	Physics Sessional	1.5	
Chem-106	Chemistry Sessional	1.5	

<b>Mathematics (Credit requirement = 12)</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Credit</b>	<b>Remarks</b>
Math-105	Differential and Integral Calculus	3	
Math-107	Matrices and Solid Geometry	3	
Math-205	Differential Equations	3	
Math-207	Vector calculus, Statistics and Harmonics	3	

<b>Humanities (Credit requirement = 9)</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Credit</b>	<b>Remarks</b>
Hum-105	English	3	
Hum-107	Engineering Economics	2	
Hum-205	Principles of Accounting & Costing	2	
Hum-207	Principles of Sociology	2	Select One
Hum-209	State & Government	2	

<b>Basic Engineering (Credit requirement 28+16.5 = 44.5)</b>			
<b>Theoretical</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Remarks</b>
WRE-101	Analytical Mechanics	3	
WRE-103	Surveying	3	
WRE-201	Engineering Geology and Geomorphology	3	



WRE-203	Fluid Mechanics	4	
WRE-205	Numerical Methods	2	
CE-281	Engineering Materials	4	
CE-283	Mechanics of Solids-I	3	
CE-285	Mechanics of Solids-II	3	
EEE-153	Basic Electrical Engineering	3	

<b>Sessional</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Remarks</b>
WRE-100	Engineering Drawing-I	1.5	
WRE-102	Engineering Drawing-II	1.5	
WRE-104	Practical Surveying	1.5	
WRE-108	Details of Construction Sessional	1.5	
WRE-204	Fluid Mechanics Sessional	1.5	
WRE-208	Estimating and Cost Analysis	1.5	
WRE 202	Computer Programming Sessional-I	1.5	
WRE-206	Computer Programming Sessional-II	1.5	
CE-282	Engineering Materials Sessional	1.5	
CE-284	Mechanics of Solids Sessional	1.5	
WRE-106	Introduction to Water Resources and Civil Engineering	1.5	

<b>Water Resources Engineering (Credit requirement 24 + 9 = 33)</b>			
<b>Theoretical</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Remarks</b>
WRE-305	Hydrology	3	
WRE-301	Open Channel Hydraulics	3	
WRE-303	GIS and RS in Water Resources Engineering	2	
WRE-401	River Engineering and Basin Management	3	
WRE-403	Groundwater Engineering	2	
WRE-405	Hydraulic Structures	3	
WRE-411	Irrigation and Drainage Engineering	3	
WRE-413	Coastal Engineering	3	
WRE-421	Hydraulic Machinery	2	Select One

WRE-423	Port and Harbour Engineering	2	
WRE-425	Climatology	2	
WRE-427	Waterways Engineering	2	
<b>Sessional</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Remarks</b>
WRE-302	Open Channel Hydraulics Sessional	1.5	
WRE-304	GIS and RS in Water Resources Engineering Sessional	1.5	
WRE-306	Mathematical Modeling in Water Resources-I	1.5	
WRE-402	Mathematical Modeling in Water Resources-II	1.5	
WRE-406	Design of Hydraulic Structures Sessional	1.5	
WRE-412	Irrigation and Drainage Engineering Sessional	1.5	

#### **Structural Engineering (Credit requirement 14+4.5 = 18.5)**

<b>Theoretical</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Remarks</b>
CE-381	Structural Analysis and Design-I	4	
CE-383	Structural Analysis and Design-II	3	
CE-385	Design of Concrete Structures-I	3	
CE-487	Design of Concrete Structures-II	4	
<b>Sessional</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Remarks</b>
CE-382	Structural Analysis and Design Sessional	1.5	
CE-386	Concrete Structures Design Sessional-I	1.5	
CE-482	Concrete Structures Design Sessional-II	1.5	

#### **Environmental Engineering (Credit requirement 4+1.5 =5.5)**

<b>Theoretical</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Remarks</b>
CE-353	Environmental Engineering	4	
<b>Sessional</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Remarks</b>
CE-354	Environmental Engineering Sessional	1.5	

<b>Geotechnical Engineering (Credit requirement 7+1.5 = 8.5)</b>			
<b>Theoretical</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Remarks</b>
CE-335	Principles of Soil Mechanics	4	
CE-337	Foundation Engineering	3	
<b>Sessional</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Remarks</b>
CE-336	Geotechnical Engineering Sessional	1.5	

<b>Transportation Engineering (Credit requirement 4+1.5 = 5.5)</b>			
<b>Theoretical</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Remarks</b>
CE-449	Transportation Engineering	4	
<b>Sessional</b>			
CE-442	Transportation Engineering Sessional	1.5	

<b>Professional Practices (Credit requirement = 7)</b>			
<b>Theoretical</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Remarks</b>
WRE-455	Integrated Water Resources Planning and Management	3	Select One
WRE-451	Professional Practices and Construction Management	3	
WRE-453	Socioeconomic Aspects of Development Projects	3	
<b>Sessional</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Remarks</b>
WRE-450	Internship	1	

<b>Project &amp; Thesis (Credit requirement = 4.5)</b>			
WRE-400	Project & Thesis	4.5	

### 5.2.4 SCHEDULE OF UNDERGRADUATE COURSES FOR DIFFERENT LEVELS AND TERMS

Level – 1 Term – I					
Course No.	Course Title	Cr. Hr.	Type	Remarks	Total Credits
WRE-101	Analytical Mechanics	3	C		Theory=15
Phy-111	Physical Optics, Matters, Waves & Oscillation	3	C		
Chem-105	Chemistry	3	C		
Math-105	Differential and Integral Calculus	3	C		
Hum-105	English	3	C		
WRE-100	Engineering Drawing–I	1.5	C		Sessional=4.5
Phy-112	Physics Sessional	1.5	C		
Chem-106	Chemistry Sessional	1.5	C		
					<b>Total = 19.5</b>
<b>Note: C=Compulsory      O=Optional</b>					

Level – 1 Term – II					
Course No.	Course Title	Cr. Hr.	Type	Remarks	Total Credits
WRE-103	Surveying	3	C		Theory=14
EEE-153	Basic Electrical Engineering	3	C		
Phy-113	Solid State Physics, Modern Physics, Heat & Thermodynamics	3	C		
Math-107	Matrices and Solid Geometry	3	C		
Hum-107	Engineering Economics	2	C		
WRE-102	Engineering Drawing-II	1.5	C		Sessional=6
WRE-104	Practical Surveying	1.5	C		
WRE-106	Introduction to Water Resources and Civil Engineering	1.5	C		
WRE-108	Details of Construction Sessional	1.5	C		
					<b>Total = 20</b>
<b>Note: C=Compulsory      O=Optional</b>					

