MANNAR THIRUMALAI NAICKER COLLEGE

PASUMALAI, MADURAI– 625 004

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

(Re-accredited with 'A' Grade by NAAC)

B.Sc., Electronics and Communication

SYLLABUS AND REGULATIONS

UNDER
CHOICE BASED CREDIT SYSTEM (CBCS)
(For those who joined during 2018-2019 and after)

Eligibility for Admission

Candidates seeking admission to the B.Sc (E&C) Degree course must have the Higher Secondary Education, (should have studied Physics or Mathematics in HSC) of the Government of Tamil Nadu or any other state or its equivalent qualification.

Duration of the course

The duration of the course shall be three academic years comprising six semesters with two semesters in each academic year.

Subject of Study

Part I: Tamil

Part II: English

Part III:

1. Core Subjects
2. Allied Subjects
3. Electives

Part IV :

1. Non Major Electives
2. Skill Based Subjects
3. Environmental Studies
4. Value Education

Part V :

Extension activities

The scheme of Examination

The components for continuous internal assessment are:

Two tests and their average	--15 marks
Seminar /Group discussion	--5 marks
Assignment	--5 marks
Total	--25 marks

Pattern of the questions paper for the continuous Internal Assessment

(For Part I, Part II, Part III , NME & Skilled Paper in Part IV)

The components for continuous internal assessment are:

Part –A

Six multiple choice questions (answer all) 6 x01= 06 Marks

Part –B

Two questions (‘either …. or ‘type) 2 x 07=14 Marks

Part –C

One question out of two 1 x 10 =10 Marks

Total 30 Marks

Pattern of the question paper for the Summative Examinations:

Note: Duration- 3 hours

Part –A

Ten multiple choice questions 10 x01 = 10 Marks

(No Unit shall be omitted; not more than two questions from each unit.)

Part –B

Five Paragraph questions (‘either …. or ‘type) 5 x 07 = 35 Marks

(One question from each Unit)

Part –C

Three Essay questions out of five 3 x 10 =30 Marks

(One question from each Unit)

Total 75 Marks

The Scheme of Examination (Environmental Studies and Value Education)

Two tests and their average	--15 marks
Project Report	--10 marks*
Total	--25 marks

** The students as Individual or Group must visit a local area to document environmental assets – river / forest / grassland / hill / mountain – visit a local polluted site – urban / rural / industrial / agricultural – study of common plants, insects, birds – study of simple ecosystem – pond, river, hill slopes, etc.

Question Paper Pattern

Pattern of the Question Paper for Environmental Studies & Value Education only) (Internal)

Part –A

(Answer is not less than 150 words)

Four questions (‘either …. or ‘type) 4 x 05=20 Marks

Part –B

(Answer is not less than 400 words)

One question (‘either …. or ‘type) 1 x 10=10 Marks

Total 30 Marks

Pattern of the Question Paper for Environmental Studies & Value Education only) (External)

Part –A

(Answer is not less than 150 words)

Five questions (either or type) 5 x 06 =30 Marks

(One question from each Unit)

Part –B

(Answer is not less than 400 words)

Three questions out of Five each unit (One question from each Unit) 3 x 15 = 45 Marks

Total 75 Marks

Minimum Marks for a Pass

40% of the aggregate (Internal +Summative Examinations).

No separate pass minimum for the Internal Examinations.

27 marks out of 75 is the pass minimum for the Summative Examinations.

PROGRAMME SPECIFIC OUTCOMES

PSO1: To improve hardware and software skills inembedded system and Industrial Automation.

PSO2: To train the students to design and troubleshoot electrical equipments.

PSO3: To enrich the knowledge of students through technical communication which is used widely today.

PSO4: To enrich the knowledge of Bio-Medical instrumentation enables the student to fetch job in Bio-Medical field.

