**Southeast University**

**Course Curriculum**

**Department of Electrical and Electronic Engineering**

**Program: Bachelor of Science in Electrical and Electronic Engineering**

**Introduction**

Electrical and Electronic Engineering (EEE) education has entered a transitional phase because the technology is changing every day. The diversity of EEE education is also increasing underscoring its multi-disciplinary nature. All the areas of the electrical and electronic engineering are growing rapidly and new fascinating disciplines of this subject are being created. Thus role of and Electrical and Electronic Engineer has changed significantly. Employers demand an Engineer with excellent communication skills along with skills of multi-disciplinary engineering. Keeping this in mind, the curriculum of the EEE Department has been designed. The main focus of the EEE Department curriculum is on four major areas-power and energy, electronics, communication and computer in the undergraduate curricula. A student is expected to specialize in one of these groups without compromising the fundamental knowledge in EEE. Courses in basic science, mathematics, relevant branch of Engineering including laboratory experience in the use of modern equipment for measurement and design. Education is the humanities, social sciences, ethical principles and management, with special attention to the development of effective written and oral communication skills. Technical Elective coursework that encourages individual interests and provides the opportunity to gain further knowledge in multiple disciplines facilitates the development of problem solving, teamwork, and engineering design skills with the aid of tools, such as, the computer.

Our specifically targeted curriculum will prepare graduates to compete in the high-tech job market on a global scale. In addition to the foreign job opportunities, graduates can avail job opportunities at home, both in public and private sector in the diversified areas, such as, Electrical Power Generation, Transmission and Distribution, Sub-Station Design Firms, Telecommunication Industry, Wireless and Mobile Telecommunication Companies, Satellite Communication Systems, Integrated Circuit (IC) Design, Satellite Television Channels, Telecommunication Switching Systems, Wired and Wireless Networking, Consumer Electronics Appliance Manufacturer, Process Industries, Textile Industries, Computer Industry, Electrical and Electronic Design Firms, Microprocessor and Microcontroller Based Systems, Real Estate Sectors, etc.

Of the five departments under the School of Engineering, Electrical and Electronic Engineering Department is one of the largest departments in terms of the number of faculty members and students. The department of Electrical and Electronic Engineering (EEE) offers the undergraduate academic program of B.Sc. in Electrical and Electronic Engineering or in short B.Sc. in EEE. At present, EEE Department has over 800 undergraduate students and per year student intake is approximately 400. The university authority is giving the attention to attract quality students from home and abroad.

Alumni of this department are serving with good reputation and success in many government and semi-government and non-government organizations, multi-national companies, and educational institutions including universities within the country and abroad. The future for graduates from EEE department looks very promising both at home and abroad because there is shortage of quality graduates and professionally competent engineers in the job market especially, in the field of power and energy, electronics, computer and communication engineering.

The EEE Department is committed to provide the students various modern laboratories equipped with the state-of-the-art equipment, training kits, test and measuring instrument, simulation software.
packages. The department is also committed to the study and analysis of fundamental as well as applied problems. Teachers and students of EEE department work in solving problems in the conventional and emerging fields.

The EEE Department has recruited well-qualified faculty members graduated from BUET, DU, JU and other foreign universities. They are very much dedicated and committed to our students. They provide enough time and efforts to the students and engage them in teaching, learning and research. The research areas of the faculty members of EEE Department include power, energy, electrical machines, nuclear engineering, semiconductor device modeling and simulation, digital signal processing, power electronics, biomedical electronics, control engineering, optical fiber communication, mobile telecommunication, VLSI and nano technology, electrical engineering education etc. Faculty members of this department take part in active teaching, research activities, consultancy, collaborative research work, curricula and laboratory developments etc.

Besides, this department has several adjunct faculty members from EEE Department of BUET who have national and international reputation and special subject expertise.

The Department of EEE will establish EEE Club and IEEE student branch through which students’ untapped talents and potentials will be explored by conducting various extra- and co-curricular activities, such as, industry visit, seminar, work shop, project fair, quiz contest etc.

In future, Department of EEE will introduce more programs, viz. B.Sc in Electronic and Telecommunication Engineering (ETE) and M. Sc. in Electrical and Electronic Engineering.

The Department of Electrical and Electronic Engineering of Southeast University (SEU) is striving to realize its vision, mission and program educational objectives to place itself on the top position in the country. So far with the available resources and facilities, the Department has succeeded to do so as a result of sincere efforts of its faculty members and students. In this context, cooperation and support from all sectors are the prime factors in attaining such goal. It is expected that the support of different organizations and the alumni of EEE Department will continue and increase in the days ahead so that vision, mission and educational objectives of the EEE Department can be achieved.

**Vision Statement of EEE Department**

To be recognized as a globally accepted Electrical and Electronic Engineering Department for producing competent graduates.

**Mission Statements of EEE Department**

1. To educate our students with engineering knowledge to meet the demands of the employers of Electrical and Electronic Engineering industries for their professional careers and higher studies at home and abroad.
2. To create and disseminate new knowledge through basic and applied research in the fields of Electrical and Electronic Engineering.
3. To serve as a resource of Electrical and Electronic Engineering expertise at the university and national in the short run as well as in regional and international levels in the long run
4. To provide professional and community services to the Electrical and Electronic Engineering community in Bangladesh and other countries around the globe.

**Program Outcomes**

The program outcomes (POs) of the EEE department of Southeast University (SEU) have been set in such a way so that after graduation the students can demonstrate the ability to-

- **[PO1] Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex electrical and electronic engineering problems;

- **[PO2] Problem Analysis:** Identify, formulate, research the literature and analyze complex electrical and electronic engineering problems and reach substantiated conclusions using first principles of mathematics, the natural sciences and the engineering sciences;
[PO3] **Design/ Development of Solutions:** Design solutions for complex electrical and electronic engineering problems and design systems, components or processes that meet the specified needs with appropriate consideration for manufacturability and sustainability, public health and safety as well as cultural, societal, economic, political, ethical and environmental concerns;

[PO4] **Investigation:** Conduct investigations of complex electrical and electronic engineering problems, considering design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions;

[PO5] **Modern Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex electrical and electronic engineering activities with an understanding of the limitations;

[PO6] **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 electrical and electronic engineering practice;

[PO7] **Environment and Sustainability:** Understand the impact of professional electrical and electronic engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development;

[PO8] **Ethics:** Apply ethical principles and commit to professional ethics, responsibilities and the norms of the electrical and electronic engineering practice;

[PO9] **Individual Work and Teamwork:** Function effectively as an individual and as a member or leader of diverse teams as well as in multidisciplinary settings;

[PO10] **Communication:** Communicate effectively about complex electrical and electronic engineering activities with the engineering community and with society at large. Be able to comprehend and write effective reports, design documentation, make effective presentations and give and receive clear instructions;

[PO11] **Project Management and Finance:** Demonstrate knowledge and understanding of the electrical and electronic engineering and management principles and apply these to one’s own work as a member or a leader of a team to manage projects in multidisciplinary environments;

[PO12] **Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent, life-long learning in the broadest context of technological change.

**Program Educational Objectives (PEOs)**
The Bachelor of Science in Electrical and Electronic Engineering (BSc in EEE) program of Southeast University (SEU) and its curriculum are designed to provide the fundamental knowledge and principles of engineering and science, and the broad general education knowledge for the continued professional growth of its graduates. The general objectives of the 4-year BSc in EEE program are to prepare the graduates to become successful in their chosen career paths. The program educational objectives (PEOs) of the BSc in EEE program have been set in such a way that after 3-5 years of graduation the graduates can demonstrate their ability to:

**PEO1: Expertise:** Demonstrate their capability as electrical and electronic engineers by acquiring the complex engineering problem-solving skills and knowledge, team-work abilities, and communication skills during their study in the program.

**PEO2: Enhancement:** Enhance professional growth continuously through post-graduate education, continuing education or professional activities or training or licensure, and thus participate in lifelong-learning activities that develop their confidence level and sustainability in the job market.

**PEO3: Engagement:** Engage in technical or business activities professionally and ethically through electrical and electronic engineering knowledge, social justice, leadership roles and responsibilities, communication and other soft skills and thus make professional contributions to the society.

**PEO4: Contribution:** Contribute to the national level in the areas of electrical and electronic engineering and thus contribute the progress and development of the country.
Mapping of Mission of the Department with the PEOs

<table>
<thead>
<tr>
<th>Mission Statements</th>
<th>PEO1</th>
<th>PEO2</th>
<th>PEO3</th>
<th>PEO4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To educate our students with engineering knowledge to meet the demands of the</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>employers of Electrical and Electronic Engineering industries for their</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>professional careers and higher studies at home and abroad.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. To create and disseminate new knowledge through basic and applied research in</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>the fields of Electrical and Electronic Engineering.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. To serve as a resource of Electrical and Electronic Engineering expertise at</td>
<td></td>
<td></td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>the university and national in the short run as well as in regional and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>international levels in the long run.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. To provide professional and community services to Electrical and Electronic</td>
<td></td>
<td></td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Engineering community in Bangladesh and other countries around the globe.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Duration of the Program

The duration for B.Sc. in Electrical and Electronic Engineering program will be of four (4) years, each year consists of 3 equal semesters if a student enrolls as a full time student. But a student may also enroll as a part time student and take less number of courses, but he/she has to complete the degree within eight (8) years from the date of course registration in the program.

Credit and Contact Hour

Three credits are assigned to a theory course and one credit is assigned to a laboratory course. The class period of a 3-credit theory course has minimum duration of 50 minutes if there are three classes per week or 75 minutes if there are two classes per week, i.e., total 150 minutes per week per semester. There are 26 weeks of classes per semester excluding midterm and final examination weeks. So, total number of contact hours per semester for a 3-credit theory class is 26×150 = 3900 minutes, i.e., contact hour required per credit is 1300 minutes.

On the other hand, a 1-credit laboratory course has minimum duration of 110 minutes if there is one class per week per semester. There are 24 weeks of classes per semester excluding midterm viva-voce, experimental/simulation test and final examination weeks. So, total number of contact hours per semester for a 1-credit laboratory class is 24×110 = 2640 minutes.

Degree Requirement

(a) Completion of minimum 153 credit hours in total.
(b) Passing of all courses individually and maintaining a minimum CGPA of 2.50.
(c) Full-filling the minimum requirements of each category of the EEE course curriculum.
(d) If any student fails in any course, he/she will get the opportunity to improve the grade by retaking the same in the subsequent semester.

Eligibility for Admission

- Students having minimum 2.5 GPA or second division both in SSC and HSC from Science or its equivalent background (with Math, Physics and Chemistry).
- For ‘O’ level and ‘A’ level system an applicant must have completed 6 papers in ‘O’ level and 6 papers in ‘A’ level. In the ‘A’ level the student must have completed at least 2 papers of Physics, Chemistry and Mathematics. Minimum average GPA of both levels should be ‘C’ separately.
- Students having SSC and Diploma Engineering in Electrical/ Electronics/ Computer/ Telecommunication/ Power/ Refrigeration and Air Conditioning/ Mechanical/ Automobile/ Civil/ Electro-Medical/ Medical and Ultra-sound/ Chemical/ Mining and Mine Survey/ Aerospace/ Printing/ Food/ Tea/ Forestry etc. Technology under the Bangladesh Technical Education Board (BTEB) are also eligible for admission with waivers in few courses as per UGC guidelines.
- An applicant must submit his/her results during the application.
- No appeared students are allowed.
- Maximum 50% credits are transferable from other universities with at least B+ (B plus) grade in each transferred course individually.


Admission Test
Prospective students may have to face a written admission test in Southeast University (SEU) if their combined GPA in SSC and HSC is less than 7.00 out of 10.00. But if combined GPA is greater than 7.00 then admission test will be exempted. Admission test questions are set from HSC level’s Physics, Chemistry, Mathematics and English as well as General Knowledge. Multiple Choice Questions (MCQ) are set where four options are given from which students have to select the best one answer. Besides, a written English proficiency test may also be conducted. Based on the scores in all parts of the admission test, final selection of the candidate is made.

Student’s Performance Evaluation Process
Each student will be evaluated individually by different ways, such as, by monitoring class attendance, by assigning home works, by taking the class tests, by conducting midterm and final examinations for theory courses. The examination syllabus will be notified before the start of the examinations. The assessment in laboratory/sessional courses is made through practical work during the class, laboratory report, viva-voce, project work and laboratory final examination.

Marks Distribution Policy
The final course grade will be awarded based on the marks obtained in a particular course at the end of the semester. Marks distribution policy adopted by the EEE Department is shown in Table 1.

Table 1 Percentages of marks for the different heads adopted by EEE Department

<table>
<thead>
<tr>
<th>For Theory Courses:</th>
<th>For Laboratory Courses:</th>
<th>For Capstone Project Work:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sl. #</td>
<td>Parameter</td>
<td>Percentage of Marks</td>
</tr>
<tr>
<td>1</td>
<td>Attendance</td>
<td>05 %</td>
</tr>
<tr>
<td>2</td>
<td>Continuous Assessment</td>
<td>25 %</td>
</tr>
<tr>
<td>3</td>
<td>Midterm Examination</td>
<td>30 %</td>
</tr>
<tr>
<td>4</td>
<td>Final Examination</td>
<td>40 %</td>
</tr>
<tr>
<td></td>
<td>Total:</td>
<td>100 %</td>
</tr>
<tr>
<td>1</td>
<td>Supervisor</td>
<td>50%</td>
</tr>
<tr>
<td>2</td>
<td>Board of</td>
<td>20%</td>
</tr>
</tbody>
</table>
Revised as per 3rd Curriculum Committee Meeting of EEE Department held on 30 January 2019

Examiner (Midterm) 30% Members of the ‘Board of Examiner’ will consider presentation mainly on what has done in their work, how much suggestions made during midterm are addressed during final presentation, how is the poster preparation, answer to the questions and Thesis/Project report.

Board of Examiner (Final Poster) 30% Members of the ‘Board of Examiner’ will consider presentation mainly on what has done in their work, how much suggestions made during midterm are addressed during final presentation, how is the poster preparation, answer to the questions and Thesis/Project report.

Total: 100 %

For Internship/Project/Seminar/Workshop:

Supervisor 30% Supervisor will consider regularity, sincerity, working method, choice of work, amount of work, experimentatio simulation, report, outcome of the work etc.

Report 30% Compliance with the format of the report writing, language and grammar of the report, amount of work and contents presented in the report, work diary etc.

Board of Examiner 40% Members of the ‘Board of Examiner’ will consider presentation contents, amount and quality of work done, answer to the questions and report etc.

Total: 100 %

Marks in each head shall be in the fractions (if any) but the total marks out of one hundred (100) shall be rounded up.

Final presentation marks of Capstone Project/Internship/Project/Seminar/Workshop should be given by the members of the “Board of Examiners” formed by the Chairman of the Department of EEE for conducting the final presentation. Presentation date and time will be decided by the Chairman of the Department of EEE after discussion in the Academic Committee. Then Member Secretary of the Academic Committee will circulate notice among the students and supervisors.

Examination Policy
If any student is absent from a test that will not be retaken if prior permission is not availed by the student. If any student wants to sit for the make-up examination with permission he/she may have to pay the necessary fee as decided by the university authority. This fee may not be waived.

Midterm and final examinations are of 1.5 and 2.0 Hours duration respectively. Zero tolerance to any kind of cheating or adopting unfair means in the examination hall and the punishment varies from cancellation of the particular examination to the expulsion from the university.

Grading Policy
This university follows the UGC’s uniform grading policy. Letter grades and corresponding grade points will be awarded in accordance to the provisions shown below as prescribed by the UGC.

