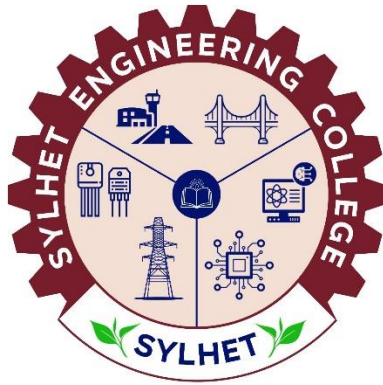


# Curriculum

## Department of Electrical and Electronic Engineering

Undergraduates  
Session: 2023-2024



Sylhet Engineering College  
Sylhet, Bangladesh

Website: sec.ac.bd  
E-mail: sec.admin@sec.ac.bd

### **Syllabus Committee:**

#### **Chairman:**

Md. Shahid Iqbal  
Assistant Prof. & Head, Dept. of EEE, SEC

#### **Members:**

Salman Fazle Rabby  
Lecturer, Dept. of EEE, SEC

Md. Ashraful Alam  
Lecturer, Dept. of EEE, SEC

Mahedi Kamal Ahmed  
Lecturer, Dept. of EEE, SEC

#### **External Members:**

Dr. Mohammad Kamruzzaman Khan Prince  
Associate Professor, Dept of EEE, SUST

Arif Ahammad  
Assistant Professor, Dept of EEE, SUST

#### **Industry Expert:**

MD. Romijul Islam,  
AGM, Sylhet PBS -2

#### **Alumni:**

Md. Faiyaz Ahmed Limon  
Lecturer, Dept. of EEE, LU, Sylhet

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## Part - A Program Name: B.Sc. (Engg.) in Electrical and Electronic Engineering

### Sylhet Engineering College Sylhet, Bangladesh

#### Institute Vision

To become a premier institution excelling in Science and Technology, with a deep national dedication and a strong global influence.

#### Institute Mission

- i. To foster the growth of knowledge and education through teaching and research in the fields of science and technology, like planting seeds that will grow into trees of innovation and discovery.
- ii. To contribute to transforming Bangladesh into a nation with sustainable economic growth and fair social development, much like guiding a ship toward a prosperous and balanced future.

#### Name of the Department

#### Electrical and Electronic Engineering

#### Vision of the Program

The Department of Electrical and Electronic Engineering, Sylhet Engineering College is responsible for imparting knowledge and excellence in Electrical and Electronic Engineering with global perspectives and hence add value to the knowledge-based economy and society consistently.

#### Mission of the Program

- M1.** To provide quality education and knowledge in Electrical and Electronic Engineering to build competent engineers and capable of addressing real-world problems to meet the needs of industry and society.
- M2.** To enable students to develop skills to solve complex technological problems and provide a framework for promoting collaborative and multidisciplinary activities.

- M3.** To contribute towards the creation of new knowledge through progressive research and innovation in EEE and related fields in order to face emerging national and global concerns for the sustainable development of the society.
- M4.** To alleviate students in gaining required ethics with an attitude of entrepreneurial skills, moral values and consciences.
- M5.** To create a bridge between industry and academia by framing curriculum based on industrial and societal needs.

### **Objectives**

The EEE department has established a set of goals that turn its mission into specific, measurable actions. The following dimensions are used to group the curriculum's goals:

- a) Inquisitiveness
- b) Career planning
- c) Professionalism and leadership
- d) Ethics and moral principles

**Name of the degree:** B.Sc. (Engr.) in Electrical and Electronic Engineering

### **Description of the Program**

The Department of Electrical & Electronic Engineering (EEE) has started its journey on 13 March 2015 under the School of Applied Sciences & Technology of Shahjalal University of Science and Technology (SUST). The department strives for excellence by integrating both theoretical knowledge and practical experience, supported by research facilities. It currently offers a four-year undergraduate program (B.Sc. (Engg.)) in Electrical and Electronic Engineering (EEE). This program provides students with a well-rounded education, blending theory, practical training, and hands-on experience through engineering design, project work, and laboratory experiments. In the fourth year, an industrial attachment enhances students' exposure to real-world engineering. The department equips students for a diverse range of engineering fields and career paths, including Solid State Devices, Nano Electronics, Physics, Photonics, Control Systems, VLSI, Robotics, Renewable Energy, Power System Analysis, and Optical Communication

### **Department at a glance**

Name of the Head: Md. Shahid Iqbal  
 Year of establishment: March, 2015  
 1st Academic year: 2015-16  
 Degree offered: B.Sc. (Engr.) in Electrical and Electronic Engineering

### **Faculties:**

#### **Assistant Professors:**

1. Md. Shahid Iqbal, B.Sc. (KUET), M.Sc. (DUET)

#### **Lecturers :**

2. Salman Fazle Rabby, B.Sc. (CUET), M.Sc. (BUET)
3. Md. Ashrafal Alam, B.Sc. (MEC)
4. Mahedi Kamal Ahmed, B.Sc. (KUET)

#### **Adjunct Lecturers :**

5. Md. Faiyaj Ahmed Limon, B. Sc. (SEC)
6. Md. Omar Faruk Sagor, B. Sc. (SEC)

### **Graduate Attributes**

**GA 01:** In-depth discipline-specific knowledge and professional skills.

**GA 02:** Beyond-discipline knowledge, insight, and skills.

**GA 03:** Capacity for critical, creative, and evidence-based thinking to solve complex problems.

**GA 04:** Awareness of and sensitivity to ethics and ethical standard on interpersonal, social, research, and professional levels.

**GA 05:** Valuing integrity, environmental sustainability, and civic engagement.

**GA 06:** Understanding of social and civic responsibilities and the rights of individuals and groups.

**GA 07:** Willingness to life-long learning through directed/guided and self-directed/independent study.

**GA 08:** Capacity for self-reflection, self-discovery, and personal development.

**GA 09:** Capable of communicating effectively in a range of contexts.

**GA 10:** Digital capabilities: well prepared for living, learning, and working in a digital society.

**GA 11:** Professionalism and leadership readiness: engage in professional behaviour and have the potential to take leadership roles in their chosen careers and communities.

### **Program Educational Objectives (PEO)**

**In order to attain these goals, the following are the program educational objectives (PEO)-**

**PEO1.** Prepare graduates for a variety of abilities, including those in communications, electric power, electronics, and digital systems by providing them with a strong foundation in engineering, mathematics, physics, and soft skills.

**PEO2.** Aid students in acquiring the fundamental competencies to perform proficiently in laboratories.

**PEO3.** Make the students capable of displaying advanced analytical and critical

thinking abilities to address conceptual and mathematical issues that arise in a range of fields, including power systems, communication technologies, and the invention of energy-efficient electronic devices.

**PEO4.** To enhance the skill for communicating scientific results effectively in written, oral and in interactive presentation.

**PEO5.** To motivate graduates to act ethically, professionally, and punctually in both their personal and professional aspects.

### Program Learning Outcome (PLO)

After graduation from our program in EEE, the graduates will be able to:

**PLO 1.** Apply engineering, mathematical, and scientific principles theoretically to present electrical and electronic engineering problems.

**PLO 2.** Apply learned skills and knowledge to the issues of sustainable development while taking societal, economic, and environmental restrictions into consideration;

**PLO 3.** Operate and calibrate lab apparatus by planning and carrying out tests, evaluating the data obtained, and drawing appropriate conclusions;

**PLO 4.** Enhance the ability to organize your research findings and data for correct documentation, as well as to locate, formulate, and study through a relevant literature review;

**PLO 5.** Demonstrate the capacity to work together as a team member to attain specified and measurable results;

**PLO 6.** Develop flexibility, adaptability, and time management abilities in line with the productivity requirements of related sector;

**PLO 7.** Recognize the value of lifelong learning and advancement in professional career;

**PLO 8.** Demonstrate an understanding of professional, ethical, and moral responsibilities as well as the capacity to uphold the conditions of the contract defined by their emPOyment.

**PLO 9.** Apply acquired knowledge and expertise to serve the society and nation at large.

### Mapping of mission of the University with PEOs:

Mission/PEO	PEO 01	PEO 02	PEO 03	PEO 04	PEO 05
M 01	✓	✓			
M 02	✓		✓		
M 03			✓	✓	
M 04	✓		✓		✓
M 05		✓	✓		✓

### Mapping PLOs with the PEOs:

PLO/ PEO	PEO 01	PEO 02	PEO 03	PEO 04	PEO 05
PLO 01	✓		✓		
PLO 02		✓	✓		
PLO 03		✓	✓	✓	
PLO 04			✓	✓	
PLO 05				✓	✓
PLO 06	✓				✓
PLO 07				✓	✓
PLO 08					✓
PLO 09	✓		✓		✓

### Mapping courses with the PLOs:

Course/ PLOs	PL O1	PL O2	PL O3	PL O4	PL O5	PL O6	PL O7	PL O8	PL O9
EEE 0713-1121	✓	✓	✓				✓	✓	✓
EEE 0713-1122	✓	✓	✓	✓	✓	✓	✓	✓	
CSE0011-1101E	✓	✓	✓	✓	✓				
CSE0011-1102E	✓	✓	✓	✓	✓				
PHY 0533-1101E	✓	✓	✓	✓					
MATH 0541-1101E					✓			✓	
MATH 0541-1103E					✓			✓	
SSS 0312-1101	✓	✓							
EEE 0713-1223	✓	✓	✓	✓	✓				

EEE 0713-1224	✓	✓	✓	✓					✓
EEE 0713-1220									
PHY 0533-1203E	✓	✓	✓	✓	✓				
PHY 0533-1204E	✓	✓		✓	✓	✓		✓	✓
MATH 0541-1205E	✓								
CHEM 0531-1201E				✓					✓
CHEM 0531-1202E	✓	✓		✓					
CEE 0720-1202E									
EEE 0713-1299									
EEE 0714-2121	✓	✓	✓	✓					
EEE 0714-2122	✓		✓	✓				✓	✓
EEE 0713-2125	✓	✓		✓					
EEE 0713-2126	✓	✓	✓		✓		✓		
EEE 0714-2124	✓	✓	✓	✓	✓				✓
ACC 0321-2101E	✓	✓		✓	✓				
MATH 0541-2107E	✓	✓		✓	✓	✓	✓	✓	✓
ENG 0231-2101E	✓	✓		✓			✓	✓	✓
ENG 0231-2102E	✓	✓		✓			✓	✓	
EEE 0714-2225	✓	✓	✓	✓			✓		
EEE 0714-2226	✓		✓	✓		✓			
EEE 0713-2227	✓		✓	✓					
EEE 0713-2228	✓		✓	✓				✓	✓
EEE 0713-2229	✓	✓	✓						✓
EEE 0713-2232	✓	✓	✓	✓	✓	✓	✓	✓	
ME 0715-2211E	✓	✓		✓					✓
ME 0715-2212E	✓	✓		✓					✓
MATH 0541-2209E	✓	✓		✓			✓		
EEE 0713-2299									
EEE 0714-3127	✓	✓	✓						
EEE 0714-3128	✓	✓	✓	✓	✓				✓
EEE 0714-3129	✓	✓	✓		✓	✓	✓		