COURSE PATTERN

Study component	Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	Total hours	Total credit	No. of course	Total marks
Part I Tamil	6(3)	6(3)	6(3)	6(3)			24	12	04	400
Part II English	6(3)	6(3)	6(3)	6(3)			24	12	04	400
Part III										
Core subjects	4(4)	4(4)	4(4) 4(4)	6(6)	4(4) 5(4)	5(5) 5(5)	41	40	9	900
Elective subjects	2(2)	2(2)			5(4)	4(4)	13	12	04	400
Core subjects(P)	2(0)	2(4)	2(0)	2(3) 2(3)	3(0) 3(0) 2(0)	3(4) 3(3) 2(4)	26	21	06	600
Allied subjects	4(4)	4(4)	4(4)	6(4)			18	16	04	400
Allied subjects(P)	2(0)	2(3)	2(0)		4(0)	4(3)	14	6	02	200
Part IV Skilled based subject	2(2)	2(2)			2(2) 2(2)	2(2) 2(2)	12	12	06	600
Non Major Elective			2(2)	2(2)			4	4	02	200
EVS/VE	2(2)	2(2)					4	4	02	200
Part V										
Extension activities				0(1)			0	01	01	100
Total	**30 (20)**	**30 (27)**	**30 (20)**	**30 (25)**	**30 (16)**	**30 (32)**	**180**	**140**	**44**	**4400**

SEMSTER-III							
Subject code	Title of the Paper	No. of Courses	Hours / week	Credits	Maximum Marks		
					Int	Ext	Total
18UTAG31	**Part-I Tamil Subject** காப்பிய இலக்கியமும் சிறுகதையும்	1	6	3	25	75	100
18UENG31	**Part-II English Subject** Exploring Language Through Literature-III	1	6	3	25	75	100
18UELC31	**Part-III Core Subject** Digital Electronics	1	4	4	25	75	100
18UELC32	**Part-III Core Subject** Linear Integrated Circuits	1	4	4	25	75	100
18UELA31	**Part-III Allied Subject** Programming in C	1	4	4	25	75	100
18UELCP2	**Part-III Core Subject (P)** Digital Electronics - Lab	-	2	0	-	-	-
18UELAP2	**Part-III Core Subject (P)** Linear Integrated Circuits – Lab	-	2	0	-	-	-
18UELN31	**PART-IV NME** Microprocessor - 8085	1	2	2	25	75	100
	Total	**6**	**30**	**20**	**150**	**450**	**600**

SEMESTER-IV							
Subject code	Title of the Paper	No. of Courses	Hours / week	Credits	Maximum Marks		
					Int	Ext	Total
18UTAG41	**Part-I Tamil Subject** பழந்தமிழ் இலக்கியமும் புதினமும்	1	6	3	25	75	100
18UENG41	**Part-II English Subject** Exploring Language Through Literature-IV	1	6	3	25	75	100
18UELC41	**Part-III Core Subject** Analog and Digital Communication Systems	1	6	6	25	75	100
18UELA41	**Part-III Allied Subject** Numerical Methods	1	6	4	25	75	100
18UELCP2	**Part-III Core Subject(P)** Digital Electronics - Lab	1	2	3	40	60	100
18UELAP2	**Part-III Core Subject (P)** Linear Integrated Circuits – Lab	1	2	3	40	60	100
18UELN41	**PART-IV NME** Mobile Communication	1	2	2	25	75	100
18UEAG40 - 18UEAG49	**Part-V** Extension activities	1	-	1	100	-	100
	Total	**8**	**30**	**25**	**305**	**495**	**800**

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Programme	**: UG**	**Part III**	**: Core**
Semester	**: III**	**Hours per week**	**: 04**
Subject Code	**: 18UELC31**	**Credit**	**: 04**

DIGITAL ELECTRONICS

Course Outcomes

CO1: To understand the concepts of binary, octal and hexadecimal conversions.
CO2: To know about arithmetic and logical circuits.
CO3: To get a strong idea in Flip-flops counters and registers.
CO4: To get Knowledge about Converters.

