

B.Sc., ELECTRONICS & COMMUNICATION

Syllabus

Program Code: UEL

2018 - Onwards



MANNAR THIRUMALAI NAICKER COLLEGE

(AUTONOMOUS)

Re-accredited with "A" Grade by NAAC

PASUMALAI, MADURAI – 625 004

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 x 01= 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 x 01 = 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	<u>--10 marks*</u>
Total	<u>--25 marks</u>

** 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.

PROGRAM EDUCATIONAL OUTCOMES

- PEO1:** To enhance the entrepreneurial abilities and research initiatives through experimental learning practices and building self-confidence.
- PEO2:** Utilize the concepts of Electronics and Communication to get placement in various electronic based Industries.
- PEO3:** To grasp with a wide range of experimental skills and soft skills to create a own project.
- PEO4:** Ability to work in any places with his/her research ideas and ethical challenges in multi- disciplinary environment.

PROGRAM OUTCOMES

- PO1:** Utilize the basic concepts of Electricity and Circuits.
- PO2:** Identify, formulate and solve any technical issues in electronic equipment.
- PO3:** Design and servicing, Troubleshooting the Electronic equipment.
- PO4:** Communicate effectively to comprehend and write reports and documentation.
- PO5:** Perform effectively as a member/Leader in various roles.
- PO6:** Develop consciousness of professional, ethical and social responsibilities as experts in the field of Electronics and Communication.
- PO7:** Demonstrate knowledge and understanding of Electronics and communication concepts to create own project.

PROGRAMME SPECIFIC OUTCOMES

- PSO1:** To improve hardware and software skills in embedded 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

SEMESTER-I							
Subject code	Title of the Paper	No. of Courses	Hours / week	credits	Maximum marks		
					Int	Ext	total
18UTAG11	பகுதி-I: தமிழ் தற்கால கவிதையும் உரைநடையும்	1	6	3	25	75	100
18UENG11	English-I: Exploring Language Through Literature-1	1	6	3	25	75	100
18UELC11	Part-III Core Subject Electronic Devices	1	4	4	25	75	100
18UELA11	Part-III Allied Subject Basic electricity and circuits	1	4	4	25	75	100
18UELE11	Part-III Elective Subject Electronic Instrumentation	1	2	2	25	75	100
18UELS11	Part-IV Skilled Subject Introduction to Computer Application	1	2	2	25	75	100
18UEVG11	Part-IV Mandatory Subject Environmental Studies	1	2	2	25	75	100
18UELCP1	Part-III Core Subject (P) Electronic Devices and Circuits – Lab	-	2	-	-	-	-
18UELAP1	Part-III Allied Subject (P) Basic Electricity and circuits Lab	-	2	-	-	-	-
	Total	7	30	20	175	525	700

SEMSTER-II							
18UTAG21	பகுதி-I தமிழ் பக்தி இலக்கியமும் நாடகமும்	1	6	3	25	75	100
18UENG21	English-II: Exploring Language Through Literature-II	1	6	3	25	75	100
18UELC21	Part-III Core Subject Electronic Circuits	1	4	4	25	75	100
18UELE21	Part-III Elective Subject Electronic Communication Systems	1	2	2	25	75	100
18UELA21	Part-III Allied Subject Allied Mathematics	1	4	4	25	75	100
18UELS21	Part-IV Skilled Subject Opto Electronics	1	2	2	25	75	100
18UVLG21	Part-IV Mandatory Subject Value Education	1	2	2	25	75	100
18UELCP1	Part-III Core Subject (P) Electronic Devices and Circuits - Lab	1	2	4	40	60	100
18UELAP1	Part-III Allied Subject (P) Basic Electricity and circuits Lab	1	2	3	40	60	100
	Total	9	30	27	255	645	900

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

SEMSTER-V							
Subject code	Title of the Paper	No. of Courses	Hours / week	Credits	Maximum Marks		
					Int	Ext	Total
18UELC51	Part-III Core Subject Microprocessors and Interfacing	1	4	4	25	75	100
18UELC52	Part-III Core Subject Sensors and Transducers	1	5	4	25	75	100
	Part-III Elective Subject						
18UELE51	Internet of Things	1	5	4	25	75	100
18UELE52	Industrial and Power Electronics						
18UELE53	Mobile Communication						
18UELS51	Part-IV Skilled Subject Fiber Optic Communication	1	2	2	25	75	100
18UELS52	Part-IV Skilled Subject Bio-Medical Instrumentation	1	2	2	25	75	100
18UELCP3	Part-III Core Subject(P) Communication - Lab	-	3	0	-	-	-
18UELAP3	Part-III Allied Subject(P) Sensors and Transducers - Lab	-	4	0	-	-	-
18UELCP4	Part-III Core Subject(P) Microprocessors and Microcontroller - Lab	-	3	0	-	-	-
18UELPR1	Part-III Project Project	-	2	0	-	-	-
	Total	5	30	16	125	375	500

SEMESTER-VI							
Subject code	Title of the Paper	No. of Courses	Hours / week	Credits	Maximum Marks		
					Int	Ext	Total
18UELC61	Part-III Core Subject Microcontroller 8051 and Embedded Systems	1	5	5	25	75	100
18UELC62	Part-III Core Subject Digital Signal Processing	1	5	5	25	75	100
	Part-III Elective Subject						
18UELE61	Industrial Automation	1	4	4	25	75	100
18UELE62	Antenna and Wave Propagation						
18UELE63	Microwave and Radar Systems						
18UELS61	Part-IV Skilled Subject Computer Networks	1	2	2	25	75	100
18UELS62	Part-IV Skilled Subject Television Systems	1	2	2	25	75	100
18UELCP3	Part-III Core Subject(P) Communication - Lab	1	3	4	40	60	100
18UELAP3	Part-III Allied Subject(P) Sensors and Transducers-Lab	1	4	3	40	60	100
18UELCP4	Part-III Core Subject(P) Microprocessors and Microcontroller - Lab	1	3	3	40	60	100
18UELPR1	Part-III Project Project	1	2	4	40	60	100
	Total	9	30	32	285	615	900

FIRST SEMESTER



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION
(For those who joined in 2018-2019 and after)

Programme	:B.Sc (E&C)	Part III	: Core
Semester Code	: I	Hours	: 04
Subject Code	: 18UELC11	Credit	: 04

ELECTRONIC DEVICES

Course Outcomes:

- CO1:** To learn the principles of working of the semiconductor devices
- CO2:** To study the operation of Electronic Devices.
- CO3:** To gain the knowledge of characteristics and uses of electronic devices
- CO4:** To understand the application of electronic devices in circuit design and troubleshooting (customer service)

Unit 1: PN JUNCTION DIODES

Introduction to PN junction diode – Construction – Working of the diode –VI characteristics – Diode resistance – Transition capacitance – Diffusion Capacitance – temperature effect.

Unit 2: SPECIAL DIODES& CHARACTERISTICS

Zener Diode, Varactor Diode, Tunnel Diode, Schottky Diode, PIN Diode –Construction –VI Characteristics – Applications

Unit 3: TRANSISTOR

Construction - types of transistors - configurations – characteristics – alpha, beta relations – Transistor as amplifier – transistor as a switch.

Unit 4: FET and MOSFET

Introduction – construction – working – n channel – p channel FET – Difference between Transistor and FET.

MOSFET –Construction – Enhancement type – Depletion type – Difference between FET and MOSFET

Unit 5: THYRISTOR & INTRODUCTION TO IC'S

Introduction -Construction and working of SCR, DIAC, TRIAC, IGBT-Introduction to fabrication of IC.

Text books:

1. R.S.Sedha, **Applied Electronics**, S.Chand& Company Ltd, New Delhi, first Edition, 1990
2. S.Salivahanan, N. Sureskumar and A. Vallavaraj, **Electronic Devices and Circuits**, Tata McGraw-Hill Publishing Company Ltd, New Delhi, Second Edition, 2011.
3. Principles of Electronics – V. K. Mehta – S.Chand publications.
4. Power Electronics –Dr.J.S.Chitode –Technical publications.

UNIT I : Text Book 2 Chapter (4.11,4.15,4.16,4.17,4.18)

UNIT II : Text Book 1 Chapter (13.01 to 13.20)

UNIT III : Text Book 2 Chapter (6.1 to 6.7)

UNIT IV : Text Book 2 Chapter (7.1 to 7.12)

UNIT V : Text Book 1 &4 Chapter (17.1 to 17.29) ,1.14

Reference books

1. SantiramKal, **Basic Electronics: Devices, Circuits and Its Fundamentals**, PHI Learning Pvt. Ltd, New Delhi, First Edition, 2002.
2. A.P.Godse, U.A.Bakshi, **Electronic Devices**, Technical Publication, Pune, First Edition, 2009.



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Programme	: B.Sc (E&C)	Part III	: Allied
Semester	: I	Credit	: 04
Subject Code:	18UELA11	Hours	: 04

BASIC ELECTRICITY AND CIRCUITS

Course Outcomes:

CO1:To understand the basics of electricity, a.c.circuit analysis & network theorems, actuators.

CO2:Basic analysis of ac and dc signals is understood with the help of Circuit theorems.

CO3: Analysis of a.c. circuits is studied.

CO4: To gain knowledge on basic circuit theorems and electricity.

Unit-I

Introduction to Electricity:

Voltage – Current – Power and Energy – The circuit – Resistance Parameter – Capacitance Parameter – Inductance parameter – Energy sources – Polyphase system – Advantages of a Three-Phase system – Generation of Three-Phase voltages – Phase Sequence.

Unit-II

Basics of Circuit analysis:

Series and Parallel circuits-Resistances in series-Resistances in parallel-Current division rule-Voltage division rule-Mesh Current method –Node Voltage method (ac &dc excitation)-Cramer’s rule-Matrix method of analysis.

Unit-III

Network Theorems:

Ohm's law-Kirchhoff's law- -Star delta transformation- Superposition Theorem- Thevenin's and Norton's Theorem- Maximum power transfer theorem –Millman's theorem.

