Bachelor of Science
Electronics Semester: III

Course Code	US03MAELE01	Title of the Course	Transistor Circuits.
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	The course is to make the students understand the Transistor applications as an amplifier, feedback techniques, power amplifier and oscillators.

Course Content		
Unit	**Description**	**Weightage In %**
1.	**Small Signal Amplifiers:** Single stage transistor Amplifier, Graphical Method, Equivalent circuit, h Parameters equivalent circuit, Amplifier analysis, Multistage Amplifiers, Gain of multistage amplifier, RC coupled, Transformer coupled and Direct coupled amplifier, frequency response	**25**
2.	**Power Amplifier** Need for Power Amplifier, Single ended power amplifier, impedance matching, Analysis of power amplifier, Class A, Class AB, Class B and Class C amplifiers, Push Pull Amplifier, Distortion in Push Pull amplifier, Complementary-Symmetry push pull amplifier.	**25**
3	**Feed back:** Concept of Feedback in amplifier, Types of feedback, voltage gain of feedback amplifier, advantages of negative feedback, amplifier circuit with negative feedback, Emitter Follower	**25**
4	**Oscillators:** Classification of oscillators, positive feedback amplifier as an oscillator, LC oscillator: Hartley Oscillator, Colpitt's Oscillator, RC oscillator, Phase Shift Oscillator, Wien Bridge Oscillator, Crystal Oscillator, Piezo electric Effect, Crystal Characteristic, Crystal Oscillator, Non sinusoidal Oscillator ant their types	**25**

Teaching-Learning Methodology	• Online and Board work, • ICT enabled teaching, • Group discussion,

	• Case Study, • Problem solving.

Evaluation Pattern (Internal / External Examinations)			
Sr. No.		Details of the Evaluation	Weightage
1.	Continuous and Comprehensive Evaluation	• Class test/Internal Written test (30%) • Quiz (30%) • Active learning (10%) • Home Assignments (10%) • Class Assignments (10%) • Attendance (10%)	50%
2.	End Semester Examination	University examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand the construction of transistors small signal amplifier.
2.	Understand types of power amplifier and its uses.
3	Understand the effect of Positive and Negative feedback on the transistors circuits.
4	Understand transistors uses as an oscillator.

Suggested References:	
Sr. No.	References
1.	Basic Electronics and Linear Circuits By Bhargava, Kulshreshtha and Gupta.
2.	Electronics Devices and Circuits By David A. Bell.

On-line resources to be used if available as reference material
On-line Resources

Bachelor of Science
Electronics Semester: III

Course Code	US03MAELE02	Title of the Course	Digital Electronics – 1
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	The course is to make the students understand binary number systems and codes, logic gates and circuit using logic gates like adder, subtractor and flip flops.

Course Content		
Unit	**Description**	**Weightage In %**
1.	**Numbers System:** Various Number systems: Decimal, Binary, Octal and Hexadecimal. Inter conversion and arithmetic, Representation of signed numbers using 1's and 2's compliment method, **Binary Codes:** Weighted and non weighted codes, BCD codes, BCD arithmetic, Excess-3 code, Excess-3 arithmetic, Gray code, Code Conversion, Binary to Grey, Grey to Binary, Alphanumeric codes: ASCII codes, EBCDIC code.	**25**
2.	**Logic gates:** Basic Gates: AND Gate, OR Gate, NOT Gate, Universal Gates: NAND Gate, NOR Gate, XOR and XNOR Gates. Boolean Algebra: Logic operations, AXIOIMS and Laws of Boolean Algebra. Demorgan's theorems. Reduction of Boolean Expression.	**25**
3	**Combinational circuits:** Half and Full Adders, Half and Full Subtractor, Parallel Binary Adder, Look Ahead Carry Adder, Two's complement addition and Subtraction using parallel adders, Serial adders, BCD adders, Binary multipliers	**25**
4	**Flip - Flops:** The S–R latch, Gated S–R Latches, The gated D latch, Edge–triggered flip–flops, The edge–triggered D Flip–Flop, The edge–triggered R–S Flip–Flop, The edge–triggered J–K Flip–Flop, The edge–triggered T Flip–Flop, Asynchronous inputs, Flip–Flops operating Characteristics,	**25**

	Master–Slave Flip–Flops Conversion of Flip–Flops, Applications of Flip–Flops, Schmitt trigger	

Teaching-Learning Methodology	• Online and Board work, • ICT enabled teaching, • Group discussion, • Case Study, • Problem solving.