<table>
<thead>
<tr>
<th>Marks Obtained</th>
<th>Letter Grade</th>
<th>Grade Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>4.00</td>
<td>80% and above</td>
</tr>
<tr>
<td>A</td>
<td>3.75</td>
<td>75% to 79%</td>
</tr>
<tr>
<td>A-</td>
<td>3.50</td>
<td>70% to 74%</td>
</tr>
<tr>
<td>B+</td>
<td>3.25</td>
<td>65% to 69%</td>
</tr>
<tr>
<td>B</td>
<td>3.00</td>
<td>60% to 64%</td>
</tr>
<tr>
<td>B-</td>
<td>2.75</td>
<td>55% to 59%</td>
</tr>
<tr>
<td>C+</td>
<td>2.50</td>
<td>50% to 54%</td>
</tr>
<tr>
<td>C</td>
<td>2.25</td>
<td>45% to 49%</td>
</tr>
<tr>
<td>D</td>
<td>2.00</td>
<td>40% to 44%</td>
</tr>
<tr>
<td>F</td>
<td>0.00</td>
<td>Below 40%</td>
</tr>
<tr>
<td>I</td>
<td>-</td>
<td>Incomplete</td>
</tr>
<tr>
<td>S</td>
<td>-</td>
<td>Satisfactory (non-credit courses)</td>
</tr>
<tr>
<td>U</td>
<td>-</td>
<td>Unsatisfactory (non-credit courses)</td>
</tr>
</tbody>
</table>

Each course has a certain number of credits, which describes its corresponding weights. A letter grade with a specified number of grade points is awarded for each course for which a student is registered.
The performance of a student is measured by both the number of credits completed satisfactorily and the weighted average of the grade point earned.

**Calculation of CGPA**
Cumulative Grade Point Average (CGPA) is the weighted average of the total grade points obtained in all the courses taken by a student. CGPA of a student is calculated by dividing the total weighted grade points by the total credits earned by the student. But the semester GPA (SGPA) is calculated by dividing the total weighted grade points obtained by the student (either pass or fail) by the total credits attempted by the student in a particular semester. Total weighted grade points of a course are calculated by multiplying the grade point value obtained by the student by the credit of that particular course. For example, if a student takes five courses in a particular semester having credits of \( C_1, C_2, C_3, C_4, \) and \( C_5 \) and his/ her obtained grade points in these courses are \( G_1, G_2, G_3, G_4, \) and \( G_5, \) respectively then his/ her Semester GPA (SGPA) would be calculated as-

\[
SGPA = \frac{\sum C_i G_i}{\sum C_i}
\]

When all his/ her courses will be completed then his/ her CGPA will be calculated using the same formula but for the earned credits only for the entire course curriculum of the BSc in EEE program required for the award of the degree.

*A numerical example of SGPA Calculation*

In Level I, Term II, a student takes the following courses and obtains the grades as mentioned:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Grade</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG102</td>
<td>Intermediate English Skills</td>
<td>3</td>
<td>A-</td>
<td>3.50</td>
</tr>
<tr>
<td>MAT125</td>
<td>Mathematics II (Ordinary and Partial Differential Equations)</td>
<td>3</td>
<td>F</td>
<td>0.00</td>
</tr>
<tr>
<td>PHY121</td>
<td>Physics II (Waves and Oscillations, Optics and Modern Physics)</td>
<td>3</td>
<td>A</td>
<td>3.75</td>
</tr>
<tr>
<td>PHY122</td>
<td>Physics Laboratory</td>
<td>1</td>
<td>B</td>
<td>3.00</td>
</tr>
<tr>
<td>CHE121</td>
<td>Chemistry</td>
<td>3</td>
<td>B+</td>
<td>3.25</td>
</tr>
</tbody>
</table>

Total(4 + 1) Courses with 13 credits

Semester GPA (SGPA) of this student would be calculated as follows:

\[
SGPA = \frac{3 \times 3.5 + 3 \times 0 + 3 \times 3.75 + 1 \times 3 + 3 \times 3.25}{3 + 3 + 3 + 1 + 3} = \frac{34.5}{13} = 2.65
\]

If any student has any ‘F’ grade he/ she has to complete that particular course or any alternative course as decided by the department and thus his/ her CGPA is not affected for courses with ‘F’ grade in the end.

Only the grades earned in the courses completed at SEU are required for a degree and hence included in the CGPA calculation. Grades earned from other universities (from credit transfer students) are reported on the transcript but are not counted in calculating the CGPA.

**Course Designation and Numbering System**
Each undergraduate course is designated with 3 letters followed by 3 digits without any gap between letters and digits. The first 3 letters correspond to the course category and the next 3 digits indicate the level of the course and the type of the course, i.e., whether the course is a theory course or a laboratory course. Letters usually indicate department that is offering the course for the BSc in EEE program. If the concerned department does not exist in the university then this course may be offered and conducted by the EEE Department itself by its own Faculty or Adjunct Faculty Pool from other reputed university. For few courses, mother departments have been identified by the university authority. In that case, mother department will provide required number of teachers from their full-time Faculty or Adjunct Faculty Pool. The most significant digit of the course code indicates the level.
of the program, then next one, i.e. the second most significant digit indicates the term of the program and the final least significant digit indicates the actual course number according to its priority serial. If the least significant digit is odd then it represents a theory course, and if it is even number then it represents a laboratory course. Of course, if the courses are listed in the elective category then this formula may not be applicable due to the presence of a huge number of courses in the list and since these are not offered in a fixed semester. For Capstone Project/ Internship/ Project/ Seminar/ Workshop course codes are started with 4 to indicate that these are offered from final year students.

Examples:
Few examples of course coding and course offering process are shown in the following table:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Level</th>
<th>Term</th>
<th>Type</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEE111</td>
<td>Course is offered by EEE Department of SEU at Level 1, Term 1, and it is a theory course and offered at first priority</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENG101</td>
<td>Course is offered by English Department of SEU at Level 1, Term 1, and it is a theory course and offered at first priority</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHY122</td>
<td>Course is offered by EEE Department or mother department of SEU at Level 1, Term 2, since SEU does not have any Physics Department. It is a laboratory course and offered at second priority</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEN211</td>
<td>Course is offered by EEE Department of SEU at Level 2, Term 1, since SEU does not have any Mechanical Engineering Department. It is a theory course and offered at first priority</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EEE443</td>
<td>Course is offered by EEE Department of SEU at Level 4, it is a theory course of technical elective course group and offered at third priority.</td>
<td></td>
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</tr>
</tbody>
</table>

Course Category
The letter prefix in any course number indicates the discipline/subject offering the course. Letter symbols for course categories are:

|------------|--------------|-------------------|-----------|----------------------------------|-----------|---------------------------------------|----------------|-------------|-------------------------------|------------|---------|----------------------------------|-----------------|

Course Structure
The Bachelor of Science in Electrical and Electronic Engineering (B.Sc. in EEE) program consists of the following categories of courses:

<table>
<thead>
<tr>
<th>Category</th>
<th>No. of Theory Courses</th>
<th>No. of Sessional/Laboratory Courses</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Courses</td>
<td>20</td>
<td>12</td>
<td>72</td>
</tr>
<tr>
<td>Capstone Project</td>
<td>-</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>Internship/Project/Seminar/Workshop</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Technical Elective Courses</td>
<td>6</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>Inter-Disciplinary Engineering</td>
<td>2</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Mathematics</td>
<td>5</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>Basic Sciences</td>
<td>3</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>English Language</td>
<td>4</td>
<td>-</td>
<td>12</td>
</tr>
<tr>
<td>General Education Courses</td>
<td>3</td>
<td>-</td>
<td>9</td>
</tr>
<tr>
<td>Professional Course</td>
<td>1</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Minimum Requirement</td>
<td>44</td>
<td>18</td>
<td>153</td>
</tr>
</tbody>
</table>
List of courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Pre-Requisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Engineering Courses: [All courses are compulsory] (72 Credits)</td>
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<td>Electronics I</td>
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<td>EEE231</td>
<td>Properties of Materials</td>
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<td>Continuous Signals and Linear Systems</td>
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<td>Solid State Devices</td>
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<td>Microprocessors and Interfacing</td>
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<td>Control Systems</td>
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</table>

Sub Total: 72

Capstone Project/Internship/Project/Seminar/Workshop: [Capstone Project is compulsory for all students and have to take in three consecutive semesters with 2 credits in each semester; Internship/Project/Seminar/Workshop is also mandatory with zero credit in one semester] (2+2+2+0=6 Credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Pre-Requisite</th>
</tr>
</thead>
<tbody>
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<td>Capstone Design Project I</td>
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<td>EEE494</td>
<td>Capstone Design Project II</td>
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<td>EEE496</td>
<td>Capstone Design Project III</td>
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<td>EEE498</td>
<td>Internship/Project/Seminar/Workshop</td>
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Sub Total: 6

Inter-Disciplinary Engineering Courses: [Students have to take at least two theory courses and one laboratory course from this course group] (7 credits)

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<thead>
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<th>Course Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>CEN211</td>
<td>Introduction to Civil Engineering</td>
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<td>CEN220</td>
<td>Civil Engineering Drawing</td>
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<tr>
<td>MEN211</td>
<td>Mechanical Engineering Fundamentals</td>
<td>3</td>
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<tr>
<td>EEE301</td>
<td>Robotics and Automation</td>
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<td>EEE302</td>
<td>Robotics and Automation Laboratory</td>
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<td>EEE303</td>
<td>Biomedical Engineering</td>
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<td>EEE304</td>
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<td>EEE305</td>
<td>Measurement and Instrumentation</td>
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<tr>
<td>EEE307</td>
<td>Brain Science and Engineering</td>
<td>3</td>
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Revised as per 3rd Curriculum Committee Meeting of EEE Department held on 30 January 2019

<table>
<thead>
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<tbody>
<tr>
<td>EEE308</td>
<td>Brain Science and Engineering Laboratory</td>
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<td>MAT009</td>
<td>Remedial Mathematics</td>
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<td>MAT111</td>
<td>Mathematics I (Differential and Integral Calculus)</td>
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<td>MAT125</td>
<td>Mathematics II (Ordinary and Partial Differential Equations)</td>
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<td>MAT135</td>
<td>Mathematics III (Complex Variables, Fourier Series and Transforms)</td>
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<td>MAT217</td>
<td>Mathematics IV (Linear Algebra, Co-ordinate Geometry and Vector Analysis)</td>
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<td>MAT229</td>
<td>Mathematics V (Probability and Statistics)</td>
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<td>PHY115</td>
<td>Physics I (Electricity and Magnetism, Thermodynamics and Mechanics)</td>
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<td>PHY121</td>
<td>Physics II (Waves and Oscillations, Optics and Modern Physics)</td>
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<td>CHE121</td>
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<td>ENG101</td>
<td>Basic English Skills</td>
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<td>ENG102</td>
<td>Intermediate English Skills</td>
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<td>ENG103</td>
<td>Advanced English Skills</td>
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<td>ENG105</td>
<td>Public Speaking</td>
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<td>SOC215</td>
<td>Engineering Ethics (Mandatory)</td>
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<tr>
<td>MGT231</td>
<td>Industrial Management</td>
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<td>ACT311</td>
<td>Financial and Managerial Accounting</td>
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<td>ECO315</td>
<td>Engineering Economics</td>
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<td>SOC311</td>
<td>Sociology</td>
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<td>SOC313</td>
<td>Bangladesh Studies</td>
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<td><strong>Sub Total</strong></td>
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</table>

**Total Credits to be completed before taking technical elective courses: 120**

**Technical Elective Courses:** [For MAJOR Group: (4×3) Credits Theory + (2×1) Credits Laboratory = 14 Credits. For MINOR Group: (2×3) Credits Theory + (1×1) Credit Laboratory = 7 Credits] (Total: 14 + 7 = 21 credits)

Students must do their major in ONE group and minor in ONE group only from any four groups, A-D. To full-fill or to meet the minimum credit requirements for the degree of Bachelor of Science in Electrical and Electronic Engineering, a student must take at least any four 3-credit theory courses of which two courses must include 1-credit laboratory if this group is a MAJOR group and any two 3-credit theory courses of which at least one course must include 1-credit laboratory if this group is a MINOR group. If he/she wants to take more laboratory based courses then his/her total credit requirements for the degree and hence tuition fee will increase according to the number of extra credits taken. But a student can’t do major in more than one course group.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Pre-Requisite</th>
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<tbody>
<tr>
<td>EEE410</td>
<td>Green Power and Energy</td>
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<td>EEE317</td>
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<td>EEE411</td>
<td>Power System II</td>
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<td>EEE412</td>
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<td>Credits</td>
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<tr>
<td>EEE413</td>
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<td>EEE415</td>
<td>Power System Protection</td>
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<td>Energy Conversion III</td>
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<td>EEE419</td>
<td>Power System Economics</td>
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<td>EEE421</td>
<td>High Voltage Engineering</td>
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<td>EEE423</td>
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<td>EEE485</td>
<td>Power Plant Engineering</td>
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<td>EEE427</td>
<td>Nuclear Power Engineering</td>
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<td>EEE429</td>
<td>Power System Operation and Control</td>
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**Group B (Electronics)**

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<td>EEE431</td>
<td>Green Electronics</td>
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<td>EEE433</td>
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<td>EEE434</td>
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<tr>
<td>EEE437</td>
<td>Analog Integrated Circuits</td>
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<td>EEE439</td>
<td>Compound Semiconductor and Hetero Junction Device</td>
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<td>EEE441</td>
<td>Optoelectronics</td>
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<td>EEE443</td>
<td>Semiconductor Device Theory</td>
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<td>EEE445</td>
<td>Hardware Design with VHDL</td>
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<td>Hardware Design with VHDL Laboratory</td>
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<td>EEE447</td>
<td>Nano Electronic Devices</td>
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<tr>
<td>EEE449</td>
<td>Semiconductor Processing and Fabrication Technology</td>
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**Group C (Communication)**

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<td>Green Communication Engineering</td>
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<td>EEE451</td>
<td>Mobile Cellular Communication</td>
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<td>EEE453</td>
<td>Digital Signal Processing II</td>
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<td>Digital Signal Processing II Laboratory</td>
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<td>EEE455</td>
<td>Telecommunication Engineering</td>
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<td>EEE457</td>
<td>Optical Fiber Communications</td>
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<td>Optical Fiber Communications Laboratory</td>
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<td>EEE459</td>
<td>Satellite Communication</td>
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<td>EEE460</td>
<td>Optical Networks</td>
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<td>EEE465</td>
<td>Random Signals and Processes</td>
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<td>Radio and Television Engineering</td>
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<td>Broadcast Engineering</td>
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<td>Radar and Navigation</td>
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<td>Internet of Things</td>
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**Group D (Computer)**

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<td>Microprocessor Based System Design</td>
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<td>Microprocessor Based System Design Laboratory</td>
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<td>EEE473</td>
<td>Real Time Computer System</td>
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<td>Multimedia Communications</td>
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<td>EEE477</td>
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<td>EEE479</td>
<td>Computer Architecture</td>
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<td>EEE480</td>
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<td>EEE481</td>
<td>Cryptography and Network Security</td>
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Sub Total 21

Policy for the Distribution of Elective Courses
From Level IV, Term I, Department of EEE starts offering elective courses under four groups, A-D viz. Power, Electronics, Communication and Computer respectively. Besides these, two more elective courses are to be chosen from the inter-disciplinary course group in Levels II&III.

Rules for distributing major and minor groups and elective courses are as follows:

1. Students will be assigned one of the four groups as MAJOR and the other one or more groups as MINOR by taking written options from the students. For regular students, this will be done in Level III, Term III.

2. Maximum number of students in any group as major will be 35, but this number should not be less than ten (10). Similarly the maximum number of students in any group as minor will also be 35, but this number should not be less than ten (10).

3. Major and minor group assignment will be based on student options and CGPA of first eight (8) terms from Level I, Term I to Level III, Term II.

4. A student will have to take minimum FOUR (4) elective courses from the respective MAJOR group. A student must also take two theory courses along with its corresponding laboratory from the major group. If any student takes more than two elective courses that include laboratory works in the major group then he/ she has to take that laboratory course work also and thus his/ her total credit requirements for the degree will increase from the minimum required credits of 153.

5. A student will have to take minimum ONE (1) elective course from the respective MINOR group. A student must also take one theory course along with its corresponding laboratory from the minor group. If any student takes more than one elective course that include laboratory work in the minor group then he/ she has to take that laboratory course work also and thus his/ her total credit requirements for the degree will increase from the minimum required credits of 153.

