

**Barisal Engineering College**  
**Department of EEE**

**2nd Year 1st Semester**

Sl. No	Course Code	Course Title	Hours/Week		Credit
			Theory	Practical/ Sessional	
1	EEE 2101	Electronics I	3		3
2	EEE 2102	Electronics I Sessional		3	1.5
3	EEE 2103	Energy Conversion I	3		3
4	EEE 2104	Energy Conversion I Sessional		3	1.5
5	EEE 2108	Electrical and Electronic Workshop Practice		3	1.5
6	ME 2101	Basic Mechanical Engineering	3		3
7	ME 2102	Basic Mechanical Engineering Sessional		3	1.5
8	MATH 2101	Linear Algebra and Vector Analysis	3		3
9	GED 2101	Financial Account & Economic Analysis	3		3
			<b>15</b>	<b>12</b>	<b>21</b>

**Core Courses**

**EEE 2101 Electronics I**

Contact hours/week: 3, Credit: 3

**Semiconductor diodes:** semiconductor material and properties, pn junction, diode circuits: dc analysis and models, diode circuits: AC equivalent circuits, other diode types, single phase rectification and regulators, Zener diode circuits, clipper and clamper circuits, multiple diode circuits, photo diodes and LED circuits, DC power supply;

**Bipolar Junction transistor (BJT):** BJT, DC analysis of BJT circuits, basic transistor applications, biasing, multistage circuits, BJT linear amplifiers-basic configurations, CE amplifiers, AC load lines, CC and CB amplifier, multistage amplifiers, power consideration; Frequency Response: Amplifier frequency response, system transfer function, frequency response: transistor amplifiers with circuit capacitors, frequency response-BJT.

**Field Effect Transistors (FET):** Structure and Operation of JFET, JFET Characteristics, JFET amplifiers Structure of MOSFET, Current-Voltage Characteristics, MOS Device Models, DC circuit analysis, basic MOSFET applications, Biasing, constant current biasing, multistage MOSFET circuits, Junction Field effect transistor (JFET), MOSFET amplifier: basic transistor amplifier configurations-Common-Source, Common-Gate Stage, Source Follower (common drain); single stage integrated circuit MOSFET amplifiers, multistage amplifiers, frequency response of FET

**Power Amplifiers:** power amplifiers, power transistors, classes of amplifiers, Class-A power amplifier, Class-AB push pull complimentary output stage.

**EEE 2102 Electronics I Sessional**

Contact hours/week: 3, Credit: 1.5

In this course students will perform experiments to verify practically the theories and concepts learned in EEE 2101 and also simulated these experiments with simulation software (i.e. PSpice, Proteus, Multisim etc.).

**EEE 2103 Energy Conversion I**

Contact hours/week: 3, Credit: 3

**DC Generators:** Types, no-load voltage characteristics, buildup of a self-excited shunt generator, load-voltage characteristic, effect of speed on no-load and load characteristics and voltage regulation, armature reaction.

**DC Motor:** Operating principle, counter emf, torque, speed, torque-speed characteristics, starting, braking, and speed control.

**Transformer:** principle of operation, construction, no load and excitation current, behavior during loading, effect of leakage flux, ideal transformer, leakage reactance and equivalent circuit of a transformer, equivalent impedance, voltage regulation, per unit quantities, regulation, losses and efficiency, determination of parameters by tests, polarity of transformer windings, vector group, transformer parallel operation. Harmonics in excitation current, transformer inrush current, three phase transformer connections, three phase transformers, harmonic suppression in three phase transformer connection. Auto-transformer, instrument transformers.

**EEE 2104 Energy Conversion I Sessional**

Contact hours/week: 3, Credit: 1.5

In this course students will perform experiments to verify practically the theories and concepts learned in EEE 2103.

**EEE 2108: Electrical & Electronic Workshop practice**

Contact hours/week: 3 Credits: 1.5

Verification of theories and concepts learned in electrical and electronic circuit theory courses by performing various projects to solve real life problems

**Allied Engineering Courses**

**ME 2101 Basic Mechanical Engineering**

Contact hours/week: 3, Credit: 3

**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:** Study of reciprocation pumps. impulse and reaction turbines; Pelton wheel and Kalpan turbine, centrifugal pumps, fans, blowers and compressors. Basics of conduction and convection: critical thickness of insulation.

**ME 2102 Basic Mechanical Engineering Sessional**

Contact hours/week: 3, Credit: 1.5

In this course students will perform experiments to verify practically the theories and concepts learned in ME 2101.

## **General Science Courses**

### **MATH 2101 Linear Algebra and Vector Analysis**

Contact hours/week: 3, Credit: 3

**Linear Algebra:** Introduction to systems of linear equations; Gaussian elimination; Inverse of a matrix; Eigen values and eigen vectors; Cayley Hamilton theorem; Euclidean  $n$  space; Linear transformations from  $\mathbb{R}^n$  to  $\mathbb{R}^m$ ; Properties of linear transformations from  $\mathbb{R}^n$  to  $\mathbb{R}^m$ ; Real vector spaces and subspaces; Basis and Dimension, Change of basis, Rank and Nullity; Inner product spaces; Diagonalization; Linear transformations: Kernel and Range.

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

## **General Education Courses**

### **GED 2101 Financial Account & Economic Analysis**

Contact hours/week: 3, Credit: 3

**Accountancy:** Basic accounting principles, Transaction, Journal, Ledger and Accounts. Cash book, Bank Reconciliation statement. Preparation of Financial Statement. Cost Accounts and its objects. Cost classification. Elements of costs, preparation of cost sheet. Overhead allocation. Use of Relevant costs in Decision Making, Standard costing. Material cost variance. Break even analysis.

**Economics:** Definition of Economics. Economics and Engineering.

**Micro Economics:** The theory of demand and supply and their elasticity. Price determination. Nature of an economic theory, applicability of economic theories to the problems of developing countries. Indifference curve technique. Marginal analysis. Production, production function, types of productivity. Rational region of production of an engineering firm. Concepts of market and market structure. Cost analysis and cost function. Small scale production and large-scale production. Optimization. Theory of distribution.

**Macro Economics:** Savings, investment, employment, National income analysis. Inflation. Monetary policy, fiscal policy and trade policy with reference to Bangladesh. Economics of development and planning.