<b>Level – 2 Term – I</b>					
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Type</b>	<b>Remarks</b>	<b>Total Credits</b>
WRE-201	Engineering geology and geomorphology	3	C		Theory=15
CE-281	Engineering Materials	4	C		
CE-283	Mechanics of Solid-I	3	C		
Math-205	Differential Equations	3	C		
Hum-205	Principles of Accounting & Costing	2	C		
CE-284	Mechanics of Solid sessional	1.5	C		Sessional=4.5
WRE-202	Computer Programming Sessional-I	1.5	C		
CE-282	Engineering Materials sessional	1.5	C		
<b>Total</b>		<b>19.5</b>			
<b>Note: C=Compulsory      O=Optional</b>					

<b>Level – 2 Term – II</b>					
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Type</b>	<b>Remarks</b>	<b>Total Credits</b>
WRE-203	Fluid Mechanics	4	C		Theory=14
WRE-205	Numerical Methods	2	C		
CE-285	Mechanics of Solids-II	3	C		
Math-207	Vector Calculus, Statistics and Harmonics	3	C		
Hum-207	Principles of Sociology	2	O	Select One	
Hum-209	State & Government	2	O		
WRE-204	Fluid Mechanics sessional	1.5	C		Sessional =4.5
WRE-206	Computer Programming Sessional-II	1.5	C		
WRE-208	Estimating and Cost Analysis	1.5	C		
<b>Total = 18.5</b>					

<b>Level – 3 Term – I</b>					
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Type</b>	<b>Remarks</b>	<b>Total Credits</b>
WRE-301	Open Channel Hydraulics	3	C		Theory=13
CE-335	Principles of Soil Mechanics	4	C		
WRE-303	GIS and RS in Water Resources Engineering	2	C		
CE-381	Structural Analysis and Design-I	4	C		
CE-336	Geotechnical Engineering Sessional	1.5	C		Sessional=6
CE-382	Structural Analysis and Design Sessional-I	1.5	C		
WRE-302	Open Channel Hydraulics Sessional	1.5	C		
WRE-304	GIS and RS in Water Resources Engineering Sessional	1.5	C		
					<b>Total = 19</b>
<b>Note: C=Compulsory      O=Optional</b>					

<b>Level – 3 Term – II</b>					
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Type</b>	<b>Remarks</b>	<b>Total Credits</b>
WRE-305	Hydrology	3	C		Theory=16
CE-337	Foundation Engineering	3	C		
CE-353	Environmental Engineering	4	C		
CE-383	Structural Analysis and Design-II	3	C		
CE-385	Design of Concrete Structure-I	3	C		
WRE-306	Mathematical Modeling in Water Resources-I	1.5	C		Sessional=4.5
CE-354	Environmental Engineering Sessional	1.5	C		
CE-386	Concrete Structure & Design Sessional-I	1.5	C		
					<b>Total = 20.5</b>
<b>Note: C=Compulsory      O=Optional</b>					

<b>Level – 4 Term – I</b>					
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Type</b>	<b>Remarks</b>	<b>Total Credits</b>
WRE-401	River Engineering and Basin Management	3	C		Theory=16
WRE-403	Groundwater Engineering	2	C		
WRE-451	Professional Practices and Construction Management	3	O	Select One	
WRE-453	Socioeconomic Aspects of Development Projects	3	O		
CE-449	Transportation Engineering	4	C		
CE-487	Design of Concrete Structure-II	4	C		
WRE-402	Mathematical Modeling in Water Resources-II	1.5	C		Sessional=5.5
CE-442	Transportation Engineering Sessional	1.5	C		
CE-482	Concrete Structure and Design Sessional-II	1.5	C		
WRE-450	Internship	1	C		
WRE-400	Project & Thesis	1.5	C		<b>1.5</b>
					<b>Total = 23</b>
<b>Note: C=Compulsory      O=Optional</b>					

<b>Level – 4 Term – II</b>					
<b>Course No.</b>	<b>Course Title</b>	<b>Cr. Hr.</b>	<b>Type</b>	<b>Remarks</b>	<b>Total Credits</b>
WRE-455	Integrated Water Resources Planning and Management	3	C		Theory=14
WRE-405	Hydraulic Structures	3	C		
WRE-411	Irrigation and Drainage Engineering	3	C		
WRE-413	Coastal Engineering	3	C		
WRE-421	Hydraulic Machinery	2	O	Select One	
WRE-423	Port and Harbor Engineering	2	O		
WRE-425	Climatology	2	O		
WRE-427	Waterways Engineering	2	O		
WRE-406	Design of Hydraulic Structure sessional	1.5	C		Sessional=3
WRE-412	Irrigation and Drainage Engineering Sessional	1.5	C		
WRE-400	Project & Thesis	3	C		<b>3</b>
					<b>Total = 20</b>
<b>Note: C=Compulsory      O=Optional</b>					

## 5.3 DETAILED SYLLABUS ACCORDING TO DIFFERENT LEVELS & TERMS

### 5.3.1 COURSES OFFERED IN LEVEL-1 TERM-I:

#### **Course Title: Analytical Mechanics**

Course No: WRE-101

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-1, Term-I

Syllabus:

Resultants and Components of forces; coplanar concurrent forces; moments and parallel coplanar forces; non- concurrent non- parallel coplanar forces; friction; non-coplanar forces. Centroids; moments of inertia of areas; moments of inertia of masses; plane motion; force systems that produce rectilinear motion; kinetic energy, power; impulse and momentum.

#### **Course Title: Physical Optics, Matters, Waves & Oscillation**

Course No: Phy-111

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-1, Term-I

Syllabus:

**Physical Optics:** Interference of light: Theory of interference, Young's double slit experiment, Fresnel Bi-prism, Interference in thin films: Interference by multiple reflections: constant and varying thickness, Newton's rings and its application.

**Diffraction of light:** Fresnel and Fraunhofer diffraction, Fraunhofer diffraction by single slit and double slit, plane diffraction grating.

**Polarization:** Production and analysis of polarized light, Brewster's law, Malus' law, Polarization by double refraction Nicol prism, Polaroid, Optical activity, polarimeters.