6. A student must also take one theory course along with its corresponding laboratory from the interdisciplinary group. If any student takes more than one elective course that includes laboratory work then he/ she has to take that laboratory course work also and thus his/ her total credit requirements for the degree will increase from the minimum required credits of 153.

7. Students will be assigned their Level IV Thesis/ Project from the area of their respective major group. Thesis may be taken from minor groups too, but in that case number of required minor group courses may increase based on the recommendation of the concerned supervisor and subsequent approval of the Chairman of the Department.

8. Students will be assigned their Level IV, Term III Project/Internship also from the area of their respective major group, but it may also be taken from minor groups as well and thus the number of required minor group courses may increase based on the recommendation of the concerned supervisor and subsequent approval of the Chairman of the Department.
9. If a student fails in an elective theory course that has a laboratory work, the student may take that theory course again or may take another theory course together with its corresponding laboratory (if any). But if a student fails in an elective laboratory course then he/she must re-take that laboratory course only and must get at least the pass grade.

10. A student who has previously failed in an elective course will be allowed to re-register the course. But if the minimum number of re-registered students is ten (10) then a separate section may be created.

11. Elective courses to be offered in a term will be distributed in the preceding term.

12. A student will be allowed to choose a course from his/her major group regardless of his/her CGPA. After distribution of the elective courses among the students of the respective major groups, remaining seats of the elective courses will be distributed among the students who have chosen the subject’s group as their minor. The distribution among the minor students will be based on their written options for their courses and CGPA at the time of the distribution.

13. In case of any unforeseen situation or ambiguity, the Department Chairman will take an appropriate decision.

Semester-wise Course Offerings
The University runs three terms per year, such as, Spring, Summer and Fall Semester and its course offerings are given in the following tables.

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit</th>
<th>Pre-requisite Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EEE111</td>
<td>Electrical Circuit I</td>
<td>3</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>ENG101</td>
<td>Basic English Skills</td>
<td>3</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>MAT111</td>
<td>Mathematics I (Differential and Integral Calculus)</td>
<td>3</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>PHY115</td>
<td>Physics I (Electricity and Magnetism, Thermodynamics and Mechanics)</td>
<td>3</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>12</strong></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>ENG102</td>
<td>Intermediate English Skills</td>
<td>3</td>
<td>ENG101</td>
</tr>
<tr>
<td></td>
<td>MAT125</td>
<td>Mathematics II (Ordinary and Partial Differential Equations)</td>
<td>3</td>
<td>MAT111</td>
</tr>
<tr>
<td></td>
<td>PHY121</td>
<td>Physics II (Waves and Oscillations, Optics and Modern Physics)</td>
<td>3</td>
<td>PHY115</td>
</tr>
<tr>
<td></td>
<td>PHY122</td>
<td>Physics Laboratory</td>
<td>1</td>
<td>PHY115</td>
</tr>
<tr>
<td></td>
<td>CHE121</td>
<td>Engineering Chemistry</td>
<td>3</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>CHE122</td>
<td>Engineering Chemistry Laboratory</td>
<td>1</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>14</strong></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>ENG103</td>
<td>Advanced English Skills</td>
<td>3</td>
<td>ENG102</td>
</tr>
<tr>
<td></td>
<td>EEE131</td>
<td>Electrical Circuits II</td>
<td>3</td>
<td>EEE111</td>
</tr>
<tr>
<td></td>
<td>EEE132</td>
<td>Electrical Circuit Laboratory</td>
<td>1</td>
<td>EEE111</td>
</tr>
<tr>
<td></td>
<td>MAT135</td>
<td>Mathematics III (Complex Variables, Fourier Series and Transforms)</td>
<td>3</td>
<td>MAT125</td>
</tr>
<tr>
<td></td>
<td>EEE133</td>
<td>Computer Programming</td>
<td>3</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>EEE134</td>
<td>Computer Programming Laboratory</td>
<td>1</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>14</strong></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>ENG105</td>
<td>Public Speaking</td>
<td>3</td>
<td>ENG103</td>
</tr>
<tr>
<td></td>
<td>EEE215</td>
<td>Electronics I</td>
<td>3</td>
<td>EEE131</td>
</tr>
<tr>
<td></td>
<td>SOC215</td>
<td>Engineering Ethics</td>
<td>3</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>MAT217</td>
<td>Mathematics IV (Linear Algebra, Co-ordinate Geometry and Vector Analysis)</td>
<td>3</td>
<td>MAT135</td>
</tr>
<tr>
<td></td>
<td>CEN211/</td>
<td>Introduction to Civil Engineering/</td>
<td>3</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>MEN211</td>
<td>Mechanical Engineering Fundamentals</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total Credits</strong></td>
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<td></td>
</tr>
<tr>
<td>5</td>
<td>CEN220</td>
<td>Civil Engineering Drawing</td>
<td>1</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>EEE220</td>
<td>Electrical and Electronic Circuit Simulation Laboratory</td>
<td>1</td>
<td>EEE215</td>
</tr>
<tr>
<td></td>
<td>EEE225</td>
<td>Electronics II</td>
<td>3</td>
<td>EEE215</td>
</tr>
<tr>
<td></td>
<td>EEE223</td>
<td>Energy Conversion I</td>
<td>3</td>
<td>EEE131</td>
</tr>
<tr>
<td></td>
<td>EEE227</td>
<td>Engineering Electromagnetics</td>
<td>3</td>
<td>MAT217</td>
</tr>
<tr>
<td></td>
<td>MAT229</td>
<td>Mathematics V (Probability and Statistics)</td>
<td>3</td>
<td>MAT217</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>14</strong></td>
<td></td>
</tr>
</tbody>
</table>
### Summary of the Courses:
1. Total number of courses is 66 with 153 credits.
2. Total number of theory courses is 44 with 129 credits with each course having 3.0 credits except one (1) zero (0) credit course.
3. Total number of laboratory courses is 22 with 21 credits each course having 1.0 credit except one (1) zero (0) credit course.
4. Total number of credits offered per semester:
   \((12+14+14)+(15+14+14)+(13+12+15)+(13+15+2) = 40+43+40+30 = 153\)
5. Total Number of Core Courses: 32 with 72 credits (Theory: 20; Laboratory: 12)
6. Total Number of Inter-Disciplinary Course: 3 courses with 7 credits (Theory: 2; Laboratory: 1)
7. Total Number of Technical Elective Courses: 9 with 21 credits (Theory: 6; Laboratory: 3)
8. Total Number of Thesis/Project/Internship: 4 with 6 credits (Completely practical works)
9. Total Number of Basic Science Courses: 5 with 11 credits (Theory: 3; Laboratory: 2)
10. Total Number of Mathematics Courses: 5 with 15 credits (Theory: 5; Laboratory: 0)
11. Total Number of General Education Courses: 4 with 9 credits (Theory: 4; Laboratory: 0)
12. Total Number of English Language Courses: 4 with 12 credits (Theory: 4; Laboratory: 0)
13. Capstone Design Project is one course with six (6) credits to be taken in Level IV, Terms I, II and III, i.e. distributed over three consecutive semesters with 2-credits in each semester and Internship/ Project/ Seminar/ Workshop is another course with zero (0) credit to be taken in the last semester, i.e., in Level IV, Term III. In the last semester, there will be no course work, except internship works at any industry/engineering firm and a ‘Professional Skills Development’ course in the department.
14. For the ‘Professional Skills Development’ course, there will be a 3 hour class in one day of each week of the semester and at the end of the semester, there will be a comprehensive viva-voce of the departmental subjects in front of the departmental interview board with an external expert from the other public/ private university, and an arrangement for the mock interview to be conducted by the professional interview board.

Detail Course Contents of the Curriculum for the Bachelor of Science in Electrical and Electronic Engineering Program

Core Courses

EEE111 Electrical Circuits I
3 credits, 3 hours/week

Circuit variables and elements: Voltage, current, power, energy, independent and dependent sources, resistance. Basic laws: Ohm's law, Kirchoff's current and voltage laws. Simple resistive circuits: Series and parallel circuits, voltage and current division, wye-delta transformation. Techniques of circuit analysis: Nodal and mesh analysis including super node and super mesh. Network theorems: 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.


EEE131 Electrical Circuits II
3 credits, 3 hours/week


EEE132 Electrical Circuits Laboratory
1 credit, 2 hours/week

In this course, students will perform experiments to verify practically the theories and concepts learned in EEE111 and EEE131.

EEE133 Computer Programming
3 credits, 3 hours/week
Introduction to digital computers. Programming languages, algorithms and flow charts. Structured Programming using C: Variables and constants, operators, expressions, control statements, functions, arrays, pointers, structure unions, user defined data types, input-output and files. Object-oriented Programming using C++: introduction, classes and objects; polymorphism; function and operator overloading; inheritance.

**EEE134 Computer Programming Laboratory**
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE133. In the second part, students will learn program design using the principles learned in EEE133.

**EEE215 Electronics I**
3 credits, 3 hours/week

P-N junction as a circuit element: Intrinsic and extrinsic semiconductors, operational principle of p-n junction diode, contact potential, current-voltage characteristics of a diode, simplified DC and AC diode models, dynamic resistance and capacitance. Diode circuits: Half wave and full wave rectifiers, rectifiers with filter capacitor, characteristics of a Zener diode, Zener shunt regulator, clamping and clipping circuits. Bipolar Junction Transistor (BJT) as a circuit element: current components, BJT characteristics and regions of operation, BJT as an amplifier, biasing the BJT for discrete circuits, small signal equivalent circuit models, BJT as a switch. Single stage mid-band frequency BJT amplifier circuits: Voltage and current gain, input and output impedance of a common base, common emitter and common collector amplifier circuits. Metal Oxide Semiconductor Field Effect Transistor (MOSFET) as circuit element: structure and physical operation of an enhancement MOSFET, threshold voltage, Body effect, current-voltage characteristics of an enhancement MOSFET, biasing discrete and integrated MOS amplifier circuits, single-stage MOS amplifiers, MOSFET as a switch, CMOS inverter.

**EEE220 Electrical and Electronic Circuit Simulation Laboratory**
1 credit, 2 hours/week

Simulation laboratory based on EEE111, EEE131, EEE215 and EEE225 theory courses. Students will verify the theories and concepts learned in EEE111, EEE131, EEE215 and EEE225 using simulation software like PSpice and MATLAB. Students will also perform specific design of electrical and electronic circuits theoretically and by simulation.

**EEE223 Energy Conversion I**
3 credits, 3 hours/week


**EEE225 Electronics II**
3 credits, 3 hours/week


**EEE227 Engineering Electromagnetics**  
3 credits, 3 hours/week

Static electric field: Postulates of electrostatics, Coulomb's law for discrete and continuously distributed charges, Gauss's law and its application, electric potential due to charge distribution, conductors and dielectrics in static electric field, flux density- boundary conditions; capacitance-electrostatic energy and forces, energy in terms of field equations, capacitance calculation of different geometries; boundary value problems- Poisson's and Laplace's equations in different co-ordinate systems. Steady electric current: Ohm's law, continuity equation, Joule's law, resistance calculation. Static Magnetic field: Postulates of magnetostatics, Biot-Savart's law, Ampere's law and applications, vector magnetic potential, magnetic dipole, magnetization, magnetic field intensity and relative permeability, boundary conditions for magnetic field, magnetic energy, magnetic forces, torque and inductance of different geometries. Time varying fields and Maxwell's equations: Faraday's law of electromagnetic induction, Maxwell's equations - differential and integral forms, boundary conditions, potential functions; time harmonic fields and Poynting theorem. Plane electromagnetic wave: plane wave in loss less media- Doppler effect, transverse electromagnetic wave, polarization of plane wave; plane wave in lossy media- low-loss dielectrics, good conductors; group velocity, instantaneous and average power densities, normal and oblique incidence of plane waves at plane boundaries for different polarization.

**EEE230 Electronics Laboratory**  
1 credit, 2 hours/week

In this course, students will perform experiments to verify practically the theories and concepts learned in EEE215 and EEE225.

**EEE231 Properties of Materials**  
3 credits, 3 hours/week

EEE233 Energy Conversion II
3 credits, 3 hours/week

Three phase induction motor: Rotating magnetic field, equivalent circuit, vector diagram, torque-speed characteristics, effect of changing rotor resistance and reactance on torque-speed curves, motor torque and developed rotor power, no-load test, blocked rotor test, starting and braking and speed control.


Synchronous Generator: excitation systems, equivalent circuit, vector diagrams at different loads, factors affecting voltage regulation, synchronous impedance, synchronous impedance method of predicting voltage regulation and its limitations. Parallel operation: Necessary conditions, synchronizing, circulating current and vector diagram.

Synchronous motor: Operation, effect of loading under different excitation condition, effect of changing excitation, V-curves and starting.

Introduction to wind turbine generators. Construction and basic characteristics of solar cells.

EEE234 Energy Conversion Laboratory
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE223 and EEE233. In the second part, students will design simple systems using the principles learned in EEE223 and EEE233.

EEE237 Continuous Signals and Linear Systems
3 credits, 3 hours/week

Classification of signals and systems: signals- classification, basic operation on signals, elementary signals, representation of signals using impulse function; systems- classification. Properties of Linear Time Invariant (LTI) systems: Linearity, causality, time invariance, memory, stability, inevitability. Time domain analysis of LTI systems: Differential equations- system representation, order of the system, solution techniques, zero state and zero input response, system properties; impulse response-convolution integral, determination of system properties; state variable- basic concept, state equation and time domain solution. Frequency domain analysis of LTI systems: Fourier series- properties, harmonic representation, system response, frequency response of LTI systems; Fourier transformation- properties, system transfer function, system response and distortion-less systems. Applications of time and frequency domain analyses: solution of analog electrical and mechanical systems, amplitude modulation and demodulation, time-division and frequency-division multiplexing. Laplace transformation: properties, inverse transform, solution of system equations, system transfer function, system stability and frequency response and application.

EEE313 Numerical Techniques
3 credits, 3 hours/week


EEE314 Numerical Techniques Laboratory
1 credit, 2 hours/week
Laboratory on numerical techniques using computer solution of differentiation and integration problems, transcendental equations, linear and non-linear differential equations and partial differential equations taught in EEE313 Numerical Techniques course.

**EEE317 Power Systems I**
3 credits, 3 hours/week

Power network representations; per unit system of calculations; power and reactive power flow in simple systems; load flow studies of large systems using the Gauss Seidel and Newton Raphson Methods; control of voltage; real power and reactive power; symmetrical fault calculations; limitation of short-circuit currents using regulators. Symmetrical components: positive, negative and zero sequence networks of generators, transformers and lines; sequence network of systems; unsymmetrical fault calculations. Power system stability involving two-machine systems; Power system stability: swing equation; Equal area criterion of stability and its applications; solution of swing equation, factors affecting transient stability.

**EEE320 Electrical Service Design**
1 credit, 2 hours/week

Wiring system design, drafting, and estimation. Design for illumination and lighting. Electrical installations system design: substation, BBT and protection, air-conditioning, heating and lifts. Design for intercom, public address systems, telephone system and LAN. Design of security systems including CCTV, fire alarm, smoke detector, burglar alarm, and sprinkler system. A design problem on a multi-storied building.

**EEE321 Solid State Devices**
3 credits, 3 hours/week

Semiconductors in equilibrium: Energy bands, intrinsic and extrinsic semiconductors, Fermi levels, electron and hole concentrations, temperature dependence of carrier concentrations and invariance of Fermi level. Carrier transport processes and excess carriers: Drift and diffusion, generation and recombination of excess carriers, built-in-field, Einstein relations, continuity and diffusion equations for holes and electrons and quasi-Fermi level. PN junction: Basic structure, equilibrium conditions, contact potential, equilibrium Fermi level, space charge, non-equilibrium condition, forward and reverse bias, carrier injection, minority and majority carrier currents, transient and AC conditions, time variation of stored charge, reverse recovery transient and capacitance. Bipolar Junction Transistor: Basic principle of pnp and npn transistors, emitter efficiency, base transport factor and current gain, diffusion equation in the base, terminal currents, coupled-diode model and charge control analysis, Ebers-Moll equations and circuit synthesis. Metal-semiconductor junction: Energy band diagram of metal semiconductor junctions, rectifying and ohmic contacts. MOS structure: MOS capacitor, energy band diagrams and flat band voltage, threshold voltage and control of threshold voltage, static C-V characteristics, qualitative theory of MOSFET operation, body effect and current-voltage relationship of a MOSFET. Junction Field-Effect-Transistor: Introduction, qualitative theory of operation, pinch-off voltage and current-voltage relationship.