Unit-I

Number systems and Boolean algebra:

Introduction – binary numbers- conversions- decimal to binary- octal numbers – octal to binary-hexadecimal numbers- hexadecimal to binary.

Basic law- De-Morgan's theorem- logic gates-construction of basic gates by universal gates- TTL and CMOS Logic and their characteristics – Tristate gates - SOP-POS-K-Map Simplification

Unit-II

Arithmetic and Combinational Circuits

Introduction - 1's, 2's, 9's and 10's complement- half and full adder – half and full subtractors - multiplexer-demultiplexer – encoder - decoder– parity checker.

Unit-III

Sequential Circuits and Flip-Flops

Introduction- RS flip-flop(NOR and NAND gates)- clocked RS flip-flop- JK flip flop- JK Master Slave flip-flop- D flip flop

Unit-IV

Registers and Counters

Registers

Shift Registers- Serial in Serial out – Serial in Parallel out – Parallel in Serial out – Parallel in Parallel out Shift Register.

Counters

Asynchronous counter – 3-bit Synchronous counter – Ring counter-BCD count**er –** UP/Down counter -Modulo–n counter-Design of Combinational and Sequential circuits using VERILOG.

Unit-V

Converters

D/A converters- Weighted resistor-binary ladder- ADC-accuracy – resolution – Counter type – dual slope- successive approximation type – simultaneous conversion-A/D Converter using Voltage-to-Time Conversion.

Text books:

1. Morris Mano.M , **Digital Logic and Computer Design**, Prentice Hall of India, 2002, New Delhi.
2. Albert Paul Malvino and Donald P. Leach, **Digital principles and applications**, Tata McGraw Hill Publishing Company Ltd, 4th edition, 2005, New Delhi.

Reference Books:

1. Salivahanan.S and Arivazhagan.S, **Digital Circuits and Design**, Vikas Publication House Private Ltd, Noida, 2nd edition,2009.

2. Stephen Brown ZvonkoVranesic, **Fundamentals of Digital Logic Design with VHDL**, special Indian Edition, TMH, 2006, New Delhi.

3. Palmer J.E and Primal. DE, **Introduction to digital systems** Schaum's outline series, TMH, 1993.

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Programme	**: UG**	**Part III**	**: Core**
Semester	**: III**	**Hours per week**	**: 04**
Sub code	**: 18UELC32**	**Credit**	**: 04**

LINEAR INTEGRATED CIRCUITS

Course Outcomes

CO1: To understand the concepts of Op-Amp
CO2: To gain the knowledge about the linear and non linear applications of an Op-amp
CO3: To understand the concepts of regulators, timers and generators
CO4: To Know about the special functions of ICs (555,565 and566)

Unit-I

Operational Amplifier: Functional Block diagram –Characteristics of an ideal Operational Amplifier – Circuit Schematic of Op Amp 741.

Operational Amplifier Characteristics: Open loop gain – CMRR – Input bias and offset currents – Input and output offset voltages – Offset compensation techniques – Frequency response characteristics – Stability – Limitation – Frequency compensation – Slew rate

Unit-II

Linear Application of Operational Amplifier: Inverting and Non-inverting amplifiers – Voltage follower – Summing amplifier - Differential amplifier – Instrumentation amplifier – Integrator and Differentiator – Voltage to Current converter-Current to voltage converter- High pass-Low pass- Band Stop Filter- Butter worth filters – Narrow band pass Filter.

Unit-III

Non Linear Application of Operational Amplifier: Comparators – Regenerative comparator – Zero crossing detector – Sample and Hold circuit – Precision diode – Half wave precision rectifiers – Active peak detector -Clipper and Clamper – Logarithm and Exponential amplifier

Unit-IV

Wave form Generators and IC voltage regulators

IC Voltage Regulator: Block diagram of 723 general – Purpose of voltage regulator – Dual power supply – Current limiting schemes. Output current boosting – Fixed and adjustable three terminal regulator.