Unit-IV

Resonance and coupled circuits:

Series and parallel resonance- Conductively coupled coils – single Tuned circuits - Double Tuned coupled circuits.

Unit-V

Actuators:

Introduction-DC Motor- Types of dc motor - Drives for dc motors – AC motor-Types of AC Motor--Synchronous Motor-Stepper motor- Servo motor.

Text book:

1. Electric Circuit Theory, S. Badrinarayanan, A. Usha Nandini
2. A. Sudhakar and Shyam Mohan, **Circuits and Networks Analysis and synthesis**, Tata MC Graw-Hill Publishing company LTD, New Delhi, Third edition-2007
3. N. Mathivanan, **PC Based Instrumentation**, PHI Learning Private Ltd, New Delhi, First Edition, 2007.

UNIT I Text Book 2 Chapter 1 (1.1 – 1.8), Chapter 9 (9.1 – 9.4)

UNIT -II Text Book 1 Chapter 1 (1.0 – 1.14)

UNIT –III Text Book 1 Chapter 2 (2.0–2.5)

UNIT – IV Text Book 1 Chapter 3 (3.0 – 3.22)

UNIT – V Text Book 3 Chapter 3 (3.5.1 – 3.5.4)

Reference books

1. A.K. Sawhney, Electrical and Electronic Measurements and Instrumentation, The Dhanpat Rai & Co (P) Ltd, New Delhi, Seventeenth Edition, 2000.
2. Chitra Shadrach and Sivakumar Vadivelu, Engineering Physics, Dorling Kindersley (India) Pvt.Ltd, License of Pearson Education, South Asia, Second Edition, 2010.



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Programme : B.Sc (E&C)
Semester : I
Sub code : 18UELE11

Part III : Elective
Hours : 02
Credits : 02

ELECTRONIC INSTRUMENTATION

Course Outcomes:

- CO1**To understand the working of electronic instruments.
- CO2:** To understand the concepts of basic analog and digital meters
- CO3:** To provide depth knowledge about the principle of oscilloscope
- CO4:** To gain the knowledge about the measuring instruments

UNIT I

Indicating instruments: Basic meter movement- PMMC – DC Ammeter- multirange Ammeter- Voltmeter -Multirange voltmeter- AC voltmeter using rectifiers-Ohm meter- Potentiometer- Multimeter- VTVM.

UNIT II

Digital Instruments &Signal generators: Digital multimeter - Digital frequency meter-digital measurement of time- digital tachometer-AF generator-oscillator- Function generator.

UNIT III

Measurement of power: Introduction- bolometer-bolometer method of power measurement- Calorimetric method-Watt meter-energy meter-Output Power meter - RF field Strength meter and Phase meter.

UNIT IV

Wave Analyzers and Bridges: Introduction - Basic wave Analyser – Super Heterodyne wave analyzer(Block diagram)

Bridges: DC resistance (Wheatstone Bridge) - AC Resistance (Wheatstone bridge) - Capacitance Schering bridge - Maxwell's Bridge - Wiens Bridge (Resistance and Q of the Resonance Circuit)- Kelvin bridge.

UNIT V

Oscilloscope: Basic principle - block diagram of oscilloscope –CRT-vertical and horizontal deflection system- Measurement of frequency by Lissajous method - Use of Lissajous figure for phase measurement.-Dual beam oscilloscope-Digital storage oscilloscope

BOOKS FOR STUDY/REFERENCE

Text Book:

1. Electronic Instrumentation - H.S. Kalsi (2002), Tata McGraw-Hill Publishing Company Ltd., New Delhi.
2. Electrical and Electronic Measurements and Instrumentation. A.K.Sahwney, (2006), Dhanpat Rai & Co.(P) Ltd., New Delhi.
3. Electronic Devices and Circuits - S.Salivahanan, N.Suresh kumar, A.Vallavaraj (1999), Tata McGraw-Hill Publishing Company Ltd, New Delhi..

UNIT I : Text Book 1 Chapter (2.2,3.1,3.2,4.3,4.4,4.13,4.14,4.21,4.25)

Text Book 2 Chapter (9.4, 20.3-20.32, 15.1)

UNIT II : Text Book 1 Chapter (6.2-6.4, 6.9,6.13)

Text Book 2 Chapter (8.3, 8.8)

UNIT III : Text Book 1 Chapter (20.1,20.3,20.4,20.10,10.2,10.3,10.4,10.5)

UNIT IV : Text Book 1 Chapter (9.1-9.6 ,11.1-11.2,11.13,11.17,11.14,10.7,11.3)

UNIT V : Text Book 1 Chapter (7.1,7.2,7.4,7.6,7.7,7.20,7.26,7.14,7.32)

Books for Reference:

1. Measurements and Instruments - Ramachandran, Priya Publishers, Trichy.
2. Electronics and Instrumentation - B.R.Gupta (2003), S.Chand & Company Ltd, New Delhi, Third Edition, 2008.
3. V.A.Bakshi, A.V.Bakshi, **Measurements and Instrumentation**, Technical Publications, Pune, First Edition, 2008.



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Programme	: B.Sc (E&C)	Part IV	: Skill
Semester	: I	Hours	: 02
Sub code	: 18UELS11	Credits	: 02

INTRODUCTION TO COMPUTER APPLICATION

Course Outcomes:

CO1: To learn the concept of Internet and Internet of things.

CO2: To study the basics of Multimedia.

CO3: To understand Word, Excel and Power point.

CO4:To gain knowledge about Multimedia and Internet of things.

CO5:To gain the knowledge about OS.

UNIT-I User Computer Interface & OS:

Introduction –Hardware- Software –System Software –Application software –Introduction to OS-Types – Objectives - Functions –Examples.

UNIT-II

MS-Word 2007:

Introduction – Starting Word – Screen and its Components – The Office Button - The Ribbon – Examples-Introduction to Ms Excel-Basics of Spreadsheet-Ms Excel-Screen & its Components-Examples.

UNIT-III

MS-PowerPoint 2007: Introduction – Basics of PowerPoint – Start MS-PowerPoint – Screen and its components – Office Button – The Ribbon – Examples.

UNIT-IV

Multimedia:

Introduction – Definition – Characteristics of Multimedia system – Elements of Multimedia – Multimedia system – Multimedia Applications.

UNIT-V

Internet and Internet of Things: Introduction to Internet-Connecting to Internet -Internet Address-Internet Services- Internet of things and its applications.

Text Book:

1. Anita Goel, **Computer Fundamentals**, Pearson Education, New Delhi, 2010.

UNIT I : Text Book 1 Chapter 6, 6.1, 6.2, 6.3, 6.4, 7.1,7.2,7.3,7.4 &7.11.

UNIT II : Text Book 1 Chapter 16 &17

UNIT III: Text Book 1 Chapter 18

UNIT IV: Text Book 1 Chapter 13

UNIT V: lecture notes

Reference Books:

1. Vikas Gupta, **Comdex Computer Course Kit Windows 2007 with Office 2010**, Dream Tech Press, New Delhi, 2011.
2. Vikas Gupta, **Comdex Multimedia and Web Design Course Kit Windows 2007 with Office 2010**, Dream Tech Press, New Delhi, 2012.



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Programme : B.Sc(E&C)
Semester : I
Sub code : 18UEVG11

Part IV: Mandatory
Hours : 02
Credits : 02

ENVIRONMENTAL STUDIES

COURSE OUTCOMES	
CO1: To gain knowledge on the importance of environmental education and ecosystem. CO2: To acquire knowledge about environmental pollution- sources, effects and control measures of environmental pollution CO3: To understand the various energy sources, exploitation and need of alternate energy resources. Disaster management To acquire knowledge with respect to biodiversity, its threats and its conservation and appreciate the concept of interdependence CO4: To make the student to understand the various pollution problems control mechanisms.	
UNIT I	: Environment and Earth: Environment – Meaning – Definition - Components of Environment – Types of Environment. Interference of man with the Environment. Need for Environmental Education. Earth – Formation and Evolution of Earth – Structure of Earth and its components – Atmosphere, Lithosphere, Hydrosphere and Biosphere. Natural Resources: Renewable Resources and Non-Renewable Resources. Natural Resources and Associated Problems. Use and Exploitation of Forest, Water, Mineral, Food, Land and Energy Resources.
UNIT II	: Ecology and Ecosystems: Ecology – Meaning - Definition – Scope – Objectives – Subdivisions of Ecology. Ecosystem – Concept - Structure - Functions – Energy Flow – Food Chain and Food Web – Examples of Ecosystems (Forest, Grassland, Desert, Aquatic).
UNIT III	: Biodiversity: Definition – Biodiversity at Global, National and Local Level. Values of Biodiversity – Threats to Biodiversity – Conservation of Biodiversity. Biodiversity of India: Biogeographical Distribution – Hotspots of Indian Biodiversity – National Biodiversity Conservation Board and Its functions. Endangered and Endemic Species of India
UNIT IV	: Pollution Issues: Definition – Causes – Effects and Control Measures of Air, Water, Soil, Marine, Noise, Thermal and Nuclear Pollutions. Global Issues: Global Warming and Ozone Layer Depletion. Future plans of Global Environmental Protection Organisations.
UNIT V	: Sustainable Development: Key aspects of Sustainable Development – Strategies for Sustainable Development - Agriculture – Organic farming – Irrigation – Water Harvesting – Water Recycling – Cyber Waste and Management. Disaster Management: Meaning – Types of Disasters - Flood and Drought – Earth quake and Tsunami – Landslides and Avalanches – Cyclones and Hurricanes – Preventions and Consequences. Management of Disasters -

Text Book:

Study Material for **Environmental Studies**, Mannar Thirumalai Naicker College, Pasumalai, Madurai – 625 004.