Properties of matter: Different states of matter, Review of Elastic properties of solids, bending of beam, Cantilever.

**Hydrodynamics:** Equation of continuity, Laminar and turbulent flow, Reynolds number and its significance, Bernoulli's Theorem.

**Viscosity:** Poiseuille's equation, Motion in a viscous medium, Stokes law: statement and Determination of coefficient of viscosity.

**Surface tension:** Surface tension, force of cohesion, force of surface tension, molecular theory of surface tension, surface energy, Calculation of excess pressure inside a curved membrane, Capillarity, Quinck's method.

**Waves and Oscillations:** Differential equation of a simple harmonic motion, total energy and average energy, combination of simple harmonic oscillation, Lissajous figures, spring-mass system, time period of torsional pendulum; damped oscillation, determination of damping coefficient, 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.



**Course Title: Chemistry**

Course No: Chem-105

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-1, Term-I

## Syllabus:

**Atomic Structure:** The structure of atom, nuclear charge and atomic number, Rutherford's model of atom, Bohr's model, wave nature of electron, quantum number, electronic configuration, radioactivity, types and properties of radiations, nuclear radiations, energy released in radiation, meson theory of nuclear forces, mass defect, nuclear binding energy, nuclear stability.

**Classification of Elements:** Periodic properties of elements, variation of properties of elements with their periods and groups, properties of s, p, d and f types elements. Structure and properties of semiconductor elements like boron, silicon, germanium, arsenic and antimony, purification of silicon.

**Chemical Bonding:** Different types of chemical bonds; ionic bond, covalent bond, co-ordinate bond, metallic bond and hydrogen bond, dipole bond. Valence bond theory, hybridization, shapes of molecules, molecular orbital theory, linear combination of atomic orbital (LCAO).

**Solutions:** Types of solution, Henry's law, solubility, factors affecting solubility, solubility curves, concentration of solutions, Nernst distribution law, solvent extraction, colligative properties of dilute solutions.

**Colloids:** Definition, classification, preparation, purification, properties, sols, gels, emulsions, coagulation, gold number, applications of colloids.

**Thermochemistry:** Definition, enthalpy of a reaction, exothermic and endothermic reactions, thermochemical equations, heat of reactions, heat of combustion, heat of solution, heat of neutralization, Hess's law and its application, bond energy, measurement of heat of reaction.

**Electrochemistry:** Different types of cells, EMF and free energy, relation between EMF measurement of cell, single electrode potential, standard electrode potentials and its application, EMF series and reactivity of metals, pH and its determination, factors influencing conductivity, mechanism of electrolytic conduction, measurement of conductivity, law of independent migration of ions and its application, abnormal conductance of proton and hydroxyl ions, ionic mobility and transport number.

**Course Title: Differential and Integral Calculus**

Course No: Math-105

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-1, Term-I

## Syllabus:

**Differential Calculus:** Limit, Continuity and Differentiability of functions, Derivatives of real functions. Higher order derivatives and Leibnitz's theorem. Rolle's theorem, Mean value theorem. Taylor's theorem, Maclaurine's Series. Expansion of functions. Indeterminate forms.

Tangent and Normal – Cartesian and Polar curves. Lengths of tangent, normal, subtangent and subnormal. Functions of several variables. Partial and total derivatives. Homogeneous functions, Euler's theorem. Maxima and Minima of functions of more than one variable. Curvature, Radius of curvature, Centre of curvature, curve tracing.

**Integral Calculus:** Techniques of integration, Standard integrals, Integration of rational fractions, Reduction formulae. Definite integrals. Integral as the limit of sum, Improper integrals, Gamma and Beta functions. Lengths of curves, Areas of Cartesian and polar curves, Volumes and surfaces of solids of revolution and relative application.

**Course Title: English**

Course No: Hum-105

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-1, Term-I

Syllabus:

**Grammar:** Functions of word classes, Phrase structures and clauses.

**Sentence making:** basic sentence patterns, analysis, transformation and synthesis. Punctuation; word formation processes and common mistakes in English

**Reading:** Various approaches to reading. Reading techniques and readability. Academic texts, types of texts, using reading lists, using library catalogs and using library websites to search electronic resources, reading abstracts, facts, opinion and critical thinking.

**Writing:** Descriptive, narrative, argumentative and persuasive writing, Principles of paragraph writing, paragraph structure, development of ideas, and linking paragraphs together. Writing introduction and its structure, and opening sentences and conclusion. Technical report writing and its purposes and various forms, Method of note taking, notice writing, assignment and examination paper.

Structure and cohesion, argument and discussion, cause and effect, comparison and contrast, definitions, exemplification classification, generalizations, numbers, problems and solutions, and academic style.

**Speaking:** Speech delivery, announcement, dialogue, Group discussion and interview skills.

**Course Title: Engineering Drawing-I**

Course No: WRE 100

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-1, Term-I

Syllabus:

**Introduction:** Handling instruments and their uses, Lettering and numbering and heading.

**Plane Geometry:** Pentagon, Hexagon, Octagon, Ellipse, Parabola, and Hyperbola.

Projection (Solid geometry): Cube, Triangle, Prism, Pentagonal prism, Hexagonal prism, Cone, Cylinder.

**Development of different types of section:** Cube, Triangle, Prism, Pentagonal prism, Hexagonal prism, Cone, Cylinder.

**Isometric Drawing:** Cube, Triangle, Prism, Pentagonal prism, Hexagonal prism, Cone, Cylinder, Interpretation of Solids.

**Architectural approaches of drawings;** B.N.B.C. requirements (Part-3, Chap-1).

Preliminary planning of one-unit housing, Plans, Elevations and Sections of multistoried buildings, Drawing of different types of stairs, Plan and Section of septic tanks.

Plan, elevation and section of simple hydraulic structures.

**Course Title: Physics Sessional**

Course No: Phy-112

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-1, Term-I

**Syllabus:**

Determination of Young's modulus for the material of a wire using searle's apparatus; Determination of modulus of rigidity of a wire (Dynamical method); Determination of surface tension of mercury and the angle of contact (Quinck's method); Determination of coefficient of viscosity of glycerin using stoke's law; Determination of mechanical equivalent of heat 'J' by electrical method; Determination of the radius of curvature of a lens (Newton's ring experiment); Determination of the thermal conductivity of a bad conductor by Lee's method; Determination of the frequency of a tuning fork by Melde's experiment; Determination of the specific rotation of sugar solution by means of a polarimeter; Calibration of a thermo-couple Thermometer and hence to measure an unknown temperature.