Unit-V

Special Functions ICs: 555 Timer function block diagram and description – Monostable and Astable operation – PWM -566 Voltage Controlled Oscillator –. Monolithic PLL IC 565.-analog multiplexer using op-amp.

Text Books:

1. Roy Choudhury and Shail, **Linear Integrated Circuits,** Wiley Ltd, New Delhi, III Edition 1991

Unit I	:	Chapter 2 - 2.2 - 2.4
		Chapter 3 - 3.2, 3.3
Unit II	:	Chapter 4 - 4.3, 4.5, 4.10, 4.11
		Chapter 7 - 7.1, 7.2
		Chapter 5 - 5.7
Unit III	:	Chapter 5 - 5.1 - 5.3
		Chapter 4 - 4.6.1 - 4.6.3, 4.7, 4.8
Unit IV	:	Chapter 6 - 6.1 - 6.4
Unit V	:	Chapter 8 - 8.1 to 8.5
		Chapter 9 - 9.4

2. Salivahanan.S & Kanchana Bhaskaran. V.S, "**Linear Integrated Circuits**", TMH, II Edition, 2008.

Reference Books:

1. Gayakwad A.R., **OP – Amps and Linear Integrated Circuits**, Prentice Hall of India, New Delhi, Third Edition,1993.
2. ConghlinF.R and Driscoll F.F, **Operational Amplifier and Linear Integrated Circuits,** PHI New Jersey, III Edition. 1997.
3. Millman and Halkias, **Integrated Electronics: Analog and Digital Circuits and Systems,** McGraw Hill, Reprint, 1995, New Delhi.

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Programme	**: UG**	**Part III**	**: Allied**
Semester	**: III**	**Hours per week**	**: 04**
Sub code	**: 18UELA31**	**Credit**	**: 04**

PROGRAMMING IN C

Course Outcomes

CO1: To have knowledge in C.
CO2: To Develop the programming skills.
CO3: To know about Pointers and Structures.
CO4: To understand about file handling I/O functions in C.

Unit – I

Data types and Operators:

Importance of C - Character set - C tokens - keywords and identifiers - constants - variables - Data types - Declaration of variables - declaration of storage class - strings - Input & Output operation-Operators.

Unit- II

Decision making and branching:

Simple IF - IF - ELSE - NESTED IF - ELSE statements - Switch statement - conditional operators - GOTO statement – LOOPS (While, do, for)-Jumps in loops

Unit III

Arrays Strings and pointers:

Array – Initialization – Declaration – One dimensional and Two dimensional arrays-Multi dimensional Arrays- String- Declaring and Initializing String variables-String Handling functions – -Simple programs- Sorting- Searching – matrix operations.

Unit - IV

Structures Unions and Pointers: Introduction – defining a structure-declaring structure variables-Accessing Structure - members-Arrays of structures-Arrays within structures-Structures and Functions- Unions –Size of structures-Bit fields- Pointers-Pointers and arrays-Array of Pointers-Pointers and functions.

Unit -V

Functions and File Management in C:

Function call - function declaration - Category of function - Nesting of function –Recursion.
File management in C - Introduction - defining and opening a file - closing a file-Input/Output operation on files - Error handling during I/O Operations.

Text Book :

1. Balagurusamy. E, **Programming in ANSIC,** Tata MC Graw Hill Education, IV Edition, 2008, New Delhi.

Unit I :	Chapter 2 - 2.1 to 2.9
	Chapter 8 - 8.1, 8.2
	Chapter 3 - 3.3
Unit II	Chapter 5 - 5.1, 5.4, 5.8
Unit –III	Chapter 7 - 7.1 to 7.7
	Chapter 8 -8.1-8.2
Unit IV:	Chapter 9 - 9.7 to 9.17
	Chapter 10 - 10.1, 10.2
Unit V:	Chapter 12 - 12.1 to 12.6

Reference Books:

1. Kenetkar. Y.P, **Let Us C,** BPB Publisher, 4th edition, 1999, New Delhi.
2. Dennis M.Ritchie C **Programming, PHI Publications, Second Edition, 2002.**
3. Ashok N.Kamthane **Programming with ANSI and Turbo C** Pearson Education, First Edition 2006.