EEE 0714-3130	✓	✓	✓	✓	✓	✓			
EEE 0713-3133	✓	✓			✓		✓		
EEE 0713-3134	✓	✓	✓						
EEE 0713-3135	✓	✓	✓	✓	✓	✓	✓	✓	✓
EEE 0713-3137	✓	✓	✓	✓	✓				
EEE 0714-3231	✓	✓	✓						
EEE 0714-3232	✓	✓	✓	✓	✓	✓	✓	✓	✓
EEE 0714-3233	✓	✓	✓	✓	✓		✓		
EEE 0714-3234	✓		✓	✓	✓				✓
EEE 0713-3239	✓	✓	✓	✓	✓				✓
EEE 0713-3240	✓	✓	✓	✓	✓			✓	✓
EEE 0713-3241	✓	✓	✓	✓	✓	✓	✓	✓	
IPE 0413-3205E	✓	✓	✓		✓	✓	✓		
EEE 0713-3299	✓	✓	✓	✓	✓	✓	✓		✓
EEE 0713-4170		✓	✓					✓	
EEE 0714-4135	✓	✓	✓	✓					
EEE 0714-4137	✓	✓	✓	✓					
EEE 0714-4138	✓	✓	✓	✓	✓	✓	✓	✓	✓
EEE 0713-4190	✓	✓	✓	✓	✓				
EEE 0713-4280	✓	✓		✓	✓	✓	✓	✓	✓
EEE 0713-4244	✓	✓		✓	✓	✓	✓	✓	
EEE 0713-4299	✓	✓	✓	✓	✓			✓	✓

## Part -B

Structure of the Curriculum

(a) **Duration of the Program: Years: 4; Semesters: 8**

(b) **Admission Requirements:**

**1 Undergraduate Admission:** The admission committee of the university will conduct the admission process for Bachelor's degree as per the rules. The student will be admitted in the first semester of an academic year in the individual discipline of different schools. However the admission of foreign students will be subjected to the verification of academic records as per the university rule.

### **2 Student Status and Student Level:**

Every student has to maintain his/her student status by getting admission paying necessary fees and register for required credits every semester. Unless a student graduate early by taking courses in advance, every student has to get admission in every semester successively. For book keeping purpose a student's level will be expressed by his/her year and semester. A student will be transferred to next level if he/she completes or appears in 80% of his designated courses at his/her present level. Once a student reaches 4th year 2nd (5th year 2nd for Architecture) semester he/she will be kept at this level until he/she graduates.

### **3 Re-Admission:**

A student has to take re-admission if his/her student status is not maintained or one or more semesters were cancelled because of disciplinary action against him/her. In case of semester cancellation the student has to get re-admission in the same semester. The level (Year and Semester) of re-admission will be determined by his completed/appeared credits. A student will be eligible for re-admission in the first year first semester of the subsequent session if he/she was present in at least 25% of the classes of his/her major courses or appeared at the semester final examination and his/her admission/semester fees was clear in the past semester/session. Re-admitted students will always be assigned the original Registration Number.

### **4 Student's Advisor:**

After admission every batch of student will be assigned to a student's Advisor from the teacher of his/her discipline to guide him/her through the semester system. Advisors will always be accessible to the students and will be ready to mentor them in their academic activities, career planning and if necessary, personal issues. There will be a prescribed guideline for the Advisors to follow.

(c) **Graduating Credits:**

### **1 Major Degree:**

#### **1.1 Total Credits:**

School of Physical Sciences, School of Social Sciences and School of Management and Business Administration have a requirement of 140 credits to graduate from its

disciplines. School of Applied Sciences and Technology, School of Life Sciences and School of Agriculture and Mineral Science have requirement of 160 (200 for Architecture) credits for graduation.

#### **1.2 Total Years:**

A regular student is expected to graduate in 8 semesters (4 years) or in 10 semesters (5 years) for the discipline of Architecture. A student may graduate in shorter time period if s/he is willing to take extra courses in a systematic way. A student will be given 4 (2 years) extra semesters in addition to 8/10 semesters to complete his/her degree. The regular examination year will be identified by the session and the end-month (June or December) of the semester the student graduates.

#### **1.3 Early Graduation:**

A student may graduate early by completing courses in advance, in that case he does not need to pay tuition or get admission in subsequent semesters. However a student will not be able to start master's degree one session earlier unless he graduates two semesters early.

#### **1.4 Minimum Credit for a Clearing Graduate:**

For a clearing graduate (8th and subsequent semesters) condition for maximum and minimum credit requirements is relaxed.

#### **1.5 Break in study:**

Those students who have not been able to achieve their degrees by participating in the ascertained 12th (for ARC department 14th) semester final exams will have the opportunity to do so by enrolling into 2 (two) running semesters back to back if after the publications of their results of the 12th (for ARC department 14th) semester final exam, it becomes evident that they have completed at least 80% of their total credits. In case of such students, on the tabulation sheet, result sheet, certificate, transcript, grade sheet, etc., number of total semesters shall be stated instead of the word "Irregular." As for irregular students, studentship shall be annulled after the aforesaid 2 (two) semesters have come to an end.

### **2 Second Major Degree:**

#### **2.1 Total Credits:**

A student may apply for a second major degree if he/she completes an extra 28-36 credit requirement designated by the offering discipline.

#### **2.2 Total Semesters:**

A student has to complete the credit requirement of second major degree within 8 regular and 4 extra semesters.

#### **2.3 Requirement of Major Degree:**

A student will not be given a second major degree if he/she fails to complete his regular major degree. A student will not be allowed to enroll in Master's program

before completion of his/her second major degree even if he/she complete his/her major degree requirement.

**2.4 Registration Criteria:**

An offering discipline will decide on the number of seats for second major, enrollment criteria and get it approved from the academic council. Students willing to get a second major have to apply to the offering discipline for enrollment and the discipline will enroll them as per the admission criteria. During registration enrolled students have to get their courses approved from the offering department completing a separate registration form.

**2.5 Class Routine:**

After enrollment a regular student may start taking the second major courses starting 3rd semester. The class routine may be arranged to accommodate the student need.

**2.6 Certificate and Mark sheet:**

A student completing the requirement will be given an additional certificate and grade sheet for his second major degree.

**(d) Total Class Weeks in a Semester:**

**1 Number of Semesters:** There will be two semesters in an academic year. The first semester will start on 1st January and end on 30th June, the Second semester will start on 1st July and end on 31st December. The routine of the final examination dates along with other academic deadlines will be announced in the academic calendar at the beginning of each semester.

**2 Duration of Semesters:**

The duration of each semester will be as follows:

Classes and Preparatory weeks	14+2 weeks
Final Examination	04 weeks
Total	19 weeks

These 19 weeks may not be contiguous to accommodate various holidays and the Recess before the final examination may coincide with holidays. The final grading will be completed before the beginning of the next semester.

- (e) **Minimum CGPA Requirements for Graduation:** 2.00
- (f) **Maximum Academic Years of Completion:** 6 Years
- (g) **Category of Courses:**

The entire Bachelor’s degree program is covered through a set of theoretical, practical, project, viva and seminar courses. At the beginning of every academic session a short description of every available course will be published by the syllabus committee of each discipline.

**1 Course Development:**

**1.1 Major and Non-Major Courses:**

Syllabus committee of every discipline will develop all the courses that will be offered by that particular discipline and has to be approved by the respective school and the Academic Council. These include major courses for the respective discipline as well as non-major courses that will be offered to other disciplines. Non-major courses will be developed with close cooperation of the disciplines concerned keeping into consideration of the need of that discipline.

**1.2 Syllabus:**

- (a) Major and Non-Major Courses: Syllabus committee will select and approve the courses from major courses of the discipline as well as non-major courses offered by other disciplines to complete the syllabus. The syllabus committee will also select a group of courses as core-courses and without these courses a student will not be allowed to graduate even if he completes the credit requirement. The committee may assign pre-requisite for any course if deemed necessary.
- (b) Second Major Courses: The syllabus committee will select a set of courses of 28-36 credits from the major courses for a second major degree.

**1.3 Course Instruction:**

At the beginning of every semester the course instructor has to make a detailed plan of the course instruction in the prescribed form and supply it to the head of the discipline to make it available to the students. The course plan should have the information about the suggested text books, number of lectures per topic, number and type of assignments, number and approximate dates of mid-semester examinations and mandatory office hours reserved for the students of the course offered. If not otherwise mentioned the medium of instruction is always English.

**2 Course Identification System:**

Each course is designated by a one-letter symbol for discipline abbreviation followed by an Eight-digit number to characterize the course. To avoid confusion new or modified courses should never be identified by reusing a discontinued course number

**2.1 Discipline Identification:**

The three-letter symbol will identify a discipline offering the course as follows. If same course is offered to more than one discipline, if necessary, an extra letter shown in the list may be used after the three digits to specify the department receiving the non-major course.

	<b>School of Applied Sciences and Technology:</b>	
EEE	Electrical and Electronic Engineering	E

## 2.2 Course Number:

The eight-digit number will be used as follows:

- (a) First Four Digits: The four digits of the eight-digit number will correspond to the classification of subject areas.
- (b) Fifth Digit: The fifth digit of the eight-digit number will correspond to the year intended for the course recipient.
- (b) Sixth Digit: The sixth digit of the eight-digit number will correspond to the semester in the year intended for the course recipient.
- (b) Seventh Digit: A discipline should use the number 0 and 1 for the seventh digit to identify non-major courses. The digits 2-9 are reserved for major courses to identify the different areas within a discipline.
- (c) Eight Digit: The eighth digit will be used to identify a course within a particular discipline. This digit can be used sequentially to indicate follow up courses. If possible even numbers will be used to identify laboratory courses.

## 2.3 Course Title and Credit:

Every course will have a short representative course title, declaration if it is core course, a number indicating the total credits as well as reference to prerequisite courses if any.

## 2.4 Theory and Lab Course:

If a single course has both Theory and Laboratory/Sessional part, then the course must be split into separate Theory and Lab courses and both should have separate course number. A student may not register for a lab course without registering or completing the corresponding theory course.

## 3 Assignment of Credits:

### 3.1 Theoretical:

One lecture per week (or 13 lectures in total) of 1-hour duration per semester will be considered as one credit. (There will be 10 minutes' recess between theory classes). A theory course will have only integer number of credits.

### 3.2 Laboratory Classes:

Minimum two contact hours of a laboratory class per week (or 26 contact hours in total) per semester will be considered as one credit. A laboratory course may have half integer credits with a minimum of 1 credit.

### 3.3 Seminar, Thesis, Projects, Monographs, Fieldwork, Viva etc.:

Will be assigned by the respective discipline.

## 4 Category of the Courses:

The Bachelor's degree courses will be classified into several groups and the syllabus committee will finalize the curricula selecting courses from the groups shown below.