**Course Title: Chemistry Sessional**

Course No: Chem-106

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-1, Term-I

**Syllabus:**

Oxidation-reduction based titrations, quantitative analysis of Fe, Cu and Ca volumetrically, brass analysis.

### 5.3.2 COURSES OFFERED IN LEVEL-1 TERM-II:

#### **Course Title: Surveying**

Course No: WRE-103

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-1, Term-II

#### Syllabus:

Introduction; Types of surveying; Traverse surveying; Leveling and Contouring; Calculation of areas and volumes; Problems of heights and distances; Curves and curve ranging; Photogrammetry; Astronomical Surveying; Hydrographic surveying; Acoustic measurements and investigations; Uses of modern surveying equipment.

#### **Course Title: Basic Electrical Engineering**

Course No: EEE-153

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-1, Term-II

#### Syllabus:

Electrical circuit analysis-DC circuit, Electrical network theorems. Fundamentals of alternating quantities., Phasor algebra, Electrical circuit analysis-AC circuits, balanced three phase circuits. Electrical wiring for residential and commercial loads.

Working principles, Constructional features. Types, Characteristics and Application of following Electrical Machines-DC generator and Motor, Single phase and three phase transformers, single phase and three phase induction motors.

Sources of electrical energy, power generation, Steam, Hydro, Gas and Nuclear; Power Generation Bangladesh context.

#### **Course Title: Solid State Physics, Modern Physics, Heat & Thermodynamics**

Course No: Phy-113

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-1, Term-II

#### Syllabus:

**Introduction to Solid State Physics:** Crystalline and non-crystalline solids, single crystal and polycrystalline solids, crystal systems; coordination number, packing fraction, reciprocal lattice, interplanar spacing, X-rays: production, Moseley's law and practical application of X-rays. Bragg's law, XRD, XRF, Methods of determination of interplanar spacing from diffraction patterns; Defects in solids: point defects, line defects. Different types of bonds in solids, cohesive and bonding energy, metal, insulator and semiconductor in terms of energy band.

**Thermodynamics:** Measurements of temperatures, resistance and thermocouple thermometers, pyrometry; radiation pyrometers.

**Transmission of heat:** Fourier equation of heat flow, steady state and periodic heat flow in one dimension, determination of thermal conductivity of good and bad conductors, heat flow through compound walls.

Review of the laws of thermodynamics, Carnot's theorem, entropy, thermodynamic functions, Maxwell thermodynamic relations, Clausius-Clapeyron equation, Gibbs phase rule, third law of thermodynamics, Nernst heat theorem.

**Modern Physics:** Michelson Morley's experiment, Galilean transformation, special theory of relativity, Lorentz transformation, length contraction, simultaneity and time dilation, variation of mass, mass energy relation, energy momentum relation, twin paradox.

Quantum effect: photo-electric effect, Compton effect, wave particle duality, de Broglie wave, interpretation of Bohr's postulates.

**Radioactivity and nuclear Physics:** Radioactivity, radioactive disintegration, radioactive equilibrium. Nuclear binding energy, nuclear reactions, fission, fusion, chain reaction, nuclear reactor: types and essential components and working principle.

### **Course Title: Matrices and Solid Geometry**

Course No: Math-107

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-1, Term-II

Syllabus:

**Matrices:** Review of matrices. Rank, inverse of matrix and elementary transformations, solution of a system of linear equations by matrix method, quadratic forms, matrix polynomials. Determination of characteristic roots and vectors, Cayley Hamilton theorem. Matrix Application to solid mechanics and differential equation (Evaluating principal Stress, deflection of beam, and stability test of dynamic system).

**Solid Geometry:** System of coordinates, projection, direction cosines and direction ratios, Angle between two straight lines. Equation of planes, Angle between two planes, distance from a point to a plane, Condition of perpendicularity and parallelism of planes, equation of straight lines. Shortest distance between two straight lines. Sphere, ellipsoid. Hyperboloid of one sheet and hyperboloid of two sheets.

### **Course Title: Engineering Economics**

Course No: Hum-107

Credit: 2.0

Contact Hour: 2 Hrs per week

Schedule: Level-1, Term-II

Syllabus:

Definition of Economics, concept of microeconomics. Demand and supply Analysis, Market Equilibrium, Elasticity of demand & supply. Theory of utility and preference, Consumer

behavior-Indifference curve analysis, analysis of consumer surplus and producer surplus. Consumer equilibrium .Theory of production, Theory of cost, concept of market and market structure.

Concept of macroeconomics, National Income analysis: various concepts about GNP, NNP GDP and NDP, methods of calculation national Income, circular flow of income, Fundamentals of savings, Investment and consumption functions, Inflation, Unemployment; types of unemployment. Problems of unemployment, how to solve the unemployment problem. Fiscal policy and monetary policy; Characteristics of five-year plans and its implication in Bangladesh Economy. Development vs. Growth, Development. The pure theory of International trade.

**Course Title: Engineering Drawing-II**

Course No: WRE-102

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-1, Term-II

Syllabus:

Plan, elevation and sections of regulator, bridges, siphon, aqueduct and other hydraulic structures with reinforcement details; Layout and x-section of irrigation canals and embankments; plan, elevation and sections of buildings; reinforcement details of beams, columns, slabs, stairs etc. using CAD.

**Course Title: Practical Surveying**

Course No: WRE-104

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-1, Term-II

Syllabus:

**Field work based on the following topics:**

Chain Survey; Traverse Survey; Plane Table Survey; Leveling & Contouring, Earthwork Calculation; Problems on Height and Distance; Hydrographic survey; Demonstration of modern survey equipment.

**Course Title: Introduction to Water Resources and Civil Engineering**

Course No: WRE-106

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-1, Term-II

Syllabus:

Appreciation of Water Resources, Structural, Geotechnical, Environmental and Transportation Engineering Issues.

**Course Title: Details of Construction Sessional**

Course No: WRE-108

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-1, Term-II

**Syllabus:**

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, load bearing and non load bearing walls; partition walls; lintels and arches: different types of lintels and arches, loading on lintels, construction of arches; stair: different type of stairs; floors: ground floors and upper floors; roof and roof coverings; shoring; underpinning; scaffolding and framework; plastering, painting, distempering and white washing; cement concrete construction; house plumbing: water supply and waste water drainage; construction of hydraulic structures.