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Title of the Paper	**: UG**	**Part III**	**: Core (P)**
Semester	**: III & IV**	**Hours per week**	**: 02**
Sub code	**: 18UELCP2**	**Credit**	**: 03**

DIGITAL ELECTRONICS- LAB

Course Outcomes:

CO1: To familiarize with the concepts of basic gates and Universal gats.
CO2: To study about Boolean laws and DeMorgan's Theorem experimentally.
CO3: To understand about sequential and combinational circuits.
CO4: To know about A/D converter and D/A converter.

Lab Experiments:

1. Study of basic gates.
2. NAND as Universal gate.
3. NOR as Universal gate.
4. Study the Boolean laws and DeMorgan's Theorem
5. Logic gates using discrete components
6. Half Adder and Half Subtractor.
7. Full Adder and Full Subtractor.
8. 4-Bit Parallel Binary Adder.
9. Binary to Gray Converter.
10. Gray to Binary Converter.
11. Clocked- RS and RS flip-flop using NAND and NOR gates.
12. JK flip-flop and D-flipflop.
13. Multiplexer and De- Multiplexer.
14. Encoder and Decoder.
15. Shift Register.
16. Ring Counter.
17. Decade and UP/DOWN Converter.
18. Digital to Analog Converter.
19. Analog to Digital Converter.
20. Simplification using Karnaugh Map

Note: Any 15 of the above mentioned experiments

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Title of the Paper	**: UG**	**Part III**	**: Core(P)**
Semester	**: III & IV**	**Hours per week**	**: 02**
Sub code	**: 18UELAP2**	**Credit**	**: 03**

LINEAR INTEGRATED CIRCUITS – LAB

Course Outcomes:

CO1: To make the students to be practical in Linear Integrated Circuit Applications.
CO2: To study the characteristics of an Operational Amplifier.
CO3: To understand about Linear and Non-Linear applications of an Operational Amplifier.
CO4: To study about applications of IC555 experimentally.

1. DC characteristics
2. Voltage follower
3. Dual Power Supply.
4. Inverting Amplifier and Non- Inverting Amplifier.
5. Summing and Difference Amplifier.
6. Differentiator and Integrator.
7. Instrumentation Amplifier
8. Op-Amp – Phase Shift Oscillator.
9. Op-Amp – Wien's Bridge Oscillator.
10. IC 555– Astable Multivibrator.
11. IC 555 – Monostable Multivibrator.
12. Digital/Analog Converter – Weighted resistor method.
13. Positive and Negative Clipper.
14. Positive and Negative Clamper.
15. Comparator.
16. Square wave generator.
17. Half Wave Rectifier.
18. Full Wave Rectifier.
19. Sequence Timer.
20. 555 Timer – Schmitt Trigger.

Note: Any 15 of the above mentioned experiments

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Programme	**: UG**	**Part IV**	**: NME**
Semester	**: III**	**Hours per week**	**: 02**
Sub code	**: 18UELN31**	**Credit**	**: 02**

MICROPROCESSOR – 8085

Course Outcomes

CO1: To know about the program model and organization of a microprocessor.
CO2: To understand the Microprocessor Architecture.
CO3: To understand the Concepts of Opcode and addressing modes.
CO4: To develop the program skills.

Unit- I

Introduction:

Central processing Unit – Microprocessor – Organization of a microprocessor based system – Program model of 8085 – Operation of Microprocessor.

