Bachelor of Science
Electronics Semester: VI (Major)

Course Code	US06MAELE01	Title of the Course	8-Bit Microprocessor Programming & Applications-2
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	The course is to make the students understand Microprocessor programming and interfacing.

Course Content		
Unit	**Description**	**Weightage In %**
1.	**Counter and time Delays**: Hexadecimal counter, Modulo-10 counter, Pulse timing for flashing lights, Debugging counter and time delay programs, Stack Subroutines, Conditional and Non conditional CALL and Return instructions, Advance Subroutine concept and related examples.	**25**
2.	**Code conversion:** BCD to Binary, Binary to BCD, BCD to Seven Segment, Binary to ASCII and ASCII to Binary.	**25**
3	**BCD Arithmetic:** BCD Addition, BCD Subtraction, Introduction to Advanced instructions and Applications, Multiplication and Subtraction with carry, the 8085 interrupts, Interrupts instructions and their utilization and their Examples.	**25**
4	**Interfacing:** Introduction to microcontroller, DAC & ADC. 8255 Peripheral Interface, 8254 Interval Timer, 8259 Interrupt Controller,	**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.	Design counters and time delays routine and subroutines and its advance concepts for application software.
2.	Know various cods and their code conversion BCD to ASCII, Binary to &-Segment and vice versa
3	Students will learn microprocessor mathematics and its advance instructions and their application.
4	Student learn interfacing different I/O ports as 8255,8254, 8259 and etc

Suggested References:	
1.	Microprocessor , Architecture, Programming and Applications with the 8085/8080 By : Ramesh S. Gaonkar
2.	8085 Microprocessor programming and interfacing By: N. K. Shrinath

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

Bachelor of Science
Electronics Semester: VI (Major)

Course Code	US06MAELE02	Title of the Course	Analog Communication.
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	The course is to make the students understand basic Constituent of analog Communication system, radio transmission and receivers, types of modulations and demodulations.

Course Content		
Unit	**Description**	**Weightage In %**
1.	**Radio Transmitters and Receivers:** Classification of Transmitters (According to type of Modulation, Service involved and Carrier frequency), Constituent stages of the AM Radio Transmitter, Basic Constituent of Communication system, The transmitter, The Receiver, Need for Higher Carrier frequency, Classification of RF spectrum, Need For modulation.	**25**
2.	**Modulation:** Definition, Types of modulation, Amplitude modulation (Definition, Expression, wave forms and Side bands), Frequency modulation (Definition, Expression, wave forms and Side bands), Phase modulation (Definition, Expression, wave forms and Side bands), comparision of AM and FM. Classification of Amplitude modulation methods; Collector Modulation, Square law diode modulator. Classification of Frequency modulation methods; Reactance modulator using BJT, Frequency modulator using Varactor diode.	**25**
3	**Demodulation:** Amplitude demodulation: - Definition, classification of detection methods, Square law diode detector, Linear diode detector, choice of RC time constant, Frequency demodulation: - Definition, classification of detection methods, Slope detector, Balanced slope detector, Centre tuned discriminator.	**25**
4	**Radio Receivers:** Classification of radio receivers, Salient Features of broadcast Receivers, Basic Function of AM Receiver, Straight receivers, TRF receivers, Principle & Block diagram of superhetrodyne Receiver. RF Amplifier, Frequency Mixer & converters, IF Amplifier, Detector stage, Automatic gain control, Automatic Frequency control.	**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 working of radio transmission and receiver circuits.
2.	Understand the different type of modulations used in data transmission.
3	Understand different types of demodulations.
4	Understand various types of radio receivers.

Suggested References:	
1.	Radio Engineering By G.K. Mithal, Khanna Publication, New Delhi
2.	Electronic Communication Systems. By George Kennedy, Tata McGraw Hill Education Private Limited, New Delhi

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

Bachelor of Science
Electronics Semester: VI (Major)

Course Code	US06MAELE03	Title of the Course	Electronics Practicals.
Total Credits of the Course	4	Hours per Week	8

Course Objectives:	The course is to make the students understand i) Basic Constituent of analog Communication system, radio transmission and receivers, types of modulations and demodulations. ii) Microprocessor programming and interfacing.