**5.3.3 COURSES OFFERED IN LEVEL-2 TERM-I:****Course Title: Engineering Geology and Geomorphology**

Course No: WRE-201

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-2, Term-I

**Syllabus:**

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

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

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

**Course Title: Engineering Materials**

Course No: CE-281

Credit: 4.0

Contact Hour: 4 Hrs per week

Schedule: Level-2, Term-I

Syllabus:

Engineering material and their properties; Manufacturing process of bricks, pavers block, tiles and cement. Properties and uses of bricks, tiles, cement, aggregates, cement and lime mortars, standard tests of bricks, cement and aggregates; Timber, uses of rubber and plastics; corrosion and its prevention; paints, varnishes, metallic coatings.

**Concrete:** composition, Properties of fresh concrete-mixing, workability, Transportation, Compaction, curing, segregation and bleeding, admixture, design of concrete mix using different codes of practices (ACI, BS), Ready-mix concrete, properties of hardened concrete, mechanical properties, shrinkage, elasticity, plasticity, special concrete,

**Durability of concrete:** factors affecting durability, chemical attack on concrete, chloride and sulfate attack; concrete in sea environment, corrosion of reinforcement in concrete, remedial measures; Ferro-cement.

### **Course Title: Mechanics of Solids-I**

Course No: CE-283

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-2, Term-I

Syllabus:

Fundamental concepts of stress and strain, Mechanical properties of materials; Strain energy; stresses and strains in members subjected to tension, compression, shear and temperature changes. Torsional stress in shafts and tubes with different cross sections. Helical springs, stresses in thin walled pressure vessels. Bending moment and shear force diagrams of beams and frames, Flexural and shear stress in beam (Straight & Curve), Inelastic Bending of Beams.

### **Course Title: Differential Equations**

Course No: Math-205

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-2, Term-I

Syllabus:

**Ordinary Differential Equation:** Definition and formation of differential equations. Solution of first order differential equations, solution of differential equations of first order and higher degrees, solution of general linear equations of second and higher orders with constant coefficient. Solutions of Euler's homogeneous linear equations. Solution of differential equations in series by the method of Frobenius. Bessel's functions, Legendre's polynomials and their properties.

**Partial Differential Equation (PDE):** Introduction, equations of the linear and non-linear first order PDE. Standard forms, Linear PDE of second and higher order with constant coefficient, Equations of the second order with variable coefficient.



**Laplace Transform:** Laplace transform, Inverse Laplace transform, Solution of differential equation applying Laplace transform technique.

**Course Title: Principle of Accounting & Costing**

Course No: Hum-205

Credit: 2.0

Contact Hour: 2 Hrs per week

Schedule: Level-2, Term-I

Syllabus:

**Introduction :** Definitions of book keeping, Costing and accounting, objects and advantages of bookkeeping; Principles of double entry book keeping, Accounting concepts and convention, Transaction, Definition of business transaction, Nature of business transactions, Journal, Ledger, Trial balance & Financial statement, Analysis of financial statement.

**Depreciation:** Definition, objects and types of depreciation, Methods of providing depreciation, classifying revenue and capital expenditure.

**Cheque:** Classification of cheque, Crossing of cheque and endorsement of cheque.

**Cost Accounting:** Introduction, Definition, object and advantages of cost accounting, Elements of cost, Stores ledger, Overhead allocation.

**Marginal analysis:** Computation of Break Even point, Standard Costing, Cost Variance, Construction Costing, Budget and Budgetary Control.

**Course Title: Mechanics of Solids Sessional**

Course No: CE-284

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-2, Term-I

Syllabus:

Problems on stress, strain and mechanical properties of materials: Tension, direct shear and impact tests of mild steel specimens. Compressions test of timber and concrete specimens. Shear force and bending moment diagrams for practical structural components (e.g. stair-case, sunshade, bus stand shed etc.) Slender column test; static bending test; hardness test of metals; torsional test of different types of materials by Torque Machine; Helical spring test, Determination of shear center, Load deflection behavior of simple beams.

**Course Title: Computer Programming Sessional-I**

Course No: WRE-202

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-2, Term-I

**Syllabus:**

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

**Course Title: Engineering Materials Sessional**

Course No: CE-282

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-2, Term-I

**Syllabus:**

General discussion on preparation and properties of concrete. Tests for specific gravity, unit weight, moisture content, and absorption of coarse and fine aggregates; Fineness, normal consistency and initial and final setting time of cement. Fineness modulus of coarse and fine aggregates, Different tests on brick, mortar and cement. Direct tensile and compressive strength of cement mortar, General discussions on preparation and properties of concrete; design and testing of a concrete mix (using ACI & BS Code).

**5.3.4 COURSES OFFERED IN LEVEL-2 TERM-II:**

**Course Title: Fluid Mechanics**

Course No: WRE-203

Credit: 4.0

Contact Hour: 4 Hrs per week

Schedule: Level-2, Term-II

**Syllabus:**

Development and scope of fluid mechanics; fluid properties; fluid statics; kinematics of fluid flow; fluid flow concepts and basic equations- continuity equation, Bernoulli's equation, energy equation, momentum equation and forces in fluid flow. Similitude and dimensional analysis. Steady incompressible flow in pressure conduits; laminar and turbulent flow; general equation for fluid friction, Empirical equations for pipe flow. Minor losses in pipe flow. Fluid measurement: pitot tube, orifice, mouthpiece, nozzle, venturimeter, weir. Pipe flow problems- pipes in series and parallel, branching pipes, pipe networks.

**Course Title: Numerical Methods**

Course No: WRE-205

Credit: 2.0

Contact Hour: 2 Hrs per week

Schedule: Level-2, Term-II

Syllabus:

Numerical solution of algebraic and transcendental equations; Bisection method, Regular false method, Newton Raphson method, alteration method (Rate of Convergence, Order of errors). Solution of systems of linear equations; Matrices, Gaussian elimination method, Gauss-Seidel iteration method. Interpolation: Simple differences, difference tables, difference of a polynomial, Newton's formula for interpolation, Central difference interpolation formulae, Divided difference. Tables of divided differences, Newton's general interpolation formula, Lagrange's interpolation formula, Curve fitting by least squares. Numerical interaction and differentiation (ordinary & partial). Numerical solution of differential equations. Picard's method, Euler's method and Runge-Kutta method.