Unit- II

Architecture of 8085:

Features of 8085 microprocessor – Pin diagram of Intel 8085 – Architecture of Intel 8085 microprocessor.

Unit- III

Opcode and Instruction format:

Instruction Format **–** Opcode format – data format – classification of instructions (Arithmetic and Data transfer instructions)

Unit- IV

Addressing modes and Instructions:

Logical group – Branch group – Stack I/O and machine control group – Addressing modes

Unit- V

Assembly language programs:

Addition of two 8-bit numbers - 8-bit subtraction – two's complement of 8-bit number – Program to multiply two 8-bit numbers - Program to perform integer division (8-bit by 8-bit) – program to find the largest number in a data array.

Text Book:

1. Gupta. M.K, **Microprocessor, Microcomputer, Microcontroller and Interfacing**, Goyal Publishing House, Second Edition, 2012, Chennai.
   UNIT I: Chapter 1: 1.1, 1.2, 1.3; Chapter 2: 2.1
   UNIT II: Chapter 3: 3.1, 3.4
   UNIT III: Chapter 4: 4.1, 4.2
   UNIT IV: Chapter 4: 4.3, 4.4, 4.5
   UNIT V: Chapter 7: 7.1,7.6, 7.9, 7.14, 7.15, 7.19

Reference Books :

1. Ramesh S.Gaonkar, **Microprocessor Architecture, Programming and Applications with the 8085**, Penram International Publishing, Prentice Hall, III Edition, 1995, New Delhi.
2. Aditya P.Mathur, **Introduction to Microprocessor**, Tata MC Graw Hill, third Edition, 1999.
3. A.Nagoorkani **Microprocessor 8085 and its Applications**, TMH, third Edition, 2013.

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Title of the Paper	**: UG**	**Part III**	**: Core**
Semester	**: IV**	**Hours per week**	**: 06**
Sub code	**: 18UELC41**	**Credit**	**: 06**

ANALOG AND DIGITAL COMMUNICATION SYSTEMS

Course Outcomes

CO1: To get strong idea about AM and FM techniques.
CO2: To know about digital data transmission.
CO3: To understand about Quantization and encoding.
CO4: To make the students understand about the concepts of Modem and RS-232 standards.

Unit –I

CW Modulation

Amplitude modulation- Double sideband Supperesed Carrier –Single Sideband modulation –Vestigial Sideband modulation-Angle modulation-frequency modulation-narrow band and Wide band FM – FM stereo.

Noise in AM receivers using envelope detection- noise in FM detection- pre emphasis-de emphasis

Unit-II

Digital data Transmission

Introduction-binary digital modulation schemes- ASK - PSK- FSK- Comparison of Digital modulation schemes –BPSK- QPSK- QAM

Unit-III

Quantization and Encoding

Digital Pulse Modulation-Sampling theory- Quantizing – Uniform and non uniform quantizing - Coding – PWM- PPM- PCM – Delta Modulation-TDM – FDM and PCM telephone technique

Unit-IV

Error Control Coding

Types of Errors- parity check codes – linear block codes – systematic codes – binary cyclic codes – convolution codes.

Unit-V

Digital Data Communication system

Fundamentals –Fundamentals of data communication systems- Characteristics of data transmission circuits –Digital Codes- Error detection and Correction Data sets and interconnections – Modem –RS232 interface- Basics of Bluetooth

Text Books:

1. Simon Haykin, **An Introduction to Analog and Digital Communications,** John wileyand sons(Asia) Pvt.Ltd, 1989, Singapore.(unit II,III)
2. K.SamShanmugam, **Digital and Analog Communication System,** John Wiley & Sons (Asia) Pvt.Ltd, 1979, Singapore.(Unit IV,V)
3. kenndy Davis, **Electronic Communication Systems**, Tata McGraw Hill Publishing Company ltd, Fourth Edition,1999, New Delhi(unit I)

Reference Books:

1. Martin S.Roden, **Analog and Digital Communication Systems**, Prentice Hall, First Edition, 1985, New Delhi.
2. Lathi. B.P, **Modern Digital and Analog Communication Systems**, Oxford University Press, USA, First Edition, 1998.
3. Srinivasan K.S. **Analog and Digital Communication** Anuradha Publications, 2nd Edition, 2011.