**EEE323 Digital Electronics**
3 credits, 3 hours/week

Introduction to number systems and codes. Analysis and synthesis of digital logic circuits: Basic logic functions, Boolean algebra, combinational logic design, minimization of combinational logic. Implementation of basic static logic gates in CMOS and BiCMOS: DC characteristics, noise margin and power dissipation. Power optimization of basic gates and combinational logic circuits. Modular combinational circuit design: pass transistor, pass gates, multiplexer, demultiplexer and their implementation in CMOS, decoder, encoder, comparators, binary arithmetic elements and ALU design. Programmable logic devices: logic arrays, field programmable logic arrays and programmable read only memory. Sequential circuits: different types of latches, flip-flops and their design using
ASM approach, timing analysis and power optimization of sequential circuits. Modular sequential logic circuit design: shift registers, counters and their applications.

**EEE324 Digital Electronics Laboratory**  
1 credit, 2 hours/week  
This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE323. In the second part, students will design simple systems using the principles learned in EEE323.

**EEE325 Digital Signal Processing I**  
3 credits, 3 hours/week  
Introduction to digital signal processing (DSP): Discrete-time signals and systems, analog to digital conversion, impulse response, finite impulse response (FIR) and infinite impulse response (IIR) of discrete-time systems, difference equation, convolution, transient and steady state response. Discrete transformations: Discrete Fourier series, discrete-time Fourier series, discrete Fourier transform (DFT) and properties, fast Fourier transform (FFT), inverse fast Fourier transform, z-transformation - properties, transfer function, poles and zeros and inverse z-transform. Correlation: circular convolution, auto-correlation and cross correlation. Digital Filters: FIR filters- linear phase filters, specifications, design using window, optimal and frequency sampling methods; IIR filters- specifications, design using impulse invariant, bi-linear z-transformation, least-square methods and finite precision effects.

**EEE326 Digital Signal Processing I Laboratory**  
1 credit, 2 hours/week  
This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE325. In the second part, students will design simple systems using the principles learned in EEE325.

**EEE331 Microprocessor and Interfacing**  
3 credits, 3 hours/week  
Introduction to microprocessors. Intel 8086 microprocessor: Architecture, addressing modes, instruction sets, assembly language programming, system design and interrupt. Interfacing: programmable peripheral interface, programmable timer, serial communication interface, programmable interrupt controller, direct memory access, keyboard and display interface. Introduction to micro-controllers.

**EEE332 Microprocessor and Interfacing Laboratory**  
1 credit, 2 hours/week  
This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE331. In the second part, students will design simple systems using the principles learned in EEE331.

**EEE333 Communication Engineering**  
3 credits, 3 hours/week  
Overview of communication systems: Basic principles, fundamental elements, system limitations, message source, bandwidth requirements, transmission media types, bandwidth and transmission capacity. Noise: Source, characteristics of various types of noise and signal to noise ratio. Information theory: Measure of information, source encoding, error free communication over a noisy channel, channel capacity of a continuous system and channel capacity of a discrete memory less system. Communication systems: Analog and digital. Continuous wave modulation: Transmission types-base-band transmission, carrier transmission; amplitude modulation- introduction, double side band,
single side band, vestigial side band, quadrature; spectral analysis of each type, envelope and synchronous detection; angle modulation- instantaneous frequency, frequency modulation (FM) and phase modulation (PM), spectral analysis, demodulation of FM and PM. Pulse modulation: Sampling theorem, Nyquist criterion, aliasing, instantaneous and natural sampling; pulse amplitude modulation principle, bandwidth requirements; pulse code modulation (PCM)- quantization principle, quantization noise, non-uniform quantization, signal to quantization error ratio, differential PCM, demodulation of PCM; delta modulation (DM)- principle, adaptive DM; line coding formats and bandwidths. Digital modulation: Amplitude-shift keying- principle, ON-OFF keying, bandwidth requirements, detection, noise performance; phase-shift keying (PSK)- principle, bandwidth requirements, detection, differential PSK, quadrature PSK, noise performance; frequency-shift keying (FSK)- principle, continuous and discontinuous phase FSK, minimum-shift keying, bandwidth requirements, detection of FSK. Multiplexing: Time-division multiplexing (TDM)- principle, receiver synchronization, frame synchronization, TDM of multiple bit rate systems; frequency-division multiplexing (FDM)- principle, de-multiplexing; wavelength-division multiplexing, multiple-access network- time-division multiple-access (TDMA), frequency-division multiple access (FDMA); code-division multiple-access (CDMA) - spread spectrum multiplexing, coding techniques and constraints of CDMA. Communication system design: design parameters, channel selection criteria and performance simulation.

**EEE334 Communication Engineering Laboratory**
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE333. In the second part, students will design simple systems using the principles learned in EEE333.

**EEE335 Control Systems**
3 credits, 3 hours/week


**EEE336 Control Systems Laboratory**
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE335. In the second part, students will design simple systems using the principles learned in EEE335.

**EEE339 Electrical Power Transmission and Distribution**
3 credits, 3 hours/week

Current and voltage relations on a transmission line: Representation of lines, the short transmission line, the medium transmission line, the long transmission line, solution of differential equation, interpretation of the equations, hyperbolic form of the equations, the equivalent circuit of a long line, direct current transmission. General line equation in terms of ABCD constants, relations between constants, charts of line constants, constants of combined networks, measurement, advantages of generalized line constants and Ferranti effect. Power circle diagram: Receiving and sending end power circle diagrams, transmitted maximum power, universal power circle diagrams, use of circle diagrams. Insulators of overhead lines; Mechanical characteristic of overhead transmission line: sag and tension analysis, effect of temperature, wind and ice loading, supports of different levels,
dampers, Introduction to corona and its effects; DC and AC Distribution system: distributor calculation of radial feeders, ring mains and interconnections.

**EEE401 VLSI I**
3 credits, 3 hours/week

VLSI technology: Top down design approach, technology trends and design styles. Review of MOS transistor theory: Threshold voltage, body effect, I-V equations and characteristics, latch-up problems, NMOS inverter, CMOS inverter, pass-transistor and transmission gates. CMOS circuit characteristics and performance estimation: Resistance, capacitance, rise and fall times, delay, gate transistor sizing and power consumption. CMOS circuit and logic design: Layout design rules and physical design of simple logic gates. CMOS subsystem design: Adders, multiplier and memory system, arithmetic logic unit. Programmable logic arrays. I/O systems. VLSI testing.

**EEE492 Capstone Design Project I**
2 credits, 2 hours/week at Level 4, Term I

**EEE494 Capstone Design Project II**
2 credits, 2 hours/week at Level 4, Term II

**EEE496 Capstone Design Project III**
2 credits, 2 hours/week at Level 4, Term III

Students must take Capstone Design Project after completion of at least 120 credits of their course work as a partial fulfillment of the requirements of their degree of B. Sc. in EEE. They must complete this work within three consecutive semesters in the final year or at the 4th Level of their academic degree program under the supervision of a Faculty Member of EEE Department of Southeast University (SEU). The first part should be completed at Level 4, Term I, the second part should be completed at Level 4, Term II and the third part should be completed at Level 4, Term III. The work may be performed individually or by forming a group of not more than 3 members. After completion of their work they must submit a Capstone Design Project Report on their findings and must present their works by appearing at an oral presentation in the middle of the semester and after the end of the final semester there will be an examination on a date fixed by the Chairman of the Department before a Board of Examiners comprising at least four members including the Supervisor and an External Member outside of the Department/SEU. Capstone Design Project should be the design and implementation of a practical and/or real life system or solving a real life problem in the field of electrical and electronic engineering.

**EEE498 Internship/Project/Seminar/Workshop**
0 credits, 3 hours/week at Level 4, Term III for project work/ seminar/ workshop, otherwise practical training/work in an industry or in an engineering firm

Students must take Internship/Project/Seminar/Workshop as a partial fulfillment of the requirements of their degree of B. Sc. in EEE. They must complete this work within one semester under the supervision of a Faculty Member of EEE Department of Southeast University (SEU). This work can be executed in an industry or in an engineering firm. After completion of their work they must submit an Internship/Project/Seminar/Workshop Report on their work and must present his report by appearing at an oral presentation and examination on a date fixed by the Chairman of the Department before a Board of Examiners comprising at least four members including the Supervisor and an External outside of the Department/ SEU. The training work may include the study and/or design and implementation of a practical and/or real life system or solving a problem in the field of electrical and electronic engineering.
Inter-Disciplinary Engineering Courses:

**CEN211 Introduction to Civil Engineering**  
3 credits, 3 hours/week  
Definition and history of Civil Engineering. Specializations in civil engineering: structural, geotechnical, transportation, water resources, environmental; Description of some outstanding civil engineering projects. Scope and nature of jobs of a civil engineer. Foundations; different types of foundations; brick masonry; framed structures and bearing walls; arches and lintels; details of floors and roofs; pointing; plastering and interior finishing; scaffolding, staging; shoring and underpinning; thermal insulation and acoustics; House plumbing.

**CEN220 Civil Engineering Drawing**  
1 credit, 2 hours/week  
Introduction: lettering, numbering and heading; instrument and their use; sectional views and isometric views of solid geometrical figures. Plan, elevation and section of multistoried building; building services drawings; detailed drawing of lattice towers.

**MEN211 Mechanical Engineering Fundamentals**  
3 credits, 3 hours/week  
Introduction to sources of energy: Steam generating units with accessories and mountings; steam turbines. Introduction to internal combustion engines and their cycles, gas turbines. Refrigeration and air conditioning: applications; refrigerants, different refrigeration methods. Fluid machinery: impulse and reaction turbines; centrifugal pumps, fans, blowers and compressors. Basics of conduction and convection: critical thickness of insulation.

**EEE301 Robotics and Automation**  
3 credits, 3 hours/week  
Robot system concepts and fundamentals: review of kinematics, forces, moments and Euler’s law. Control techniques, path/position control. Bandwidth, transmission techniques and design optimization.  

**EEE302 Robotics and Automation Laboratory**  
1 credit, 2 hours/week  
This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE301. In the second part, students will design simple systems using the principles learned in EEE301.

**EEE303 Biomedical Engineering**  
3 credits, 3 hours/week  
electrocardiography, phonocardiograph, vector cardiograph, analysis and interpretation of cardiac signals, cardiac pacemakers and defibrillator.


**EEE304 Biomedical Engineering Laboratory**
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE303. In the second part, students will design simple systems using the principles learned in EEE303.

**EEE305 Measurement and Instrumentation**
3 credits, 3 hours/week


**EEE306 Measurement and Instrumentation Laboratory**
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE305. In the second part, students will design simple systems using the principles learned in EEE305.

**EEE307 Brain Science and Engineering**
3 credits, 3 hours/week

Technology and Brain: Development of computer system in line with interface between brain, computer and machine. Neuromorphic Computing, System design with Neuromorphic chip; Brain inspired computing system; Core software techniques including operating systems, database systems, and artificial intelligence etc. Brain Computer Interface along with system being developed like, IoT with Brain Interface, Data Science, Brain Computer Interface (BCI), Brain Machine Interface (BMI), Bio-net, Bio-Money etc. Neural Networks: Brain Facts on Artificial Intelligence (AI), Robotics, Deep Learning etc. Brain Intelligence (BI), its’ opportunities, research and area of possible business. Brain Science and Healthcare: Nervous system development and function, brain anatomy, the biological basis of visual auditory, taste and smell perception, learning, memory, reward, drugs and addiction, psychological and neurological disorders, feeding etc. Undiscovered areas of human brain to utilize knowledge in the fields like Robotics, Medical Technology, Bio-medical Engineering, Biomedical Imaging and Analysis, Methods for Neuroimaging, Deep Brain Stimulation, Disease like Alzheimer's etc. Collective Intelligence in Biomedical Applications, Memory System Design. Train the Brain: Knowing the way to explore unlimited brain power, apply and improve quality of life. Cognitive Neuroscience, Performance Management, Neuro Linguistic Programming (NLP), Attitude, Bio-Marketing, Bio-Finance, Bio-Business, Bio-Education, Bio-Crime, Bio-Commerce etc.
EEE308 Brain Science and Engineering Laboratory  
1 credit, 2 hours/week  
This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE307. In the second part, students will design simple systems using the principles learned in EEE307.

Elective Courses: Group A (Power and Energy)

EEE410 Green Power and Energy  
3 credits, 3 hours/week  
Introduction to non-conventional power plants and their environmental impacts; Wind Energy: wind turbine generator, wind mapping, cost of wind energy generation and its environmental impacts. Solar Energy: PV Technology, fabrication of solar cells, open circuit voltage, short circuit current, maximum power and maximum power point tracker; solar home system (SHS), charge controller, battery- energy storage for renewable power; other sources of renewable energies; introduction to Green Smart Power Grid; renewable power economics.

EEE411 Power System II  
3 credits, 3 hours/week  
Series impedance of transmission line: Types of conductors, resistance, definition of inductance, inductance of conductor due to internal flux, flux linkages between two points external to an isolated conductor, inductance of a single phase two wire line. Capacitance of transmission lines: Capacitance of a three-phase with equilateral spacing and unsymmetrical spacing, effect of earth on the capacitance of three-phase transmission lines, bundled conductors, parallel-circuit three-phase lines. Transmission lines cables: overhead and underground. Insulated cables: underground cables versus overhead lines, insulating materials, electrostatic stress grading, three core cables, dielectric losses and heating, modern developments, oil-filled and gas-filled cables, measurement of capacitance, cable testing. Power factor and voltage control in power system; Tap changing transformer: OFF load and ON load tap changing, regulating transformer, boosting transformer; Substation: Classification, bus-bar arrangements and layout of substation. Reactive power compensation. Flexible AC transmission system (FACTS). High voltage DC transmission system. Harmonics of power system: causes and effects of harmonics generation in power system and effect on power quality.

EEE412 Power System Laboratory  
1 credit, 2 hours/week  
This course consists of two parts. In the first part, students will perform experiments/simulations to verify practically the theories and concepts learned in EEE317 and EEE441. In the second part, students will design simple systems using the principles learned in EEE317 and EEE 441.

EEE413 Power Electronics  
3 credits, 3 hours/week  

EEE414 Power Electronics Laboratory  
1 credit, 2 hours/week
This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE413. In the second part, students will design simple systems using the principles learned in EEE413.

EEE415 Power System Protection
3 credits, 3 hours/week


EEE416 Power System Protection Laboratory
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE415. In the second part, students will design simple systems using the principles learned in EEE415.

EEE417 Energy Conversion III
3 credits, 3 hours/week


EEE419 Power System Economics
3 credits, 3 hours/week

Economic structure of electric power systems. Electricity generation system design, operation and maintenance, electricity market players, market places, alternative structures of the electricity industry. Role of spot (balancing) markets and power exchanges among the neighboring countries. Private power generation and purchase policy; revenue recovery and pricing of transmission network and distribution services; electrical energy tariff determination. Role of Bangladesh Energy Regulatory Commission (BERC).

Problem formulation, optimization methods and programming for economic analysis of power system operation, planning and economic reliability. Locational marginal pricing, impact of losses and network constraints, modeling of network constraints, concept of contract networks, locational hedging, value of transmission, alternative approaches to investment pricing. Economic dispatch, load forecasting, unit commitment, interchange, planning and reliability analysis. Background study to pursue advanced work in network planning and operation.

EEE421 High Voltage Engineering
3 credits, 3 hours/week

measurements and testing. Over-voltage phenomenon and insulation coordination. Lightning and switching surges, basic insulation level, surge diverters and arresters.

**EEE422 High Voltage Engineering Laboratory**  
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 4413. In the second part, students will design simple systems using the principles learned in EEE 4413.

