Bachelor of Science
Electronics Semester: II (Major Course)

Course Code	US02MAELE01	Title of the Course	AC Fundamentals
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	The course is to make the students understand 1. The Fundamentals of Electronics Components to the AC Supplies. 2. Transistors construction and working 3. Biasing a transistor.

Course Content		
Unit	**Description**	**Weightage In %**
1.	**AC Fundamentals:** Types of Alternating waves. Definitions of Cycle, Time Period, Frequency and Amplitude. Characteristics of Sine wave, Different values of Sinusoidal voltage and current, Phase angle and Phase difference of AC signal, Vector representation of an Alternating quantity, AC through pure Resistance, Inductance and Capacitance, Non Sinusoidal waveforms.	**25**
2.	**Series and Parallel AC Circuits:** R-L Circuit, Q factor of coil, R-C circuit, R-L-C Circuit, Resonance in RLC circuit, Resonance curve, Main characteristics of Series resonance, Band width of a Tuned circuit, sharpness of resonance, Parallel resonance. Examples related to resonance.	**25**
3.	**Transistor:** Introduction, Structure of Transistor, working of Transistor, Relation between different currents, transistor amplifying action, Transistor Configurations, Transistor characteristics in CE mode, Basic CE amplifier circuit.	**25**
4.	**Transistor Biasing:** Need of Biasing, Selection of operating point, Need for bias stabilization, requirements of biasing circuits, Fixed Biasing Circuit, Collector to base biasing circuit, Bias circuit with emitter follower, voltage divider biasing circuit, Emitter biasing circuit.	**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	Written Test 100 %	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Helps to understand the response of various active electronics components and their applications.
2.	Make students understand basic electronics AC circuits and their troubleshooting.

Suggested References:	
Sr. No.	References
1.	Basic Electronics (Solid State) By B.L.Theraja
2.	Basic Electronics By Bernard Grob.
3	Basic Electronics and Linear Circuits By Bhargava, Kulshreshtha and Gupta.

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

Bachelor of Science
Electronics Semester: II (Major Course) Practicals

Course Code	US02MAELE02	Title of the Course	Electronics Practicals.
Total Credits of the Course	4	Hours per Week	8

Course Objectives:	To make the students understand 1. The Fundamentals of Electronics Components 2. Power supplies and their applications.

Part -1

Course Content		
No	**Title of Practical**	
1.	Measurement of Time Period and Frequency of AC signals.	
2.	Measurement of Phase angle of AC signals.	
3.	Phase relation of Inductive Voltage and Current.	
4.	Phase relation of Capacitive Voltage and Current.	
5.	Analysis of Network Using Thevenin's theorem.	
6.	Analysis of Network Using Norton's theorem.	
7.	Series Resonance.	
8.	Parallel Resonance.	
9.	Other experiments based on Theory.	

Part -2

Course Content		
No	**Title of Practical**	
1.	Transistor characteristics	
2.	Fixed biasing circuit.	
3.	Fixed bias with/without emitter resistor.	
4.	Collector to base biasing circuit.	
5.	Voltage divider biasing circuit.	
6.	Voltage gain of CE amplifier.	
7.	Frequency response of CE amplifier	
8.	Emitter biasing circuit.	
9.	Other experiments based on Theory.	

Evaluation Pattern (Internal / External Examinations)

Sr. No.		Details of the Evaluation	Weightage In %
1.	Continuous and Comprehensive Evaluation	• Lab work assessment (40%) • Viva voice/ Lab Quiz (40%) • •Attendance (10%)	50%
2.	End Semester Examination	• Lab work assessment (40%) • Viva voice/ Lab Quiz (40%) • Attendance (10%)	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Apply the various procedures and techniques for the experiments.
2.	Use different measuring devices and meters to record the data with precision.

3	Apply the mathematical concepts/equations to obtain quantitative results.
4	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results.

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: II (Minor Course)
Paper - 1

Course Code	US2MIELE01	Title of the Course	AC Circuits.
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	The course is to make the students understand the Fundamentals of Electronics Components to the AC Supplies.