## 4.1 Core Courses:

A student has to take at least 70% courses from his/her own discipline. Out of these courses a section will be identified as core courses and every student of a particular discipline will be required to take those courses.

## 4.2 General Education Courses:

Every student is required to take at least 25% (including mandatory) courses from related disciplines. If any General Education course is declared as Core course a student is required to take that course to graduate. The General Education courses will be designed, offered and graded by the offering disciplines.

## 4.3 Capstone Courses:

Capstone courses include thesis, project, training, internship, viva-voce.

## 4.4 Optional/Elective Courses:

Courses for specialization within the discipline

## 4.5 Other Courses:

After completion of the required mandatory, core and General Education courses a student may take few other courses of his/her choice not directly related to his/her discipline to fulfill the total credit requirement.

## 4.6 Credit-Only Courses:

The credit of these Credit-Only courses will be added to the total credits if passed but will not affect the CGPA as there will be no grades for these courses.

## Assessment or Evaluation Procedure for theory courses/sessional Courses /industrial tour and training/field visit/seminars/thesis

A student will be evaluated continuously in the courses system, for theoretical classes s/he will be assessed by class participation, assignments, quizzes, mid-semester examinations and final examination. For laboratory work s/he will be assessed by observation of the student at work, viva-voce during laboratory works, from his/her written reports and grades of examinations designed by the respective course teacher and the examination committee.

## Distribution of Marks:

The marks of a given course will be as follows:

Class Attendance	10%
Class performance	10%
Assignments and Mid-Semester Examinations	20%
Final Examination	60%

## Class Participation:

The marks for class participation will be as follows:

Attendance (Percentage)	Marks	Attendance (Percentage)	Marks	Attendance (Percentage)	Marks
95 and above	10	80 to 84	7	65 to 69	4
90 to 94	9	75 to 79	6	60 to 64	3
85 to 89	8	70 to 74	5	Less than 60	0

A student will not be allowed to appear at the examination of a course if his/her class attendance in that course is less than 50%.

#### Assignments and Mid-Semester Examinations:

There should be at least two mid-semester examinations for every course. The course teacher may decide the relative marks distribution between the assignments, tutorial and mid-semester examinations, however at least 50% contribution should come from the mid-semester examinations. The answer script should be returned to the students as it is valuable to their learning process.

#### Final Examination:

The final examination will be conducted as per the Semester Examination Ordinance.

(a) Duration of the Final Examination: There will be a 3-hour final examination for every course of 3 credits or more after the 13th week from the beginning of the semester. Courses less than 3 credits will have final examination of duration 2 hours.

(b) Evaluation of Answer Script: The students of the School of Applied Science and Technology and the School of Agriculture and Mineral Sciences will have two answer scripts to answer separate questions during final examination. Two separate examiner will grade the two scripts separately and the marks will be added together to get the final mark.

#### Project/Thesis:

The marks of Project/Thesis will be as follows:

Dissertation	20%	Evaluated by two Teachers
Project/Thesis Work	40%	Evaluated by Supervisor.
Presentation	40%	Evaluated by a panel of teachers.

### Part C

#### 1. Grading/Evaluation

##### 1.1) Grading Scale

Students performance are graded out of Grade Point 4.00 which is equivalent to Letter Grade A+.

##### 1.2) Grades

Letter Grade and corresponding Grade-Point for a course will be awarded from the roundup marks of individual courses as follows:

Numerical Grade	Letter Grade	Grade Point
80% and above	A+	4.00
75% to less than 80%	A	3.75
70% to less than 75%	A-	3.50
65% to less than 70%	B+	3.25
60% to less than 65%	B	3.00
55% to less than 60%	B-	2.75
50% to less than 55%	C+	2.50
45% to less than 50%	C	2.25
40% to less than 45%	C-	2.00
Less than 40%	F	0.00

#### 1.3) Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA)

Grade Point Average (GPA) is the weighted average of the grade points obtained in all the courses completed by a student in a semester. Cumulative Grade Point Average (CGPA) of only major and both major and second major degree will be calculated by the weighted average of every course of previous semesters along with the present semester. For clearing graduates if the roundup value of the third digit after decimal is nonzero the second digit will be incremented by one. A student will also receive a separate CGPA for his second major courses.

#### 1.4) Course Registration and Withdrawal

A student has to register for his/her courses and pay necessary dues within the first two weeks of every semester. Departmental student advisor will advise every student about his/her courses and monitor his/her performances. A student at any level is expected to register the courses at his level provided he/she does not have any incomplete courses from previous levels. A student will not be allowed to appear in the examination if his/her semester and examination fee is not cleared. A student, if s/he is not a clearing graduate, has to register for at least 12 credits minimum and 30 credits maximum every semester.

A student can withdraw a course by a written application to the Controller of Examinations through the Head of the discipline on or before the last day of instruction. The Controller of Examinations will send the revised registration list to the disciplines before the examination. There will be no record of the course in transcript if the course is withdrawn.

#### 1.5) Incomplete (I) Courses

(i) If a student has incomplete courses, he/she has to register his/her available incomplete courses from preceding levels before s/he can register courses from current or successive levels. If an incomplete course is not offered in a given

semester the student has to take the courses when it is offered next time. A student with incomplete courses will not be eligible for Distinction.

(ii) A student to register his/her incomplete courses, if offered, from proceeding semesters before s/he can register courses from current or successive semester, otherwise s/he takes the courses when the desired course is offered next time. A student will not be allowed to take 100 and 300 level and 200 and 400 level courses simultaneously. 100 level courses mean courses of 1st and 2nd semesters, 200 level courses mean courses of 3rd and 4th semesters and so on.

#### 1.6) Retake

If a student has to repeat a failed or incomplete course and that course is not offered any more, the discipline may allow him/her to take an equivalent course from the current syllabus. For clearing graduates if any incomplete course is not offered in the running semester, the discipline may suggest a suitable course to complete the credit requirement.

#### 1.7) Distinction

Candidates for four-year Bachelor degree will be awarded the degree with Distinction if his/her overall CGPA is 3.75 or above. However, a student will not be considered for Distinction if (a) s/he is not a regular student (has semester drop, incomplete courses in any semester or break of study) (b) has 'F' grade in one or more courses.

#### 1.8) Degree Requirement

All major theory and sessional courses offered by the EEE department must be completed to obtain the degree.

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Ref.: This Ordinance was approved in the 126th Academic Council (26 June 2013). Clause 3.4.1 was cancelled in 127th Academic Council (27 August 2013). 128th Academic Council (21 November 2013) decided to make it effective from 01 January

### List of courses according to category is tabulated below-

#### (i) General Education Courses:

Course Code	Course Title	Hours/Week		Credits
		Theory	Lab	
CSE0011-1101E	Introduction to Computer Language	2	0	2.0
CSE0011-1102E	Introduction to Computer Language Sessional	0	3	1.5
PHY 0533-1101E	Physics I	3	0	3.0
MATH 0541-1101E	Differential and Integral Calculus	3	0	3.0
MATH 0541-1103E	Complex Variables and Vector Analysis	3	0	3.0
SSS 0312-1101	History of the Emergence of Independent Bangladesh	3	0	3.0
PHY 0533-1203E	Physics II	3	0	3.0
PHY 0553-1204E	Physics II Sessional	0	3	1.5
MATH 0541-1205E	Differential Equations, Laplace & Fourier Transform	3	0	3.0
CHEM 0531-1201E	General Chemistry	3	0	3.0
CHEM 0531-1202E	General Chemistry Sessional	0	3	1.5
CEE 0720-1202E	Engineering Drawing	0	3	1.5
ACC 0321- 2101E	Financial and Managerial Accounting	3	0	3.0
MATH 0541-2107E	Co-ordinate Geometry and Linear Algebra	3	0	3.0
ENG 0231-2101E	English	3	0	3.0
ENG 0231-1102E	Communication in English Practice	0	2	1
ME 0715-2211E	Fundamentals of Mechanical Engineering	3	0	3.0
ME 0715-2212E	Fundamentals of Mechanical Engineering Sessional	0	3	1.5
MATH 0541-2209E	Probability & Statistics	3	0	3.0
IPE 0413-3205E	Management for Engineers	3	0	3.0
<b>Total</b>		<b>41</b>	<b>17</b>	<b>49.5</b>

## (ii) Core Courses:

Course Code	Course Title	Hours/Week		Credits
		Theory	Lab	
EEE 0713-1121	Electrical Circuits I	3	0	3.0
EEE 0713-1122	Electrical Circuits I Lab	0	3	1.5
EEE 0713-1223	Electrical Circuits II	3	0	3.0
EEE 0713-1224	Electrical Circuits II Lab	0	3	1.5
EEE 0713-1220	Energy Economics	2	0	2.0
EEE 0714-2121	Electronics I	3	0	3.0
EEE 0714-2122	Electronics I Lab	0	3	1.5
EEE 0713-2125	Energy Conversion I	3	0	3.0
EEE 0713-2126	Energy Conversion I Lab	0	3	1.5
EEE 0714-2124	Numerical Analysis Lab	0	3	1.5
EEE 0714-2225	Electronics II	3	0	3.0
EEE 0714-2226	Electronics II Lab	0	3	1.5
EEE 0713-2227	Energy Conversion II	3	0	3.0
EEE 0713-2228	Energy Conversion II Lab	0	3	1.5
EEE 0713-2229	Electromagnetic Fields and Waves	3	0	3.0
EEE 0713-2232	Circuit Simulation Lab	0	3	1.5
EEE 0714-3127	Communication I	3	0	3.0
EEE 0714-3128	Communication I Lab	0	3	1.5
EEE 0714-3129	Digital Electronics	3	0	3.0
EEE 0714-3130	Digital Electronics Lab	0	3	1.5
EEE 0713-3133	Power System I	3	0	3.0
EEE 0713-3134	Power System I Lab	0	3	1.5
EEE 0713-3135	Electrical Properties of Materials	3	0	3.0
EEE 0713-3137	Continuous Signals and Linear Systems	3	0	3.0
EEE 0714-3231	Digital Signal Processing I	3	0	3.0
EEE 0714-3232	Digital Signal Processing I Lab	0	3	1.5
EEE 0714-3233	Control System I	3	0	3.0
EEE 0714-3234	Control System I lab	0	3	1.5
EEE 0713-3239	Power System Protection	3	0	3.0
EEE 0713-3240	Power System Protection Lab	0	3	1.5
EEE 0713-3241	Power System II	3	0	3.0
EEE 0714-4135	Solid State Devices	3	0	3.0
EEE 0714-4137	Microprocessor and Interfacing	3	0	3.0
EEE 0714-4138	Microprocessor and Interfacing Lab	0	3	1.5

EEE 0713-4244	Electrical Services Design	0	3	1.5
<b>Total</b>		<b>56</b>	<b>45</b>	<b>78.5</b>