**EEE423 Power System Reliability**  
3 credits, 3 hours/week


**EEE427 Nuclear Power Engineering**  
3 credits, 3 hours/week


**EEE429 Power System Operation and Control**  
3 credits, 3 hours/week

Principles of power system operation: SCADA, conventional and competitive environment. Unit commitment, static security analysis, state estimation, optimal power flow, automatic generation control and dynamic security analysis.

**EEE485 Power Plant Engineering**  
3 credits, 3 hours/week


**Elective Courses: Group B (Electronics)**

**EEE431 Green Electronics**  
3 credits, 3 hours/week

Introduction: technology scaling and major bottlenecks for digital and mixed signal design: power dissipation, parameter variations, reliability (NBTI, HCI, TDDB), transistor basics and short channel effects, leakage power, dynamic power, and parameter variations; leakage tolerant design - logic and memory, design of ultra-low power digital CMOS circuits, including near-threshold and sub-threshold
logic, low-power DSP; memory design in scaled technologies - parameter variations and memory stability, low voltage and low power memories, new bit-cells, array architecture, parameter variations and low-voltage and low power design - voltage over-scaling and variation tolerance, application to general purpose computing and DSP systems, emerging technologies- FinFETs and variants, Tunnel FETs, III-V devices, Spin-torque transfer based logic and memories; power and performance implications.

Quality of Service Constraints: energy resource efficiency, product longevity and lifecycle extension, sustainable, safe and benign materials, corporate transparency and supply chain management, optimization of product lifecycle resource management.

**EEE433 VLSI II**
3 credits, 3 hours/week

VLSI MOS system design: Layout extraction and verification, full and semi-full custom design styles and logical and physical positioning. Design entry tools: Schematic capture and HDL. Logic and switch level simulation. Static timing. Concepts and tools of analysis, solution techniques for floor planning, placement, global routing and detailed routing. Application specific integrated circuit design including FPGA.

**EEE434 VLSI Laboratory**
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE401 and EEE434. In the second part, students will design simple systems using the principles learned in EEE401 and EEE434.

**EEE437 Analog Integrated Circuits**
3 credits, 3 hours/week


**EEE439 Compound Semiconductor and Hetero-Junction Devices**
3 credits, 3 hours/week


**EEE441 Optoelectronics**
3 credits, 3 hours/week

Optical properties in semiconductor: Direct and indirect band-gap materials, radiative and non-radiative recombination, optical absorption, photo-generated excess carriers, minority carrier life time,

**EEE442 Optoelectronics Laboratory**  
1 credit, 2 hours/week  
This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE441. In the second part, students will design simple systems using the principles learned in EEE441.

**EEE443 Semiconductor Device Theory**  
3 credits, 3 hours/week  

**EEE445 Hardware Design with VHDL**  
3 credits, 3 hours/week  
VHDL: meaning, history and reasons for studying hardware design, design hierarchy. VHDL design example: Behavioral, Data flow and Structural descriptions. Introduction to PLD, PLA, PAL, CPLDs and FPGA technology and implementation of various logic functions using these technologies. Basic VHDL constructs, coding styles and synthesis. Design of various combinational and sequential logic circuits using VHDL. Bus Architecture, ALU, RAM, simple processor, CPU and various controller circuit design using VHDL. Pipelining. Implementation of FSM and ASM based design in VHDL. Writing VHDL test benches.

**EEE446 Hardware Design with VHDL Laboratory**  
1 credit, 2 hours/week  
This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE445. In the second part, students will design simple systems using the principles learned in EEE445.

**EEE447 Nano Electronic Devices**  
3 credits, 3 hours/week  
Basic concepts: 3D, 2D, 1D carriers, DOS, carrier densities, directed moments, quantized conductance, semi-classical carrier transport, ballistic transport (classical and quantum). The MOSFET: MOS electronics: the MOS capacitor, MOSFET energy bands vs. bias, 2D electrostatics (the geometrical scaling factor). MOSFET current-voltage characteristics: General expression, linear region current, saturation region current (long channel), saturation region current (velocity saturated), full-range (above threshold and sub-threshold).
The bipolar transistor: Device structure, I-V characteristics, MOSFET as a bipolar transistor. CMOS technology: the CMOS inverter and digital gates, device, circuit and system, figures of merit, MOSFET scaling, system considerations.

The Ballistic MOSFET: the mean-free paths and L, ballistic I-V (T > 0 non-degenerate, T = 0 degenerate and T > 0), numerical simulation of the ballistic MOSFET. Scattering theory of the MOSFET: I-V in terms of the transmission coefficient, the transmission coefficient (low and high), the mean-free path for backscattering.

Beyond the silicon MOSFET (the Carbon Nano Tube FET): carbon nanotubes, band-structure basics, MIS electrostatics of carbon nanotube capacitors, theory of the ballistic CNTFET, CNTFETs vs. MOSFETs, discussion.

EEE448 Nano Electronic Devices Laboratory
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE447. In the second part, students will design simple systems using the principles learned in EEE447.

EEE449 Semiconductor Processing and Fabrication Technology
3 credits, 3 hours/week


Elective Courses: Group C (Communication)

EEE450 Green Communication Engineering
3 credits, 3 hours/week

Introduction of green communication technology; Theory and modeling of sustainable green communication systems; Architecture, design and strategies for green communication; Algorithms and protocols for green communication; Allocation and scheduling for green communication systems. Environment Friendly Communication: electromagnetic pollution mitigation, green terminals for wireless and wire-line communication, contention of distribution network; signal processing; software and hardware, device and equipment; green cognitive communication and computing, data storage and cloud computing.

Quality of Service Constraints: improving energy efficiency of green communication systems.

EEE451 Mobile Cellular Communication
3 credits, 3 hours/week

and channel assignment. Handoffs and Dropped Calls: Reasons and types, forced handoffs, mobile assisted handoffs and dropped call rate. Diversity Techniques: Concept of diversity branch and signal paths, carrier to noise and carrier to interference ratio performance. Digital cellular systems: Global system for mobile, time division multiple access and code division multiple access.

EEE453 Digital Signal Processing II
3 credits, 3 hours/week


EEE454 Digital Signal Processing II Laboratory
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE453. In the second part, students will design simple systems using the principles learned in EEE453.

EEE455 Telecommunication Engineering
3 credits, 3 hours/week


EEE457 Optical Fiber Communications
3 credits, 3 hours/week


EEE458 Optical Fiber Communications Laboratory
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE457. In the second part, students will design simple systems using the principles learned in EEE457.
EEE459 Satellite Communication
3 credits, 3 hours/week

Brief history and overview of satellite communications, communication satellite systems, communication satellites, orbiting satellites, satellite frequency bands, satellite multi-access formats, the Regulatory Bodies. Frequency allocations. Fundamental orbital laws, GEO, MEO, LEO satellites, subsystems of a communication satellite, earth station, satellite link analysis, attenuation, effect of rain on propagation. Modulation and multiplexing techniques for satellite link, Communication payload, transponders, coverage. Multiple access techniques: FDMA, SPADE, TDMA, CDMA, Antijam advantage of spectral spreading, satellite jamming, DS-CDMA acquisition and tracking, FH-CDMA acquisition and tracking, random access. Phase coherency in satellite systems: carrier phase-noise, phase noise spectra, carrier frequency and phase stability, phase errors in carrier referencing. Satellite ranging systems: ranging systems, component-ranging codes, and tone-ranging systems. Inter-satellite links, VSAT satellite system concept, link analysis, transformation path, path loss, mobile-satellite communication systems, mobile satellite channel, direct home TV broadcasting.

EEE460 Optical Networks
3 credits, 3 hours/week


EEE461 Digital Communication
3 credits, 3 hours/week


EEE462 Digital Communication Laboratory
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE461. In the second part, students will design simple systems using the principles learned in EEE461.

EEE463 Microwave Engineering
3 credits, 3 hours/week

EEE464 Microwave Engineering Laboratory
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE463. In the second part, students will design simple systems using the principles learned in EEE463.

EEE465 Random Signals and Processes
3 credits, 3 hours/week


EEE467 Radio and Television Engineering
3 credits, 3 hours/week


EEE469 Broadcast Engineering
3 credits, 3 hours/week

EEE470 Radar and Navigation
3 credits, 3 hours/week

Air Traffic Management: Air Traffic Management (ATM) concepts, En-route and Terminal Guidance, Supporting technology, Types of Navigational Aids, An introduction to ICAO.
Navigational Aids for Landing: Instrument Landing System (ILS), Microwave Landing System (MLS), Approach and Terminal Radars, Use of Precision Approach Path Indicators (PAPI), Automatic Dependent Surveillance (ADS) System.

EEE483 Internet of Things
3 credits, 3 hours/week

Sensors and sensor nodes: Sensing components and devices. Sensor modules, nodes and systems.
Connectivity and networks: Wireless technologies for the IoT. Edge connectivity and protocols.
Wireless sensor networks.
Analytics and applications: Signal processing, real-time and local analytics. Databases, cloud analytics and applications.
Industry perspective: Business considerations. Legal challenges.
IoT related practical exercises: Local processing on the sensor nodes. Connecting devices at the edge and to the cloud. Setting up wireless mesh networks. Processing data offline and in the cloud.

EEE484 Internet of Things Laboratory
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE483. In the second part, students will design simple systems using the principles learned in EEE483.

Elective Courses: Group D (Computer)

EEE471 Microprocessor Based System Design
3 credits, 3 hours/week

Review of 8086 family of microprocessors. Instructions and data access methods in a 32 bit microprocessor; Representation of operands and operators; Instruction formats; Designing Arithmetic Logic Unit; Processor design: single bus, multi-bus architecture; Control Unit Design: hardwired, micro-programmed and pipe line; VLSI implementation of a microprocessor or part of a microprocessor design.

EEE472 Microprocessor Based System Design Laboratory
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE471. In the second part, students will design simple systems using the principles learned in EEE471.
EEE473 Real Time Computer System
3 credits, 3 hours/week

Introduction to real time system; Classification of real time process; Real time scheduling; Real time programming; Implementation; Operating systems; Real time I/O. Real Time design methodologies. Modeling for real time systems. Reliable and Safe design for critical applications. Review of Microprocessor fundamentals and programmable input/output devices and systems for PC. Application examples: digital controls, robotics, on line systems, communication with real world signals and automatic control using feedback, feed-forward and adaptive control, control algorithm implementation.

EEE475 Multimedia Communications
3 credits, 3 hours/week


EEE477 Computer Networks
3 credits, 3 hours/week


EEE478 Computer Networks Laboratory
1 credit, 2 hours/week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE477. In the second part, students will design systems using the principles learned in EEE477.

EEE479 Computer Architecture
3 credits, 3 hours/week

Instructions and data access methods; Arithmetic Logic Unit (ALU) design: arithmetic and logical operations, floating point operations; Processor design: data paths- single cycle and multi cycle implementations; Control Unit design: hardware and micro-programmed Pipeline- pipelined data path and control, hazards and exceptions. Memory organization: cache, virtual memory; Buses; Multiprocessors, type of multiprocessor performance, single bus multiprocessors, clusters.
EEE480 Green Computing
3 credits, 3 hours/week

Green use of computer: minimizing the electricity consumption of computers and their peripheral devices. Green disposal: re-purposing an existing computer or appropriately disposing of, or recycling, unwanted electronic equipment. Green design: designing energy-efficient computers, servers, storage devices, printers, projectors and other digital devices. Green manufacturing: minimizing waste during the manufacturing of computers and other subsystems to reduce the environmental impact of these activities.

Introduction: service providers’ battle to reduce carbon footprint as data centers expand, green data center; reduction of energy consumption with hot and cold aisles, optimization for best energy efficiency, MAID 2.0 and disk spin down for reducing energy costs. Designing, manufacturing, using, and disposing of computers, servers, and associated subsystems, such as, monitors, printers, storage devices, and networking and communications systems etc. Software and deployment optimization: algorithmic efficiency, resource allocation, virtualizing, terminal servers. Power Management: data center power, operating system support, power supply, storage and display etc.

Government regulatory authorities to promote green computing concepts.

EEE481 Cryptography and Network Security
3 credits, 3 hours/week


Mathematics Courses:

MAT009 Remedial Mathematics
0 credits, 3 hours/week

Algebra: Set, function, hyperbolic function, matrix, series-exponential, logarithmic and trigonometric function, complex numbers.
Geometry: Coordinates, direction cosines, circle, plane, straight line, sphere, parabola, hyperbola and ellipse.
Trigonometry: Plane trigonometry, spherical trigonometry, trigonometric ratios of associated and compound angles, circular function.
Calculus: Differential calculus, limits, addition, multiplication, division, Integral calculus, substitution method, integration by parts, reduction formulae, definite integral.

MAT111 Mathematics I (Differential and Integral Calculus)
3 credits, 3 hours/week

Differential Calculus: Concepts of Set, Cartesian product set, Relation, Functions, Domain, Co-domain and Range of a function, Graph of functions, Limits, continuity and differentiability, Derivative of functions, Finding differential coefficient’s of the various functions, Application of
Rolles’s Theorem, Mean Value Theorem, Intermediate value theorem, Successive differentiation, Leibnitz’s theorem, Partial differentiation, Tangent and Normal, Maximum and minimum values of functions of single variable, Points of inflection, Curvature, Asymptotes, Curve tracing.

Integral Calculus: Integration by 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 enclosed by two curves in Cartesian and polar co-ordinates, Volumes and surface areas of solids of revolution.

MAT125 Mathematics II (Ordinary and Partial Differential Equations)
3 credits, 3 hours/week

Ordinary Differential Equations: Degree and order of ordinary differential equations: formation of differential equations, solution of first order differential equations by various methods, solution of first order higher degree ordinary differential equations, solution of general linear equations of second and higher orders with constant coefficients, solution of homogeneous linear equations and its applications, solution of differential equations of higher order when dependent and independent variables are absent, solution of differential equations by the method of factorization of operators.

Partial Differential Equations: Four rules for solving simultaneous equations, Langrange’s method of solving PDE of order one. Integral surfaces passing through a given curve, non-linear PDE of order one (complete, particular, singular and general integrals). Standard forms, Charpit’s method, second order PDE, its nomenclature and classification to canonical, parabolic, elliptic, hyperbolic, solution by separation of variables, linear PDE with constant coefficients.

MAT135 Mathematics III (Complex Variables, Fourier Series and Transforms)
3 credits, 3 hours/week


Laplace Transforms: Definition, Theorems and properties of Laplace transformation. Laplace transforms of some elementary functions; Inverse Laplace transforms; Laplace transforms of derivatives. The unit step function; Periodic function; Some special theorems on Laplace transforms; Partial fraction; Solutions of differential equations by Laplace transforms; Evaluation of improper integrals.

MAT217 Mathematics IV (Linear Algebra, Co-ordinate Geometry and Vector Analysis)
3 credits, 3 hours/week

Linear Algebra: Definition of matrices, Operations of matrices, Transpose and inverse of a matrix Determinants, Matrix polynomials, Euclidean n-space, Linear transformations from IRn to IRm, Properties of linear transformations from IRn to IRm, System of linear equations and its solution by various methods, Real vector spaces and subspaces, Basis and Dimension, Rank and Nullity, Linear combination, Linear dependency and independency, Inner product spaces: Gram-Schmidt process and QR-Decomposition, Eigen values and Eigen vectors, Diagonalization, Linear transformations: Kernel and Range, Application of linear algebra to electric networks.

Co-ordinate Geometry: Two dimensional coordinate geometry: Changes of axes: Transformation of co-ordinates, simplification of equation of curves, Conic section (pair of straight line, system of circle, parabola, Ellipse, Hyperbola). Three dimensional coordinate geometry: System of coordinate, distance between two points, section formula, projections, direction cosines, equations of planes and lines.

Vector Analysis: Multiple products of vectors, Linear dependence and independence of vectors, Differentiation and integration of vectors together with elementary applications, Line, surface and
volume integrals, Gradient of a scalar function, divergence and curl of a vector function, Integral forms of gradient, divergence and curl. Divergence theorem, Stoke's theorem, Green's theorem and Gauss's theorem.