Course Content		
Unit	**Description**	**Weightage In %**
1.	**AC Fundamentals:** Types of Alternating waves. Definitions of Cycle, Time Period, Frequency and Amplitude. Characteristics of Sine wave, Different values of Sinusoidal voltage and current, Phase angle and Phase difference of AC signal, Vector representation of an Alternating quantity, Non Sinusoidal waveforms.	**50**
2.	**Series and Parallel AC Circuits:** R-L Circuit, Q factor of coil, R-C circuit, R-L-C Circuit, Resonance in RLC circuit, Resonance curve, Main characteristics of Series resonance, sharpness of resonance, Parallel resonance.	**50**

Teaching-Learning Methodology	Online and Board work

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%

3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Helps to understand the response of various active electronics components and their applications.
2.	Make students understand basic electronics AC circuits and their troubleshooting.

Suggested References:	
Sr. No.	References
1.	Basic Electronics (Solid State) By B.L.Theraja
2.	Basic Electronics By Bernard Grob.
3	Basic Electronics and Linear Circuits By Bhargava, Kulshreshtha and Gupta.

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

Bachelor of Science
Electronics Semester: II (Minor Course) Practicals 1

Course Code	US2MIELE02	Title of the Course	Electronics Practicals
Total Credits of the Course	2	Hours per Week	4

Course Objectives:	To make the students understand the Fundamentals of Electronics Components and Power supplies and their applications.

No	Title of Practical	
1.	Measurement of Time Period and Frequency of AC signals.	
2.	Measurement of Phase angle of AC signals.	
3.	Phase relation of Inductive Voltage and Current.	
4.	Phase relation of Capacitive Voltage and Current.	
5.	Analysis of Network Using Thevenin's theorem.	
6.	Analysis of Network Using Norton's theorem.	
7.	Series Resonance.	
8.	Parallel Resonance.	
9.	Other experiments based on Theory.	

Teaching-Learning Methodology	Online and Board work

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%

2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Helps to understand the various passive and active electronics components.
2.	Make students understand basic electronics circuits and their troubleshooting.

Suggested References:	
Sr. No.	References
1.	Basic Electronics (Solid State) By B.L.Theraja
2.	Basic Electronics By Bernard Grob.

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

Bachelor of Science
Electronics Semester: (Minor Course)
Paper 2

Course Code	US02MIELE03	Title of the Course	Active Electronic Components.
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	The course is to make the students understand the fundamentals of PN junction Diodes, other special diodes and DC power supplies.

Course Content		
Unit	**Description**	**Weightage In %**
1.	**Diodes:** PN Junction theory, Forward Biased PN junction, Reverse Biased PN junction, VI characteristics of PN Junction diode. **Special type Diodes:** Zener Diode: Characteristics, Varactor diode, Operation and characteristics, Tunnel diode, Operation and Characteristics, Schottky diode, PIN diode, Light Emitting diode, Photo diode, Solar Cells.	**50**
2.	**DC Power Supplies:** Block Diagram of Power supply. Rectifiers: Half wave, Centre tapped Full wave and Bridge type Full wave rectifier. Filters: Series Inductors, shunt capacitor, LC Filter and PI filter. Regulators: Zener diode as Voltage regulator	**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	• Class test/Internal Written test (30%) • Quiz (30%)	50%

	Comprehensive Evaluation	• Active learning (10%) • Home Assignments (10%) • Class Assignments (10%) • Attendance (10%)	
2.	End Semester Examination	Written Test 100 %	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Helps to understand the various types of PN junction diodes and to analyze their simple circuit.
2.	Make students understand various power supply circuits and their troubleshooting.

Suggested References:	
Sr. No.	References
1.	Electronics Devices and Circuits By David A. Bell. (5^{th} Edition)
2.	Basic Electronics and Linear Circuits By Bhargava, Kulshreshtha and Gupta.