## (iii) Optional Courses:

Course Code	Course Title	Hours/Week		Credits
		Theory	Lab	
EEE 0713-4145	Power Plant Engineering	3	0	3.0
EEE 0714-4139	Processing and Fabrication Technology	3	0	3.0
EEE 0714-4141	Digital Signal Processing II	3	0	3.0
EEE 0714-4143	Random Signals and Process	3	0	3.0
EEE 0714-4145	Fundamentals of Nano electronics and Quantum Transport	3	0	3.0
EEE 0713-4147	Power Electronics	3	0	3.0
EEE 0713-4148	Power Electronics Lab	0	3	1.5
EEE 0714-4147	Microwave Engineering	3	0	3.0
EEE 0714-4148	Microwave Engineering Lab	0	3	1.5
EEE 0714-4149	Microcontroller System Design	3	0	3.0
EEE 0714-4150	Microcontroller System Design Lab	0	3	1.5
EEE 0713-4149	Renewable Energy Systems	3	0	3.0
EEE 0713-4151	Energy Conversion III	3	0	3.0
EEE 0714-4151	Compound Semiconductor and Hetero-Junction Devices	3	0	3.0
EEE 0714-4153	Geographical Communication	3	0	3.0
EEE 0714-4155	Real Time Computer System	3	0	3.0
EEE 0713-4253	Measurement & Instrumentation	3	0	3.0
EEE 0713-4254	Measurement & Instrumentation Lab	0	3	1.5
EEE 0713-4255	High Voltage Engineering	3	0	3.0
EEE 0713-4256	High Voltage Engineering Lab	0	3	1.5
CSE 0714-4261E	Computer Networking	3	0	3.0
CSE 0714-4262E	Computer Networking Lab	0	3	1.5
EEE 0713-4257	Power System Reliability	3	0	3.0
EEE 0714-4257	Optoelectronics	3	0	3.0
EEE 0714-4259	Telecommunication Engineering	3	0	3.0
EEE 0713-4259	Power System Operation and Control	3	0	3.0

EEE 0714-4261	Semiconductor Device Theory	3	0	3.0
EEE 0714-4263	Fundamentals of Biomedical Engineering	3	0	3.0
EEE 0714-4265	Control System II	3	0	3.0
EEE 0714-4266	Control System II Lab	0	3	1.5
EEE 0714-4267	Optical Fiber Communication	3	0	3.0
EEE 0714-4268	Optical Fiber Communication Lab	0	3	1.5
EEE 0714-4269	Cellular Mobile and Satellite Communication	3	0	3.0
EEE 0714-4270	Cellular Mobile and Satellite Communication Lab	0	3	1.5
EEE 0714-4271	VLSI Design	3	0	3.0
EEE 0714-4272	VLSI Design Lab	0	3	1.5

(iv) Capstone Courses

Course Code	Course Title	Hours/Week		Credits
		Theory	Lab	
EEE 0713-4170	Project/Thesis (Initial work)	0	4	2.0
EEE 0713-4280	Project/Thesis	0	8	4.0
EEE 0713-4190	Industrial Training	As required	As required	1.0
EEE 0713-1299	Viva Voce			1.0
EEE 0713-2299	Viva Voce			1.0
EEE 0713-3299	Viva Voce			1.0
EEE 0713-4299	Viva Voce			1.0
<b>Total</b>			12	7.0

16. Year/Semester wise distribution of courses:

a) First Year: 1st Semester

Course Code	Course Title	Course Category	Hours/Week		Credits
			Theory	Lab	
EEE 0713-1121	Electrical Circuits I	Core	3	0	3.0
EEE 0713-1122	Electrical Circuits I Lab	Core	0	3	1.5
CSE0011-1101E	Introduction to Computer Language	General Education	2	0	2.0
CSE0011-1102E	Introduction to Computer Language Sessional	General Education	0	3	1.5
PHY 0533-1101E	Physics I	General	3	0	3.0

Course Code	Course Title	Course	Hours/Week		Credits
		Education			
MATH 0541-1101E	Differential and Integral Calculus	General Education	3	0	3.0
MATH 0541-1103E	Complex Variables and Vector Analysis	General Education	3	0	3.0
SSS 0312-1101	History of the Emergence of Independent Bangladesh	General Education	3	0	3.0
<b>Total</b>			17.00	6.00	20.00

b) First Year: 2nd Semester

Course Code	Course Title	Course Category	Hours/Week		Credits
			Theory	Lab	
EEE 0713-1223	Electrical Circuits II	Core	3	0	3.0
EEE 0713-1224	Electrical Circuits II Lab	Core	0	3	1.5
EEE 0713-1220	Energy Economics	Core	2	0	2.0
PHY 0533-1203E	Physics II	General Education	3	0	3.0
PHY 0533-1204E	Physics II Sessional	General Education	0	3	1.5
MATH 0541-1205E	Differential Equations, Laplace & Fourier Transform	General Education	3	0	3.0
CHEM 0531-1201E	General Chemistry	General Education	3	0	3.0
CHEM 0531-1202E	General Chemistry Sessional	General Education	0	3	1.5
CEE 0720-1202E	Engineering Drawing	General Education	0	3	1.5
EEE 0713-1299	Viva	Capstone			1.0
<b>Total</b>			14.00	12.00	21.00

c) Second Year: 1st Semester

Course Code	Course Title	Course Category	Hours/Week		Credits
			Theory	Lab	
EEE 0714-2121	Electronics I	Core	3	0	3.0
EEE 0714-2122	Electronics I Lab	Core	0	3	1.5
EEE 0713-2125	Energy Conversion I	Core	3	0	3.0
EEE 0713-2126	Energy Conversion I Lab	Core	0	3	1.5

EEE 0714-2124	Numerical Analysis Lab	Core	0	3	1.5
ACC 0321- 2101E	Financial and Managerial Accounting	General Education	3	0	3.0
MATH 0541-2107E	Co-ordinate Geometry and Linear Algebra	General Education	3	0	3.0
ENG 0231-2101E	English	General Education	3	0	3.0
ENG 0231-2102E	Communication in English Practice	General Education	0	2	1
<b>Total</b>			15.00	11.00	20.5

**d) Second Year: 2nd Semester**

Course Code	Course Title	Course Category	Hours/Week		Credits
			Theory	Lab	
EEE 0714-2225	Electronics II	Core	3	0	3.0
EEE 0714-2226	Electronics II Lab	Core	0	3	1.5
EEE 0713-2227	Energy Conversion II	Core	3	0	3.0
EEE 0713-2228	Energy Conversion II Lab	Core	0	3	1.5
EEE 0713-2229	Electromagnetic Fields and Waves	Core	3	0	3.0
EEE 0713-2232	Circuit Simulation Lab	Core	0	3	1.5
ME 0715-2211E	Fundamentals of Mechanical Engineering	General Education	3	0	3.0
ME 0715-2212E	Fundamentals of Mechanical Engineering Sessional	General Education	0	3	1.5
MATH 0541-2209E	Probability & Statistics	General Education	3	0	3.0
EEE 0713-2299	Viva Voce	Capstone			1
<b>Total</b>			15.00	12.00	22.00

**e) Third Year: 1st Semester**

Course Code	Course Title	Course Category	Hours/Week		Credits
			Theory	Lab	
EEE 0714-3127	Communication I	Core	3	0	3.0
EEE 0714-3128	Communication I Lab	Core	0	3	1.5
EEE 0714-3129	Digital Electronics	Core	3	0	3.0
EEE 0714-3130	Digital Electronics Lab	Core	0	3	1.5
EEE 0713-3133	Power System I	Core	3	0	3.0
EEE 0713-3134	Power System I Lab	Core	0	3	1.5
EEE 0713-3135	Electrical Properties of Materials	Core	3	0	3.0
EEE 0713-3137	Continuous Signals and	Core	3	0	3.0

Course Code	Course Title	Course Category	Hours/Week		Credits
			Theory	Lab	
	Linear Systems				
<b>Total</b>			15.00	9.00	19.5

**f) Third Year: 2nd Semester**

Course Code	Course Title	Course Category	Hours/Week		Credits
			Theory	Lab	
EEE 0714-3231	Digital Signal Processing I	Core	3	0	3.0
EEE 0714-3232	Digital Signal Processing I Lab	Core	0	3	1.5
EEE 0714-3233	Control System I	Core	3	0	3.0
EEE 0714-3234	Control System I lab	Core	0	3	1.5
EEE 0713-3239	Power System Protection	Core	3	0	3.0
EEE 0713-3240	Power System Protection Lab	Core	0	3	1.5
EEE 0713-3241	Power System II	Core	3	0	3.0
IPE 0413-3205E	Management for Engineers	General Education	3	0	3.0
EEE 0713-3299	Viva Voce	Capstone			1.0
<b>Total</b>			15.00	9.00	20.5

**g) Fourth Year: 1st Semester**

Course Code	Course Title	Course Category	Hours/Week		Credits
			Theory	Lab	
EEE 0713-4170	Project/Thesis (Initial work)	Capstone	0	4	2.0
EEE 0714-4135	Solid State Devices	Core	3	0	3.0
EEE 0714-4137	Microprocessor & Interfacing	Core	3	0	3.0
EEE 0714-4138	Microprocessor & Interfacing	Core	0	3	1.5
EEE 071**	Elective I	Optional	3	0	3.0
EEE 071**	Elective II	Optional	3	0	3.0
EEE 071**	Elective II Lab	Optional	0	3	1.5
EEE 071**	Elective III	Optional	3	0	3.0
EEE 0713-4190	Industrial Training	Capstone	As required	As required	1.0
<b>Total</b>			15.00	10.00	21.0

**h) Fourth Year: 2nd Semester\***

Course Code	Course Title	Course Category	Hours/Week		Credits
			Theory	Lab	
EEE 0713-4280	Project/Thesis	Capstone	0	8	4.0
EEE 0713-4244	Electrical Services Design	Core	0	3	1.5
EEE 071**	Elective IV	Optional	3	0	3.0
EEE 071**	Elective IV Lab	Optional	0	3	1.5
EEE 071**	Elective V	Optional	3	0	3.0
EEE 071**	Elective VI	Optional	3	0	3.0
EEE 071**	Elective VI Lab	Optional	0	3	1.5
EEE 0713-4299	Viva voce	Capstone			1.0
Total			9.00	17	18.5

**Total Credits: 20.00+21.00+20.5+22.00+19.5+20.5+21.0+18.5=163.00**

**List of Options**

**Elective I Courses**

Course Code	Course Title	Course Category	Hours/Week		Credits
			Theory	Lab	
EEE 0713-4145	Power Plant Engineering	Optional	3	0	3.0
EEE 0714-4139	Processing and Fabrication Technology	Optional	3	0	3.0
EEE 0714-4141	Digital Signal Processing II	Optional	3	0	3.0
EEE 0714-4143	Random Signals and Process	Optional	3	0	3.0
EEE 0714-4145	Fundamentals of Nano electronics and Quantum Transport	Optional	3	0	3.0