Part -1

Course Content		
Ser. No	**Title of Practical**	**Weightage**
1.	Phase Shift Oscillator.	**50%**
2.	Wien Bridge Oscillator.	
3.	Hartley's Oscillator.	
4.	Colpitt's Oscillator.	
5.	Amplitude Modulation.	
6.	Amplitude Demodulation	
7.	Frequency Modulation.	
8.	Frequency Demodulation.	
9.	Other experiments based on syllabus	

Part -2

Course Content		
Ser. No	**Title of Practical**	**Weightage**
1.	BCD to Binary Code Conversion using 8085.	**50%**
2.	Binary to BCD Code Conversion using 8085.	
3.	8 bit BCD Addition and Subtraction.	
4.	16-bit Arithmetic (Addition and Subtraction)	

5.	BCD to Seven segments LED code Conversion using 8085.	
6.	Hexadecimal multiplication using 8085	
7.	BCD to ASCII code Conversion using 8085.	
8.	ASCII to BCD code Conversion using 8085.	
9.	8-bit Analog to Digital Conversion using ADC 0800.	
10.	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

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 the construction and working of various radio receiver circuits.
2.	Understand working of modulation and demodulation technologies.

3.	Understand working of a radio receiver.
4.	Understand different types of programming and techniques of binary code conversion programs.
5.	Understand memory related arithmetical and logical operations and also Dynamic debugging of software programs.

Suggested References:	
1.	Microprocessor , Architecture, Programming and Applications with the 8085/8080 By : Ramesh S. Gaonkar
2.	8085 Microprocessor programming and interfacing By: N. K. Shrinath
3.	Radio Engineering By G.K. Mithal, Khanna Publication, New Delhi
4.	Electronic Communication Systems. By George Kennedy, Tata McGraw Hill Education Private Limited, New Delhi

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

Bachelor of Science
Electronics Semester: VI (Minor)

Course Code	US06MIELE01	Title of the Course	Digital Electronics – 2
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	The course is to make the students understand; i) Various Counters and their applications. ii) Basic working of electronic A/D & D/A Converters.

Course Content		
Unit	**Description**	**Weightage In %**
1.	**Counters:** Asynchronous counters: Binary Ripple Counter, Asynchronous Counter 3 Bit, Mod -5,6 and 7, Synchronous Counter: four bit synchronous counter, Mod 6,7and 8, Combinational Counter Mod S Advantages and Disadvantages of various Counters Applications of Counters: Binary Decade Counter, Decoding Gates, Decoding Waveforms, BCD Counter, Up/Down Counter, Shift Counter, Three stage shift counter.	**50**
2.	**DAC & ADC** Introduction, Digital to Analog (D/A) conversion: The R-2R Ladder types DAC, The weighted Resistor type DAC, Analog to Digital conversion: The Counter type A/D converter, The tracking type A/D converter, The Flash type A/D converter. 25% 4. Successive Approximation,	**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	• Class test/Internal Written test (30%)	50%

	and Comprehensive Evaluation	• Quiz (30%) • Active learning (10%) • Home Assignments (10%) • Class Assignments (10%) • Attendance (10%)	
2.	End Semester Examination	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able	
1.	Understand functioning different types of counters and able to make different types of counter applications.
2.	Understand the function of various DAC & ADC circuits.

Suggested References:	
1.	Fundamental of Digital circuits By : A. Anand Kumar
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: VI (Minor)

Course Code	US05MIELE02	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 understand; i) Various Counters and their applications. ii) Basic working of electronic A/D & D/A Converters.

