PERIYAR UNIVERSITY

PERIYAR PALKALAI NAGAR

SALEM – 636011

DEGREE OF BACHELOR OF SCIENCE

OUTCOME BASED EDUCATION

Syllabus for

B.SC. ELECTRONICS AND COMMUNICATION

(SEMESTER PATTERN)

(For Candidates admitted in the Colleges affiliated to Periyar University from 2021 - 2022 onwards)

Programme Educational Objectives (PEOs):

Programme Educational Objectives (PEOs) are established through a consultation process. PEOs are broad statements that describe the career and professional accomplishments that the graduates can find opportunities in Sales, Marketing, Service and R&D Sectors.
The B.Sc. Degree programme graduates will……

• **PEO 1** Practice the ethics of their profession consistent with a sense of social responsibility and develop their engineering design, problem –solving skills and aptitude for innovations as they work individually and in multi-disciplinary teams.
• **PEO 2** Communicate effectively and manage resources skill fully as members and leaders of the profession.
• **PEO 3** Be receptive to new technologies and attain professional competence through lifelong learning such as advanced degrees, professional registration, publications and other professional activities.

Programme Specific Outcomes:

On completion of the BSc Degree in Electronics and Communication, graduates will be able to

• **PSO1** Apply the fundamental concepts of electronics and communication to design a variety of components and systems for applications including ……. communication, networking, embedded systems, PCB, Mobile, TV and etc.
• **PSO2** Select and apply cutting-edge hardware and software tools to solve complex Electronics and Communication problems.

Programme Outcomes:

On completion of the B.Sc. degree the Electronics and Communication graduates will be able to

• **PO1** Utilize the basic knowledge in mathematics, science in Electronics and Communication areas.
• **PO2** Identify formulate and solve complex problems to achieve demonstrated conclusions using mathematical principles.
• **PO3** Design system components that meet the requirement of public safety and offer solutions.
• **PO4** Apply research-based knowledge to design and conduct experiments, analyze, synthesize and interpret the data pertaining to Electronics and arrive at valid conclusions.
• **PO5** Construct, choose and apply the techniques, resources and modern tools required for Electronics applications.
• **PO6** Examine the impact of Electronics solutions in global and environmental contexts and utilize the knowledge for sustained development.
• **PO7** Develop consciousness of professional, ethical and social responsibilities as experts in the field of Electronics.

REGULATIONS

1. ELIGIBILITY:

Candidates seeking admission to the first year of the Bachelor of Science in Electronics & Communication should have passed the Higher Secondary Examination conducted by the Government of Tamil Nadu or an examination accepted as Equivalent there to by the Syndicate subject to such conditions as may be prescribed from to time are permitted to appear and qualify for the B.Sc., Electronics and Communication Degree of this university after a course of study of Three Academic Years.

2. DURATION OF THE COURSE:

The course for the degree of Bachelor of Electronics and Communication shall consist of three academic years divided into six semesters. Each semester will be of of 90 working days.

3. COURSE OF STUDY:

The course of study shall comprise instruction in the following subjects under OBE (Outcome Based Education) pattern according to the syllabus and books prescribed from time to time.

FOUNDATION SUBJECTS:

PART I: Tamil /Hindi/Malayalam/ French / German

PART II : English

ALLIED SUBJECTS: IN THE FIRST YEAR ONE MAJOR

Department out of the four mentioned below; to be chosen for the study of two allied papers. In the second year another major department in the list to be chosen for the study of another two allied papers.

SEMESTER	MAJOR DEPARTMENT	ALLIED SUBJECT
I / III	MATHS	ALGEBRA, CALCULUS & FOURIER SERIES
I / III	PHYSICS	ALLIED PHYSICS - I
I / III	COMPUTER SCIENCE	PROGRAMMING IN C
II / IV	MATHS	DIFFERENTIALEQUATIONS AND LAPLACE TRANSFORMS
II / IV	PHYSICS	ALLIED PHYSICS - II
II / IV	COMPUTER SCIENCE	PROGRAMMING IN VISUAL BASIC
II		ALLIED LAB - I FOR ALLIED I & II MATHS/PHYSICS/C & VB LAB
IV		ALLIED LAB - II FOR ALLIED III & IV MATHS/PHYSICS/C & VB LAB

5. SCHEME OF EXAMINATIONS

The scheme of examinations under OBE (Outcome Based Education) for different semesters shall be as follows.

SEMESTER I

PART	SUBJECT	SUBJECT TITLE	TOTAL HOURS		CREDITS	TOTAL		
			L	T/P		CIA	EA	MARKS
I	Language	Tamil - I @	6		3	25	75	100
II	Language	English – I COMMUNICATIVE ENGLISH	6		3	25	75	100
III	Core - I	Semiconductor Devices	4		4	25	75	100
III	Core Pract.- I	Basic Electronics Lab	1	2				
III	Allied I		4		4	25	75	100
III	Allied Lab - I		2					
IV	SBEC-I	Applied Electric Circuits	2		2	25	75	100
IV	Value Education	Yoga	1		2	25	75	100
IV	Add-on	Proffessional English-I	2		4	25	75	100