Evaluation Pattern (Internal / External Examinations)			
Sr. No.		Details of the Evaluation	Weightage
1.	Continuous and Comprehensive Evaluation	• Class test/Internal Written test (30%) • Quiz (30%) • Active learning (10%) • Home Assignments (10%) • Class Assignments (10%) • Attendance (10%)	50%
2.	End Semester Examination	University examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand various number systems, digital codes and their conversion.
2.	Understand various logic gates and their construction.
3	Understand Boolean algebra to solve various logical expressions.
4	Understand the applications of logic gates like Adder, Subtractor and flip flops..

Suggested References:	
Sr. No.	References
1.	Digital Electronics by W. H. Gothmann

2.	Digital Principles and Applications by A. P. Malvino and D. P. Leach
3.	Fundamental of Digital circuits By : A. Anand Kumar

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Bachelor of Science

Electronics Semester: III

Course Code	US03MAELE03	Title of the Course	Electronics Practicals.
Total Credits of the Course	4	Hours per Week	8

Course Objectives:	1) To make the students understand uses of transistor in various amplifier and oscillator circuits. 2) To Study construction and verification of truth tables of various logic gates. 3) To study applications of gates as arithmetic circuits and flip flops.

Part -1

Course Content		
No	**Title of Practical**	**Weightage**
1.	Single stage CE amplifier frequency response	**50%**
2.	Negative feedback amplifier	
3.	Phase shift oscillator	
4.	Wien bridge oscillator	
5.	Hartley oscillator	
6.	Colpitt's oscillator	
7.	Voltage gain of amplifier with and without feedback	
8.	Other experiments based on Theory.	

Part -2

Course Content		
No	**Title of Practical**	**Weightage**
1.	Logic gates using discreet components	
2.	Logic gates using ICs	

3.	Half and full adder	**50%**
4.	Half and full Subtractor	
5.	Applications of X-OR, X – NOR gate	
6.	Reduction of Boolean expression	
7.	Shift register	
8.	Ring counter	
9.	Other experiments based on Theory.	

To maintain uniformity in assessment of practical examination the below mentioned marks distribution pattern is followed:

Sr. No.	Details of the Evaluation	Weightage
1.	University examination.	16
2	Diagram/Circuit Diagram / Expected Graph	16
3	Setting up of the experiment + Tabular Columns + taking readings	28
4	Calculations (explicitly shown) + Graph	20
5	Accuracy of results with units	08
6	Round the year Performance/ Records (to be valued at the time of practical Examination through oral viva)	12
	Total practical	100

To maintain uniformity in assessment of practical examination the below mentioned marks distribution pattern is followed:

Sr. No.	Details of the Evaluation	Weightage
1.	• Internal Continuous Assessment in the form of Practical Examination, • Quizzes, Assignments, • Active learning, • Viva-voce, Seminars, • Attendance (As per NEP Guideline)	50%

2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand and construct various types of amplifiers and oscillators using transistor.
2.	Understand and construct various logic gates.
3.	Understand arithmetic operations using logic gates.
4.	Understand various Flip flop circuits using logic gates.

Suggested References:	
Sr. No.	References
1.	Basic Electronics and Linear Circuits By Bhargava, Kulshreshtha and Gupta.
2.	Electrical Engineering Fundamentals By Del Toro.
3.	Digital Electronics by W. H. Gothmann
4.	Digital Principles and Applications by A. P. Malvino and D. P. Leach
5.	Fundamental of Digital circuits By : A. Anand Kumar

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Bachelor of Science
Electronics Semester: III

Course Code	US03IDELE01	Title of the Course	Transistor Circuits.
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	The course is to make the students understand the fundamentals of Transistor, their characteristics, and biasing.

Course Content		
Unit	**Description**	**Weightage In %**
1.	**Transistors:** Structure of Transistor, Working, Transistor Amplifying Action, Configurations, Input and Output characteristics of CB, CE and CC configurations. Comparison of three configurations. Basic CE amplifier circuit, DC Load Line.	**50**
2.	**Transistor Biasing:** Why bias a transistor?, Selection of operating point, Need for Bias Stabilization, Requirements of Biasing circuit, Different Biasing circuits, Fixed Bias circuit, Collector to base bias Circuit, Bias Circuit with Emitter Resistor, Voltage divider Biasing Circuit. Emitter Bias Circuit, PNP transistor biasing circuit, Single stage Transistor Amplifier, Frequency Response curve of an RC coupled amplifier, Bandwidth of amplifier.	**50**

Teaching-Learning Methodology	• Online and Board work, • ICT enabled teaching, • Group discussion, • Case Study, • Problem solving.

Evaluation Pattern (Internal / External Examinations)			
Sr. No.		Details of the Evaluation	Weightage

1.	Continuous and Comprehensive Evaluation	• Class test/Internal Written test (30%) • Quiz (30%) • Active learning (10%) • Home Assignments (10%) • Class Assignments (10%) • Attendance (10%)	50%
2.	End Semester Examination	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand the construction of transistors their characteristics, various configurations and parameters in different modes.
2.	Understand biasing a transistor for various applications.