**MAT229 Mathematics V (Probability and Statistics)**
3 credits, 3 hours/week


**Basic Science Courses:**

**PHY115 Physics I (Electricity and Magnetism, Thermodynamics and Mechanics)**
3 credits, 3 hours/week

Electricity and Magnetism: Electric charge and Coulomb's law, electric dipole and dipole moment, Electric field, concept of electric flux and the Gauss's law- some applications of Gauss's law, Gauss's law in vector form, Electric potential, relation between electric field and electric potential, capacitance and dielectrics, gradient, Laplace's and Poisson's equations, Current, Current density, resistivity, the magnetic field due to orbital motion of electrons, electron spin. Ampere's law, Biot-Savart law and their applications, Laws of electromagnetic induction- Maxwell's equation.


Mechanics: Linear momentum of a particle, linear momentum of a system of particles, conservation of linear momentum, some applications of the momentum principle; Angular momentum of a particle, angular momentum of a system of particles, Kepler's law of planetary motion, the law of universal Gravitation, the motion of planets and satellites, introductory quantum mechanics; Wave function; Uncertainty principle, postulates, Schrodinger time independent equation, expectation value, Probability, Particle in a zero potential, calculation of energy.

**PHY121 Physics II (Waves and Oscillations, Optics and Modern Physics)**
3 credits, 3 hours/week

Waves and oscillations: Differential equation of simple harmonic oscillator, total energy and average energy, combination of simple harmonic oscillations, spring mass system, torsional pendulum; two body oscillation, reduced mass, damped oscillation, forced oscillation, resonance, progressive wave, power and intensity of wave, stationary wave, group and phase velocities.

Modern Physics: Galilean relativity and Einstein's special theory of relativity; Lorentz transformation equations, Length contraction, Time dilation and mass-energy relation, photoelectric effect, Compton effect; De Broglie matter waves and its success in explaining Bohr's theory, Pauli's exclusion principle, Constituent of atomic nucleus, Nuclear binding energy, different types of radioactivity, radioactive decay law; Nuclear reactions, nuclear fission, nuclear fusion, atomic power plant.

**PHY122 Physics Laboratory**  
1 credit, 2 hours/week

Laboratory experiments based on PHY115 and PHY121.

**CHE121 Engineering Chemistry**  
3 credits, 3 hours/week


**CHE122 Engineering Chemistry Laboratory**  
1 credit, 2 hours/week

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

**English Language Courses:**

**ENG101 Basic English Skills**  
3 credits, 3 hours/week

This course is an introductory one to develop students’ English language proficiency with a special emphasis on basic language skills as well as grammatical competence. The language skills include: Reading (skimming, scanning); Writing (topic sentence, developers, transitional words, terminators, descriptive writing: describing a person, a place, an object, narrative writing: narrating events, writing applications); Listening (getting main points and particular information); Speaking (introducing self and others, greetings, giving directions, presentation skills: how to give a presentation, impromptu speech, situational conversation: getting information, making offers, seeking permission). The grammatical items include tenses (present simple, present progressive, past simple, past progressive, present perfect, present perfect progressive, past perfect, past perfect progressive); articles; noun (countable & uncountable); verb; subject - verb agreement; prepositions of time and place.

**ENG102 Intermediate English Skills**  
3 credits, 3 hours/week

This course is designed to develop students’ efficiency in the four communication skills of English in an integrated way. This course includes grammar contents, writing, speaking and listening materials that are in more advanced level than the Basic Composition so that students can gradually improve. Students will practice different forms of writing, reading, speaking, listening, and grammar practices within context. The course includes: Reading (Getting the main points, making inferences, intensive reading); Writing (Writing essays- compare and contrast, causes and effects, paraphrasing, summarizing, process analysis, reflective writing based on given pictures and samples); Speaking (Group discussions and making comments and decisions, public interactions and presentations, role
plays, mock interviews, discussions on social problems and the causes, comparison and telling the differences on any topic); Listening (playing audios and documentaries relevant to the purpose of listening, comparing and contrasting, identifying causes and effects, identifying processes /steps); Grammar (future tense, modals, clauses, conditionals, phrasal verbs, adverbials, degrees, voices, modifiers, capitalizations and punctuations).

**ENG103 Advanced English Skills**  
3 credits, 3 hours/week

This is a higher level English course offered to the students of 3rd semester of Southeast University. The contents have been selected to help students gain advanced level skills in English required at academic and future professional contexts. The contents include - reinforcement of grammatical items (including gerund, infinitives, fragments, parallel, parts of speech, and narration); essay writing (argumentative and persuasive essays); business writing (memo/notice writing); business letters (request letter, letter of complaints/claims, and refusal letter); writing curriculum vitae/resume and cover letters; report writing; analyzing and interpreting charts and drafts (pie chart, bar graph, line graph); group conversations; job interviews; PowerPoint presentations; debate.

**ENG105 Public Speaking**  
3 credits, 3 hours/week

This course is comprised of theory and practical lessons designed to teach participants how to master the art of Presentation and Public speaking including techniques to reduce speaker- anxiety, and the use of visual aids to enhance speaker presentations. Its main goal is to prepare students for success in typical public speaking situations and to provide them with the basic principles of organization and research needed for effective speeches. Throughout the course, students will learn new skills and techniques; explore best practices for communication and content delivery. During the lessons they will be taught how to unleash their creativity to deliver stunning key note speeches and presentation and deliver a learnable experience when speaking to a target audience, whether prepared or impromptu. This course will help students take their presentation and public speaking skills to the next higher level.

**General Education Courses:**

**SOC215 Engineering Ethics**  
3 credits, 3 hours/week


**MGT231 Industrial Management**  
3 credits, 3 hours/week

Management Functions and Organization: Evolution, management function: organization, theory and structure, span of control, authority delegation, manpower planning. Personal Management: Importance, need hierarchy, motivation, leadership, wage incentives, performance appraisal, participative management.  
Operation Management: Production planning and control (PPC) functions, quantitative methods applied in production, quality management, location and layout planning safety and loss management.

**ACT311 Financial and Managerial Accounting**
3 credits, 3 hours/week


**ECO315 Engineering Economics**
3 credits, 3 hours/week


**SOC311 Sociology**
3 credits, 3 hours/week

Introduction: Society, Science and Technology- an overview; Scientific Study of Society; Social Elements, Society, Community, Association and Institution; Mode of Production and Society Industrial Revolution, Development of Capitalism. Culture and Socialization: Culture; Elements of Culture; Technology and Culture; Cultural Lag; Socialization and Personality; Family; Crime and Deviance; Social Control. Technology, Society and Development; Industrialization and Development; Development and Dependency Theory; Sustainable Development; Development and Foreign Borrowing; Technology Transfer and Globalization, Modernity and Environment; Problem and Prospects. Pre-industrial, Industrial and Post-industrial Society: Common Features of Industrial Society; Development and Types of Social Inequality in Industrial Society; Poverty, Technology and Society; Social Stratification and Social Mobility; Rural and Urban Life, and their Evaluation. Population and Society: Society and Population; Fertility. Mortality and Migration; Science, Technology and Human Migration; Theories of Population Growth-Demographic Transition Theory, Malthusian Population Theory; Optimum Population Theory; Population Policy.
SOC313 Bangladesh Studies
3 credits, 3 hours/week


PSD430 Professional Skills Development
0 credits, 3 hours/week

Socialization and Introduction of Professional Life Skills Development Program; Introduction to Career Planning; Identifying Professional Talents: Self-Assessment; Preparing Cover Letters; Developing and Enhancing Professional Resume: Resume Preparation Techniques, Resume Contents and Sample Resumes; Introduction to the Career Search Processes: Job Search Strategies and Prospecting for Job Leads; Professional Communication: Communicating with Potential Employers; Interviews: Preparing for Interviews and Managing Interviews; Developing Professional Career Portfolio and Presentation; Working in Organizations: Work Ethics; Managing Workplace; Mock Interview, Professional Career Portfolio and Presentation. Comprehensive viva-voce on curriculum.

Course Equivalence of New Syllabus with Old Syllabus with Pre-Requisite Courses:

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<td>Course Title</td>
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<tr>
<td>EEE1021/EEE 1101</td>
<td>Electrical Circuits I</td>
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<td>EEE1021/EEE 1101</td>
<td>Electrical Circuits II</td>
<td>EEE131</td>
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<td>EEE1032/EEE 1302</td>
<td>Electrical Circuits Laboratory</td>
<td>EEE132</td>
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<td>Language I (C)/Computer Programming</td>
<td>EEE133</td>
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<tr>
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<td>Programming Language I (C) Lab/Computer Programming Laboratory</td>
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<tr>
<td>EEE2011/EEE2101</td>
<td>Electronic Devices I/Electronics I</td>
<td>EEE215</td>
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<tr>
<td>EEE2012</td>
<td>Electronic Devices I Lab</td>
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<td>EEE2043/EEE2201</td>
<td>Electronic Devices II/Electronics II</td>
<td>EEE225</td>
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<td>EEE2044/EEE 3100</td>
<td>Electronic Devices II Lab/Electronics Lab</td>
<td>EEE230</td>
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<tr>
<td>EEE2046/EEE 2300</td>
<td>Circuit Simulation Lab/Electrical and Electronic Circuit Simulation Laboratory</td>
<td>EEE220</td>
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<td>Courses of old syllabus</td>
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<td>EEE2013/ EEE 3203 Digital Electronics/</td>
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<td>EEE225 Electronics II</td>
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<td>EEE2014/ EEE 3204 Digital Electronics</td>
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<td>EEE223 Energy Conversion I</td>
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<td>EEE227 Engineering Electromagnetics</td>
<td>MAT217 Mathematics IV (Linear Algebra, Co-ordinate Geometry and Vector Analysis)</td>
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<td>EEE233 Energy Conversion II</td>
<td>EEE223 Energy Conversion I</td>
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<td>EEE2038/ EEE 2302 Electrical Properties</td>
<td>EEE234 Energy Conversion I</td>
<td>EEE223 Energy Conversion I</td>
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<td>EEE231 Properties of Materials</td>
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<td>EEE3028/ EEE 3104 Numerical Techniques</td>
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<td>EEE325 Digital Signal Processing I</td>
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<td>EEE4014/ EEE 3206 Digital Signal</td>
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<td>EEE2042/ EEE 3300 Electrical Services</td>
<td>EEE320 Electrical Service Design</td>
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<td>EEE3014/ EEE 3302 Microprocessor Design</td>
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<td>EEE2023/ EEE 3303 Analog &amp; Digital</td>
<td>EEE333 Communication Engineering</td>
<td>EEE237 Continuous Signals and Linear Systems</td>
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<td>EEE4026/ EEE 3304 Communication</td>
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<td>EEE 3306 Control Systems Laboratory</td>
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<td>EEE4000/ EEE 4002 Research Methodology Thesis/Project I</td>
<td>EEE492 Capstone Design Project I</td>
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<td>EEE 4004 Thesis/Project II</td>
<td>EEE494 Capstone Design Project II EEE492 Capstone Project I</td>
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<td>EEE496 Capstone Design Project III</td>
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<td>EEE498 Internship/Project/Seminar/ Workshop</td>
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<td>CEN220 Civil Engineering Drawing</td>
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<td>MEN211 Mechanical Engineering Fundamentals</td>
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<td>EEE301 Robotics and Automation</td>
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<td>EEE 3212 Robotics and Automation Laboratory</td>
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<td>EEE303 Biomedical Engineering</td>
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<td>EEE 2026/ EEE 3216 Measurement &amp; Instrumentation Lab/ Measurement and Instrumentation Laboratory</td>
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<td>MATH103 4/ MATH 1101 Differential &amp; Integral Calculus/ Mathematics I (Differential and Integral Calculus)</td>
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<td>MATH103 5/ MATH 1305 Ordinary Differential Equations and Partial Differential Equation/ Mathematics III (Ordinary and Partial Differential Equations)</td>
<td>MAT125 Mathematics II (Ordinary and Partial Differential Equations) MAT111 Mathematics I (Differential and Integral Calculus)</td>
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<td>MATH201 4/ MATH 1203 Complex Variables and Transforms/ Mathematics II (Complex Variables, Fourier’s Series and</td>
<td>MAT135 Mathematics III (Complex Variables, Fourier Series and Transforms) MAT125 Mathematics II (Ordinary and Partial Differential Equations)</td>
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<td>MATH201S/ MATH 2107 Linear Algebra &amp; Vector Analysis/ Mathematics IV</td>
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<td>STAT2012/ MATH 2209 Statistical Methods and Probability/ Mathematics V (Probability</td>
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<td>PHY1033/PHY 1101 Advanced Physics/ Physics I (Waves and Oscillations, Optics and</td>
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<td>PHY 1201 Physics II (Electricity and Magnetism, Modern Physics and Mechanics)</td>
<td>PHY121 Physics II (Waves and Oscillations, Optics and Modern Physics)</td>
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<td>ENG101 Basic English Skills</td>
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<td>ENG 1002/ENG 1002 Intermediate Composition/ Intermediate Composition</td>
<td>ENG102 Intermediate English Skills</td>
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<td>ENG103 Advanced English Skills</td>
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<td>ENG105 Public Speaking</td>
<td>ENG103 Advanced English Skills</td>
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<td>ENG 1021/ENG 2301 English for Engineers/ English for Engineers</td>
<td>ACT1021/ACT 3101 Introduction to Accounting/ Financial and Managerial</td>
<td>ACT311 Financial and Managerial Accounting</td>
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<td>ACT311 Financial and Managerial Accounting</td>
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<td>SOC311 Sociology</td>
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<td>PSD 4000 Professional Skills Development</td>
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<td>EEE 4403 Nuclear Power Engineering</td>
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<td>EEE 3011/EEE 4405 Power Electronics and drives/ Power Electronics</td>
<td>EEE413 Power Electronics</td>
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<td>EEE 3012/EEE 4406 Power Electronics and drives Lab/ Power Electronics Laboratory</td>
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<td>EEE4017/EEE 4407 Power Plant Engineering/ Power Plant Engineering</td>
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<td>EEE 3023/EEE 4409 Power System protection/ Power System Protection</td>
<td>EEE415 Power System Protection</td>
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<td>EEE 4411 Energy Conversion III</td>
<td>EEE417 Energy Conversion III</td>
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<td>EEE 4501 Analog Integrated Circuits</td>
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<td>EEE321 Solid State Devices</td>
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<td>EEE 4025/EEE 4503 VLSI Design/ VLSI I</td>
<td>EEE401 VLSI I</td>
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<td>EEE434 VLSI Laboratory</td>
<td>EEE401 VLSI I</td>
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<td>EEE 4505 Compound Semiconductor and Hetero Junction Device</td>
<td>EEE439 Compound Semiconductor and Hetero Junction Device</td>
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<td>EEE 3029/EEE 4507 Semiconductor Processing and Fabrication Technology/ Semiconductor Processing and Fabrication Technology</td>
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<td>EEE 4509 VLSI II</td>
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<td>EEE 3035/EEE 4511 Optoelectronic Devices/ Optoelectronics</td>
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<td>EEE321 Solid State Devices</td>
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<td>EEE 4513 Semiconductor Device Theory</td>
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<td>EEE431 Green Electronics</td>
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<td>EEE 4518 Nano Electronic Devices Laboratory</td>
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<td>EEE321 Solid State Devices</td>
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<td>EEE445 Hardware Design with</td>
<td>EEE323 Digital Electronics</td>
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<td>EEE 4601 Random Signals and Processes</td>
<td>EEE465 Random Signals and Processes</td>
<td>EEE237 Continuous Signals and Linear Systems</td>
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<td>EEE4021/ EEE 4603 Microwave Engineering/ Microwave Engineering</td>
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<td>EEE464 Microwave Engineering Laboratory</td>
<td>EEE334 Communication Engineering Laboratory</td>
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<td>EEE-4023/ EEE 4605 Optical Fiber Communication/ Optical Fiber Communications</td>
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<td>EEE 4617 Satellite Communication</td>
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<td>EEE 4619 Broadcast Engineering</td>
<td>EEE469 Broadcast Engineering</td>
<td>EEE333 Communication Engineering</td>
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<td>EEE 4621 Radio and Television Engineering</td>
<td>EEE467 Radio and Television Engineering</td>
<td>EEE333 Communication Engineering</td>
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<td>EEE 4623 Optical Networks</td>
<td>EEE460 Optical Networks</td>
<td>EEE333 Communication Engineering</td>
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<td>EEE 4625 Radar and Navigation</td>
<td>EEE470 Radar and Navigation</td>
<td>EEE333 Communication Engineering</td>
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<td>EEE483 Internet of Things</td>
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<td>EEE 4701 Microprocessor Based System Design</td>
<td>EEE471 Microprocessor Based System Design</td>
<td>EEE331 Microprocessors and Interfacing</td>
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<td>EEE472 Microprocessor Based System Design Laboratory</td>
<td>EEE332 Microprocessors and Interfacing Laboratory</td>
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<td>EEE 4703 Real Time Computer System</td>
<td>EEE473 Real Time Computer System</td>
<td>EEE 3301 Microprocessors and Interfacing</td>
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<td>EEE 4705 Multimedia Communications</td>
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<td>EEE 4707 Computer Networks</td>
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<td>EEE 4709 Computer Architecture</td>
<td>EEE479 Computer Architecture</td>
<td>EEE331 Microprocessors and Interfacing</td>
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<td>EEE 4711 Green Computing</td>
<td>EEE480 Green Computing</td>
<td>EEE331 Microprocessors and Interfacing</td>
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<td>EEE 4713 Cryptography and Network Security</td>
<td>EEE481 Cryptography and Network Security</td>
<td>EEE333 Communication Engineering</td>
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</table>