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Programme	**: UG**	**Part III**	**: Allied**
Semester	**: IV**	**Hours per week**	**: 06**
Subject code	**: 18UELA41**	**Credit**	**: 04**

NUMERICAL METHODS

Course Outcomes

CO1: To make the students understand basic concepts of Numerical Methods.
CO2: To develop the skills in solving Simultaneous equations and Interpolations**.**
CO3: To develop the skills in solving differentiation and integration problems numerically.
CO4: To improve the ability to solve difference equations and differential equations numerically.

UNIT- I Algebraic and Transcendental equations

Introduction - Errors in Numerical Computation – Iteration method – Bisection method – Regula-falsi method – Newton Raphson method.

UNIT – II Simultaneous Equations

Gauss Elimination Method – Gauss Jordan Elimination Method – Calculation of Inverse of a Matrix – Crout's method.

UNIT – III Interpolation

Newton's forward and backward Interpolation formulae (Problems Only) – Central Difference Interpolation formulae: Gauss forward Interpolation formula - Gauss backward Interpolation formula – Lagrange's Interpolation formula – Lagrange's Inverse Interpolation.

UNIT – IV Numerical Differentiation

Derivatives using Newton's forward and backward difference formulae (Problems Only) – Maxima and minima of the interpolating polynomial.

Numerical integration: Trapezoidal rule, Simpson's one-third rule, Simpson's three-eighth rule (Problems Only).

UNIT – V Difference Equations

Basic definitions – Linear difference equations.

Numerical Solutions of Differential Equations: Taylor's Series Method.

Textbook:

1. Arumugam. S, Thangapandi Isaac. A, Somasundaram. A, **Numerical Methods**, Scitech Publication (India) private limited, Second Edition, Reprint June 2015.

Unit I: Chapter 3 – Sections 3.0 – 3.5.

Unit II: Chapter 4 – Sections 4.3 - 4.6.

Unit III: Chapter 7 – Sections 7.1, 7.2 (i) & (ii), 7.3, 7.6.

Unit IV: Chapter 8 – Sections 8.1, 8.2, 8.4,8.5.

Unit V: Chapter 9 – Sections 9.1, 9.3.

Chapter 10 – Section10.1.

Reference Books:

1. Veerarajan.T and Ramachandran.T, **Numerical Methods**, Tata Mc-Graw Hill, Second Edition, 2006.
2. Sastry. S.S, **Introductory Methods of Numerical Analysis**, Prentice Hall India Private Limited, Fourth Edition, 2008, New Delhi.
3. Jain. M.K, Iyengar. S.R.K, Jain. R.K, **Numerical Methods,** New Age International publishers, 5th Edition, 2007, New Delhi.

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Title of the Paper	**: UG**	**Part III**	**: Core (P)**
Semester	**: III & IV**	**Hours per week**	**: 02**
Sub code	**: 18UELCP2**	**Credit**	**: 03**

DIGITAL ELECTRONICS- LAB

Course Outcomes:

CO1: To familiarize with the concepts of basic gates and Universal gats.
CO2: To study about Boolean laws and DeMorgan's Theorem experimentally.
CO3: To understand about sequential and combinational circuits.
CO4: To know about A/D converter and D/A converter.