**Elective II Courses**

Course Code	Course Title	Course Category	Hours/Week		Credits
			Theory	Lab	
EEE 0713-4147	Power Electronics	Optional	3	0	3.0
EEE 0713-4148	Power Electronics Lab	Optional	0	3	1.5
EEE 0714-4147	Microwave Engineering	Optional	3	0	3.0
EEE 0714-4148	Microwave Engineering Lab	Optional	0	3	1.5
EEE 0714-4149	Microcontroller System Design	Optional	3	0	3.0
EEE 0714-4150	Microcontroller System Design Lab	Optional	0	3	1.5

**Elective III Courses**

Course Code	Course Title	Course Category	Hours/Week		Credits
			Theory	Lab	
EEE 0713-4149	Renewable Energy Systems	Optional	3	0	3.0
EEE 0713-4151	Energy Conversion III	Optional	3	0	3.0
EEE 0714-4151	Compound Semiconductor and Hetero-Junction Devices	Optional	3	0	3.0
EEE 0714-4153	Geographical Communication	Optional	3	0	3.0
EEE 0714-4155	Real Time Computer System	Optional	3	0	3.0

**Elective IV Courses**

Course Code	Course Title	Course Category	Hours/Week		Credits
			Theory	Lab	
EEE 0713-4253	Measurement & Instrumentation	Optional	3	0	3.0
EEE 0713-4254	Measurement & Instrumentation Lab	Optional	0	3	1.5
EEE 0713-4255	High Voltage Engineering	Optional	3	0	3.0
EEE 0713-4256	High Voltage Engineering Lab	Optional	0	3	1.5
CSE 0714-4261E	Computer Networking	Optional	3	0	3.0
CSE 0714-4262E	Computer Networking Lab	Optional	0	3	1.5

**Elective V Courses**

Course Code	Course Title	Course Category	Hours/Week		Credits
			Theory	Lab	
EEE 0713-4257	Power System Reliability	Optional	3	0	3.0
EEE 0714-4257	Optoelectronics	Optional	3	0	3.0
EEE 0714-4259	Telecommunication Engineering	Optional	3	0	3.0
EEE 0713-4259	Power System Operation and Control	Optional	3	0	3.0
EEE 0714-4261	Semiconductor Device Theory	Optional	3	0	3.0

EEE 0714-4263	Fundamentals of Biomedical Engineering	Optional	3	0	3.0
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**Elective VI Courses**

Course Code	Course Title	Course Category	Hours/Week		Credits
			Theory	Lab	
EEE 0714-4265	Control System II	Optional	3	0	3.0
EEE 0714-4266	Control System II Lab	Optional	0	3	1.5
EEE 0714-4267	Optical Fiber Communication	Optional	3	0	3.0
EEE 0714-4268	Optical Fiber Communication Lab	Optional	0	3	1.5
EEE 0714-4269	Cellular Mobile and Satellite Communication	Optional	3	0	3.0
EEE 0714-4270	Cellular Mobile and Satellite Communication Lab	Optional	0	3	1.5
EEE 0714-4271	VLSI Design	Optional	3	0	3.0
EEE 0714-4272	VLSI Design Lab	Optional	0	3	1.5

**Part D**  
**Sylhet Engineering College**  
**School of Applied Sciences and Technology**  
**Department of Electrical and Electronic Engineering**  
**COURSE PROFILE**  
**First Year**

<b>Course Title</b>	Electrical Circuits I
<b>Credits</b>	3.0
<b>Course No</b>	EEE 0713-1121
<b>Contact Hours</b>	3 hours/week
<b>Rationale</b>	This is an introductory course in Electrical and Electronic Engineering, introducing simple electrical DC circuits as well as the technical skills to facilitate necessary knowledge to analyze such simple and complex circuits. It is a course suitable for students pursuing further studies in electrical, electronic or telecommunications engineering as well as some other related engineering disciplines including computer engineering. In the practical section, it provides hands-on experience in building and testing circuits. It is packaged in such a way that students, having taken this course, can go away and build and analyze some practical, useful devices afterwards. It is a pre-requisite for the subsequent course on Circuits and Signals.
<b>Objective</b>	<ul style="list-style-type: none"> <li>• To disseminate knowledge about electrical charge, voltage, current and power.</li> <li>• To give the idea of basic concepts of DC circuit behavior.</li> <li>• To develop mathematical representations for simple RLC DC circuits.</li> <li>• To teach the students methods to solve mathematical representations for simple RLC DC circuits of dependent and independent sources.</li> <li>• To make the students understand the use of circuit analysis theorems and methods.</li> <li>• To give idea about magnetic circuits.</li> </ul>
<b>Course Content</b>	<p><b>Circuit variables and elements:</b> Voltage, current, power, energy, independent and dependent sources, and resistance.</p> <p><b>Basic laws:</b> Ohm's law, Kirchhoff's current and voltage laws.</p> <p><b>Simple resistive circuits:</b> Series and parallel circuits, voltage and current division, wye-delta transformation.</p> <p><b>Techniques of circuit analysis:</b> Nodal and mesh analysis including super node and super mesh.</p>

	<p><b>Network theorems:</b> Source transformation, Thevenin's, Norton's and superposition theorems with applications in circuits having independent and dependent sources, maximum power transfer condition and reciprocity theorem.</p> <p><b>Energy storage elements:</b> Inductors and capacitors, series parallel combination of inductors and capacitors.</p> <p><b>Responses of RL and RC circuits:</b> Natural and step responses.</p> <p><b>Magnetic quantities and variables:</b> Flux, permeability and reluctance, magnetic field strength, magnetic potential, flux density, magnetization curve.</p> <p><b>Laws in magnetic circuits:</b> Ohm's law and Ampere's circuital law.</p> <p><b>Magnetic circuits:</b> series, parallel and series-parallel circuits.</p>																					
<b>Course Learning Outcome</b>	<p>After the successful completion of the course, the student will be able to-</p> <table border="1" style="width: 100%;"> <tr> <td><b>CLO1</b></td> <td>Define charge, current, voltage and power, resistance etc</td> </tr> <tr> <td><b>CLO2</b></td> <td>Describe the basic circuit laws and circuit analysis techniques.</td> </tr> <tr> <td><b>CLO3</b></td> <td>Explain DC circuit analysis.</td> </tr> <tr> <td><b>CLO4</b></td> <td>Describe the basic idea about magnetic circuits and Electric Flux.</td> </tr> <tr> <td><b>CLO5</b></td> <td>Understand the energy storage elements.</td> </tr> <tr> <td><b>CLO6</b></td> <td>Apply different Network Theorems for circuit analysis</td> </tr> </table>										<b>CLO1</b>	Define charge, current, voltage and power, resistance etc	<b>CLO2</b>	Describe the basic circuit laws and circuit analysis techniques.	<b>CLO3</b>	Explain DC circuit analysis.	<b>CLO4</b>	Describe the basic idea about magnetic circuits and Electric Flux.	<b>CLO5</b>	Understand the energy storage elements.	<b>CLO6</b>	Apply different Network Theorems for circuit analysis
<b>CLO1</b>	Define charge, current, voltage and power, resistance etc																					
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<b>Mapping of Course Learning Outcomes to Program Outcomes</b>		<b>PL O1</b>	<b>PL O2</b>	<b>PL O3</b>	<b>PL O4</b>	<b>PL O5</b>	<b>PL O6</b>	<b>PL O7</b>	<b>PL O8</b>	<b>PL O9</b>												
<b>CL O 1</b>				✓																		
<b>CL O 2</b>	✓	✓	✓																			
<b>CL O 3</b>	✓		✓					✓														
<b>CL O 4</b>	✓	✓	✓																			

	CL O 5							✓	✓	
	CL O 6							✓		✓
<b>Mapping of Course Learning Outcomes (CLOs) with the Teaching-Learning &amp; Assessment Strategy</b>	<b>CL O</b>	<b>Teaching Learning Strategy</b>		<b>Assessment Strategy</b>						
	CL O 1	Lectures		Class Test, Final Exam						
	CL O 2	Lectures, Demonstration, Project Design		Class Test, Assignment						
	CL O 3	Lectures,		Assignment, Presentation						
	CL O 4	Lectures, Presentation		Assignment, Final Exam						
	CL O 5	Lectures, Home work		Class Test, Class Test						
	CL O 6	Lectures		Class Test, Final Exam, Assignment						
<b>Textbook</b>	1. Fundamentals of Electric Circuits by Charles K. Alexander, Mathew N.O. Sadiku R. 2. Electric Circuits by James W. Nilsson, Susan Riedel 3. Introductory Circuit Analysis by Robert L. Boylestad									

<b>Course Title</b>	Electrical Circuit I Lab
<b>Credits</b>	1.5
<b>Course No</b>	EEE 0713-1122
<b>Contact Hours</b>	3 hours/week
<b>Rationale</b>	In this course students will perform experiments to verify practically the theories and concepts learned in EEE 121. Theoretical knowledge is incomplete without hands on experiments using the basic components and measuring devices used in electrical circuits' analysis. This course teaches the fundamentals of electrical circuits, application of circuit laws, theorems and measuring techniques for DC circuits.
<b>Objective</b>	<ul style="list-style-type: none"> <li>To provide the students with capability of implementing different real-life dc circuits.</li> <li>To provide the students with the techniques of solving of different types of circuits by network theorem.</li> </ul>

	<ul style="list-style-type: none"> <li>To teach the voltage, current and load relationship in a network.</li> <li>To facilitate necessary knowledge about transient analysis and steady state analysis of a capacitor and inductor network.</li> </ul>												
<b>Course Content</b>	<p>This lab has two parts, hardware experimentation and software simulation. In this course students will perform experiments to verify practically the theories and concepts learned in EEE-101.</p> <ol style="list-style-type: none"> <li>To make students familiar with the operation of different electrical instruments.</li> <li>To verify the following theorems for DC circuits: <ol style="list-style-type: none"> <li>KCL and KVL,</li> <li>Superposition theorem,</li> <li>Thevenin's theorem,</li> <li>Norton's theorem and</li> <li>Maximum power transfer theorem</li> </ol> </li> <li>To perform other experiments relevant application based on EEE 0713-1121.</li> </ol>												
<b>Course Learning Outcome</b>	<p>After the successful completion of the course, the student will be able to-</p> <table border="1"> <tr> <td><b>CLO 1</b></td> <td>Recognize different types of electrical instruments and measuring devices.</td> </tr> <tr> <td><b>CLO 2</b></td> <td>Describe the idea about complex circuit network.</td> </tr> <tr> <td><b>CLO 3</b></td> <td>Interpret transient response about capacitor and inductor circuits.</td> </tr> <tr> <td><b>CLO 4</b></td> <td>Design experiments to interpret different types of circuit analysis theorem and laws.</td> </tr> <tr> <td><b>CLO 5</b></td> <td>Implement electrical circuits for real life application.</td> </tr> <tr> <td><b>CLO 6</b></td> <td>Demonstrate team-based communication skills, magnify their moral standards and apply these in practical life.</td> </tr> </table>	<b>CLO 1</b>	Recognize different types of electrical instruments and measuring devices.	<b>CLO 2</b>	Describe the idea about complex circuit network.	<b>CLO 3</b>	Interpret transient response about capacitor and inductor circuits.	<b>CLO 4</b>	Design experiments to interpret different types of circuit analysis theorem and laws.	<b>CLO 5</b>	Implement electrical circuits for real life application.	<b>CLO 6</b>	Demonstrate team-based communication skills, magnify their moral standards and apply these in practical life.
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Mapping of Course Learning Outcomes to Program Outcomes		PL O1	PL O2	PL O3	PL O4	PL O5	PL O6	PL O7	PL O8	PL O9
	CL O1			✓						
	CL O2	✓	✓		✓					
	CL O3	✓	✓							
	CL O4	✓	✓	✓						
	CL O5	✓		✓	✓					
	CL O6					✓	✓	✓	✓	
Mapping of Course Learning Outcomes (CLOs) with the Teaching-Learning & Assessment Strategy	CLOs	Teaching Learning Strategy			Assessment Strategy					
	CLO 1	Lectures, Demonstration			Viva, Report Writing					
	CLO 2	Demonstration			Laboratory Test, Report Writing					
	CLO 3	Lectures, Project Design			Viva, Quiz, Laboratory Test					
	CLO 4	Lectures, Demonstration			Viva, Quiz, Laboratory Test					
	CLO 5	Lectures, Demonstration			Laboratory Test, Viva, Report Writing					
	CLO 6	Lectures, Demonstration,			Viva, Project Design					
Textbooks	<ul style="list-style-type: none"> <li>Fundamental of Electric Circuits – Charles K. Alexander and Matthew N.O. Sadiku</li> <li>Introductory Circuit Analysis by Robert L. Boylestad</li> <li>Electronic Devices and Circuit Theory by Robert L. Boylestad and Louis Nashlesky</li> </ul>									

