Changes (Total 4 changes) in structure and subjects of 3rd Semester, 2nd Year, B. Tech. (Electrical Engineering)

Old Course Structure as per B. Tech. Ordinance approved in 2017-18

Semester III

Sr. No.	Course Type	Subject Code	Course Title	Credits (L-T-P)	Sessional Marks				ESM	Total
					MSE	TA	Lab.	Total		
1.	BSC	BMA-201	Maths-III	4 (3-1-0)	30	20	-	50	50	100
2.	ESC	EET-201	SSDC	5 (3-1-2)	15	20	15	50	50	100
3.	ESC	EET-203	Digital Electronics	5 (3-1-2)	15	20	15	50	50	100
4.	PCC	EEE-201	BSA	5 (3-1-2)	15	20	15	50	50	100
5.	HSMC	HHS-201	Engineering Economics and Management	3 (3-0-0)	30	20	-	50	50	100
6.	MC (Non-credit)	HHS-205	Indian Constitution	2 (2-0-0)	30	20	-	50	50	100
Total Credits				**22**						

New Course Structure as per B. Tech. Ordinance Approved in 2019-20

Semester III

Sr. No.	Course Type	Subject Code	Course Title	Credits (L-T-P)	Sessional Marks				ESM	Total Marks
					MSE	TA	Lab.	Total		
1.	BSC			4 (3-1-0)	30	20	-	50	50	100
2.	ESC			5 (3-1-2)	15	20	15	50	50	100
3.	PCC			4 (3-0-2)	15	20	15	50	50	100
4.	PCC			4 (2-1-2)	15	20	15	50	50	100
5.	PCC			2 (2-0-0)	15	20	15	50	50	100
6.	HSMC			3 (3-0-0)	30	20	-	50	50	100
7.	MC (Non-credit)			2 (2-0-0)	30	20	-	50	50	100
Total Credits				**22**						

Change 1

Earlier (Old)

EEE-201 BSA 3L: 1T: 2P 5 Credits Course Type: PCC

Now (**New** - as per change in structure communicated by Dean of Academic Affairs, HBTU, Kanpur) - **for BoS-EED HBTU Kanpur action and approval**

EEE-201 BSA 3L: 0T: 2P 4 Credits Course Type: PCC

Note: Except above reduction in tutorial from 1 to 0 and reduction in its credit from 5 to 4, there is no other change. Subject contents and other things remain same as earlier.

Change 2: Retaining ESC EET 201 SSDC, and removing ESC EET 203 Digital Electronics. Course types BSC, HSMC and MC have been retained with previous subjects in each type, - for approval

Change 3: Inclusion of a new PCC - for approval

EEE-	**Introduction to Digital Systems**	**2L: 1T: 2P**	**4 Credits**	**Course Type: PCC**

Preamble:

This course will provide a good understanding and hold to the students in the area of digital electronics and systems. The course includes study of Boolean Algebra and Number Systems. This course also gives an insight into combinational and sequential circuits.

Prerequisites:

Engineering Mathematics, Engineering Physics, Basic Electrical Engineering.

Course Outcomes:

Upon Completion of the course the students will be able to:

1. To understand the basic concept of digital systems.
2. To apply the knowledge of gates, K maps, flip flops, registers, counters etc.
3. To design the simple digital combinational circuits.
4. Having the basic knowledge of counters.
5. To apply the knowledge of Boolean Algebra.
6. To apply the knowledge of Number Systems.

Syllabus:

Module 1: Introduction (6 Lecture)

Boolean Algebra, Logic Gates, Concept of Universal Gate, Minimization using K map and its applications, case studies.

Module 2: Digital Number System (6 Lectures):

Quantization and implementation of digital number system, Data representations and arithmetic using Floating point & fixed point number system: Signed, Unsigned, Fractional & Integer representations.

Module 3: Combinational Circuits (6 Lectures):

Half adder, Full Adder, Half-subtractor, Full subtractor, BCD adder, Binary Multiplier, Binary Divider, Multiplexer / Demultiplexer, Decoder, Encoder, Parity checker, Parity generators, Code converters, Magnitude Comparator.

Module 4: Sequential Circuits - I (6 Lectures):

Latches, Flip-flops-SR, JK, D, T, and Master-Slave, Edge triggering & Level Triggering, Serial adder / subtractor.

Module 5: Sequential Circuits - II (6 Lectures):

Asynchronous and Synchronous Counters, Registers - shift registers, Universal shift registers, Shift register.

Experiments (Virtual Lab or Simulations or Videos demonstrations or any other mode with the permission of HoD) - Any eight (08) experiments at least.

1. Study of logic gates.
2. Study of adders.
3. Study of subtractors.
4. Study of flip-flops.
5. Study of counters.
6. Study of registers.
7. Study of K-map.
8. Study multiplexer and demultiplexer.
9. Study of encoders and decoders.
10. Study of number systems.

Text Books:

1. Malvino & Leach / "Digital Principles & Applications" / Tata McGraw-Hill.
2. John F. Wakerly / "Digital Design Principles & Practices" / Pearson Education 3rd Ed.
3. Mano, M. Morris / "Digital Design"/ Prentice Hall.
4. Mano, M. Morris / "Digital Logic and Computer Design"/ Prentice Hall (India).