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

Bachelor of Science
Electronics Semester: II (Minor Course) Practicals 2

Course Code	US02MIELE04	Title of the Course	Electronics Practicals
Total Credits of the Course	2	Hours per Week	4

Course Objectives:	To make the students understand the fundamentals of electronics components and Power supplies, Cathode Ray Oscilloscope and their applications.

No	Title of Practical	
1.	Forward Characteristics of PN junction Diode.	
2.	Reverse Characteristics of PN junction Diode.	
3.	Study of Half wave rectifiers.	
4.	Study of Full wave rectifiers.	
5.	Study of Filter Circuits.	
6.	Zener diode as Voltage regulator.	
7.	Clipping Circuit using Zener Diode.	
8.	Other experiments based on Theory.	

Teaching-Learning Methodology	Online and Board work

Evaluation Pattern (Internal / External Examinations)			
Sr. No.		Details of the Evaluation	Weightage
1.	Continuous and Comprehensive Evaluation	• Lab work assessment (40%) • Viva voice/ Lab Quiz (40%) • •Attendance (10%)	50%

2.	End Semester Examination	• Lab work assessment (40%) • Viva voice/ Lab Quiz (40%) • Attendance (10%)	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Apply the various procedures and techniques for the experiments.
2.	Use different measuring devices and meters to record the data with precision.
3	Apply the mathematical concepts/equations to obtain quantitative results.
4	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results.

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: II (Inter Disciplinary)
Paper 1

Course Code	US2IDELE01	Title of the Course	Impedance Circuits.
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	The course is to make the students understand the Fundamentals of Electronics Components to the AC Supplies.

Course Content		
Unit	**Description**	**Weightage In %**
1.	**Fundamentals of AC signals:** Types of Alternating waves. Definitions of Cycle, Time Period, Frequency and Amplitude. Characteristics of Sine wave, Different values of Sinusoidal voltage and current, Phase angle and Phase difference of AC signal, Vector representation of an Alternating quantity, Non Sinusoidal waveforms.	**50**
2.	**Series and Parallel AC Circuits:** R-L Circuit, Q factor of coil, R-C circuit, R-L-C Circuit, Resonance in RLC circuit, Resonance curve, Main characteristics of Series resonance, sharpness of resonance, Parallel resonance.	**50**

Teaching-Learning Methodology	Online and Board work

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%

3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Helps to understand the response of various active electronics components and their applications.
2.	Make students understand basic electronics AC circuits and their troubleshooting.

Suggested References:	
Sr. No.	References
1.	Basic Electronics (Solid State) By B.L.Theraja
2.	Basic Electronics By Bernard Grob.
3	Basic Electronics and Linear Circuits By Bhargava, Kulshreshtha and Gupta.

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

Bachelor of Science
Electronics Semester: II (Inter Disciplinary) Practicals 1

Course Code	US2IDELE02	Title of the Course	Electronics Practicals
Total Credits of the Course	2	Hours per Week	4

Course Objectives:	To make the students understand the Fundamentals of Electronics Components and Power supplies and their applications.

No	Title of Practical	
1.	Measurement of Time Period and Frequency of AC signals.	
2.	Measurement of Phase angle of AC signals.	
3.	Phase relation of Inductive Voltage and Current.	
4.	Phase relation of Capacitive Voltage and Current.	
5.	Analysis of Network Using Thevenin's theorem.	
6.	Analysis of Network Using Norton's theorem.	
7.	Series Resonance.	
8.	Parallel Resonance.	
9.	Other experiments based on Theory.	

Teaching-Learning Methodology	Online and Board work

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%

2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Helps to understand the various passive and active electronics components.
2.	Make students understand basic electronics circuits and their troubleshooting.

Suggested References:	
Sr. No.	References
1.	Basic Electronics (Solid State) By B.L.Theraja
2.	Basic Electronics By Bernard Grob.

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

Bachelor of Science
Electronics Semester: II (Inter Disciplinary)
Paper 2

Course Code	US02IDELE03	Title of the Course	Semiconductor diode and power supply
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	The course is to make the students understand the fundamentals of PN junction Diodes, other special diodes and DC power supplies.