Course Title	Introduction to Computer Language
Credits	2.0
Course No	CSE0011-1101E

Contact Hours	2 hours/week						
Rationale	To familiarize the student with basic concepts of computer programming and developer tools. To present the syntax and semantics of the “C” language as well as data types offered by the language. To allow the students to write their own programs using standard language infrastructure regardless of the hardware or software platform.						
Objective	<ul style="list-style-type: none"> <li>To provide students a basic understanding of computer hardware and how a computer works.</li> <li>To teach students the basic terminology used in computer programming.</li> <li>To teach how to write, compile and debug programs in C language.</li> <li>To help students write programs involving decision structures, loops and functions.</li> <li>To teach the students the concepts and usage of pointers.</li> <li>To teach students good programming practices and how to build up their own logics and how to implement them.</li> </ul>						
Course Content	<p><b>Introduction to digital computers:</b> Early history of computing devices; Computers; Major components of a computer;</p> <p><b>Hardware:</b> processor, memory, I/O Devices; <b>Software:</b> Operating system, application software; Basic architecture of a computer; Basic Information Technology; The Internet; <b>Number systems:</b> binary, octal, hexadecimal, binary arithmetic.</p> <p><b>Structured Programming using C:</b> Basic programming concepts, program development stages: flow charts; programming constructs: data types, operators, expressions, statements, control statements, functions, array, pointers, structure unions, user defined data types, input-output and files.</p> <p><b>Object-oriented Programming using C++:</b> introduction, classes and objects; polymorphism; function and operator overloading; inheritance.</p>						
Course Learning Outcome	<p>After the successful completion of the course, the student will be able to-</p> <table border="1"> <tr> <td>CLO 1</td> <td>Understand the concepts of computer hardware and how it works.</td> </tr> <tr> <td>CLO 2</td> <td>Recall the basic terminology used in computer programming.</td> </tr> <tr> <td>CLO 3</td> <td>Construct, compile and debug programs in C language.</td> </tr> </table>	CLO 1	Understand the concepts of computer hardware and how it works.	CLO 2	Recall the basic terminology used in computer programming.	CLO 3	Construct, compile and debug programs in C language.
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CLO 2	Recall the basic terminology used in computer programming.						
CLO 3	Construct, compile and debug programs in C language.						

	<b>CLO 4</b>	Apply control-flow tools such as loop, if-else etc.								
	<b>CLO 5</b>	Understand the usage of pointers, structures and some advanced topics.								
	<b>CLO 6</b>	Employ good programming practices for betterment of society.								
<b>Mapping of Course Learning Outcomes to Program Outcomes</b>		<b>PL O 1</b>	<b>PL O 2</b>	<b>PL O 3</b>	<b>PL O 4</b>	<b>PL O 5</b>	<b>PL O 6</b>	<b>PL O 7</b>	<b>PL O 8</b>	<b>PL O 9</b>
	<b>CL O 1</b>	✓								
	<b>CL O 2</b>	✓								
	<b>CL O 3</b>	✓			✓					
	<b>CL O 4</b>	✓			✓					
	<b>CL O 5</b>	✓			✓					
	<b>CL O 6</b>							✓		✓
<b>Mapping of Course Learning Outcomes (CLOs) with the Teaching-Learning &amp; Assessment Strategy</b>	<b>CLO</b>	<b>Teaching Learning Strategy</b>	<b>Assessment Strategy</b>							
	<b>CLO1</b>	Lectures	Quiz Test, Final Exam							
	<b>CLO2</b>	Lectures, Practice	Class Test, Assignment							
	<b>CLO3</b>	Lectures,	Assignment, Presentation							
	<b>CLO4</b>	Lectures, Presentation	Assignment, Final Exam							
	<b>CLO 5</b>	Lectures, Class work	Class Test, Final Exam.							
<b>CLO 6</b>	Lectures, Demonstration	Class Test, Presentation								
<b>Textbook</b>	1. Schaum's Outline of Programming with C by Byron S. Gottfried 2. C: The Complete Reference by Herbert Schildt									

<b>Contact Hours</b>	3 hours/week
<b>Rationale</b>	To familiarize the student with basic concepts of computer programming and developer tools. To present the syntax and semantics of the “C” language as well as data types offered by the language. To allow students to write their own programs using standard language infrastructure regardless of the hardware or software platform.
<b>Objective</b>	<ul style="list-style-type: none"> <li>To develop skills to work with C++ compilers and how to use run programs on the computer.</li> <li>Foster the analytical and critical knowledge to build up logic and implement them using C.</li> <li>To facilitate necessary knowledge about how to design programs involving decision structures, loops and functions</li> <li>To develop skills to debug codes by giving an in-depth idea about different syntax errors, exceptions and how to fix them.</li> <li>To facilitate necessary knowledge about the concepts and usage of pointers, structures and some advanced topics.</li> <li>To provide the knowledge of good programming practices.</li> </ul>
<b>Course Content</b>	<p>Computer Basics: Overview of computer hardware and software, including classifications.</p> <p>C-Language: Introduction to C programming with topics such as variables, data types, input/output (character and formatted), arithmetic expressions, loops, decision-making, arrays, functions, recursion, structures, file handling (sequential and random I/O), pointers (including operations and memory management), and bit operations. The program also covers advanced features, standard libraries, and problem-solving techniques.</p> <p>Problem Solving: Tasks include basic calculations, determining odd/even numbers, letter grades, geometric shapes, Fibonacci series, geometric mean, quadratic formula, prime numbers (Sieve of Eratosthenes), prime factorization, factorial, leap year, and string manipulation (vowel/consonant count, reversing words, matrix multiplication).</p>

<b>Course Title</b>	Introduction to Computer Language Lab
<b>Credits</b>	1.5
<b>Course No</b>	CSE0011-1102E

<b>Course Learning Outcome</b>	After the successful completion of the course, the student will be able to-									
	<b>CLO1</b>	Recognize C compilers and necessary tools to run programs on the computer.								
	<b>CLO2</b>	Interpret logic and implement them using C.								
	<b>CLO3</b>	Design programs involving decision structures, loops and functions								
	<b>CLO4</b>	Debug codes by giving means of an in-depth idea about different syntax errors, exceptions and how to fix them.								
	<b>CLO5</b>	Implement good programming practices.								
<b>Mapping of Course Learning Outcomes to Program Outcomes</b>		<b>PL O 1</b>	<b>PL O 2</b>	<b>PL O 3</b>	<b>PL O 4</b>	<b>PL O 5</b>	<b>PL O 6</b>	<b>PL O 7</b>	<b>PL O 8</b>	<b>PL O 9</b>
	<b>CL O 1</b>		✓	✓						
	<b>CL O 2</b>		✓	✓						
	<b>CL O 3</b>		✓	✓						
	<b>CL O 4</b>				✓					
	<b>CL O 5</b>								✓	
<b>Mapping of Course Learning Outcomes (CLOs) with the Teaching-Learning &amp; Assessment Strategy</b>	<b>CLO</b>	<b>Teaching Learning Strategy</b>				<b>Assessment Strategy</b>				
	<b>CLO1</b>	Lectures, Demonstration				Quiz, Class Work				
	<b>CLO2</b>	Lectures, Class Work				Quiz, Assignment, Practice				
	<b>CLO3</b>	Lectures, Problem Solving				Quiz, Assignment, Lab Final				
	<b>CLO4</b>	Lectures, Practice				Quiz, Assignment, Lab Final				
	<b>CLO5</b>	Lectures, Demonstration				Assignment, Projects				
<b>Textbook</b>	1. Software Engineering: A Practitioner's Approach- Roger S. Pressman.									

	2. Head First Design Patterns, Eric & Elisabeth Freeman, O'REILLY.
<b>Course Title</b>	Physics I (Waves & Oscillations, Optics, Thermal Physics)
<b>Credits</b>	3.0
<b>Course No</b>	PHY 0533-1101E
<b>Contact Hours</b>	3 hours/week
<b>Rationale</b>	In this course, Students will be able to gather knowledge of thermal properties of materials and apply the knowledge in different thermal situations. This course will also provide basic knowledge on wave and oscillations. Physical optics will be covered by this course through which students will be familiar with interference, Bi-prism and diffraction.
<b>Objective</b>	<ul style="list-style-type: none"> <li>To learn about thermometer and its construction.</li> <li>To learn basic principles of thermodynamics.</li> <li>To know wave behaviour and Lissajous figure.</li> <li>To learn physical optics and problem-solving technique.</li> </ul>
<b>Course Content</b>	<p><b>Physical Optics:</b> Theories of light: Huygen's principle and construction. <b>Interference of light:</b> Young's double slit experiment, Fresnel bi-prism, Newton's rings, interferometers. <b>Diffraction of light:</b> Fresnel and Fraunhofer diffraction, diffraction by single slit, diffraction by double slit, diffraction gratings, polarization, production and analysis of polarized light, optical activity, optics of crystals.</p> <p><b>Heat and Thermodynamics:</b> Temperature, zeroth law of thermodynamics. <b>Thermometers:</b> constant volume, platinum resistance, thermocouple. First law of thermodynamics and its application, molar specific heats of gases, isothermal and adiabatic relations, work done by a gas. <b>Kinetic theory of gases:</b> explanation of gas laws, kinetic interpretation of temperature, equipartition of energy and calculation of ratio of specific heats, mean free path, Vander Waals equation of state, second law of thermodynamics: reversible and irreversible processes, Carnot cycle, efficiency, Carnot's theorem, entropy.</p> <p><b>Waves and Oscillations:</b> Simple harmonic motion, damped simple harmonic oscillations, forced oscillations, resonance, vibrations of membranes and columns. Combination and composition of simple harmonic motions, Lissajous figures. Transverse and longitudinal nature of waves, travelling and</p>