**Course Title: Mechanics of Solids-II**

Course No: CE-285

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-2, Term-II

Syllabus:

Riveted and welded joints shear center, Compound stresses; Transformation of stresses; deflection of statically determinate beam by various methods: moment area method, direct integration method, Conjugate beam method, Elastic load method. Buckling of Columns, Flexural and shear stress in beams due to unsymmetrical bending.

**Course Title: Vector Calculus, Statistics and Harmonics**

Course No: Math-207

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-2, Term-II

Syllabus:

**Vector Calculus:** Scalar and Vector point function. Gradient, Divergence and Curl; Physical interpretation of Gradient, Divergence and Curl; Solenoidal and irrotational vector fields, Vector Integration (line, surface and volume integral), Green's theorem in the plane, Gauss's Divergence theorem, Stoke's theorem and their applications.

**Statistics:** Elementary probability theory; Random variable, discrete probability distributions, e.g., Binomial, Poisson and negative Binomial distributions. Continuous probability distributions e.g., Normal and Exponential distributions, Elementary sampling theory, Estimation, Hypothesis testing and Regression analysis.

**Harmonic Analysis:** Introduction, Laplace equation in Cartesian, Cylindrical and spherical coordinates, cylindrical harmonics, Spherical harmonics and their applications to Engineering problems.

**Course Title: Principles of Sociology**

Course No: Hum-207

Credit: 2.0

Contact Hour: 2 Hrs per week

Schedule: Level-2, Term-II

**Syllabus:**

Definition Nature and Scope of Sociology, Sociological Perspectives, Importance of Studying Sociology for Civil Engineering Students, Method of Sociology, Basic Concepts; Society, Community. Association and institution, Socialization, Nation and Nationality, Social Stratification, Group, Social Structure, marriage and family, Social change, Social control and Deviance, Culture and Civilization, Industrialization and Urbanization, Urban Ecology, Population and Environment; Population Growth, Environment as Sociological Issue, Sustainable Development, Environmental decision making, Social Impacts of Disaster. Social problems; Juvenile Delinquency, Crime, Unemployment, Corruption, Rights and Duties of Citizens in Society.

**Course Title: State and Government**

Course No: Hum-209

Credit: 2.0

Contact Hour: 2 Hrs per week

Schedule: Level-2, Term-II

**Syllabus:**

Nature of State, Origin and Development of the state. Basic Concepts: Pressure Group, Interest Group, Civil Society, Good Governance, Political Party, Socialism, Fascism, Marxism.

**Nationalism & Internationalism:** Nationality, Nation and State, Federation and Confederation.

**Organization Theories:** Classical Theories- F.W Taylor, Henry Fayol, Neo Classical Theories and Modern Theories. Process of Organization- Motivation, Leadership, Communication, decision making.

**The United Nations, Bureaucracy:** Bureaucracy and Max Weber, Bureaucracy in Bangladesh, its characteristics and functions, Forms of Government, Organs of Government, Local Government, Concepts of Public Administration, constitution.

**Course Title: Fluid Mechanics Sessional**

Course No: WRE-204

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-2, Term-II

Syllabus:

Center 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.

**Course Title: Computer programming Sessional-II**

Course No: WRE-206

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-2, Term-II

Syllabus:

Programming language for Water Resources Engineering and Management: 1D, 2D, 3D graph plotting and other scientific applications, data formatting from ASCII and other formats, data processing, query, data representation.

**Course Title: Estimating and Cost Analysis**

Course No: WRE-208

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-2, Term-II

Syllabus:

Analysis of rates; detailed estimate of all items of work of a building including sub-structure regulator, bridge, truss, culvert, embankment, lined canals; Specifications of materials for the above constructions.

**5.3.5 COURSES OFFERED IN LEVEL-3 TERM-I:**

**Course Title: Open Channel Hydraulics**

Course No: WRE-301

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-3, Term-I

Syllabus:

Open channel flow and its classification, Velocity and pressure distributions, Energy equation, specific energy and transition problems; Critical flow and control; Principle of flow measurement and devices; Concept of uniform flow, Chezy and Manning equations, estimation of resistance coefficients and computation of uniform flow; Momentum equation and specific momentum; Hydraulic jump; Theory and analysis of gradually varied flow; Computation of flow profiles; Design of channel regime; Hydraulics of bridges and culverts.

**Course Title: Principles of Soil Mechanics**

Course No: CE-335

Credit: 4.0

Contact Hour: 4 Hrs per week

Schedule: Level-3, Term-I

**Syllabus:**

Introduction to geotechnical engineering, Basic properties and characteristics of soil, soil grain and aggregate, clay mineralogy, Weight, volume and moisture-density relationship, soil structure and fabric, Index properties of soil, Identification and classification of soil, principles of total and effective stress, soil-water, Permeability, Seepage and flow nets, fundamental of soil liquefaction. Stress distribution, Soil compaction, One-dimensional consolidation, Stress-strain-strength characteristics of soil.

**Course Title: GIS and RS in Water Resources Engineering**

Course No: WRE-303

Credit: 2.0

Contact Hour: 2 Hrs per week

Schedule: Level-3, Term-I

**Syllabus:**

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

**Course Title: Structural Analysis and Design-I**

Course No: CE-381

Credit: 4.0

Contact Hour: 4 Hrs per week

Schedule: Level-3, Term-I

**Syllabus:**

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.

**Course Title: Geotechnical Engineering Sessional**

Course No: CE-336

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-3, Term-I

**Syllabus:**

Field identification tests: Specific gravity test, Atterberg limits test, Grain size analysis by sieve and hydrometer, Relative density test, Field density test, Permeability test, Compaction test, Unconfined compression test, Direct shear test, Consolidation tests.

**Course Title: Structural Analysis and Design Sessional**

Course No: CE-382

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-3, Term-I

**Syllabus:**

Analysis and design problems: Design of members and connections of steel structures (e.g. trusses, steel plate girder and gable frames).

**Course Title: Open Channel Hydraulics Sessional**

Course No: WRE-302

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-3, Term-I

**Syllabus:**

Use of Broad-crested weir, Sluice gate, Venturi flume, Parshall flume, Cut-throat flume in laboratory flow measurement, Hydraulic jump, Velocity distribution profile, Manning's roughness coefficient, Specific force and specific energy.