Reference Books:

1. Study Material for **Environmental Studies**, Publications Division, Madurai Kamaraj University, Madurai – 625 021.
2. R.C. Sharma and Gurbir Sangha, **Environmental Studies**, Kalyani Publishers, 1, Mahalakshmi Street, T.Nagar, Chennai – 600 017.
3. Radha, **Environmental Studies for Undergraduate Courses of all Branches of Higher Education, (Based on UGC Syllabus)**, Prasanna Publishers & Distributors, Old No. 20, Krishnappa Street, (Near Santhosh Mahal), Chepak, Chennai – 600 005.
4. S.N.Tripathy and Sunakar Panda, **Fundamentals of Environmental Studies**, Vrinda Publications (P) Ltd. B-5, Ashish Complex, (opp. To Ahicon Public School), MayurVihar, Phase-1, Delhi– 110 091.
5. G.Rajah, **Environmental Studies for All UG Courses, (Based on UGC Syllabus)**, Margham Publications, 24, Rameswaram Road, T.Nagar, Chennai – 600 017.



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Programme	: B.Sc (E&C)	Part III : Core (P)
Semester	: II	Hours : 02
Sub code	: 18UELCP1	Credits : -

ELECTRONIC DEVICES AND CIRCUITS - Lab

Course Outcomes:

- CO1:** To study of electronic devices and circuits the Student will develop his servicing career of electronic systems.
- CO2:** To develop the skill in Rectifier Circuits.
- CO3:** To create awareness functions of oscillatory Circuits.
- CO4:** To develop practical skills in his own entrepreneurship.

Lab Experiments: (Any 12)

1. P-N junction diode characteristics.
2. Zener diode characteristics.
3. Half wave & Full wave Rectifier.
4. Bridge Rectifier.
5. Zener Regulated power supply.
6. IC Regulated power supply.
7. Transistor characteristics (common emitter).
8. Transistor Amplifier.
9. Emitter Follower.
10. Hartley Oscillator.
11. Colpitts Oscillator.
12. Phase Shift Oscillator.
13. Wiens Bridge Oscillator.
14. Clipping and clamping circuits.
15. Astable Multivibrator using Transistor.
16. Mono stable Multivibrator using Transistor.
17. FET characteristics.
18. FET Amplifier.

-
19. UJT characteristics.
 20. Low Pass filter & High Pass filter using RC components.



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION
(For those who joined in 2018-2019 and after)

Programme	: B.Sc (E&C)	Part III	: Allied(P)
Semester	: II	Hours	: 02
Subject Code	: 18UELAP1	Credit	: -

BASIC ELECTRICITY AND CIRCUITS Lab

Course Outcomes:

CO1: To create skill in the Circuit analysis.

CO2: To understand and to develop knowledge on Calibration of electric circuits.

CO3: To enable the students to verify the various theorem with help of electric circuits.

CO4: To develop his practical skills in electricity.

LAB EXPERIMENTS (Any 12)

1. Carry –foster bridge-(Resistance and specific resistivity).
2. Potentiometer-calibration of low range volt meter.
3. Potentiometer-calibration of high range volt meter.
4. Potentiometer-calibration of high range ammeter.
5. Conversion of galvanometer in to volt meter and ammeter.
6. Ballistic galvanometer -comparison of capacitance.
7. Solar cell.
8. LCR-series resonance.
10. Owens Bridge.
11. Verification of Ohm'S Law
12. Verification of KCL.
13. Verification of Thevenin's Theorem
14. Verification of Nortons Theorem
15. Measurement of Unknown Resistance using Wheatstone Bridge.
16. Verification of KVL.
17. Verification of Superposition Theorem
18. Verification of Maximum Power Transfer theorem.

SECOND SEMESTER



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION
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Title of the Paper	: B.Sc (E&C)	Part III	: Core
Semester	: II	Hours	: 04
Sub code	: 18UELC21	Credits	: 04

ELECTRONIC CIRCUITS

Course Outcomes:

- CO1:** Students gain knowledge in analysis of Electronics circuits.
- CO2:** Students can analyze, design and implement circuits in applications.
- CO 3:** Students can design power supplies.
- CO 4:** Students can understand biasing.

UNIT-I

Rectifier, Power supply and wave shaping circuits:

Half wave rectifier- Full wave rectifier- Bridge rectifier- linear mode power supply- switch mode power supply- types of clipper and its operation- types of clamper and its operation- Applications.

UNIT-II

Transistor biasing:

Bias stability- Thermal runaway- stability factor - methods of transistor biasing: base resistor method- collector to base bias method- voltage divider bias method. FET biasing: self bias method –voltage divider bias method.

UNIT-III

Amplifiers:

Classification of amplifier- CE amplifier – RC coupled amplifier – transformer coupled amplifier – single tuned amplifier, stagger tuned amplifier- FET as an amplifier.

UNIT-IV

Feedback and Power amplifiers:

Concept of feedback – negative voltage feedback amplifier- negative current feedback amplifiers- class A, class B and class C power amplifiers-push pull amplifier- complementary symmetry amplifier.

UNIT-V

Oscillators and multivibrators:

Barkhausen criteria- Hartley oscillator-Colpitt's oscillator- Wien Bridge oscillator- crystal oscillator- UJT relaxation oscillator-Astable multivibrator-monostable multivibrator- Bistable multivibrator.

Text books:

1. S.Salivahanan, N. Sureskumar and A. Vallavaraj, **Electronic Devices and Circuits**, Tata McGraw-Hill Publishing Company Ltd, New Delhi, Second Edition, 2011
2. V.K Mehta, Rohit Mehta, **Principles of Electronics**, S.Chand & Company Ltd, New Delhi, First Edition, 1980.
3. R.S.Sedha, **Applied Electronics**, S.Chand & Company Ltd, New Delhi, First Edition, 1990.

UNIT I : Text Book 1 Chapter(15.1, 15.2.1, 15.2.2, 15.3, 4.22, 4.23)

UNIT II : Text Book 1 Chapter(6.9, 6.9.1, 6.9.2, 6.10.1, 6.10.2, 6.10.3, 7.16)

UNIT III : Text Book 1 Chapter (10.3.1, 10.7.4, 10.7.5, 10.8.1, 10.8.5, 10.5)

UNIT IV : Text Book 1 Chapter (12.1,12.2,12.3,12.4,10.6.1, 10.6.4,10.6.5,10.6.8)

UNIT V : Text Book 1 Chapter (13.3,13.5,13.6,13.10,13.11,14.3.1,14.3.2,14.3.3)

Reference books:

1. Santiram Kal, **Basic Electronics: Devices, Circuits and It Fundamentals**, PHI Learning Pvt. Ltd, New Delhi, First Edition, 2002.
2. A.P.Godse, U.A.Bakshi, **Electronics Circuits – I**, Technical Publication, Pune, 2009.
3. A.P.Godse., U.A.Bakshi, **Electronics Circuits – II**, Technical Publication, Pune, 2009.



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Programme : B.Sc (E&C)
Semester : II
Sub code : 18UELE21

Part III : Elective
Hours : 02
Credits : 02

ELECTRONIC COMMUNICATION SYSTEMS

Course Outcomes:

- CO1:** To study the concepts of communication systems
- CO2:** To gain the knowledge of Modulation techniques.
- CO3:** To study the concepts of satellite communication and Mobile communication systems.
- CO4:** To understand principles of electronic communications.

UNIT I

Introduction:

Communication process-source of information-communication networks-communication channel-modulation process-need for modulation- demodulation

UNIT II

Analog communication:

Introduction-Amplitude modulation-Angle modulation-Frequency modulation-Transmitter and receiver of AM and FM.

UNIT III

Digital communication:

Digital pulse modulation-PCM-Sampling-Quantizing-coding-delta modulation-wireless communication

UNIT IV

Mobile Communication:

Introduction: Cell Mobile Telephone system – Group of special mobile (GSM) – Multiple access techniques (TDMA, FDMA, CDMA)- Advanced systems –GPRS- Introduction to Mobile Communication Spectrum.

Unit V

Satellite communication:

Introduction – Active and passive satellite- structure of satellite communication-satellite orbits-Application-Attitude and orbit control system-TT&C-communication subsystems.

Text books:

1. Simon Haykin, Communications Systems, Wiley India, New Delhi, 4th Edition, Reprint. 2007.
2. K.S.Srinivasan, Principles of Communication System, Anuradha Publications, New Delhi, First Edition, Reprint 2007..
3. MonojitMitra, Satellite Communication, Prentice Hall of India, New Delhi, First Edition, 2005.

Reference books:

1. Simon Haykin, Analog and Digital Communications, Wiley India, New Delhi, 1st Edition, Reprint. 2003
2. B.P.Lathi, Communication Systems, Wiley Eastern University Edition, USA, First Edition Reprint 1994.
3. B.P.Lathi, Modern Digital and Analog Communication Systems, Prism Books Private Ltd, Newyork, Second Edition, 1993.

UNIT I : Text Book 1 Chapter (1 -8)

UNIT II : Text Book 1 Chapter (2.1-2.2, 2.6, 2.7)

Text Book 2 Chapter (2.28, 2.46)

UNIT III : Text Book 1 First Edition Chapter (5.1-5.8)

UNIT IV : (Prepared by Department)

UNIT V : Text Book 1 Chapter (1.1,1.3,1.5,1.4,3.2,3.3)



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Programme	: B.Sc (E & C)	Part III	: Allied
Semester	: II	Hours	:04
Code	: 18UELA21	Credits	:04

ALLIED MATHEMATICS

Course Outcomes:

- CO1:** To Provide the students with calculation competency, concept understanding and mathematical literacy.
- CO2:** To use computational techniques and algebraic skills for the study of matrix algebra, eigenvalues and eigenvectors.
- CO3:** To make the students to evaluate definite and indefinite integrals and use them in applications.
- CO4:** This course enable the students to use the problem solving skills in a wide variety of situations.

- Unit – I** Matrix Algebra – Introduction – Operations – Inverse, Rank of matrix – Solution of Simultaneous linear equations – Eigen values & Eigen vectors.
- Unit - II** Theory of equation – An n^{th} degree equation has exactly n roots – Relation between the roots and the coefficients
- Unit - III** Finding the roots upto two decimals by Newton's method and Horner's Method
- Unit -IV** Radius of curvature, Center of curvature of plane curves.
- Unit - V** Integral calculus: Integration –Integration by Parts.