	standing waves, intensity of a wave, energy calculation of progressive and stationary waves, phase velocity, group velocity. Sound waves: velocity of longitudinal wave in a gaseous medium. Doppler Effect. Architectural acoustics: Sabine's formula, requisites of a good auditorium.																																																												
<b>Course Learning Outcome</b>	After the successful completion of the course, the student will be able to- <table border="1" style="margin-left: 20px;"> <tr> <td><b>CLO1</b></td> <td>Explain thermometer, kinetic theory of gases, mean free path, Brownian motion, Van der Waals equation and related problems.</td> </tr> <tr> <td><b>CLO2</b></td> <td>Learn basic law of thermodynamics and solve related problems.</td> </tr> <tr> <td><b>CLO3</b></td> <td>Understand and use simple harmonic motion.</td> </tr> <tr> <td><b>CLO4</b></td> <td>Learn wave behaviour and calculate wave properties for different situations.</td> </tr> <tr> <td><b>CLO5</b></td> <td>Know physical optics and related problems.</td> </tr> </table>	<b>CLO1</b>	Explain thermometer, kinetic theory of gases, mean free path, Brownian motion, Van der Waals equation and related problems.	<b>CLO2</b>	Learn basic law of thermodynamics and solve related problems.	<b>CLO3</b>	Understand and use simple harmonic motion.	<b>CLO4</b>	Learn wave behaviour and calculate wave properties for different situations.	<b>CLO5</b>	Know physical optics and related problems.																																																		
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<b>Mapping of Course Learning Outcomes (CLOs) with the Teaching-Learning &amp; Assessment Strategy</b>	<b>CLO</b>	<b>Teaching Learning Strategy</b>	<b>Assessment Strategy</b>
	<b>CLO1</b>	Lectures	Quiz, Final Exam
	<b>CLO2</b>	Lectures, Demonstration, Project Design	Class Test, Assignment
	<b>CLO3</b>	Lectures,	Assignment, Presentation
	<b>CLO4</b>	Lectures, Presentation	Assignment, Final Exam
	<b>CLO 5</b>	Lectures, Home work	Class Test, Final Exam
<b>Textbook</b>	1. Halliday, D. and Resnick, R: physics (Vol.I and Vol II) 2. Physics for Engineers. Dr. Giasuddin Ahmed		

<b>Course Title</b>	Differential and Integral Calculus
<b>Credits</b>	3.0
<b>Course No</b>	MATH 0541-1101E
<b>Contact Hours</b>	3 hours/week
<b>Rationale</b>	Mathematics is the language of science which develops thinking and critical problem-solving skills. Differential calculus deals with the calculation of instantaneous rate of change and integral calculus deals with finding out the limit of a summation of the infinitely many small factors. The calculus has wide applications in science, engineering, economics, finance, statistics etc. The content of the course comprises functions, limits, continuity, derivatives, tangent and normal, different theorems such as Rolle's, Mean value, Taylor's, Leibnitz's and Euler's theorems etc., indefinite and definite integrals and their applications in real life situations.
<b>Objective</b>	<ul style="list-style-type: none"> <li>Learn the general concept of function and its applications to real- Know the basic concept of function and its applications to real – life problems.</li> <li>Explore the concepts, properties, and aspects of the differential and integral calculus of single variable functions.</li> <li>Learn the concepts of limits, continuity and derivative.</li> <li>Learn to finding out the derivative of different type of functions applying the formulae of derivatives.</li> </ul>

	<ul style="list-style-type: none"> <li>Know the application of derivatives to solve maximum and minimum value problems.</li> <li>Study various types of integrations for different cases.</li> <li>Apply the techniques of integration to solve the real-life oriented problems such as length, areas and volumes etc.</li> </ul>												
<b>Course Content</b>	<p><b>Differential Calculus:</b> Limits, continuity and differentiability. Successive differentiation of various types of functions. Leibnitz's theorem. Rolle's theorem, Mean value theorem, Taylor's and Maclaurin's theorems in finite and infinite forms. Lagrange's form of remainders. Cauchy's form of remainders. Expansion of functions, evaluation of indeterminate forms of L' Hospital's rule. Partial differentiation. Euler's theorem. Tangent and normal. Sub tangent and subnormal in Cartesian and polar co-ordinates. Determination of maximum and minimum values of functions. Curvature. Asymptotes. Curve tracing.</p> <p><b>Integral Calculus:</b> Definitions of integrations; Integration by parts, the method of substitution. Standard integrals. Integration by successive reduction. Definite integrals, its properties and use in summing series. Walli's formulae. Improper integrals. Beta function and Gamma function. Area under a plane curve and area of a region enCOsed by two curves in Cartesian and polar co-ordinates. Volumes and surface areas of solids of revolution.</p>												
<b>Course Learning Outcome</b>	<p>After the successful completion of the course, the student will be able to-</p> <table border="1"> <tr> <td><b>CLO1</b></td> <td>understand the fundamental ideas and principles as well as geometrical meaning of differential and integral calculus of single valued functions.</td> </tr> <tr> <td><b>CLO2</b></td> <td>evaluate limits, derivatives, limits in indeterminate forms and apply the derivatives to analyze and sketch the graph of various types of functions.</td> </tr> <tr> <td><b>CLO3</b></td> <td>find maxima and minima, critical points and inflection points of functions.</td> </tr> <tr> <td><b>CLO4</b></td> <td>know standard indefinite integrals and evaluate integrals by substitution, by partial fractions and by parts.</td> </tr> <tr> <td><b>CLO5</b></td> <td>understand the concept of definite integral and evaluating definite integrals including the evaluation of improper integrals.</td> </tr> <tr> <td><b>CLO6</b></td> <td>calculate the area of regions in the plane, the volume</td> </tr> </table>	<b>CLO1</b>	understand the fundamental ideas and principles as well as geometrical meaning of differential and integral calculus of single valued functions.	<b>CLO2</b>	evaluate limits, derivatives, limits in indeterminate forms and apply the derivatives to analyze and sketch the graph of various types of functions.	<b>CLO3</b>	find maxima and minima, critical points and inflection points of functions.	<b>CLO4</b>	know standard indefinite integrals and evaluate integrals by substitution, by partial fractions and by parts.	<b>CLO5</b>	understand the concept of definite integral and evaluating definite integrals including the evaluation of improper integrals.	<b>CLO6</b>	calculate the area of regions in the plane, the volume
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<b>Mapping of Course Learning Outcomes to Program Outcomes</b>		PL O 1	PL O 2	PL O 3	PL O 4	PL O 5	PL O 6	PL O 7	PL O 8	PL O 9
	CL O 1	✓	✓					✓		
	CL O 2	✓	✓		✓			✓		
	CL O 3	✓	✓		✓			✓		
	CL O 4	✓	✓		✓			✓		
	CL O 5	✓	✓		✓			✓		
	CL O 6	✓	✓		✓			✓		
<b>Mapping of Course Learning Outcomes (CLOs) with the Teaching-Learning &amp; Assessment Strategy</b>	<b>CLO</b>	<b>Teaching Learning Strategy</b>		<b>Assessment Strategy</b>						
	<b>CLO1</b>	Lectures		Quiz Test Final Exam						
	<b>CLO2</b>	Lectures, Demonstration,		Class Test, Assignment						
	<b>CLO3</b>	Lectures, Class Work		Assignment, Presentation						
	<b>CLO4</b>	Lectures, Presentation		Assignment, Final Exam						
	<b>CLO5</b>	Lectures, Home work		Class Test, Final Exam						
	<b>CLO 6</b>	Lectures, Practice Problem		Quiz, Final Exam						
<b>Textbook</b>	<ol style="list-style-type: none"> <li>Thomas Finney: <i>Calculus and Analytic Geometry</i></li> <li>Das and Mukherjee: <i>Differential Calculus</i></li> <li>Das and Mukherjee: <i>Integral Calculus</i></li> </ol>									

<b>Course Title</b>	<b>Complex Variable and Vector Analysis</b>
<b>Credits</b>	3.0
<b>Course No</b>	MATH 0541-1103E
<b>Contact Hours</b>	3 hours/week
<b>Rationale</b>	This course is designed primarily for those students taking courses in mathematics, physics, mechanics, electromagnetic theory, aerodynamics, geophysics, metrology or any of the numerous other fields in which vector methods are applicable. In complex variable part, the students will learn algebra and geometry of complex numbers, mappings in the complex plane,

	the calculus of functions of single complex variable, analyticity of a complex function, theory of multi-valued functions, contour integrations and some properties of complex mappings. Vector algebra have become basic part of fundamental mathematical background required of those in engineering, sciences and allied disciplines
<b>Objective</b>	<p>The objectives of this course are:</p> <ul style="list-style-type: none"> <li>• Represent complex numbers algebraically and geometrically</li> <li>• Understand complex function and complex plane. Then analyze limit, continuity and differentiability of Complex number.</li> <li>• Understand conformal mappings in the complex plane.</li> <li>• Work with multi-valued functions (logarithmic, complex power) and determine branches of these functions.</li> <li>• Understand Cauchy-Riemann equations, analytic functions and various properties of analytic functions</li> <li>• Determine the number of singularities, zeros of a polynomial in the unit disk and in the right half plane.</li> <li>• Evaluate a contour integral using parametrization, fundamental theorem of calculus and Cauchy's integral formula.</li> <li>• Basic concepts of the complex sequences and infinite series. Find the Taylor series and Laurent series of a complex function and determine its circle or annulus of convergence.</li> <li>• Introduce students to the fundamentals of vector algebra.</li> </ul>
<b>Course Content</b>	<p><b>Complex Variable:</b> Complex number system; general functions of a complex variable; limit and continuity of a function of complex variables and related theorems; complex differential and the Cauchy-Riemann equations; mapping by elementary functions; line integral of a complex function; Cauchy's integral formula; Liouville's theorem; Taylor's and Laurent's theorem; singular points; residue; Cauchy's residue theorem; evaluation of residues; contour integration; conformal mapping.</p> <p><b>Vector Analysis:</b> Definitions of line, surface and volume integrals; gradient of a scalar function; divergence and curl of a vector function; physical significance of gradient, divergence and curl - various formulae; integral forms of gradient; divergence</p>