**Course Title: GIS and RS in Water Resources Engineering Sessional**

Course No: WRE-304

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-3, Term-I

**Syllabus:**

Application of GPS data to Engineering Projects; Creating and editing spatial data: digitizing, new view, map projection, classification of features; creating and editing attributes: tables, relationship between tables; spatial analysis: spatial relationship, spatial analysis operation, buffers, geo-processing; charts, layouts; introduction to surface data: TIN, DEM; application of GIS in water resources.

### **5.3.6 COURSES OFFERED IN LEVEL-3 TERM-II:**

#### **Course Title: Hydrology**

Course No: WRE-305

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-3, Term-II

#### **Syllabus:**

Hydrologic cycle, Weather and Hydrology, Precipitation, Evaporation and transpiration, Infiltration, Stream flow, Application of telemetry and remote sensing in hydrologic data acquisition, Rainfall-runoff relations, Hydrographs, unit hydrographs. Hydrologic routing, Statistical methods in hydrology; Hypothesis Testing, Trend Analysis, Linear regression, Uncertainty, Data Analysis, Correlation, Probability, Frequency Analysis.

#### **Course Title: Foundation Engineering**

Course No: CE-337

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-3, Term-II

#### **Syllabus:**

Soil investigation techniques; various types of foundation & factors affecting their selection. Bearing capacity of shallow & deep foundation, settlement & distortion foundations. Design and construction of footings, rafts & piles, slope stability analysis.

#### **Course Title: Environmental Engineering**

Course No: CE-353

Credit:4.0

Contact Hour: 4 Hrs per week

Schedule: Level-3, Term-II

#### **Syllabus:**

Introduction to environmental engineering. Water supply: water requirement, water sources, water quality, treatment and distribution systems, design concepts of water treatment plants. Water engineering: wastewater characteristics, treatment and disposal, on site sanitation systems. Solid waste management. Introduction to environmental pollution: water, air, soil and noise pollution: effects of pollution. Introduction to environmental management: environmental policy, legislation and environmental quality standards: introduction to environmental impact assessment.



**Course Title: Structural Analysis and Design-II**

Course No: CE-383

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-3, Term-II

**Syllabus:**

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

**Course Title: Design of Concrete Structure-I**

Course No: CE-385

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-3, Term-II

**Syllabus:**

Fundamental behavior of reinforced concrete; Loads, Introduction to Strength design and Service load design method; Analysis and design of singly reinforced beam, doubly reinforced beam and T-beam according to Strength design method; Diagonal tension, bond and anchorage according to Strength design method, Analysis and design of one-way and two-way slabs by Strip and Alternate methods; Stair case, Shear walls; Introduction to ferro-cement design as per BNBC.

**Course Title: Mathematical Modeling in Water Resources-I**

Course No: WRE-306

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-3, Term-II

**Syllabus:**

Introduction to hydrodynamic modeling: definition and examples; Review of mass balance, momentum and energy equations; Different hydrodynamic models and their applications and limitations; Hands on training on hydrodynamic model(s).

**Course Title: Environmental Engineering Sessional**

Course No: CE-354

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-3, Term-II

**Syllabus:**

Water and wastewater sampling techniques, sample preservation; Physical, chemical and bacteriological tests of water and wastewater; Design of water supply system.

**Course Title: Concrete Structure & Design Sessional-I**

Course No: CE-386

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-3, Term-II

**Syllabus:**

Analysis and design problems based on CE-385; design of a slab bridge, balanced cantilever bridge and a low-rise building.

**5.3.7 Courses offered in Level-4 Term-I:**

**Course Title: River Engineering and Basin Management**

Course No: WRE-401

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-4, Term-I

**Syllabus:**

Behavior of alluvial rivers; River pattern and morphological processes; River training and bank protection works; Navigation and dredging; Sediment movement in river channels, bed forms and flow regimes;

Flood and its management; River basin concepts; Major issues in river basin management; Environmental and ecological aspects; Trans boundary issues, water diplomacy, water treaties, water right, water law, conflict resolution and management.

**Course Title: Groundwater Engineering**

Course No: WRE-403

Credit: 2.0

Contact Hour: 2 Hrs per week

Schedule: Level-4, Term-I

**Syllabus:**

Groundwater in hydrologic cycle and its occurrence, Physical properties and principles of groundwater movement. Groundwater and well hydraulics; hand, shallow, deep set shallow and deep tube wells, their design , drilling, construction and maintenance; Groundwater resource evaluation, Groundwater levels and environmental influences. Water mining and land subsidence. Groundwater pollution and contaminant transport. Recharge of groundwater, Saline water intrusion in aquifers, Groundwater management.

**Course Title: Professional Practices and Construction Management**

Course No: WRE-451

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-4, Term-I

Type: Optional

**Syllabus:**

Introduction; Project preparation; Types of contracts; Various procurement methods; Tender document and specification; Evaluation of bids; Conflict resolution and arbitration; Professional ethics; Professional practice management plan; Report writing and communication.

Principles of construction management; Inspection and quality control; Construction safety; Construction planning and scheduling; PERT, CPM, material management and inventory control; Construction of equipment and plant; Human factors in construction management.

**Course Title: Socioeconomic Aspects of Development Projects**

Course No: WRE-453

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-4, Term-I

Type: Optional

**Syllabus:**

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

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

Productivity; land loss, land use and land ownership patterns; deforestation and afforestation; commerce, industries and other economic benefits;

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

**Course Title: Transportation Engineering**

Course No: CE-449

Credit: 4.0

Contact Hour: 4 Hrs per week

Schedule: Level-4, Term-I

**Syllabus:**

Introduction to transportation Engineering: elements of transportation system: transportation in Bangladesh; transportation planning concepts; study and analysis of basic data; highway location and surveys; geometric design of highways; elements of design, cross-section

elements, road intersections; traffic engineering; the road/traffic system, vehicle and traffic characteristics and its classification, traffic control devices, traffic studies, parking and roadway lighting.

Various types of pavements used in Bangladesh and its various structural layers indicating their functions and material used. Production, properties and uses of bituminous materials.

Railways: general requirements, alignment, permanent way, station and yards, signaling, points and crossings, maintenance.