Text Book:

1. Dr. M.Venkatraman, Dr. N. Sridharan & N.Chandrasekaran, **Discrete Mathematics**, The National Publishing Company.
2. Dr. S.Arumugam, **Ancillary Mathematics Volume I**, New Gamma Publication, Palayamkottai, Reprint 2006.

Unit I-	Chapter:6. Section: 6.1 to 6.5, 6.7
Unit II-	Chapter 1: Page No: 1 to 26
Unit III-	Chapter 1: Page No :40 to 48
Unit IV-	Chapter 3: Page No: 65 to 90
Unit V-	Chapter 3 Page No: 91 to 113

Reference Books:

1. T.K .ManicavasagamPillai and S.Narayanan, **Algebra, Volume I and II**,S.ViswanthanPrinters and Publishers Pvt Ltd, Chennai, 2009 (Unit I to IV).
2. T.KManicavasagampillai and S.Narayanan, **Trigonometry Volume III and IV**,S.ViswanthanPrinters and Publishers Pvt Ltd, Chennai, 2009 (Unit V).



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Programme : B.Sc(E&C)
Semester : II
Sub code : 18UELS21

Part IV : Skill
Hours : 02
Credits : 02

OPTOELECTRONICS

Course Outcomes:

- CO1:** To understand the concepts of Optical process in Semiconductors.
- CO2:** To provide beneficial knowledge about the Optical source and detectors
- CO3:** To gain the knowledge about the LASER.
- CO4:** To gain the knowledge about Fiber Optic Communication as a Emerging trend.

Unit –I

Energy bands & Band gap in Semiconductors:

Formation of energy bands in semiconductors-energy band diagram-Direct band gap and Indirect band gap semiconductor-Density of states-Optical absorption.

Unit –II

Optical Process & Detectors :

Luminescence –Photo luminescence –Electroluminescence-Solar Cell
LED-IR Emitter-Photodiode-PIN-APD- photo transistor –Photothyristor -SLD-
Photothermistor

Unit –III

LASER Principle & types:

Population inversion-Laser principle-Types of laser sources-Ruby laser-He-Ne-laser-Carbon dioxide laser-Semiconductor laser-Surface emitting laser-Edge emitting laser.

Unit-IV

Optoelectronic Devices

Photoconductive sensors-Photo emissive Sensors-Photovoltaic sensors-LCD
Opto coupler.

Unit –V

Fiber optic Communication:

Optical Fiber- Characteristics-Acceptance angle –Numerical aperture-Step index fiber – Graded index fiber-Attenuation in optical fiber-Applications.

Text Book:

1. Asit Baran Maity, Optoelectronics and optical fiber sensors, PHI, edition, 2013.
2. S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, Electronic Devices and Circuits –, The Mc Graw-Hill Companies.
3. Dr.M.Arumugam, Optical Fiber Communication and sensors –.I edition, 2002
4. A.Ubald raj, Opto Electronics –G.Jose Robin, Indira Publications, edition, ,2002

UNIT I : Text Book 1 Chapter3 (3.1-3.3& lecture notes)

UNIT II : Text Book 1 Chapter 3 (3.4.1-3.4.3, 6.5.1- 6.5.3, 6.6.1 & lecture notes).

UNIT III: Text Book 1 Chapter 5 (lecture notes,5.5.5, 5.6.1,5.6.4&5.6.5)

UNIT IV: Text Book 2 Chapter 18 (18.3-18.5,18.7 &18.10)

UNIT V: Text Book 2 Chapter 18 (18.11 &lecture notes)

Reference Books:

1. Pallab Bhattacharya, Semiconductor optoelectronic Devices, Prentice India Pvt Ltd, Second Edition,2006.
2. Gerd Keiser, optical Fiber Communications, Tata Mc Graw Hill, Fourth Edition.
3. Subir Kumar Sarkar,Optical fibres and fibre optic communication Systems S.Chand&Co Pvt.Ltd,2000.



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Programme : B.Sc (E&C)	Part IV :
Mandatory	
Semester : II	Hours : 02
Sub code : 18UVLG21	Credits : 02

VALUE EDUCATION

COURSE OUTCOMES	
<p>CO1: Clarifying the meaning and concept of value - value education.</p> <p>CO2: To inspire students to develop their personality and social values based on the principles of human values.</p> <p>CO3: Developing sense of Love, Peace and Brotherhood at Local, national and international levels.</p> <p>CO4: To enable the students to understand the social realities and to inculcate an essential value system towards building a health society</p>	
UNIT I	<p>: Values and The Individual: Values – Meaning – Definition – Importance – Classification of Values, Value Education – Meaning – Need for Value Education. Values and the Individual – Self-Discipline – Meaning – Tips to Improve Self-Discipline. Self-Confidence – Meaning - Tips to Improve Self-Confidence. Empathy – Meaning – Role of Empathy in motivating Values. Compassion – Role of Compassion in motivating Values. Forgiveness – Meaning - Role of Forgiveness in motivating Values. Honesty – Meaning – Role of Honesty in motivating Values. Courage – Meaning – Role of Courage in motivating Values.</p>
UNIT II	<p>: Religions and Communal Harmony: Religions – Meaning – Major Religions in India - Hinduism – Values in Hinduism. Christianity – Values in Christianity. Islam – Values in Islam. Buddhism – Values in Buddhism. Jainism – Values in Jainism. Sikhism – Values in Sikhism. Need for Religious Harmony in India. Caste System in India – Need for Communal Harmony in India. Social Justice – Meaning – Factors Responsible for Social Justice.</p>
UNIT III	<p>: Society and Social Issues: Society – Meaning – Values in Indian Society. Democracy – Meaning – Values in Indian Democracy. Secularism – Meaning – Values in Indian Secularism. Socialism – meaning – Values in Socialism. Social Issues – Alcoholism – Drugs – Poverty – Unemployment.</p>

UNIT IV	:	Human Rights and Marginalised People: Human Rights – Meaning – Problem of Violation of Human Rights in India – Authorities available under the Protection of Human Rights Act in India. Marginalised People like Women, Children, Dalits, Minorities, Physically Challenged – Concept – Rights – Challenges. Transgender – Meaning – Issues.
UNIT V	:	Social Institutions in Value Formation: Social Institutions – Meaning – Important Social Institutions. Family – Meaning – Role of Families in Value Formation. Role of Press & Mass Media in Value Formation – Role of Social Activists – Meaning Contribution to Society – Challenges.

Text Book:

Text Module for **Value Education**, Mannar Thirumalai Naicker College, Pasumalai, Madurai – 625 004

Reference Books:

1. Text Module for **Value Education**, Publications Division, Madurai Kamaraj University, Madurai – 625 021.
2. N.S.Raghunathan, **Value Education**, Margham Publications, 24, Rameswaram Road, T.Ngar, Chennai – 600 017.
3. Dr.P.Saravanan, and P.Andichamy, **Value Education**, Merit India Publications, (Educational Publishers), 5, Pudumandapam, Madurai-625001.



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

Programme	: B.Sc (E&C)	Part III	:
Core(P)			
Semester	: II	Hours	: 02
Sub code	: 18UELCP1	Credits	: 04

ELECTRONIC DEVICES AND CIRCUITS - Lab

Course Outcomes:

CO1: To study of electronic devices and circuits the Student will develop his servicing career of electronic systems.

CO2: To develop the skill in Rectifier Circuits.

CO3: To create awareness functions of oscillatory Circuits.

CO4: To develop practical skills in his own entrepreneurship.

Lab Experiments: (Any 12)

1. P-N junction diode characteristics.
2. Zener diode characteristics.
3. Half wave & Full wave Rectifier.
4. Bridge Rectifier.
5. Zener Regulated power supply.
6. IC Regulated power supply.
7. Transistor characteristics (common emitter).
8. Transistor Amplifier.
9. Emitter Follower.
10. Hartley Oscillator.
11. Colpitts Oscillator.
12. Phase Shift Oscillator.
13. Wiens Bridge Oscillator.
14. Clipping and clamping circuits.
15. Astable Multivibrator using Transistor.
16. Mono stable Multivibrator using Transistor.
17. FET characteristics.
18. FET Amplifier.
19. UJT characteristics.
20. Low Pass filter & High Pass filter using RC components.



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

Programme	: B.Sc (E&C)	Part III	: Allied(P)
Semester	: II	Hours	: 02
Subject Code	: 18UELAP1	Credit	: 03

BASIC ELECTRICITY AND CIRCUITS Lab

Course Outcomes:

CO1: To create skill in the Circuit analysis.

CO2: To understand and to develop knowledge on Calibration of electric circuits.

CO3: To enable the students to verify the various theorem with help of electric circuits.

CO4: To develop his practical skills in electricity.

LAB EXPERIMENTS (Any 12)

1. Carry –foster bridge-(Resistance and specific resistivity).
2. Potentiometer-calibration of low range volt meter.
3. Potentiometer-calibration of high range volt meter.
4. Potentiometer-calibration of high range ammeter.
5. Conversion of galvanometer in to volt meter and ammeter.
6. Ballistic galvanometer -comparison of capacitance.
7. Solar cell.
8. LCR-series resonance.
10. Owens Bridge.
11. Verification of Ohm’S Law
12. Verification of KCL.
13. Verification of Thevenin’s Theorem
14. Verification of Nortons Theorem
15. Measurement of Unknown Resistance using Wheatstone Bridge.
16. Verification of KVL.
17. Verification of Superposition Theorem
18. Verification of Maximum Power Transfer theorem.

THIRD SEMESTER



MANNAR THIRUMALAI NAICKER COLLEGE(Autonomous)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION
(For those who joined in 2018-2019 and after)

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 counter – 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. Conghlin F.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 gates.
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



MANNAR THIRUMALAI NAICKER COLLEGE(Autonomous)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION
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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.

FOURTH SEMESTER



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION
(For those who joined in 2018-2019 and after)

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 Suppressed 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 Wiley and 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. Kennedy 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.