**Recommended Books’ List of the Various Courses of the Course Curriculum of the Bachelor of Science in Electrical and Electronic Engineering**

**Core Courses**

**EEE111 Electrical Circuits I**
3 credits, 3 hours/week  
**Text:**
1. Introductory Circuit Analysis - Boylestad R.L  
**Reference:**
1. Fundamentals of Electric Circuits - Alexander & Sadiku  

**EEE131 Electrical Circuits II**
3 credits, 3 hours/week  
**Text:**
1. Introductory Circuit Analysis - Boylestad R.L  
**Reference:**
1. Fundamentals of Electric Circuits - Alexander & Sadiku  

**EEE132 Electrical Circuits Laboratory**
1 credit, 2 hours/week  
**Text:**
1. Introductory Circuit Analysis - Boylestad R.L  
**Reference:**
1. Fundamentals of Electric Circuits - Alexander & Sadiku  

**EEE133 Computer Programming**
3 credits, 3 hours/week  
**Text:**
1. Programming with C (Schaum’s outline series) - B. S. Gottfried  
**Reference:**
1. C Programming Language - Brian W. Kernighan and Dennis M. Ritchie  
2. Teach Yourself C - H. Schildt  

**EEE134 Computer Programming Laboratory**
1 credit, 2 hours/week  
**Text:**
1. Programming with C (Schaum’s outline series) - B. S. Gottfried  
**Reference:**
1. C Programming Language - Brian W. Kernighan and Dennis M. Ritchie  
2. Teach Yourself C - H. Schildt  

**EEE215 Electronics I**
3 credits, 3 hours/week
Text:
1. Microelectronic Circuits - Sedra and Smith

Reference:
1. Electronic Circuits Theory - Boylested, R. L.
2. Electronic Circuits Theory - Bell, David A.
3. Integrated Electronics: Analog and Digital Circuits Systems - Millman, J.

EEE220 Electrical and Electronic Circuit Simulation Laboratory
1 credit, 2 hours/week

Text:
1. Microelectronic Circuits - Sedra and Smith
2. Operational Amplifiers and Linear Circuits – Coughlin and Driscoll

Reference:
1. Electronic Circuits Theory - Boylested, R. L.
2. Electronic Circuits Theory - Bell, David A.
3. Integrated Electronics: Analog and Digital Circuits Systems - Millman, J.

EEE223 Energy Conversion I
3 credits, 3 hours/week

Text:
1. Electric Machinery Fundamentals - Stephen J. Chapman

Reference:
1. Electric Machines: Theory, Operating Applications, and Controls. - Charles I. Hubert

EEE225 Electronics II
3 credits, 3 hours/week

Text:
1. Microelectronic Circuits - Sedra and Smith
2. Operational Amplifiers and Linear Circuits – Coughlin and Driscoll

Reference:
1. Electronic Circuits Theory - Boylested, R. L.
2. Electronic Circuits Theory - Bell, David A.
3. Integrated Electronics: Analog and Digital Circuits Systems - Millman, J.

EEE227 Engineering Electromagnetics
3 credits, 3 hours/week

Text:
1. Engineering Electromagnetics – David K Cheng

Reference:
1. Field and Wave Electromagnetics – I. Chiang
2. Fields and Waves in Communication Electronics - Simon Ramo, John R. Whinnery, Theodore Van Duzer

EEE230 Electronics Laboratory
1 credit, 2 hours/week

Text:
1. Microelectronic Circuits - Sedra and Smith
2. Operational Amplifiers and Linear Circuits – Coughlin and Driscoll

Reference:
1. Electronic Circuits Theory - Boylested, R. L.
2. Electronic Circuits Theory - Bell, David A.
3. Integrated Electronics: Analog and Digital Circuits Systems - Millman, J.

EEE231 Properties of Materials
3 credits, 3 hours/week

Text:
2. Electrical Properties of Materials - L. Solymar & D. Walsh
   Reference:

EEE233 Energy Conversion II
3 credits, 3 hours/week
Text:
1. Electric Machinery Fundamentals - Stephen J. Chapman
Reference:
1. Electric Machines: Theory, Operating Applications, and Controls. - Charles I. Hubert

EEE234 Energy Conversion Laboratory
1 credit, 2 hours/week

Text:
1. Electric Machinery Fundamentals - Stephen J. Chapman
Reference:
1. Electric Machines: Theory, Operating Applications, and Controls. - Charles I. Hubert

EEE237 Continuous Signals and Linear Systems
3 credits, 3 hours/week

Text:
1. Signals and systems - Alan V. Oppenheim
Reference:
1. Scham’s Outlines of Theory and Problems of Signals and Systems - Hwei P. Hsu

EEE313 Numerical Techniques
3 credits, 3 hours/week

Text:
1. Numerical Methods for Engineers - S. C. Chapra and R. P. Canale
Reference:

EEE314 Numerical Techniques Laboratory
1 credit, 2 hours/week

Text:
1. An Introduction to MATLAB® Programming and Numerical Methods for Engineers - Timmy Siauw, Alexandre Bayen
Reference:
2. MATLAB Programming for Numerical Analysis (MATLAB Solutions) - Cesar Perez Lopez

EEE317 Power Systems I
3 credits, 3 hours/week

Text:
Reference:

EEE320 Electrical Service Design
1 credit, 2 hours/week

Text:

Reference:

EEE321 Solid State Devices
3 credits, 3 hours/week

Text:
1. Solid State Electronic Devices – Ben G. Streetman

Reference:
1. Semiconductor Physics and Devices - D. Neamen
2. Semiconductor Devices, Physics and Technology J. Wiley and Sons - S. M. Sze

EEE323 Digital Electronics
3 credits, 3 hours/week

Text:
1. Digital Fundamentals – Thomas L. Floyd
2. Digital Design - Mano, M. M.

Reference:
1. Digital Design: A Pragmatic Approach - Johnson, E. L. & Karim, M. A
2. Digital Logic Design - Tocci

EEE324 Digital Electronics Laboratory
1 credit, 2 hours/week

Text:
1. Digital Design - Mano, M. M.

Reference:
1. Digital Design: A Pragmatic Approach - Johnson, E. L. & Karim, M. A
2. Digital Logic Design - Tocci

EEE325 Digital Signal Processing I
3 credits, 3 hours/week

Text:

Reference:
2. Digital Signal Processing - S.K.Mitra

EEE326 Digital Signal Processing I Laboratory
1 credit, 2 hours/week

Text:

Reference:
2. Digital Signal Processing - S.K.Mitra

EEE331 Microprocessor and Interfacing
3 credits, 3 hours/week

Text:
1. The Intel Microprocessors – Barry B. Brey
2. Microprocessors and Interfacing – Doughlous V. Hall

Reference:
1. Microprocessors and Microcomputers: Hardware and Software – Tocci and Ambrosio,
3. Microprocessor – Rafiquzzaman
EEE332 Microprocessor and Interfacing Laboratory
1 credit, 2 hours/week

Text:
1. The Intel Microprocessors – Barry B. Brey
2. Microprocessors and Interfacing – Doughlous V. Hall

Reference:
1. Microprocessors and Microcomputers: Hardware and Software – Tocci and Ambrosio,
3. Microprocessor – Rafiuzzaman

EEE333 Communication Engineering
3 credits, 3 hours/week

Text:
1. Modern Digital and Analog Communication Systems - Lathi, B. P.

Reference:
1. Communication Systems - Haykin, S.

EEE334 Communication Engineering Laboratory
1 credit, 2 hours/week

Text:
2. Modern Digital and Analog Communication Systems - Lathi, B. P.

Reference:
2. Communication Systems - Haykin, S.

EEE335 Control Systems
3 credits, 3 hours/week

Text:
1. Control Systems Engineering – Norman S. Nise

Reference:
1. Modern Control Systems - Richard C. Dorf and Bishop
2. Modern Control Engineering – K. K. Ogata
3. Control Engineering - C.C. Bissel

EEE336 Control Systems Laboratory
1 credit, 2 hours/week

Text:
1. Control Systems Engineering – Norman S. Nise

Reference:
1. Modern Control Systems - Richard C. Dorf and Bishop
2. Modern Control Engineering – K. K. Ogata
3. Control Engineering - C.C. Bissel

EEE339 Electrical Power Transmission and Distribution
3 credits, 3 hours/week

Text:

Reference:

EEE401 VLSI I
3 credits, 3 hours/week

Text:
1. Basic VLSI design - Douglas A. Pucknell, Kamran Eshraghian,

Reference:
EEE492 Capstone Design Project I  
2 credits, 2 hours/week at Level 4, Term I  
EEE494 Capstone Design Project II  
2 credits, 2 hours/week at Level 4, Term II  
EEE496 Capstone Design Project III  
2 credits, 2 hours/week at Level 4, Term III  

There is no definite book for capstone projects. Students will require books and research papers published in various journals and conference papers based on their topics.

EEE498 Internship/Project/Seminar/Workshop  
0 credits, 3 hours/week at Level 4, Term III for project work/ seminar/ workshop, otherwise practical training/work in an industry or in an engineering firm  

There is no definite book for Internship/Project/Seminar/Workshop. Students will require books and research papers published in various journals and conference papers based on their topics.

Inter-Disciplinary Engineering Courses:

CEN211 Introduction to Civil Engineering  
3 credits, 3 hours/week  

Text:  
1. Fundamental of Civil Engineering - Richard H. McCuen, Edna Z. Ezzell  
Reference:  
1. Civil Engineering: Avery short Introduction - David Muir Wood  

CEN220 Civil Engineering Drawing  
1 credit, 2 hours/week  

Text:  
1. Civil Engineering Drawing by Gurcharan Singh  
Reference:  
1. Civil Engineering Drawing & House Planning: A Text Book by B.P Verma  

MEN211 Mechanical Engineering Fundamentals  
3 credits, 3 hours/week  

Text:  
1. Fundamentals of Mechanical Engineering - G. S. Sawhney  
Reference:  
1. Air Conditioning and Refrigeration – T. Hossain  

EEE301 Robotics and Automation  
3 credits, 3 hours/week  

Text:  
1. Robotics Demystified - Edwin Wise  
Reference:  
1. Robot Mechanisms and Mechanical Devices Illustrated - Paul Sandin  
2. Concise Encyclopedia of Robotics - Stan Gibilisco  

EEE302 Robotics and Automation Laboratory  
1 credit, 2 hours/week  

Text:  
1. Robotics Demystified - Edwin Wise  
Reference:  
1. Robot Mechanisms and Mechanical Devices Illustrated - Paul Sandin  
2. Concise Encyclopedia of Robotics - Stan Gibilisco
EEE303 Biomedical Engineering
3 credits, 3 hours/week

Text:
1. Introduction to Biomedical Equipment Technology – J. J. Carr & J. M. Brown
2. Introduction to Biomedical Engineering - John Denis Enderle & Joseph D Bronzino

Reference:
1. Signals and Systems in Biomedical Engineering - Suresh R Devasahayam.

EEE304 Biomedical Engineering Laboratory
1 credit, 2 hours/week

Text:
1. Introduction to Biomedical Equipment Technology – J. J. Carr & J. M. Brown
2. Introduction to Biomedical Engineering - John Denis Enderle & Joseph D Bronzino

Reference:
1. Signals and Systems in Biomedical Engineering - Suresh R Devasahayam.

EEE305 Measurement and Instrumentation
3 credits, 3 hours/week

Text:
1. Electrical and Electronic Measurements and Instrumentation - A.K. Sawhney

Reference:
1. Electrical Instrument and Measuring Technique - Cooper

EEE306 Measurement and Instrumentation Laboratory
1 credit, 2 hours/week

Text:
1. Electrical and Electronic Measurements and Instrumentation - A.K. Sawhney

Reference:
1. Electrical Instrument and Measuring Technique - Cooper

EEE307 Brain Science and Engineering
3 credits, 3 hours/week

Text:
1. Computational Modeling Methods for Neuroscientists - Edited by Erik De Schutter
2. The mind and the brain: neuropsychology and the power of mental force - Jeffrey Schwartz

Reference:
1. Signal Processing and Machine Learning for Brain-Machine Interfaces - Toshihisa Tanaka and Mahnaz Arvaneh
2. Neuron is a simulation environment for modeling individual and networks of neurons. It was primarily developed by Michael Hines, John W. Moore, and Ted Carnevale

EEE308 Brain Science and Engineering Laboratory
1 credit, 2 hours/week
Text:
1. Brain-Computer Interface Research: A State-of-the-Art Summary 4 - Christoph Guger, Brendan Z. Allison and Gernot R. Müller-Putz

Reference:
1. Neuron is a simulation environment for modeling individual and networks of neurons. It was primarily developed by Michael Hines, John W. Moore, and Ted Carnevale
2. Scripting language- hoc and Python

Elective Courses: Group A (Power and Energy)

EEE410 Green Power and Energy
3 credits, 3 hours/week

Text:
1. Green Power- Solar and Wind Power–Peter Lerangis
1. Green Power: Perspectives on Sustainable Electricity Generation by Joao Neiva de Figueiredo, Mauro F. Guillén, CRC Press
2. Greenhouse Solutions with Sustainable Energy, Diesendorf, Mark, UNSW Press

Reference:

EEE411 Power System II
3 credits, 3 hours/week

Text:

Reference:

EEE412 Power System Laboratory
1 credit, 2 hours/week

Text:

Reference:
1. Power System Analysis- Hadi Sadat
2. Electrical Power Distribution and Transmission. - Luces M.Faulkenberry

EEE413 Power Electronics
3 credits, 3 hours/week

Text:
1. Power Electronics - Rashid, H.R

Reference:
1. Industrial Electronics & Robotics - Charles A Schuler, William L McNamee

EEE414 Power Electronics Laboratory
1 credit, 2 hours/week

Text:
1. Power Electronics - Rashid, H.R

Reference:
1. Industrial Electronics & Robotics - Charles A Schuler, William L McNamee

EEE415 Power System Protection
3 credits, 3 hours/week

Text:
1. Power System Stability and Control – PrabhaKundur

Reference:
1. Power system operations and control - S. Kumar
EEE416 Power System Protection Laboratory
1 credit, 2 hours/week
Text:
1. Power System Stability and Control – Prabha Kundur
Reference:
1. Power system operations and control - S. Kumar

EEE417 Energy Conversion III
3 credits, 3 hours/week
Text:
1. Electric Machinery Fundamentals - Stephen J. Chapman
Reference:
1. Electric Machines: Theory, Operating Applications, and Controls. - Charles I Hubert

EEE419 Power System Economics
3 credits, 3 hours/week
Text:
Reference:
1. Acts, Policies, Rules, Regulations and Guidelines enacted by BERC
2. Electricity Markets and Power System Economics by Deqiang Gan, Donghan Feng, Jun Xie, CRC Press
3. Spatial Electric Load Forecasting by H. Lee Willis, CRC Press

EEE421 High Voltage Engineering
3 credits, 3 hours/week
Text:
Reference:

EEE422 High Voltage Engineering Laboratory
1 credit, 2 hours/week
Text:
Reference:

EEE423 Power System Reliability
3 credits, 3 hours/week
Text:
1. Power System Stability and Control – Prabha Kundur
Reference:
1. Power System Operations and Control - S. Kumar

EEE427 Nuclear Power Engineering
3 credits, 3 hours/week
Text:
Reference:
1. Irradiation Embrittlement of Reactor Pressure Vessels (RPVs) in Nuclear Power Plants by Naoki Soneda, Elsevier
2. Handbook of Small Modular Nuclear Reactors by Mario Carelli and Daniel Ingersoll, Elsevier
EEE429 Power System Operation and Control
3 credits, 3 hours/week
Text:
1. Power System Stability and Control – Prabha Kundur
Reference:
1. Power system operations and control - S. Kumar

EEE485 Power Plant Engineering
3 credits, 3 hours/week
Text:
1. Power Plant Engineering. - P. K. Nag
Reference:
1. Power Plant Engineering. - Larry Drball.