**Course Title: Design of Concrete Structure-II**

Course No: CE-487

Credit: 4.0

Contact Hour: 4 Hrs per week

Schedule: Level-4, Term-I

Syllabus:

Review of codes (BNBC, ACI, BS, EURO, IS, etc.); Analysis and design of columns; Introduction to slender column; footings, retaining walls, piles and pile caps according to Strength design method; Analysis and design of members subjected to torsion; Deep beam; flat plate and flat slab design by Direct design method and Equivalent frame method; Limit state design and yield-line theory; Design of reinforcement at joints, brackets and corbels; Seismic detailing of slab, beam, column, footing; Structural forms; Introduction to prestressed concrete.

**Course Title: Internship**

Course No: WRE-450

Credit: 1.0

Contact Hour: 2 weeks

Schedule: Level-4, Term-I

Syllabus: Hands on training/internship on water resources engineering problems at related organizations.

**Course Title: Mathematical Modeling in Water Resources-II**

Course No: WRE-402

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-4, Term-I

Syllabus:

Introduction to hydrologic modeling; Definition and examples; Rainfall runoff model; Different hydrologic model and their applications and limitations; Hands on training on hydrologic model(s).

**Course Title: Transportation Engineering Sessional**

Course No: CE-442

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-4, Term-I

**Syllabus:**

Test on bituminous materials, Tests on sub-grade, Sub-base, base and surface course materials.

**Course Title: Concrete Structure & Design Sessional-II**

Course No: CE-482

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-4, Term-I

**Syllabus:**

Computer applications in the analysis of buildings and PC Girder Bridge; Design of a multistoried RCC frame residential building and a simple span PC girder bridge.

**Course Title: Institutional/Industrial Training**

Course No: WRE-450

Credit: Non-Credit course

Contact Hour: 1 week

Schedule: Level-4, Term-I

Type: Compulsory

**Syllabus:**

Hands on training/internship on water resources engineering problems at related organizations.

**Course Title: Project & Thesis**

Course No: WRE-400

Credit: 4.5

Schedule: Level-4, Term-I & Level-4, Term-II

**Syllabus:**

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

### **5.3.8 Courses offered in Level-4 Term-II:**

#### **Course Title: Integrated Water Resources Planning and Management**

Course No: WRE-455

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-4, Term-II

#### **Syllabus:**

Basic concepts in integrated water resources planning and management; Process of water resources planning; Economic, environmental, social and industrial aspects; Administrative and institutional system; Public participation; Project formulation and appraisal; Feasibility reports; Cost benefit analysis case studies; Conceptual framework and models; Mathematical optimization and simulation; Definition aims and objective of environmental impact assessment; Environmental issues related to water resources project: scoping, screening, impact analysis, impact management; Environmental management system; Social impact assessment.

#### **Course Title: Hydraulic Structures**

Course No: WRE-405

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-4, Term-II

#### **Syllabus:**

Hydraulic structures: Classification and Characteristics, Principle of design of hydraulic structures. Design of barrages, weirs, silt control devices, reservoir, dam, spillways, energy dissipators, regulator, transition, Irrigation structures. Cross drainage works: Siphon, aqueduct, bridge, culvert, surface fall.

#### **Course Title: Irrigation and Drainage Engineering**

Course No: WRE-411

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-4, Term-II

#### **Syllabus:**

Importance of irrigation; Sources and quality of irrigation water; Soil water relationship. Consumptive use and estimation of irrigation water requirements. Irrigation efficiencies; Design of irrigation canal system; Problems of irrigated land; irrigation water management; irrigation scheduling; Concept and practices of participatory design, Participatory management of irrigation projects, irrigation water market in developing countries; importance of land drainage; drainage system and its design, EIA of Water Resources Projects.

**Course Title: Coastal Engineering**

Course No: WRE-413

Credit: 3.0

Contact Hour: 3 Hrs per week

Schedule: Level-4, Term-II

**Syllabus:**

Coast and coastal features; tides and currents; tidal flow measurement; waves and its characteristics; forces of waves and tides in the design of coastal and harbor structures; coastal water level fluctuation-storm surge, tsunami and basin oscillation; coastal zone processes; deltas and its characteristics; estuary and estuary control; docks and harbors, design of shore protection works.

**Course Title: Hydraulic Machinery**

Course No: WRE-421

Credit: 2.0

Contact Hour: 2 Hrs per week

Schedule: Level-4, Term-II

Type: Optional

**Syllabus:**

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

**Course Title: Port and Harbor Engineering**

Course No: WRE-423

Credit: 2.0

Contact Hour: 2 Hrs per week

Schedule: Level-4, Term-II

Type: Optional

**Syllabus:**

Planning and harbor layout; channel basin and berths; wharves, jetties, dolphins and moorings; dry docks and shipway; cargo handling equipment; supporting facilities and ancillaries; navigation aids; port structures; construction materials and methods.

**Course Title: Climatology**

Course No: WRE-425

Credit: 2.0

Contact Hour: 2 Hrs per week

Schedule: Level-4, Term-II

Type: Optional

**Syllabus:**

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

**Course Title: Waterways Engineering**

Course No: WRE-427

Credit: 2.0

Contact Hour: 2 Hrs per week

Schedule: Level-4, Term-II

Type: Optional

**Syllabus:**

Introduction to waterways system; route classification; river types; causes of deterioration of waterways measures of improving waterways; navigational aids; purpose, buoys, channel markers, lighthouses, radar reflectors etc.; river ports; facilities, developments and problems; inland vessels; waterways of Bangladesh

**Course Title: Design of Hydraulic Structure Sessional**

Course No: WRE-406

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-4, Term-II

**Syllabus:**

Types of hydraulic structures; principles of design; design of different types of hydraulic structures: regulators; dams; barrages; cross- drainage works; pump house, etc.

**Course Title: Irrigation and Drainage Engineering Sessional**

Course No: WRE-412

Credit: 1.5

Contact Hour: 3 Hrs per week

Schedule: Level-4, Term-II

**Syllabus:**

Soil- water characteristics; infiltration; losses in irrigation canal; abstraction from a well in an unconfined aquifer; hydrograph analysis; pumps in series and parallel; pump characteristics; design of subsurface drainage system; design of irrigation and drainage network; flow through canal regulating structures.



**Course Title: Project & Thesis**

Course No: WRE-400

Credit: 4.5

Schedule: Level-4, Term-I & Level-4, Term-II

**Syllabus:**

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