Suggested References:	
Sr. No.	References
1.	Basic Electronics and Linear Circuits By Bhargava, Kulshreshtha and Gupta.
2.	Electronics Devices and Circuits By David A. Bell.

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Bachelor of Science
Electronics Semester: III

Course Code	US03IDELE02	Title of the Course	Electronics Practicals.
Total Credits of the Course	2	Hours per Week	4

Course Objectives:	

Course Content		
No	**Title of Practical**	**Weightage**
1.	Study of Transistor fixed bias circuit with and without emitter resistor	**100%**
2.	Study of Transistor collector to base bias circuit	
3.	Study of Transistor potential divider bias circuit	
4.	PNP transistor Characteristics	
5.	NPN transistor Characteristics	
6.	Single stage CE amplifier frequency response	
7.	Other experiments based on Theory.	

To maintain uniformity in assessment of practical examination the below mentioned marks distribution pattern is followed:

Sr. No.	Details of the Evaluation	Weightage
1.	University examination.	08
2	Diagram/Circuit Diagram / Expected Graph	08
3	Setting up of the experiment + Tabular Columns + taking readings	14
4	Calculations (explicitly shown) + Graph	10
5	Accuracy of results with units	04
6	Round the year Performance/ Records (to be valued at the time of	06

	practical Examination through oral viva)	
	Total practical	50
Sr. No.	Details of the Evaluation	Weightage
1.	• Internal Continuous Assessment in the form of Practical Examination, • Quizzes, Assignments, • Active learning, • Viva-voce, Seminars, • Attendance (As per NEP Guideline)	50%
2.	University Examination 100 %	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Helps to understand the various biasing circuits of transistors circuit.
2.	Make students understand characteristics of transistor and its application as an amplifier.
3.	Helps the student to understand positive and negative feedback effect in transistorised circuit.

Suggested References:	
Sr. No.	References
1.	Basic Electronics and Linear Circuits By Bhargava, Kulshreshtha and Gupta.
2.	Electrical Engineering Fundamentals By Del Toro.

On-line resources to be used if available as reference material
On-line Resources

Bachelor of Science
Electronics Semester: III

Course Code	US03IDELE03	Title of the Course	Number Systems and Logic Gates.
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	The course is to make the students to understand, i) Various number systems and binary codes. ii) Logic gates, Boolean algebra and reduction of digital expression.

Course Content		
Unit	**Description**	**Weightage In %**
1.	**Numbers System:** Various Number systems: Decimal, Binary, Octal and Hexadecimal. Inter conversion and arithmetic, Representation of signed numbers using 1's and 2's compliment method, **Binary Codes:** Weighted and non weighted codes, BCD codes, BCD arithmetic, Excess-3 code, Excess-3 arithmetic, Gray code, Code Conversion, Binary to Grey, Grey to Binary, Alphanumeric codes: ASCII codes, EBCDIC code.	**50**
2.	**Logic gates:** Basic Gates: AND Gate, OR Gate, NOT Gate, Universal Gates: NAND Gate, NOR Gate, XOR and XNOR Gates. Boolean Algebra: Logic operations, AXIOIMS and Laws of Boolean Algebra. Demorgan's theorems. Reduction of Boolean Expression.	**50**

Teaching-Learning Methodology	• Online and Board work, • ICT enabled teaching, • Group discussion, • Case Study, • Problem solving.

Evaluation Pattern (Internal / External Examinations)			
Sr. No.		Details of the Evaluation	Weightage
1.	Continuous and Comprehensive Evaluation	• Class test/Internal Written test (30%) • Quiz (30%) • Active learning (10%) • Home Assignments (10%) • Class Assignments (10%) • Attendance (10%)	50%
2.	End Semester Examination	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand various number systems and their inter conversions.
2.	Understand various binary codes used in computer systems.
3.	Understand construction and function of different logic gates.
4.	Understand reduction of hardware requirement using Boolean algebra.

Suggested References:	
Sr. No.	References
1.	Digital Electronics by W. H. Gothmann
2.	Digital Principles and Applications by A. P. Malvino and D. P. Leach
3.	Fundamental of Digital circuits By : A. Anand Kumar

On-line resources to be used if available as reference material
On-line Resources

Bachelor of Science
Electronics Semester: III

Course Code	US03IDELE04	Title of the Course	Electronics Practicals.
Total Credits of the Course	2	Hours per Week	4

Course Objectives:	The course is to make the students to understand, i) Construction and working of different logic gates.. ii) Boolean algebra and reduction of digital expression.