Course Content		
Unit	**Description**	**Weightage In %**
1.	**Construction and working of Power Supplies:** Block Diagram of Power supply. Types of Rectifiers: Half wave, Centre tapped Full wave and Bridge type Full wave rectifier. Types of Filters: Series Inductors, shunt capacitor, LC Filter and PI filter. Regulators: Zener diode as Voltage regulator	**50**
2.	**Fundamentals of PN junction Diodes:** PN Junction theory, Forward Biased PN junction, Reverse Biased PN junction, VI characteristics of PN Junction diode. **Introduction of Special type Diodes:** Zener Diode: Characteristics, Varactor diode, Operation and characteristics, Tunnel diode, Operation and Characteristics, Schottky diode, PIN diode, Light Emitting diode, Photo diode, Solar Cells.	**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	Written Test 100 %	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Helps to understand the various types of PN junction diodes and to analyze their simple circuit.
2.	Make students understand various power supply circuits and their troubleshooting.

Suggested References:	
Sr. No.	References
1.	Electronics Devices and Circuits By David A. Bell. (5^{th} Edition)
2.	Basic Electronics and Linear Circuits By Bhargava, Kulshreshtha and Gupta.

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

Bachelor of Science
Electronics Semester: II (Inter Disciplinary) Practicals 2

Course Code	US02IDELE04	Title of the Course	Electronics Practicals.
Total Credits of the Course	2	Hours per Week	4

Course Objectives:	To make the students understand the fundamentals of electronics components and Power supplies, Cathode Ray Oscilloscope and their applications.

No	Title of Practical	
1.	PN junction Diode Forward Characteristics.	
2.	PN junction Diode Reverse Characteristics.	
3.	AC components of Half wave rectifiers.	
4.	Reverse Characteristics Full wave rectifiers.	
5.	Load regulation characteristics of half wave rectifier with L, LC and π Filter Circuits.	
6.	Load regulation characteristics of full wave rectifier with L, LC and π Filter Circuits	
7.	Zener diode as Voltage regulator.	
8.	Zener Diode line regulation characteristics.	
9.	Other experiments based on Theory.	

Teaching-Learning Methodology	Online and Board work

Evaluation Pattern (Internal / External Examinations)			
Sr. No.		Details of the Evaluation	Weightage
1.	Continuous and	• Lab work assessment (40%) • Viva voice/ Lab Quiz (40%)	50%

	Comprehensive Evaluation	• •Attendance (10%)	
2.	End Semester Examination	• Lab work assessment (40%) • Viva voice/ Lab Quiz (40%) • Attendance (10%)	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Apply the various procedures and techniques for the experiments.
2.	Use different measuring devices and meters to record the data with precision.
3	Apply the mathematical concepts/equations to obtain quantitative results.
4	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results.

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: II
(Skill Enhancement Course)

Course Code	US02SEELE01	Title of the Course	Fundamentals of Computer Hardware-2.
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	The course is to make the students understand 1. Working of various Input Devices 2. Working of various Output Devices

Course Content		
Unit	**Description**	**Weightage In %**
1.	**Input Devices:** Key board, Mouse, Hand held devices: Pen, Touch screen, Joy Stick, **Optical input devices:** Barcode reader, magnetic – ink character reader(MICR), Scanner, Image scanner, Optical character reader, **Audio input devices:** microphone, **Video input devices:** digital camera.	**50**
2.	**Output Devices:** Monitors : CRT monitors, flat panel monitors – LCD and LED monitors, Comparing monitors: Size, Resolution, Refresh rate, Dot pitch Printers: Impact and nonimpact printer, Dot matrix printer, Inkjet and Laser printer, Photo printer, Thermal wax printer, dye –sub printer. Comparisons of printer: image quality, speed, initial cost, cost of operation.	**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	Written Test 100 %	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand the constituents of the modern computer systems.
2.	Make students understand basic organizations of computer, various Input and Output devices and their working.

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

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