	theorem, Stoke's theorem, Green's theorem and Gauss's theorem.									
<b>Course Learning Outcome</b>	<b>CLO1</b>	Perform basic mathematical operations and prove basic properties of complex numbers in Cartesian form using complex arithmetic and complex conjugates to fine comparison with limits/continuity/differentiability between real valued function and complex valued function..								
	<b>CLO2</b>	Know about analyticity, different types of singularities, application of Taylor series expansion.								
	<b>CLO3</b>	Able to know the residue of a function and use the residue, applications of related theorems in complex plane and evaluate a contour integral or an integral over the complex plane								
	<b>CLO4</b>	Adept about conformal mappings, bilinear transformations and their properties and finally, comparison all the applications with real analysis and complex analysis.								
	<b>CLO5</b>	Provide working tools for students in some branches of applied mathematics.								
	<b>CLO6</b>	Develops ability to solve mathematical problems involving vectors.								
	<b>CLO7</b>	Competently use vector algebra as a tool in the field of applied sciences and related fields.								
<b>Mapping of Course Learning Outcomes to Program Outcomes</b>		<b>PL 01</b>	<b>PL 02</b>	<b>PL 03</b>	<b>PL 04</b>	<b>PL 05</b>	<b>PL 06</b>	<b>PL 07</b>	<b>PL 08</b>	<b>PL 09</b>
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<b>Mapping of Course Learning Outcomes (CLOs) with the Teaching-Learning &amp; Assessment Strategy</b>	<b>CLO</b>	<b>Teaching Learning Strategy</b>	<b>Assessment Strategy</b>
	<b>CLO 1</b>	Lectures	Quiz Test Final Exam
	<b>CLO 2</b>	Lectures, Demonstration,	Class Test, Assignment
	<b>CLO 3</b>	Lectures, Class Work	Assignment, Presentation
	<b>CLO 4</b>	Lectures, Presentation	Assignment, Final Exam
	<b>CLO 5</b>	Lectures, Home work	Class Test, Final Exam
	<b>CLO 6</b>	Lectures, Practice Problem	Quiz, Final Exam
	<b>CLO 7</b>	Lectures	Quiz Test Final Exam
<b>Textbook</b>	<ol style="list-style-type: none"> <li>1. M. R. Spiegel: <i>Vector Analysis</i></li> <li>2. Churchill: <i>Introduction to Complex Variable and Applications</i></li> <li>3. Macrobeat: <i>Complex Variable</i></li> <li>4. Spiegel, M.R. <i>Complex Variable</i></li> </ol>		

<b>Course Title</b>	History of the Emergence of Independent Bangladesh
<b>Credits</b>	3.0
<b>Course No</b>	SSS 0312-1101
<b>Contact Hours</b>	3 hours/week
<b>Rationale</b>	This is a special compulsory course for all students of Bachelor program of Sylhet Engineering College, Sylhet. This course deals with the interrelated themes and topics that are essential to understand the emergence of Bangladesh.
<b>Objective</b>	<p>The objective of this course is to make students understand about the causes of liberation war, rising of Bengali nationalism and identity, feelings of victory of Bangladesh. The specific course objectives are:</p> <ol style="list-style-type: none"> <li>01. Give an outline about the concept of liberation war and freedom fighter.</li> <li>02. Clarify the role of different people in liberation war.</li> <li>03. Explain the role of Bangabandhu in liberation war.</li> </ol>

	04. Develop an insight about the value of the sacrifice of martyrs for motherland.
<b>Course Content</b>	<ol style="list-style-type: none"> <li><b>1. Description of the country and its people</b> <ol style="list-style-type: none"> <li>a. Impact of Geographical features</li> <li>b. Ethnic composition of Bangladesh</li> <li>c. Development of Bengali Language and its impact</li> <li>d. Cultural syncretism and religious tolerance</li> <li>e. Distinctive identity of Bangladesh in the context of undivided Bangladesh</li> </ol> </li> <li><b>2. Proposal for undivided sovereign Bengal, the partition of the Subcontinent, 1947 and Foreshadowing Bangladesh</b> <ol style="list-style-type: none"> <li>a. Rise of communalism under the colonial rule, Lahore Resolution 1940</li> <li>b. The proposal of Suhrawardi and Sarat Bose for undivided Bengal : consequences           <ol style="list-style-type: none"> <li>c. The creation of Pakistan 1947</li> <li>d. Foundation of Awami Muslim League and Foreshadowing Bangladesh</li> </ol> </li> </ol> </li> <li><b>3. Pakistan: Structure of the state and disparity</b> <ol style="list-style-type: none"> <li>a. Central and provincial structure</li> <li>b. Influence of Military and Civil bureaucracy</li> <li>c. Economic, social and cultural disparity</li> </ol> </li> <li><b>4. Language Movement and quest for Bengali identity</b> <ol style="list-style-type: none"> <li>a. Misrule by Muslim League and Struggle for democratic politics</li> <li>b. The Language Movement: context, phases and International Recognition of Bengali Language           <ol style="list-style-type: none"> <li>c. United front of Haque – Vasani – Suhrawardi: election of 1954, consequences</li> </ol> </li> </ol> </li> <li><b>5. Military rule: the regimes of Ayub Khan and Yahia Khan (1958-1971)</b> <ol style="list-style-type: none"> <li>a. Definition of military rules and its characteristics</li> <li>b. Ayub Khan’s rise to power and characteristics of his rule (Political repression, Basic democracy, Islamisation)</li> <li>c. Fall of Ayub Khan and Yahia Khan’s rule</li> </ol> </li> <li><b>6. Rise of nationalism and the Movement for self-</b></li> </ol>

	<p><b>determination</b></p> <p>a. Resistance against cultural aggression and resurgence of Bengali culture</p> <p>b. Sheikh Mujibur Rahman and the 6 points movement</p> <p>c. Reactions : Importance and significance</p> <p>d. The Agortola Case 1968</p> <p><b>7. The mass- upsurge of 1969 and 11 point movement</b></p> <p>a. Background</p> <p>b. Programme</p> <p>c. Significance</p> <p><b>8. Election of 1970 and its Impact</b></p> <p>a. Legal Framework Order (LFO)</p> <p>b. Programme of different political parties</p> <p>c. Election result and centres refusal to comply</p> <p><b>9. Non-cooperation Movement and 7th March Speech, 1971</b></p> <p>a. The non-cooperation movement</p> <p>b. Speech of 7th March : Background of the speech, major characteristics of the speech,</p> <p>c. impact of this speech</p> <p>d. International recognition of 7th March Speech as part of world heritage</p> <p><b>10. Declaration of Independence of Bangladesh</b></p> <p>a. Operation Searchlight</p> <p>b. Declaration of Independence of Bangladesh by Bangobondhu</p> <p>c. Beginning of the Liberation War of Bangladesh</p> <p><b>11. The war of Liberation 1971</b></p> <p>a. Genocide, repression of women, refugees</p> <p>b. Formation of Bangladesh government and proclamation of Independence</p> <p>c. The spontaneous early resistance and subsequent organized resistance (Mukti Fouz, Mukti Bahini, guerillas and the frontal warfare)</p> <p>d. Publicity Campaign in the war of Liberation (Shadhin Bangla Betar Kendra, the Campaigns abroad and formation of public opinion)</p> <p>e. Contribution of students, women and the masses (Peoples war) and different political parties</p> <p>f. The role of Great powers and the United Nations in the Liberation war</p> <p>g. The contribution of India in the Liberation War</p>
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	<p>h. The Anti-liberation activities of the occupation army, the Peace Committee, Al- Badar, Al-Shams, Rajakars, pro Pakistan political parties and Pakistani Collaborators , killing of the intellectuals</p> <p>i. Trial of Bangabandhu and reaction of the World Community</p> <p>j. Formation of joint command and the Victory</p> <p>k. The overall contribution of Bangabandhu in the Independence struggle</p> <p><b>12. The Bangabandhu Regime 1972-1975</b></p> <p>a. Homecoming; Speech of 10 January</p> <p>b. Making of the constitution</p> <p>c. Reconstruction of the war-ravaged country</p> <p>d. Foreign Policy of Bangabandhu; Bangabandhu's First Speech in the United Nations</p> <p>e. The murder of Bangabandhu and his family and the ideological turn-around</p>																																																												
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	<b>CLO4</b>	Lectures, Group Discussion	Assignment, Presentation, Final Exam
	<b>CLO5</b>	Lectures, Home work, Exercise	Class Test, Final Exam
<b>Textbook</b>	<b>Recommended Books:</b>		
	<ol style="list-style-type: none"> <li>Ahmed, Salahuddin and Bazlul Mobin Chowdhury (eds.), <i>Bangladesh: National Culture and Heritage: An Introductory Reader</i> (Dhaka: Independent University Bangladesh, 2004)</li> <li>Harun-or-Roshid, <i>The Foreshadowing of Bangladesh: Bengal Muslim League and Muslim Politics, 1906-1947</i> (Dhaka : The University Press Limited, 2012)</li> <li>Jahan Rounaq, <i>Pakistan: Failure in National Integration</i>, (Dhaka : The University Press Limited, 1977)</li> <li>Maniruzzaman Talukder, <i>Radical Politics and the Emergence of Bangladesh</i>, (Dhaka : Mowla, Brothers, 2003)</li> <li>Muhith, A M A, <i>History of Bangladesh: A Subcontinental Civilization</i>, (Dhaka: UPL, 2016)</li> <li>Samad Abdus, <i>History of Liberation War of Bangladesh</i>, (Dhaka : Aparajeyo Bangla Prakashani, 2019)</li> <li>Milton Kumar Dev, Md. Abdus Samad, <i>History of Bangladesh</i> (Dhaka : Biswabidyalya Prokasoni, 2014)</li> <li>Nurul Islam, <i>Making of a Nation : Bangladesh- An Economist Tale</i>, (Dhaka: UPL 2013)</li> <li>nviæb-Ai-iwk`, evsjv`k : ivRbxwZ miKvi I kvmbZvws`K Dbæqb 1757-2018, (XvKv: Ab`cÖKvk 2018)</li> </ol>		

	<ol style="list-style-type: none"> <li>nviæb-Ai-iwk`, e/2xq gymwjg jxM : cvwK`Ívb Av`yjb, evOvwji ivó`fvebv I e/zeÜz, (XvKv: Ab`cÖKvk 2018)</li> <li>nviæb-Ai-iwk`, 7B gv`P©i fiLY `Kb wek`-HwZn` mæú, e/zeÜz gyw`hy× evsjv`k, (XvKv: Ab`cÖKvk 2018)</li> <li>`kL gywReyi ingvb, Amgvß AvZ`Rxebx, (XvKv: BDwcGj 2012)</li> <li>`kL gywReyi ingvb, KvivMv`ii `ivRbvgPv, (evsjv GKv`Wwg 2017)</li> <li>Awj Avnv`, RvZxq ivRbxwZ, 1945-1975, (XvKv: evsjv`k `Kv-Acv`iwUf eyKm `mvmvBwU 2004)</li> <li>`mq` Av`bvqvi `nv`mb : evsjv`k`ki `vaxbZvhy`× civkw`i f-wgKv, (XvKv : Wvbv cÖKvkbx, 1982)</li> <li>Avejy gvj Ave`yj gywnZ : evsjv`k: RvwZiv`ó`i D`M`e, (XvKv : mvwnZ` cÖKvk, 2000)</li> </ol>
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