Elective Courses: Group B (Electronics)

EEE431 Green Electronics
3 credits, 3 hours/week
Text:
1. Green Electronics Designing and Manufacturing – Sammy Shina
Reference:
1. Green Electronics Manufacturing - John X Wang

EEE433 VLSI II
3 credits, 3 hours/week
Text:
1. Basic VLSI design - Douglas A. Pucknell, Kamran Eshraghian,
Reference:

EEE434 VLSI Laboratory
1 credit, 2 hours/week
Text:
1. Basic VLSI design - Douglas A. Pucknell, Kamran Eshraghian,
Reference:

EEE437 Analog Integrated Circuits
3 credits, 3 hours/week
Text:
1. Integrated Electronics: Analog and Digital Circuits Systems - Millman, J.
Reference:
1. Op-amps & Linear Integrated Circuits - Gayakwad R.L

EEE439 Compound Semiconductor and Hetero-Junction Devices
3 credits, 3 hours/week
Text:
1. Solid State Electronic Devices – Ben G. Streetman
Reference:
1. Semiconductor Physics and Devices - D. Neamen
2. Semiconductor Devices, Physics and Technology – S. M. Sze

EEE441 Optoelectronics
3 credits, 3 hours/week
Text:
1. Optoelectronic Devices - J. W Wilson
Reference:
2. Optical fiber communication - John Senior
EEE442 Optoelectronics Laboratory
1 credit, 2 hours/week
Text:
1. Optoelectronic Devices - J. W Wilson
Reference:
1. Semiconductor physics - S.M. Sze
2. Optical fiber communication - John Senior

EEE443 Semiconductor Device Theory
3 credits, 3 hours/week
Text:
1. Solid State Electronic Devices – Ben G. Streetman
2. Semiconductor Device Physics – S. M. Sze
Reference:
1. Semiconductor Physics and Devices - D. Neamen

EEE445 Hardware Design with VHDL
3 credits, 3 hours/week
Text:
2. VHDL Programming by Example – Douglas Perry
Reference:
1. Circuit Design and Simulation with VHDL - Volnei A. Pedroni

EEE446 Hardware Design with VHDL Laboratory
1 credit, 2 hours/week
Text:
2. VHDL Programming by Example – Douglas Perry
Reference:
1. Circuit Design and Simulation with VHDL - Volnei A. Pedroni

EEE447 Nano Electronic Devices
3 credits, 3 hours/week
Text:
1. Nano Electronics and Nano Systems – Goser, Karl
Reference:
1. Nano-electronic Device Application - James E. Morris

EEE448 Nano Electronic Devices Laboratory
1 credit, 2 hours/week
Text:
1. Nano Electronics and Nano Systems – Goser, Karl
Reference:
1. Nano-electronic Device Application - James E. Morris

EEE449 Semiconductor Processing and Fabrication Technology
3 credits, 3 hours/week
Text:
1. Fundamentals of Semiconductor Fabrication – S. May Gary
Reference:
1. Plasma Etching in Semiconductor Fabrication – R. A. Morgan

Elective Courses: Group C (Communication)

EEE450 Green Communication Engineering
3 credits, 3 hours/week
Text:

Reference:
1. Self-Organization and Green Applications in Cognitive Radio Networks by Anwer Al-Dulaimi, John Cosmas and Abbas Mohammed, Information Science, ISBN: 978-1-4666-2813-7 (e), 978-1-4666-2814-4 (p)
3. Best Readings in Green Communications from IEEE Communications Society

EEE451 Mobile Cellular Communication
3 credits, 3 hours/week
Text:
Reference:
1. Wireless Communication. - Theodore S. Rappaport

EEE453 Digital Signal Processing II
3 credits, 3 hours/week
Text:
Reference:
2. Digital Signal Processing - S.K. Mitra

EEE454 Digital Signal Processing II Laboratory
1 credit, 2 hours/week
Text:
Reference:
2. Digital Signal Processing - S.K. Mitra

EEE455 Telecommunication Engineering
3 credits, 3 hours/week
Text:
1. Digital Telephony – John C. Bellamy
Reference:
1. Telecommunication Switching Systems and Networks - Viswanathan Thiagarajan

EEE457 Optical Fiber Communications
3 credits, 3 hours/week
Text:
1. Optical fiber Communication (Principles and practice) - John M. Senior
Reference:
1. Optical fiber Communication - Agarwall

EEE458 Optical Fiber Communications Laboratory
1 credit, 2 hours/week
Text:
1. Optical fiber Communication (Principles and practice) - John M. Senior
Reference:
1. Optical fiber Communication - Agarwall
EEE459 Satellite Communication
3 credits, 3 hours/week
Text:
1. Satellite Communications - Timothy Pratt.
Reference:
1. Satellite Communications - Dennis Roddy

EEE460 Optical Networks
3 credits, 3 hours/week
Text:
1. Optical Networks – Rajiv Ramaswami
Reference:
1. Optical Networks – Mukharjee, Bishwanath

EEE461 Digital Communication
3 credits, 3 hours/week
Text:

Reference:
2. Digital Communications: Fundamentals and Applications by Bernard Sklar
4. Data Communication and Networking - Forouzan, B. A.
5. Information, Transmission, Modulation and Noise - Schwartz, M. M.
6. Data Communication - Gupta, P. C.

EEE462 Digital Communication Laboratory
1 credit, 2 hours/week
Text:
Reference:
8. Digital Communications: Fundamentals and Applications by Bernard Sklar
10. Data Communication and Networking - Forouzan, B. A.
11. Information, Transmission, Modulation and Noise - Schwartz, M. M.
12. Data Communication - Gupta, P. C.

EEE463 Microwave Engineering
3 credits, 3 hours/week
Text:
1. Fields and Waves in Communication Electronics - Simon Ramo, John R. Whinnery
Reference:
1. Microwave Devices and Circuits - Samuel Y. Liao
2. Microwave Communication – Hund

EEE464 Microwave Engineering Laboratory
1 credit, 2 hours/week
Text:  
1. Fields and Waves in Communication Electronics - Simon Ramo, John R. Whinnery  
Reference:  
1. Microwave Devices and Circuits - Samuel Y. Liao  
2. Microwave Communication - Hund  

EEE465 Random Signals and Processes  
3 credits, 3 hours/week  
Text:  
1. Signals and Systems - Alan V. Oppenheim  
Reference:  
1. Schaum’s Outlines of Theory and Problems of Signals and Systems - Hwei P. Hsu  

EEE467 Radio and Television Engineering  
3 credits, 3 hours/week  
Text:  
1. Radio Engineering - G. K. Mithal  
Reference:  
1. Television Engineering – Grobe  

EEE469 Broadcast Engineering  
3 credits, 3 hours/week  
Text:  
1. Digital Telephony – John C. Bellamy  
Reference:  
1. Telecommunication Switching Systems And Networks - Viswanathan Thiagarajan  

EEE470 Radar and Navigation  
3 credits, 3 hours/week  
Text:  
1. The Radar Book: Effective Navigation and Collision Avoidance - Kevin Monahan  
Reference:  
1. Radar and Electronic Navigation – G. J. Sonnenberg  

EEE483 Internet of Things  
3 credits, 3 hours/week  
Text:  
1. Introduction to the Internet of Things - Thorsten Kramp, Rob van Kranenburg, Sebastian Lange  
2. SmartStuff: an introduction to the Internet of Things - W. David Stephenson  
3. Internet of Things: Principles and Paradigms - Rajkumar Buyya, Amir Vahid Dastjerdi  
4. From Machine-to-Machine to the Internet of Things - Jan Holler Vlasios Tsiatsis Catherine Mulligan Stamatis Karnouskos Stefan Avesand David Boyle  
Reference:  
1. The Internet of Things - Samuel Greengard  
2. The Fourth Industrial Revolution - Klaus Schwab  
3. Getting started with Internet of Things - Cuno Pfister  

EEE484 Internet of Things Laboratory  
1 credit, 2 hours/week  
Text:  
1. Getting Started with the Internet of Things: Connecting Sensors and Microcontrollers to the Cloud (Make: Projects) - Cuno Pfister  
Reference:  
1. Precision: Principles, Practices and Solutions for the Internet of Things - Timothy Chou  
2. Learning Internet of Things - Peter Waher  

Elective Courses: Group D (Computer)  

EEE471 Microprocessor Based System Design  
3 credits, 3 hours/week
Text:
1. The Intel Microprocessors – Barry B. Brey
Reference:
1. Microprocessors and Microcomputers: Hardware and Software – Tocci and Ambrosio,

EEE472 Microprocessor Based System Design Laboratory
1 credit, 2 hours/week
Text:
1. The Intel Microprocessors – Barry B. Brey
Reference:
1. Microprocessors and Microcomputers: Hardware and Software – Tocci and Ambrosio,

EEE473 Real Time Computer System
3 credits, 3 hours/week
Text:
1. Real-Time Systems, Architecture, Scheduling, and Application - Syed Mortoza Babamir
Reference:
1. Real-Time Systems for Distributed Embedded Applications – Hermann Koptez

EEE475 Multimedia Communications
3 credits, 3 hours/week
Text:
1. Theoretical Foundations of Multimedia -Tanenbaum, R. S.
Reference:

EEE477 Computer Networks
3 credits, 3 hours/week
Text:
Reference:
1. Computer Networks - Tanenbaum, A. S.

EEE478 Computer Networks Laboratory
1 credit, 2 hours/week
Text:
Reference:
1. Computer Networks - Tanenbaum, A. S.

EEE479 Computer Architecture
3 credits, 3 hours/week
Text:
Reference:

EEE480 Green Computing
3 credits, 3 hours/week
Text:
1. Green Computing–Bud E. Smith
Reference:
1. The Green Computing Book- Wu-ChunFeng

EEE481 Cryptography and Network Security
3 credits, 3 hours/week
Text:
Reference:
1. Cryptography and Network Security by Behrouz A. Forouzan
Mathematics Courses:

MAT009 Remedial Mathematics
0 credits, 3 hours/week
Reference: 1. Integral Calculus - Das, B. C. & Mukherjee, B. N.
2. Differential Calculus - Das, B. C. & Mukherjee, B. N.

MAT111 Mathematics I (Differential and Integral Calculus)
3 credits, 3 hours/week
Reference: 1. Integral Calculus - Das, B. C. & Mukherjee, B. N.
2. Differential Calculus - Das, B. C. & Mukherjee, B. N.

MAT125 Mathematics II (Ordinary and Partial Differential Equations)
3 credits, 3 hours/week
Text: 1. Differential Equations - Sharma, B.

MAT135 Mathematics III (Complex Variables, Fourier Series and Transforms)
3 credits, 3 hours/week
3. Schaum’s Outline of Fourier Analysis with Applications to Boundary Value Problems - Spiegel, M. R.

MAT217 Mathematics IV (Linear Algebra, Co-ordinate Geometry and Vector Analysis)
3 credits, 3 hours/week
Text: 1. Elementary Linear Algebra - Antônio, H. &Rorres, C.
Reference: 1. Coordinate Geometry - Eisenhart, L. P.

MAT229 Mathematics V (Probability and Statistics)
3 credits, 3 hours/week
Text: 1. Introduction to Statistics and Probability - Islam, M. N.

Basic Science Courses:

PHY115 Physics I (Electricity and Magnetism, Thermodynamics and Mechanics)
3 credits, 3 hours/week
Text: 1. Outlines of Physics Vol. 1 & 2 - Ahmed, Giasuddin
2. Properties of Matters – Brijlal & Subrahmanyam
3. Heat & Thermodynamics – Brijlal & Subrahmanyam
4. Waves & Oscillations – Brijlal & Subrahmanyam
5. Elements of Properties of Matters - Mathur, D. S.
PHY121 Physics II (Waves and Oscillations, Optics and Modern Physics)
3 credits, 3 hours/week
Text:
1. Outlines of Physics Vol. 1& 2 - Ahmed, Giasuddin
Reference:
1. Physics: Part-1 & 2 - Resnick, R. & Haliday, D.
2. Properties of Matters – Brijlal & Subrahmanyam
3. Heat & Thermodynamics – Brijlal & Subrahmanyam
4. Waves & Oscillations – Brijlal & Subrahmanyam
5. Elements of Properties of Matters - Mathur, D. S.

PHY122 Physics Laboratory
1 credit, 2 hours/week
Text:
1. Outlines of Physics Vol. 1& 2 - Ahmed, Giasuddin
Reference:
1. Physics: Part-1 & 2 - Resnick, R. & Haliday, D.

CHE121 Engineering Chemistry
3 credits, 3 hours/week
Text:
Reference:

CHE122 Engineering Chemistry Laboratory
1 credit, 2 hours/week
Text:
Reference:

English Language Courses:

ENG101 Basic English Skills
3 credits, 3 hours/week
Text/Reference:

ENG102 Intermediate English Skills
3 credits, 3 hours/week
Text/Reference:

ENG103 Advanced English Skills
3 credits, 3 hours/week
Text/Reference:

ENG105 Public Speaking
3 credits, 3 hours/week
Text/Reference:

General Education Courses:

SOC215 Engineering Ethics
3 credits, 3 hours/week
Text:
1. Engineering Ethics - M. Govindarajan
Reference:
1. Ethics in Engineering Practice and Research - Caroline Whitbeck

MGT231 Industrial Management
3 credits, 3 hours/week
Text:
1. Industrial Management–B. Narayan
Reference:
1. Engineering Management- Fausto Pedro GarcíaMárquez and Benjamin Lev

ACT311 Financial and Managerial Accounting
3 credits, 3 hours/week
Text:
1. Accounting Principle – Weygandt, Kieso and Kimmel
Reference:
1. Accounting Theory – Ahmed RiahiBelkaoui
2. Fundamentals of Accounting Principles – Pyle and Larson

ECO215 Engineering Economics
3 credits, 3 hours/week
Text:
1. Fundamentals of Engineering Economics–Chan S. Park
Reference:

SOC211 Sociology
3 credits, 3 hours/week
Text:
1. Introduction to Sociology - Anthony Giddens, Mitchel Duneier
Reference:
1. Introduction to Sociology - Henry L. Tischler

SOC213 Bangladesh Studies
3 credits, 3 hours/week
Text:
1. Bangladesh Studies: Muslim Community in Bengal 1884-1912 ~ Sufia Ahmed
2. Bangladesh Studies ~ Hasebur Rahman
3. Economic Geography of Bangladesh ~ Haroun er Rashid
Reference:
3. History of Bangladesh: A Subcontinental Civilisation - Abul Maal A. Muhith
4. Bangladesh: History, Politics, Economy, Society and Culture Essays in Honour of Professor Alamgir Muhammad Serajuddin - Mahmudul Huque

PSD430 Professional Skills Development
0 credits, 3 hours/week
Text:
1. Skill Development for Engineers – Kevin Hoag
Reference:
1. Ten Essential Skills for Electrical Engineers – Ahmed Riahi Belkaoui