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION
(For those who joined in 2018-2019 and after)

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 gates.
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



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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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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.

Web: 1. <https://whatsag.com>

2. <https://www.lifewire.com>

3. <https://www.quora.com>

FIFTH SEMESTER



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF B.Sc. ELECTRONICS AND COMMUNICATION
(For those who joined in 2018-2019 and after)

Programme	: B.Sc.(E&C)	Part III	: Core
Semester Code	: V	Hours	: 04
Subject Code	: 18UELC51	Credit	: 04

MICROPROCESSORS AND INTERFACING

Course Outcomes:

On successful completion of this course, the students will be able:

CO 1: Understand the basic architecture of 8085 and 8255 PPI.

CO 2: Classify different addressing modes and instructions set.

CO 3: Apply microprocessor instructions to develop assembly languages programs.

CO 4: Analyze the concept of advanced microprocessors.

CO 5: Select the interfacing devices with microprocessors.

CO 6: Design and develop interfacing programs with microprocessors.

Unit: I

ARCHITECTURE OF 8085 MICROPROCESSOR: Functional block diagram – Registers- ALU- Bus systems- Timing and control signal- machine cycles.

Unit: II

PROGRAMMING 8085: Instruction formats – Addressing modes – Instruction set – Need for Assembly language – Development of Assembly language program.

Unit: III

INTERFACING CONCEPTS: Peripherals I/O instruction –Device selection and data transfer- Input interfacing;- Interfacing memory- Bus contention - Time and wait states.

Unit: IV

THE 8255 PROGRAMMABLE PERIPHERAL INTERFACING (PPI): Peripheral interfacing block diagram 8255A and the modes, Simple input and output. BSR mode – Programming the 8255A in Mode1 and 2 -Bidirectional data transfer.

BLOCK DIAGRAM OF 8253: Programming 8253 – The 8253 as a counter – 8279 keyboards, display controller.

Unit: V

ADVANCED MICROPROCESSORS: Introduction - The 80286 microprocessor - The 80386 microprocessor – The 80486 microprocessor – The Pentium microprocessor.

Text Books:

1. Goankar R.S... “Microprocessor Architecture Programming And Application With 8085/8086A” III Edition, Penram International Publishing House, 1997
2. Douglas V. Hall, “Microprocessor & Interfacing Programming and Hardware” McGraw Hill Inc, New Delhi, 1992.

Reference Books:

1. A.P. Mathur. “**Introduction to Microprocessor**”, III Edition, TMH 2004.
2. N.Mathivanan. “**Microprocessors, PC hardware and interfacing**”, Prentice Hall of India, New Delhi, 2005.



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF B.Sc ELECTRONICS AND COMMUNICATION
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Programme : B.Sc. (E&C)
Semester : V
Sub code : 18UELC52

Part III : Core
Hours : 05
Credits : 04

SENSORS AND TRANSDUCER

Course Outcomes:

On successful completion of this course, the students will be able:

CO 1: Remembering the concept of a transducer

CO 2: Understand the principle of displacement and strain gauge techniques

CO 3: Identify the concept of pressure sensors.

CO 4: Classify types of flow meters.

CO 5: Evaluate force and torque of sensors and transducers

CO 6: Improve the concepts of different measuring techniques.

UNIT-I

Transducer Classification and Temperature

Introduction-Electrical transducer-classification-basic requirement

Temperature

Introduction-mechanical temperature sensors-resistive type-platinum resistance thermometer-thermistors- Quartz thermometer-radiation method-optical pyrometer

UNIT-II

Displacement and strain

Principle of transduction-digital transducer-level measurements

Strain

Introduction-factors affecting strain measurement-types of strain gauge-theory of operation of resistance strain gauge-types of electrical strain gauge-gauge techniques and other factors

UNIT-III

Vibration and pressure

Introduction -characteristics- analysis of Vibration sensing device-Vibration Sensing devices-Signal conditioners-Shock measurement.

Pressure

Introduction-Diaphragms-Piezoelectric pressure transducer-vibrating element pressure sensors

UNIT-IV

Flow

Introduction-classification-head type flow meter- rota meter -electromagnetic flow meter- mechanical flow meter-Anemometer-ultrasonic flow meter.

UNIT-V

Force and Torque

Introduction - force measuring sensor-load cell elastic transducer-digital force transducer- hydraulic load cell-electronic weighting system-torque measurement.

Text Book:

1. C.S.Rangan,G R Sharma VSV Mani”**Instrumentation Devices & Systems**, Tata M c Graw Hill publishing company private ltd, Delhi II edition,

Chapter 2 and 9: 2.1 to 2.4, 9.1, 9.3to 9.7, 9.9 to 9.11

Chapter 4 and 5 :4.1 to 4.4,5.1 to 5.7

Chapter 6 and 7 :6.1 to 6.6,7.1-7.2,7.8-7.9

Chapters 8: 8.1-8.8

Chapter 10: 10.1to10.9

Reference Books:

1. D.Patranabi, **Sensors and Transducers**, PHI Learning Pvt.Ltd, New Jersey,Second Edition,2003.
2. Lan Sinclair, **Sensors and Transducers**,Newnes, Copyright, Oxford University, U.K, Third Edition



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF B.Sc. ELECTRONICS AND COMMUNICATION
(For those who joined in 2018-2019 and after)

Programme : B.Sc. (E&C)
Semester : V
Sub code : 18UELE51

Part III : Elective
Hours : 05
Credits : 04

INTERNET OF THINGS

Course Outcomes:

On successful completion of this course, the students will be able:

CO1:Remember the concepts of Internet of Things.

CO2:Understand the basic design principles for IoT.

CO3: How to apply enterprises plan for IoT deployment in networks.

CO4:Compare skills on IoT Systems like Python Packages and Raspberry pi.

CO5:Importance of basic IoT applications on embedded platform.

UNIT- Introduction to Internet of Things:

Definition and Characteristics of IoT ; Physical Design of IoT -Logical Design of IoT;
IoT Enabling Technologies- IoT Levels and Deployment Templates Domain Specific IoTs:
Home Automation, Smart Cities, and Industry Automation-Gateway

UNIT II Design Principles:

for Connected Devices IoT/M2M systems layers and designs standardization;
Communication technologies -Data enrichment, -Data consolidation and device management
at gateway

Design Principles for Web Connectivity Web communication protocols for connected
devices; Message communication protocols for connected devices -Web connectivity for
connected-devices network using gateway, SOAP, REST, HTTP, Web Sockets-Artificial
intelligence.

UNIT III Internet Connectivity Principles:

Internet connectivity; Internet based communication; IP addressing in the IoT; Media
access control

Application layer protocols: HTTP; HTTPS; FTP; Telnet and others

Data Acquiring, Organizing, Processing and Analytics Data acquiring and storage; organizing
the data; Transactions, Business processes, Integration and enterprise systems

UNIT IV Programming Language in IOT:

IoT Systems-Logical Design using Python Python Data Types and Data Structures; Control Flow; Functions -IoT Physical Devices and Endpoints An IoT Device; Raspberry Pi; About the Board; Linux on Raspberry Pi

Text Books

1. ArshdeepBahga, Vijay Madiseti, “**Internet of Things: A Hands-On Approach**”, Orient Blackswan Pvt. Ltd., First edition, 2015.
2. B. Raj Kamal, “**Internet of things Architecture and design principles**”, McGraw Hill Education Pvt. Ltd., First edition, 2017.

Reference Books:

1. Hanes David, Salgueiro Gonzalo, Grossetete Patrick, Barton Rob, Henry Jerome, “*IoT*Fundamentals: Networking Technologies, Protocols and Use Cases for the Internet of Things”, Pearson Education, First edition, 2017.
2. B. RajkumarBuyya, Amir VahidDastjerdi, “Internet of Things Principles and Paradigms”, Elsevier-Todd Green, 2016
3. C. Pethuru Raj, Anupama C. Raman, “The Internet of Things Enabling Technologies, Platforms, and Use Cases”, CRC Press-Taylor & Francis Group, 2017
4. D. Charles Bell, “MySQL for the Internet of Things”, Apress, First edition, 2016. E. <http://nptel.ac.in/courses/106105166/>



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF B.Sc ELECTRONICS AND COMMUNICATION
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Title of the Paper	: B.Sc. (E&C)	Part III	: Elective
Semester	: V	Hours	: 05
Sub code	: 18UELE52	Credits	: 04

INDUSTRIAL AND POWER ELECTRONICS

Course Outcomes:

On successful completion of this course, the students will be able:

- CO 1:** Identify basic requirements for power electronics based design applications.
- CO2:** Understanding the knowledge about power devices.
- CO 3:** Identify single and three phase inverters and cycloconverters.
- CO 4:** Classify different power converters and control with their applications.
- CO 5:** Design and develop various power electronic circuits for industrial applications.

Unit -I: Power Devices and its Applications in Power Control:

Power Transistors: MOSFET; MCB, MCCB, SSR, IGBT-Types of power electronic circuits- Thyristor turn-on methods- Thyristor protection: Design of Snubber circuits- Over voltage protection- Over current protection; Gate protection-UPS- HVDC-Types of HVDC link. Static switches- Static Circuit. Breakers.

Unit- II: Converters and Commutation Techniques

Principle of phase-controlled converter: Single phase full converters. Single- phase dual converters. Three-phase full converters - Introduction to Commutation: Class A, Class B, Class C, Class D, Class E and Class F

Unit :III Inverters and Cyclo Converters

Inverters: Operating principle; Single-phase bridge inverter. Three-phase bridge inverter; Three-phase 180° mode VSI.

Pulse width modulated inverters: Single-pulse modulation; Multiple-pulse modulation. Sinusoidal-pulse Modulation (SPWM); Realization of PWM in single phase bridge inverters. Cycloconverters: Single-phase Cycloconverters. Three-phase Cycloconverters.

Unit -IV: Choppers:

DC choppers- principle of chopper operation- Step-Up choppers-Types of chopper circuits Switching Regulator: Buck regulator-Boost regulator-Buck-Boost regulator Uninterruptible power supply (UPS).