Reference Books:

1. Shilling, D. H. & Belove, Ch. / "Electronic Circuit"/ McGraw-Hill International.
2. Millman , J. &Halkias, C. / "Integrated Electronics" / McGraw-Hill International.
3. NPTEL Lectures.

Course Contents and Lecture Schedule

Module No.	Topic(s)	No. of Lectures
1	Boolean Algebra, Logic Gates,	2
1	Concept of Universal Gate, Minimization using K map and its applications, case studies	4
2	Quantization and implementation of digital number system,	2
2	Data representations and arithmetic using Floating point & fixed point number system: Signed, Unsigned, Fractional & Integer representations	4
3	Half adder, Full Adder, Half-subtractor, Full subtractor, BCD adder, Binary Multiplier, Binary Divider	3
3	Multiplexer / DE multiplexer, Decoder, Encoder, Parity checker, Parity generators, Code converters, Magnitude Comparator	3
4	Latches, Flip-flops -SR, JK, D, T, and Master-Slave	3
4	Edge triggering & Level Triggering, Serial adder / subtractor	3
5	Asynchronous and Synchronous Counters	3
5	Registers - shift registers, Universal shift registers, Shift register	3

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Change 4: Inclusion of a new PCC - for approval

EEE-	Introduction to Electrical Engineering Materials	2L: 0T: 0P	2 Credits	Course Type: PCC

Preamble:

This course will provide a good understanding and hold to the students in the area of electrical engineering materials. The course includes study of dielectrics and conductors. This course also gives an insight into conducting and insulating materials.

Prerequisites:

Engineering Physics, Basic Electrical Engineering.

Course Outcomes:

Upon Completion of the course the students will be able to:

1. To understand the basic concept of electrical engineering materials.
2. To apply the knowledge of dielectrics.
3. To understand and apply knowledge of magnetic properties of materials.
4. Having the basic knowledge of conductors.
5. To apply the knowledge of conducting materials.
6. To apply the knowledge of insulating materials.

Syllabus:

Module 1: Dielectrics (5 Lecture):

Dielectric properties, Polarization and dielectric constant. Piezoelectricity, Behaviour of dielectrics in alternating fields.

Module 2: Magnetic Properties of Materials (5 Lectures):

Magnetic dipole moment of current loop, Orbital magnetic dipole moment, Lenz's law, Classification of magnetic materials.

Module 3: Conductors (7 Lectures):

Free electron theory of metals, Ohm's law, Relaxation time, Collision time and mean free path, Electron scattering and the resistivity of metals, Superconductivity, Properties of Semiconductors, Fermi level, Generation and recombination, carrier life-time, diffusion length. Scattering and mobility of carriers, Einstein relation, LASER.

Module 4: Conducting Materials (6 Lectures):

High conductive materials-copper, Aluminium, Tungsten, Nickel, Brass, Bronze and other alloys; contact materials - Mercury, High resistivity materials-carbon, graphite, Nichrome; Fuses.

Module 5: Insulating Materials (5 Lectures):

Gaseous materials - Oxide gases, Electronegative gases, Hydrocarbon gases; Liquid materials-mineral oils, Silicon liquids, Hydrocarbon liquids; Solid materials - Paper and boards, Resins (Polymers), Rubbers-natural and synthetic, glass, Ceramics, Asbestos.

Text Books:

1. S.P. Seth, P.V. Gupta, "A course in Electrical Engineering Materils", Dhanpat Rai and Sons.
2. A.J. Dekker, "Electrical Engineering Materials", PHI.

Reference Books:

1. J.K. Shackelford & M.K. Muralidhara, "Introduction to Material Science for Engineers", Pearson Education.
2. Ian P. Jones, "Materials Science for Electrical & Electronics Engineers", Oxford
3. NPTEL Lectures.

Course Contents and Lecture Schedule

Module No.	Topic (s)	No. of Lectures
1	Dielectric properties, Polarization and dielectric constant.	2
1	Piezoelectricity, Behaviour of dielectrics in alternating fields	3
2	Magnetic dipole moment of current loop, Orbital magnetic dipole moment	2
2	Lenz's law, Classification of magnetic materials	3
3	Free electron theory of metals, Ohm's law, Relaxation time, Collision time and mean free path, Electron scattering and the resistivity of metals, Superconductivity	3
3	Properties of Semiconductors, Fermi level, Generation and recombination, carrier life-time, diffusion length. Scattering and mobility of carriers, Einstein relation, LASER	4
4	High conductive materials-copper, Aluminium, Tungsten, Nickel, Brass, Bronze and other alloys; contact materials - Mercury	3
4	High resistivity materials-carbon, graphite, Nichrome; Fuses	3
5	Gaseous materials - Oxide gases, Electronegative gases, Hydrocarbon gases; Liquid materials-mineral oils, Silicon liquids	3
5	Hydrocarbon liquids; Solid materials - Paper and boards, Resins (Polymers), Rubbers-natural and synthetic, glass, Ceramics, Asbestos	3

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