Course Content		
No	**Title of Practical**	**Weightage**
1.	Asynchronous counter (MOD 16, 8, 7)	**100%**
2.	Synchronous counter (MOD 16, 8),	
3.	R-2R , weighted Registers DAC	
4.	8-bit Analog to Digital Conversion using ADC 0800	
5.	Weighted resistor type DAC	
6.	A/D successive type.	
7.	A/D counter type.	
9.		

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	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand functioning different types of counters and able to make different types of counter applications.
2.	Understand the function of various DAC & ADC circuits.

Suggested References:	
1.	Fundamental of Digital circuits By : A.Anand Kumar
2.	Digital Integrated Electronics By : Herbert Taub & Donald Schilling
3.	Digital Fundamental By : Floyd

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

Bachelor of Science
Electronics Semester: VI (Minor)

Course Code	US06MIELE03	Title of the Course	8-Bit Microprocessor Programming - 2
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	i) Understand different types of programming and techniques and about 16 bit programs. ii) Understand memory related arithmetical and logical operations and also Dynamic debugging of software programs.

Course Content		
Unit	**Description**	**Weightage In %**
1.	**Branch operations:** Branch operations and their related programs, writing assembly language programs, Debugging a program, programming techniques: Looping, Counting and Indexing and their related flow charts, Additional Data transfer and 16 bit Arithmetic instruction and related program.	**50**
2.	**Memory Operations:** Arithmetic operations related to memory, Logical operations : Rotate and compare and related programs, Dynamic Debugging	**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 different types of programming and techniques and about 16 bit programs.
2.	Understand memory related arithmetical and logical operations and also Dynamic debugging of software programs.

Suggested References:	
Sr. No.	References
1.	Microprocessor , Architecture, Programming and Applications with the 8085/8080 By : Ramesh S. Gaonkar
2.	8085 Microprocessor programming and interfacing By: N. K. Shrinath

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

Bachelor of Science
Electronics Semester: VI (Minor)

Course Code	US06MIELE04	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 understand; i) Different types of programming and techniques and about 16 bit programs. ii) Memory related arithmetical and logical operations and also Dynamic debugging of software programs.

Course Content		
No	**Title of Practical**	**Weightage**
1.	Hexadecimal 8 Bit Arithmetic operations addition using 8085.	**100%**
2.	Hexadecimal 8 Bit Arithmetic operations subtraction using 8085.	
3.	Logical operations (AND, OR, NOT) using 8085.	
4.	Logical operations (NAND, NOR) using 8085.	
5.	1'S and 2'S compliment of 8 bit data using 8085.	
6.	Hexadecimal 16 Bit Arithmetic operations addition using 8085.	
7.	Hexadecimal 16 Bit Arithmetic operations subtraction using 8085.	
8.	Logical operations (Rotate Left and Right) using 8085.	
9.	Other experiments based on syllabus	

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	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand different types of programming and techniques and about 16 bit programs.
2.	Understand memory related arithmetical and logical operations and also Dynamic debugging of software programs.

Suggested References:	
1.	Microprocessor , Architecture, Programming and Applications with the 8085/8080 By : Ramesh S. Gaonkar
2.	8085 Microprocessor programming and interfacing By: N. K. Shrinath

On-line resources to be used if available as reference material
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Bachelor of Science
Electronics Semester: VI (Minor)

Course Code	US06MIELE05	Title of the Course	Applications of Transistors.
Total Credits of the Course	2	Hours per Week	2

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

Course Content		
Unit	**Description**	**Weightage In %**
1.	**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**
2.	**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, Astable Multivibrator.	**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 effect of Positive and Negative feedback on the transistors circuits.
2.	Understand transistors uses as an oscillator.

Suggested 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: VI (Minor)

Course Code	US06MIELE06	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 understand the Transistor applications as, feedback techniques and oscillators.

Course Content		
No	**Title of Practical**	**Weightage**
1.	CE amplifier with different feedbacks.	**100%**
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	
9.	Other experiments based on syllabus	

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	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand different feedback technique used in an amplifiers.
2.	Understand various types of sinusoidal oscillator circuit construction and its applications.

Suggested 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