Unit V: Thyristors Industrial Application:

Automatic water level indicator using SCR, Automatic battery charger using SCR, Automatic street lighting circuit using LDR and SCR. Emergency light using SCR. Burglar alarm using SCR.

Text Books:

1. P. S. Bimbhra, "Power Electronics", Khanna Publishers, Fourth Edition, 2011.
2. B. S. K. Bhattacharya, S. Chatterjee, "Industrial Electronics and Control", Tata McGraw Hill, Reprint 2011.
3. C. Muhammad Rashid, "Power electronics, Circuits, Devices & Applications", Prentice Hall Edition, Third Edition, 2004.

References Books:

1. Gyanendra K. Mithal, "Industrial and Power Electronics", Khanna Publishers, 19th Edition, 2001.
2. B. <http://nptel.ac.in/courses/108101038>



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF B.Sc ELECTRONICS AND COMMUNICATION
(For those who joined in 2018-2019 and after)

Title of the Paper	: B.Sc. (E&C)	Part III	: Elective
Semester	: V	Hours	: 05
Sub code	: 18UELE53	Credits	: 04

MOBILE COMMUNICATION

Course Outcomes:

On successful completion of this course, the students will be able:

CO1: Remember the modulation techniques and elements of communication system.

CO2: Summarize different technic in mobile communication.

CO3: Identify the concepts of GSM and multiple access techniques.

CO4: classify various types of spectrum techniques.

CO5: Importance of mobile satellitesand GPS.

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.

Unit - V:

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

Text Book:

3. V. JeyasriArokiamary, **Mobile Communication**, Technical Publications, Pune, First Edition, 2009.
4. Simon Haykin, **An Introduction to Analog and digital Communications**, John Wiley and Sons (Asia) Pvt.Ltd, Singapore,1989.

Reference Books:

4. The Odores.Rappaport, **Wireless Communications**, Prentice Hall of India Private Limited, New Delhi, 2nd edition, 2003.
5. Jochen Schiller, **Mobile Communications**, an Imprint of Pearson Education, New Delhi, Second Edition, 2003



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(For those who joined in 2018-2019 and after)

Title of the Paper	: B.Sc. (E&C)	Part IV	: Skill
Semester	: V	Hours	: 02
Sub code	: 18UELS51	Credits	: 02

FIBER OPTIC COMMUNICATION

Course Outcomes:

On successful completion of this course, the students will be able:

- CO1:** Remember the theory of fiber optic communication.
- CO2:** Describe the different characteristics of optical fiber.
- CO3:** Operation of different types of optical sources
- CO4:** Classify the different types of optical detector.
- CO5:** Importance of an optical fiber system.
- CO6:** Prepare the data communication through FOC Cable.

Unit-I Fundamentals of optic fiber:

Block diagram of general communication system-comparison with other communication system-Different types of optical fiber application.

Unit-II Theory of transmission:

Total internal reflection-Acceptance angle –Numerical aperture-Skew rays, Phase and group velocities, mode coupling-Fiber Bend losses.

Unit-III Optical Sources:

Absorption and emission of radiation-population inversion-optical feedback and laser oscillation- Threshold condition optical emission from semiconductors.

Unit-IV Optical detector:

Device types, optical detector principles-P-I-N photo diode, Avalanche Photo diode.

Unit-V Optical Fiber System:

Optical transmission circuit, optical receiver circuit, Analog and Digital system, Different multiplexing techniques.

Text Books:

1. John M.Senior," **Optic Fiber Communication.**" Pearson Education, New Delhi,India,First Edition,2009.
2. N.Sharma,TataMcGraw Hill "**FiberOptc in Telecommunication.**"TataMcGraw Hill, New Delhi, First Edition, 2003.

Reference Book:

1. G.Keiser,**Optical Fiber Communication**,TMH.Ltd,New Delhi,First Edition,2010.
2. S.C.Gupta,**Optical fiber Communication and its Application**, PHI Learning Pvt. Ltd, New Delhi, First Edition,2004.
3. Dr.M.Arumugam,**Optical Communication**,Anuradha Publication.



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(For those who joined in 2018-2019 and after)

Title of the Paper	:B.Sc(E&C)	Part IV	: Skill
Semester	: V	Hours	: 02
Sub code	: 18UELS52	Credits	: 02

BIO- MEDICAL INSTRUMENTATION

Course Outcomes:

On successful completion of this course, the students will be able:

- CO1:** Identify various Bio – potential and their specifications in terms of amplitude and frequency.
- CO2:** Understand the concept of biomedical recorders and patients monitoring systems.
- CO3:** Use of the therapeutic instruments for treatment purpose.
- CO4:** Analyze various factors of Bio electric signals and electrodes.
- CO5:** Importance of modern imaging instruments.

Unit: I BIOPOTENTIALS:

Cellular fluids-Transmembrane potential- action and resting potentials-Physiological transducers, Biosensors, Smart sensors.

Unit: II BIOELECTRIC SIGNALS AND ELECTRODES:

Origin of bioelectrical signals – Recording electrodes – Skin contact – Impedance – Electrodes for ECG – EMG and EEG – Electrical conductivity of electrodes- jellies creams microelectrodes.

Unit: III BIOMEDICAL RECORDERS AND PATIENTS MONITORING SYSTEMS:

Block diagram and signal analysis of phonocardiography - Electroencephalograph. – Electromyograph – Measurement of heart rate – Measurement of blood pressure – Measurement of temperature – Measurement of respiration rate

Unit: IV THERAPEUTIC EQUIPMENTS:

Cardiac pacemaker - Cardiac defibrillators – Surgical diathermy – shortwave diathermy – Microwave diathermy- ultrasonic therapy unit – Pain relief therapy electrical stimulation.

Unit: V MODERN IMAGING SYSTEMS:

Computer X ray machine - X ray computer tomography – Basic NMR components – Echocardiography - Thermography equipment - MRI instrumentation - Positron emission tomography.

Text Book:

1. L.Cromwell.F., J.Weibell and E.A.Pfeiffer.”**Bio-Medical Instrumentation and Measurements**”. PHI, 1991.

Reference Books:

- 1.R.Khandpur. “**Hand book of Bio-Medical Instrumentation**”. TMH.II Edition., 2003.
2. M.Arumugam. “**Bio-Medical Instrumentation.**” Anuradha Agencies.1992.



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(For those who joined in 2018-2019 and after)

Title of the Paper	: B.Sc. (E&C)	Part III	: Core (P)
Semester	: V &VI	Hours	: 03
Sub code	: 18UELCP3	Credits	: -

COMMUNICATION LAB

Course outcomes:

On successful completion of the course, the learners should be able to:

CO1: Remember the basic concepts of Filters

CO2: Understand the working principles of modulation and demodulation techniques

CO3: Construct analog and digital modulation and demodulation circuits

CO4: construct mini project based on communication system (FM Transmitter and Receiver)

CO5: understanding the concept of PLL synthesizer.

List of Experiments:

1. Low and High pass active filters.
2. Band pass and Band rejection active filters.
3. Cross over Network.
4. Sampling and reconstruction of signals.
5. Amplitude Modulation and Demodulation.
6. Suppressed Carrier amplitude Modulation.
7. Frequency Modulation and Demodulation.
8. Pulse Amplitude Modulation and Demodulation.
9. Pulse Width Modulation and Demodulation.
10. Pulse Position Modulation and Demodulation.
11. Pulse Code Modulation.
12. Voltage to Frequency Converter.
13. Experiments using Fiber Optic Kit.
14. Experiments 1 using MATLAB.
15. Experiments 2 using MATLAB.



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Title of the Paper (P)	: B.Sc. (E&C)	Part III	: Allied
Semester	: V & VI	Hours	: 04
Sub code	: 18UELAP3	Credits	: -

SENSORS AND TRANSDUCERS LAB

Course outcomes:

On successful completion of the course, the learners should be able to:

- CO1:** Remember the basic concepts of Transducers
- CO2:** Understand the working principles of Temperature sensors
- CO3:** Understand the working principles of strain sensors
- CO4:** Understand the application of displacement and optical sensors.
- CO5:** Measure and calibrate all sensing devices.

1. Study of RTD, Thermistor characteristics.
2. Study of Thermocouples characteristics and cold junction compensation.
3. Study of IC Temperature sensors.
4. Study of Strain gauge and Load cell characteristics.
5. Study of LVDT and Tacho generator characteristics.
6. LDR and Opto-coupler characteristics.
7. Study of Piezo-electric transducers and vibration measurement using Piezo electric transducer.
8. PLL application circuits, Frequency multiplier.
9. Study of UJT, IGBT devices.
10. Speed control of AC/DC Motors using Thyristor.
11. Design and testing of FET input volt meter.
12. Phase sensitive detectors.



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Title of the Paper	: B.Sc. (E&C)	Part III	: Core (P)
Semester	: V & VI	Hours	: 03
Sub code	: 18UELCP4	Credits	: -

MICROPROCESSOR AND MICROCONTROLLER LAB

Course outcomes:

On successful completion of the course, the learners should be able to:

CO1: Remember the instruction set of microprocessor and microcontroller

CO2: Understand the Assembly language programming

CO3: Write assembly language program for arithmetic, logical, data transfer operation

CO4: Design IO interfacing circuit with microprocessor and microcontroller

CO5: Design mini project based on the microprocessors and microcontroller

MICROPROCESSOR

1. Addition of two 8-bit numbers.
2. Subtraction of two 8-bit numbers.
3. Multiplication of two 8-bit numbers.
4. Division of two 8-bit numbers.
5. 1's and 2's complement of a given 8-bit data.
6. Largest/Smallest in an array.
7. Positive/Negative numbers in an array.
8. Odd/Even numbers in an array.
9. Number of 1's and 0's in a data.
10. Ascending/Descending order.
11. Block data transfer.
12. Reading/Writing of data using 8255 PPI.
13. Binary Counter/Ring Counter using 8255 PPI.