Course Content		
No	**Title of Practical**	**Weightage**
1.	Logic gates using discreet components (Basic Gates)	**100%**
2.	Logic gates using discreet components (Universal Gates)	
3.	Logic gates using ICs (Basic Gates)	
4.	Logic gates using ICs (Universal Gates)	
5.	Verification of Truth table of XOR and XNOR gates.	
6.	Reduction of Boolean expression.	
7.	Examples of Demorgan's Theorems.	
	Other experiments based on Theory.	

To maintain uniformity in assessment of practical examination the below mentioned marks distribution pattern is followed:

Sr. No.	Details of the Evaluation	Weightage
1.	University examination.	08
2	Diagram/Circuit Diagram / Expected Graph	08
3	Setting up of the experiment + Tabular Columns + taking readings	14
4	Calculations (explicitly shown) + Graph	10

5	Accuracy of results with units	04
6	Round the year Performance/ Records (to be valued at the time of practical Examination through oral viva)	06
	Total practical	50
Sr. No.	Details of the Evaluation	Weightage
1.	• Internal Continuous Assessment in the form of Practical Examination, • Quizzes, Assignments, • Active learning, • Viva-voce, Seminars, • Attendance (As per NEP Guideline)	50%
2.	University Examination 100 %	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand working of various logic gates.
2.	Understand application of Boolean algebra.

Suggested References:	
Sr. No.	References
1.	Digital Electronics by W. H. Gothmann
2.	Digital Principles and Applications by A. P. Malvino and D. P. Leach

On-line resources to be used if available as reference material
On-line Resources

Bachelor of Science
Electronics Semester: III

(Course Code	US03SEELE01	Title of the Course	Fundamentals of Computer Hardware-3.
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	The course is to make the students understand the basic of the operating systems and networking of computers.

Course Content		
Unit	**Description**	**Weightage In %**
1.	**Operating System Basics:** Types of operating system: Real time OS, Single user / Single tasking OS, Single user / Multitasking OS, Multi user / Multitasking OS, Providing a user interface, Graphical interface, Command line interfaces, Running programs, Sharing information, Enhancing an OS with utility software, Backup utilities, Anti Virus, Fire wall, Screen Savers.	**50**
2.	**Networks:** Use of Networks, Simultaneous Access, Shared Peripherals Devices, Personal Communications, Easier Data backups, Common types of Networks; Local Area Networks, Wide Area Networks, Hybrid Networks, Campus Area Networks, metropolitan Area Networks, Home Area Networks Network Structures: server based Networks, Client / server Networks, Peer to Peer Networks, Network Topologies and Protocols. Network Media: Wire based and Wireless media.	**50**

Teaching-Learning Methodology	• Online and Board work, • ICT enabled teaching, • Group discussion, • Case Study, • Problem solving.

Evaluation Pattern (Internal / External Examinations)

Sr. No.		Details of the Evaluation	Weightage
1.	Continuous and Comprehensive Evaluation	• Class test/Internal Written test (30%) • Quiz (30%) • Active learning (10%) • Home Assignments (10%) • Class Assignments (10%) • Attendance (10%)	50%
2.	End Semester Examination	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand the constituents of the modern Operating system.
2.	Make students understand basic organizations of computer operating systems and computer communication networks.

Suggested References:	
Sr. No.	References
1.	Introduction To Computers By Peter Norton (sixth edition) (The McGraw– Hill Companies)
2.	Computer Fundamentals By P.K. Sinha (BPB Publications)

On-line resources to be used if available as reference material
On-line Resources

Bachelor of Science
Electronics Semester: III

Course Code	US03SEELE02	Title of the Course	Introduction to Electronics Projects.
Total Credits of the Course	2	Hours per Week	4

Course Objectives:	The course is to make the students understand; 1) The printed circuit board. 2) To identify and test various passive and active electronic components 3) To Construct simple electronic working projects.

Course Content		
Unit	**Description**	**Weightage In %**
1.	Introduction to Printed Circuit boards, Identifying components, Soldering techniques.	**50**
2.	Construction of Electronics projects and troubleshooting.	**50**

Teaching-Learning Methodology	• Online and Board work, • ICT enabled teaching, • Group discussion, • Case Study, • Problem solving.

Evaluation Pattern (Internal / External Examinations)			
Sr. No.		Details of the Evaluation	Weightage
1.	Continuous and Comprehensive Evaluation	• Class test/Internal Written test (30%) • Quiz (30%) • Active learning (10%) • Home Assignments (10%) • Class Assignments (10%) • Attendance (10%)	50%
2.	End Semester Examination	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Identify and testing various electronic active and passive components.
2.	Construction of simple electronic working projects.

Suggested References:	
Sr. No.	References
1.	Electronics for you - project work book
2.	Elektor Electronics projects - project work book

On-line resources to be used if available as reference material
On-line Resources