Lab Experiments:

20. Study of basic gates.
21. NAND as Universal gate.
22. NOR as Universal gate.
23. Study the Boolean laws and DeMorgan's Theorem
24. Logic gates using discrete components
25. Half Adder and Half Subtractor.
26. Full Adder and Full Subtractor.
27. 4-Bit Parallel Binary Adder.
28. Binary to Gray Converter.
29. Gray to Binary Converter.
30. Clocked- RS and RS flip-flop using NAND and NOR gates.
31. JK flip-flop and D-flipflop.
32. Multiplexer and De- Multiplexer.
33. Encoder and Decoder.
34. Shift Register.
35. Ring Counter.
36. Decade and UP/DOWN Converter.
37. Digital to Analog Converter.
38. Analog to Digital Converter.
20. Simplification using Karnaugh Map

Note: Any 15 of the above mentioned experiments

MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
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Title of the Paper	**: UG**	**Part III**	**: Core (P)**
Semester	**: III & IV**	**Hours per week**	**: 02**
Sub code	**: 18UELAP2**	**Credit**	**: 03**

LINEAR INTEGRATED CIRCUITS – LAB

Course Outcomes:

CO1: To make the students to be practical in Linear Integrated Circuit Applications.
CO2: To study the characteristics of an Operational Amplifier.
CO3: To understand about Linear and Non-Linear applications of an Operational Amplifier.
CO4: To study about applications of IC555 experimentally.

21. DC characteristics
22. Voltage follower
23. Dual Power Supply.
24. Inverting Amplifier and Non- Inverting Amplifier.
25. Summing and Difference Amplifier.
26. Differentiator and Integrator.
27. Instrumentation Amplifier
28. Op-Amp – Phase Shift Oscillator.
29. Op-Amp – Wien's Bridge Oscillator.
30. IC 555– Astable Multivibrator.
31. IC 555 – Monostable Multivibrator.
32. Digital/Analog Converter – Weighted resistor method.
33. Positive and Negative Clipper.
34. Positive and Negative Clamper.
35. Comparator.
36. Square wave generator.
37. Half Wave Rectifier.
38. Full Wave Rectifier.
39. Sequence Timer.
40. 555 Timer – Schmitt Trigger.

Note: Any 15 of the above mentioned experiments

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION
(For those who joined in 2018-2019 and after)

Title of the Paper	**: UG**	**Part IV**	**: NME**
Semester	**: IV**	**Hours per week**	**: 02**
Sub code	**: 18UELN41**	**Credit**	**: 02**

MOBILE COMMUNICATION

Course Outcomes

CO1: To understand the concept of mobile Communication.
CO2: To know about the mobile communication standards.
CO3: To understand about Multiple access techniques
CO4: To know about the Mobile Satellities

Unit- I

Modulation Techniques: Introduction about Communication, Signal and their Classification, analog and Digital signal, Elements of communication system.

Unit-II

Mobile Communication Introduction : Cell Mobile Telephone system – Tuning efficiency – Frequency reuse concept – Co-channel interference reduction – Hand-off mechanism – Frequency spectrum utilization – Cell splitting**.**

Unit- III

Digital Cellular Systems: Digital speech – Group of special mobile (GSM) – Multiple access techniques (TDMA, FDMA, CDMA).

Unit- IV

Spectrum: Introduction – 2G -3G -4G -5G– Advantages – Applications.

Unit - V:

Mobile Satellites: Architecture –Orbits-Constellation –Classification -GPS

Text Books:

1. John Schiller, **Mobile Communications**, an Imprint of Pearson Education, Second Edition, 2003, New Delhi.
2. Jeyasri Arokiamary.V, **Mobile Communication**, Technical Publications, First Edition, 2009, Pune.

Reference Books:

1. The Odore S.Rappaport, **Wireless Communications,** Prentice Hall of India Private Limited, 2nd edition, 2003, New Delhi.
2. Simon Haykin, **An Introduction to Analog and digital Communications**, John Wiley and Sons (Asia) Pvt.Ltd, 1989, Singapore.
3. Srinivasan K.S. **Analog and Digital Communication** Anuradha Publications, 2nd Edition, 2011.

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