MICROCONTROLLER

1. Addition of two 8-bit numbers.
2. Subtraction of two 8-bit numbers.
3. Multiplication of two 8-bit numbers.
4. Division of two 8-bit numbers.
5. Addition of two 16-bit numbers.



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Title of the Paper	: B.Sc. (E&C)	Part III	: Core (P)
Semester	: V & VI	Hours	: 02
Sub code	: 18UELPR1	Credits	: -

PROJECT

Course outcomes:

On successful completion of the course, the learners should be able to:

CO1: Define a project [K1]

CO2: Discuss a major issue in a project [K2]

CO3: Apply the interpretative skills on a theme [K3]

CO4: Compare the work of art in comparison with others [K5]

CO5: Create one's own project [K6]

Course Description

The Project is conducted by the following Course Pattern.

Internal

Presentation	}	40
Submission		

External

Project Report	}	60
Viva Voce		

Total	-100
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SIXTH SEMESTER



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Title of the Paper	: B.Sc. (E&C)	Part III	: Core
Semester	: VI	Hours	: 05
Sub code	: 18UELC61	Credits	: 05

MICROCONTROLLER 8051 AND EMBEDDED SYSTEMS

Course Outcomes:

On successful completion of this course, the students will be able:

CO1: Remember the basic architecture of 8051 microcontrollers and embedded processors.

CO2: Understand the concepts of addressing modes, instruction set, I/O ports, interrupt, timers.

CO3: Develop interfacing with various real-time system using embedded C programming

CO4: Focus on the architecture of PIC microcontroller.

CO5: Importance of the features, applications and functional description of ARM microcontroller.

UNIT-I 8051 Microcontrollers:

Architecture-Memory organization-Microcontrollers and embedded processors-

UNIT-II

Addressing modes-Instruction set-I/O ports-serial ports-interrupt-Timers

UNIT-III Interfacing with 8051 using embedded C programming

LCD –Keyboard-ADC-DAC-Sensor interfacing with signal conditioning- 8255- Stepper motor-DC motor-RTC

UNIT-IVPIC Microcontroller

16F87X Architecture –Core features-Peripheral features-pin diagram

UNIT-VARM Microcontroller

LPC 2378 –features-block diagram-applications-functional description

Text Books:

1. Mohammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. McKinlay "The 8051 Microcontrollers and Embedded systems", Dorling Kindersley (India) Pvt. Ltd., 2nd edition, 2006.
2. ARM NXP semiconductors datasheet.
3. PIC Microchip technology incorporated USA, 2001.

Reference Books:

1. Kenneth Ayala, **8051 Microcontroller**, Thomson Delmar Learning, United States, Third Edition, 1991.
2. Dr. Rajiv Kapadia, **8051 Micro Controller and Embedded systems**, Jaico Publishers, New Delhi, 2010



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Title of the Paper	: B.Sc. (E&C)	Part III	: Core
Semester	: VI	Hours	: 05
Sub code	: 18UELC62	Credits	: 05

DIGITAL SIGNAL PROCESSING

Course Outcomes:

On successful completion of this course, the students will be able:

CO1: Understand Digital Signal Controllers and their Applications

CO2: Design digital filters IIR and FIR filters

CO3: Develop discrete form and cascade form of FIR and ITR system

CO4: Analyze the concept of FFT and DFT

CO5: Evaluate finite word length effects in signal processing

Unit-1

Z-transform: Definition of Z transform – Inverse Z transform – Properties of Z transform.

Discrete Time System: Introduction – Block diagram representation of discrete time system. Classification of discrete time system – Static versus dynamic system – Time invariant versus time variant system – Linear versus Nonlinear system – Causal versus Non causal systems – Stable versus unstable systems.

Unit-2

Design of Digital Filter: Design of linear phase FIR filter using windows – IIR filter design: -impulse invariant method- bilinear transformation method – Review of design technique for analog low pass filter.

Unit-3

Realization of Digital Linear System:

Basic Structure for FIR system: Direct form – cascade form

Basic Structure for IIR system: Direct form -Cascade form structure- Parallel structure- Ladder structure.

Unit-4

Discrete Fourier transform: Definition and properties.

FFT algorithm: Introduction to radix 2 fast Fourier transforms – Decimation in time
FFT - Decimation in frequency FFT.

Unit-5

Finite word length Effects in digital filters: Types of Number representation-
Quantization noise- Truncation and rounding -quantization error -overflow limit cycle
oscillation.

Text Books:

1. S.Salivahanan. A. Vallavaraj and C.GnanaPriya, **Digital Signal and Processing**,Tata McGraw-Hill publishing company, New Delhi, First Edition, 2001.
2. John G.proakisandD.G.Manolakis,” **Digital Signal and Processing**”PHI, 1986.
3. P. Rameshababu, ”**Digital Signal and Processing**”, fourth edition Scitech 2007.

Reference Books:

1. P. Ramesh Babu, **Digital Signal Processing**,SciTech Publications, Chennai,Fourth Edition 2007.
2. Johny R Johnson, **Introduction to Digital Signal Processing**, Pearson Education, New Delhi, 2015.



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Title of the Paper	: B.Sc. (E&C)	Part III	: Elective
Semester	: VI	Hours	: 04
Sub code	: 18UELE61	Credits	: 04

INDUSTRIAL AUTOMATION

Course Outcomes:

On successful completion of this course, the students will be able:

CO1: Remembering the basics of industrial automation system

CO2: Understand the concepts of actuators

CO3: Develop data acquisition system

CO4: Focus on data acquisition systems

CO5: Importance of programmable logic controller

CO6: Develop the knowledge of PLC applications.

Unit: I

BASICS: Classification – Open loop systems – Closed loop systems – block diagrams of P, PI, PD, PID control systems-Advantages and Disadvantages.

Unit: II

ACTUATORS: Induction Motor-AC/DC Servomotor-DC motor – Stepper motor – Digital O/P Components(relays, lamps, meters, solenoid valve)

Unit: III

PROGRAMMABLE LOGIC CONTROLLER:

Block diagram – I/O module – Memory – Ladder diagram, Control system flowchart – Statement list – Timers- Counters- Applications.

Unit: IV

DATA ACQUISITION / SCADA: Analog input – Analog output – Digital I/O – Timing I/O – Basic Architecture of SCADA.

Unit: V

INDUSTRIAL FIELD BUSES: Process Field Bus(PROFIBUS) – Modbus – Device Net – Profinet – Industrial Internet

Text Books:

1. U.A.Bakshi, V.U.Bakshi. “CONTROL SYSTEMS”, Technical Publications Pune, II Revised Edition-2007.
2. N.Mathivanan. “PC-BASED INSTRUMENTATION CONCEPTS AND PRACTICE”, PHI Learning Private Limited, New Delhi 2009.

Reference Books:

1. KelvinCollins,PLC Programming for Industrial Automation, Exposure Publications, Florida, First Edition,2007.
2. Copy Prepared by Dept of E&C staff



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Title of the Paper	: B.Sc. (E&C)	Part III	: Elective
Semester	: VI	Hours	: 04
Sub code	: 18UELE62	Credits	: 04

ANTENNA AND WAVE PROPAGATION

Course Outcomes:

On successful completion of this course, the students will be able:

CO1: Define antenna parameters and radiation principles.

CO2: Understand the fundamentals of antenna types.

CO3: Manipulate the radiation resistance of dipole antennas.

CO4: Analyze the different types of frequency based antennas.

CO5: Importance of Wave propagation types.

UNIT – I

Radiation principle and Antenna Terminology: Principles of Radiation- Isotropic radiator –Antenna terminology –reciprocity theorem –Friis Formula.

UNIT – II

Antenna Arrays: Pattern multiplication –Arrays of two driven antennas- Broadside array- end fire arrays –collinear arrays –Parasitic array –Linear array with ‘n’ isotropic point source –Stacked array- Traveling wave radiators.

UNIT – III

Antenna Fundamentals: Radiation from an oscillation dipole – Short linear antennas – Half wave dipole as a basic radiating element – Folded unipole and dipole antennas – Shunt fed dipoles – slot antennas – Loop antennas – Standing wave radiators.

UNIT – IV

Antenna Practice : Antenna for low Frequencies –Beverage antenna for medium frequencies – Tower antenna –Effects off ground on antenna performance –Ground systems –Top Loading –Excitation Methods –Antenna Couplers, baluns –Resonant V- Inverted V antenna –Rhombic arrays for MUSA-Diversity reception. Yagi-Uda antenna –Cornerreflector –bi conical antenna –Turnstile Antenna –Helical antenna –Parabolic reflector-Horn antenna –Lens antenna –Log Periodic antenna

UNIT – V

Wave Propagation : Propagation in Free Space – Propagation Around the earth Surface wave and its propagation – Structure of the Ionosphere – Propagation of plane waves in an ionized medium – Determination of critical frequencies – Maximum Usable Frequency – Effect of Earth’s magnetic field – Ionosphere variation – Fading – Refractive index of troposphere – Effect of Surface irregularities – Scatter propagation..

Text Books:

1. Prasad K.D., “Antenna and Wave Propagation”, Satya Prakasan 3rd edition , 1996.
2. Edward C. Jordan and Keith G. Balmain, “Electromagnetic C waves radiating systems”, Prentice Hall II Ed, 1995.

Reference Books:

1. Kraus, “Antennas”, II Ed, TMH, 1997.
2. Rajeswari Chatterjee, “Antenna Theory Practice”, Wiley Eastern.
3. F.E. Terman. “Electronics and Radio Engineering” McGraw Hill, 1984.



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Title of the Paper	: B.Sc. (E&C)	Part III	: Elective
Semester	: VI	Hours	: 04
Sub code	: 18UELE63	Credits	: 04

MICROWAVE AND RADAR SYSTEMS

Course Outcomes:

On successful completion of this course, the students will be able:

CO 1: Understand the theory of microwave and Radar systems

CO 2: Discuss the working of microwave amplifiers, oscillators and devices.

CO 3: Design and analyze the microwave amplifiers, oscillators and devices.

CO 4: Illustrate the different types of radar systems

CO 5: Evaluate the concepts of Radar transmitter and receiver.

CO 6: Generalize the concepts of Microwave and radar systems.

Unit: I

MICROWAVE TUBES: High Frequency limitation of conventional tubes – Principle of velocity modulation – Klystron amplifiers – Reflex Klystrons – Magnetron oscillators – Travelling wave tubes – Backward oscillators.

Unit: II

MICROWAVE SOLID STATE DEVICES: High Frequency limitations – Microwave transistors – Varactor diode – Parametric amplifier – Tunnel diodes – Theory of negative resistance amplifiers – Gunneffect – Gunn diode oscillators – Avalanche effect IMPATT and TRAPATT diodes – Lasers and Masers.

Unit: III

MICROWAVE COMMUNICATION SYSTEMS: Simplified microwave system block diagram – Repeaters – Need for diversity – Frequency and space diversity – Protection switching arrangements – Microwave radio communication- system gain.

Unit: IV

RADAR SYSTEMS: Radar range equations – Mono static and bi static radars – CW (Continuous wave) Radar – Frequency modulated CW radar – Altimeters – MTI and pulse Doppler radar – Tracking radars – Conical scan, Sequential – Lobbing Monopolies.

Unit: V

TRANSMISSION AND RECEIVER: Modulators – Line type modulator, hard tube modulator, Saturable reactor modulator – Signal detection in noise – Duplexers - Displays- Radar antennas.

Text Book:

1. Reich J.H., "MICROWAVE PRINCIPLES", Van nostrand Reinhold co., 1st edition, 1987.

Reference Books:

1. Tomasi W. "ADVANCED ELECTRONIC COMMUNICATION SYSTEMS", Prentice Hall International, 1987.
2. Liao Y.S., "MICROWAVE DEVICE AND CIRCUITS", Prentice Hall of India, 3rd Edition, 5th reprint 1992.
3. Solink M.I., "INTRODUCTION TO RADAR SYSTEMS", McGraw Hill, 2nd Edition, 1992.



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Title of the Paper	: B.Sc. (E&C)	Part IV	: Skilled
Semester	: VI	Hours	: 02
Sub code	: 18UELS61	Credits	: 02

COMPUTER NETWORKS

Course Outcomes:

On successful completion of this course, the students will be able:

CO 1: Understand the basics of computer networks and reference models

CO 2: Explain the communication medium of physical layer

CO 3: Develop the knowledge of data link layer and medium access layer

CO 4: Compare all layers in OSI model and TCP/IP

CO 5: Importance of Network usage in recent trend

UNIT I:

Introduction: User of computer networks – Network Hardware – Network Software – Reference Models – Example Networks – Example data communication services – Network Example data communication services – Network Standardization.

UNIT II:

Physical Layer: Transmission media – Wireless Transmission – The Telephone system – Cellular radio – Communication satellites.

UNIT III:

Data Link Layer & Medium Access Layer: Data Link Layer Design Issues – Elementary Data Link Protocols – Multiple Access Protocols – Ethernet, Token bus, Token ring.

UNIT IV:

Network Layer & Transport Layer: Network Layer Design Issues – Routing Algorithms – The Transport Service – Elements of Transport Protocols.

UNIT V:

Application Layer: Network Security – Electronic mail – Usenet news – The World Wide Web- Multimedia.

Text Book:

1. Tanenbaum, Computer Network, Prentice Hall India, New Delhi, II Edition, 1989.

Reference Books:

1. Keiser, G.E., Computer Area Network, Tata MC Graw Hill Publishing company, New Delhi.
2. Andrew S. Tanenbaum, Computer Networks, Pearson Education, New Delhi, 2007.



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Title of the Paper	: B.Sc. (E&C)	Part IV	: Skilled
Semester	: VI	Hours	: 02
Sub code	: 18UELS62	Credits	: 02

TELEVISION SYSTEMS

Course Outcomes:

On successful completion of this course, the students will be able:

CO 1: Define the various parameters of television picture

CO 2: Understand the working principle of camera tubes

CO 3: Develop knowledge in transmitting and receiving concepts of TV

CO 4: Compare monochrome television and color television system

CO 5: Importance of advanced television systems

Unit- I

Television picture and TV standards: Geometric forms and aspect ratio of the picture - Scanning - Interlaced scanning - Number of scanning line - VSB transmitter - Complete channel bandwidth - Reception of VSB - TV standards.

Unit - II

Camera tubes: Block diagram of camera tubes - Photo conductive - Photo emission principle - Block diagram of Transmitter - Visual exciter - Aural exciter - Diplexers.

Unit –III

Transmitter and Receiver

Video Detector- Dc Restoration- Sync Separator-Vertical and Horizontal system- Vertical output stage- EHT Generation

Unit –IV Television Receiver:

Block diagram of TV Receiver - RF tuner - IF stage - Wave trap circuits

Unit-V

Trends in TV: LED TV–LCD TV- Compatibility with monochrome and vice versa color TV transmission and reception - Advanced TV's.

Text Book:

1. Gulati R.R. Monochrome and Colour TV, Wiley Eastern Limited, New Delhi, II Edition, 1991.

Reference Books:

1. Grob, Hernbdon, Basic Television and Video Systems, Tata McGraw Hill Publishing Company, New Delhi, VI edition, 1999.
2. K.G. Jackson and G.B. Townsend, TV and Video Engineers reference book, Butterworthheineam, Oxford, First Edition, 1991.



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Title of the Paper	: B.Sc. (E&C)	Part III	: Core (P)
Semester	: V &VI	Hours	: 03
Sub code	: 18UELCP3	Credits	: 04

COMMUNICATION LAB

Course outcomes:

On successful completion of the course, the learners should be able to:

CO1: Remember the basic concepts of Filters

CO2: Understand the working principles of modulation and demodulation techniques

CO3: Construct analog and digital modulation and demodulation circuits

CO4: construct mini project based on communication system (FM Transmitter and Receiver)

CO5: understanding the concept of PLL synthesizer.

List of Experiments:

16. Low and High pass active filters.
17. Band pass and Band rejection active filters.
18. Cross over Network.
19. Sampling and reconstruction of signals.
20. Amplitude Modulation and Demodulation.
21. Suppressed Carrier amplitude Modulation.
22. Frequency Modulation and Demodulation.
23. Pulse Amplitude Modulation and Demodulation.
24. Pulse Width Modulation and Demodulation.
25. Pulse Position Modulation and Demodulation.
26. Pulse Code Modulation.
27. Voltage to Frequency Converter.
28. Experiments using Fiber Optic Kit.
29. Experiments 1 using MATLAB.
30. Experiments 2 using MATLAB.



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Title of the Paper (P)	: B.Sc. (E&C)	Part III	: Allied
Semester	: V & VI	Hours	: 04
Sub code	: 18UELAP3	Credits	: 03

SENSORS AND TRANSDUCERS LAB

Course outcomes:

On successful completion of the course, the learners should be able to:

- CO1:** Remember the basic concepts of Transducers
- CO2:** Understand the working principles of Temperature sensors
- CO3:** Understand the working principles of strain sensors
- CO4:** Understand the application of displacement and optical sensors.
- CO5:** Measure and calibrate all sensing devices.

- 13. Study of RTD, Thermistor characteristics.
- 14. Study of Thermocouples characteristics and cold junction compensation.
- 15. Study of IC Temperature sensors.
- 16. Study of Strain gauge and Load cell characteristics.
- 17. Study of LVDT and Tacho generator characteristics.
- 18. LDR and Opto-coupler characteristics.
- 19. Study of Piezo-electric transducers and vibration measurement using Piezo electric transducer.
- 20. PLL application circuits, Frequency multiplier.
- 21. Study of UJT, IGBT devices.
- 22. Speed control of AC/DC Motors using Thyristor.
- 23. Design and testing of FET input volt meter.
- 24. Phase sensitive detectors.



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Title of the Paper	: B.Sc. (E&C)	Part III	: Core (P)
Semester	: V & VI	Hours	: 03
Sub code	: 18UELCP4	Credits	: 03

MICROPROCESSOR AND MICROCONTROLLER LAB

Course outcomes:

On successful completion of the course, the learners should be able to:

CO1: Remember the instruction set of microprocessor and microcontroller

CO2: Understand the Assembly language programming

CO3: Write assembly language program for arithmetic, logical, data transfer operation

CO4: Design IO interfacing circuit with microprocessor and microcontroller

CO5: Design mini project based on the microprocessors and microcontroller

MICROPROCESSOR

14. Addition of two 8-bit numbers.
15. Subtraction of two 8-bit numbers.
16. Multiplication of two 8-bit numbers.
17. Division of two 8-bit numbers.
18. 1's and 2's complement of a given 8-bit data.
19. Largest/Smallest in an array.
20. Positive/Negative numbers in an array.
21. Odd/Even numbers in an array.
22. Number of 1's and 0's in a data.
23. Ascending/Descending order.
24. Block data transfer.
25. Reading/Writing of data using 8255 PPI.
26. Binary Counter/Ring Counter using 8255 PPI.

MICROCONTROLLER

6. Addition of two 8-bit numbers.
7. Subtraction of two 8-bit numbers.
8. Multiplication of two 8-bit numbers.
9. Division of two 8-bit numbers.
10. Addition of two 16-bit numbers.



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Title of the Paper	: B.Sc. (E&C)	Part III	: Core (P)
Semester	: V & VI	Hours	: 02
Sub code	: 18UELPR1	Credits	: 04

PROJECT

Course outcomes:

On successful completion of the course, the learners should be able to:

CO1: Define a project [K1]

CO2: Discuss a major issue in a project [K2]

CO3: Apply the interpretative skills on a theme [K3]

CO4: Compare the work of art in comparison with others [K5]

CO5: Create one's own project [K6]

Course Description

The Project is conducted by the following Course Pattern.

Internal

Presentation	}	40
Submission		

External

Project Report	}	60
Viva Voce		

Total	- 100
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