SEMESTER II

PART	SUBJECT	SUBJECT TITLE	TOTAL	HOURS	CRE-DITS	TOTAL		
			L	T/P		CIA	EA	MARKS
I	Language	Tamil - II @	6		3	25	75	100
II	Language	English – II COMMUNICATIVE ENGLISH	4		3	25	75	100
II	**Naan Muthalvan Skill Development Course**	**Language Proficiency for Employability - Effective English**	**2**		**2**	**25**	**75**	**100**
III	Core - II	Applied Digital Electronics	4		4	25	75	100
III	Core Pract.-I	Basic Electronics Lab	1	2	4	40	60	100
III	Allied-II		4		4	25	75	100
III	Allied Lab - I			2	2	40	60	100
IV	SBEC-II	Power Electronics	2		2	25	75	100
IV	EVS	Environmental Studies	1		2	25	75	100
IV	Add-on course	Professional English- II	2		4	25	75	100

SEMESTER III

PART	SUBJECT	SUBJECT TITLE	TOTAL	HOURS	CRE-DITS	TOTAL		
			L	T/P		CIA	EA	MARKS
I	Language	Tamil - III @	6		3	25	75	100
II	Language	English - III	6		3	25	75	100
III	Core III	Electronic Circuits	4		4	25	75	100
III	Core Pract.-II	Electronic Circuits Practical	1	2				
III	Core Pract.-III	8085 Microprocessor	1	2				
III	Allied III		4		4	25	75	100
III	Allied Lab - II		2					
IV	NMEC - I	(From Group A) #$	2		2	25	75	100

SEMESTER IV

PART	SUBJECT	SUBJECT TITLE	TOTAL	HOURS	CRE-DITS	TOTAL		
			L	T/P		CIA	EA	MARKS
I	Language	Tamil - IV @	6		3	25	75	100
II	Language	English - IV	6		3	25	75	100
III	Core IV	8085 Microprocessor and Interfacing	4		4	25	75	100
III	Core Pract. II	Electronic Circuits Lab	1	2	4	40	60	100
III	Core Pract. III	8085 Microprocessor and Interfacing Lab	1	2	4	40	60	100
III	Allied IV		4		4	25	75	100
III	Allied Lab - II			2	2	40	60	100
IV	**Naan Muthalvan Skill Development Course**	**Digital Skills for Employability- Office Fundamental**	**2**	-	**2**	**25**	**75**	**100**
IV	Add-on course	INTERNSHIP !*	Industry Oriented	Training 15 days				

SEMESTER V

PART	SUBJECT	SUBJECT TITLEs	TOTAL	HOURS	CRE-DITS	TOTAL		
			L	T/P		CIA	EA	MARKS
III	Core V	Electronic Communication Systems	5		5	25	75	100
III	Core VI	Ic's & Their Applications	5		5	25	75	100
III	Elective I	From Group A	5		5	25	75	100
III	Elective II	From Group B	5		4	25	75	100
III	Core Pract-IV	IC'S & Communication Lab	1	2				
III	Core Pract-V	From Group D	1	2				
IV	SBEC III	Electronic Instrumentation	2		2	25	75	100
IV	SBEC IV	Competetive Skills	2		2	25	75	100

SEMESTER VI

PART	SUBJECT	SUBJECT TITLE	TOTAL HOURS		CRE-DITS	TOTAL		
			L	T/P		CIA	EA	MARKS
III	Core VII	PC Hard Ware Networking & Troubleshooting	5		5	25	75	100
III	Core VIII	Network Communication & Security	5		5	25	75	100
III	Elective III	From Group C	5		5	25	75	100
III	Core Pract. IV	IC'S & Communication Lab	1	2	4	40	60	100
III	Core Pract. V	From Group D	1	2	4	40	60	100
III	Core IX	Biomedical Instruments (or) Project Viva Voce *	5		5	25	75	100
III	**Naan Muthalvan Skill Development Course**	**Emerging Technology for Employability – Project based learning** 2	**2**	**-**	**2**	**25**	**75**	**100**
IV	SBEC VI	Life Development Skills	2		2	25	75	100
V	Extension Activities	(NCC/NSS/YRC/Sports Etc.)			1			
		Total Credits & Marks			**150**			**4100**
*		**No Internal Mark For Project Work**						
		Project Report Evaluation	**80**	**Marks**				
		Viva Voce Evaluation	**20**	**Marks**				

!* Internship: To be carried out 4th semester vacation period ,The internship course will not meet as a regular class.

@ Any other Language like Hindi/Malayalam/French/etc .

#$ Those who have not studied Tamil upto XII std and taken a Non Tamil language under part-I shall take Tamil comprising of two courses (level will be at 6th standard) instead of NMEC

#$ Those who have studied Tamil upto XII std and taken a Non Tamil language under part-I shall take Advanced Tamil comprising of two courses instead of NMEC.

5.A. **INTERNSHIPS OBJECTIVES**

The internship could be a new job or a new experience within an existing job as the work performed in the internship should lead to new learning, discovery or growth for the student and contribute toward the student's academic program.

The student intern will either find a company to sponsor him or her or perform a specific project at an existing job. The internship program is an agreement between the student, faculty advisor and the company supervisor.

Perform job requirements in a professional manner.

Maintain regular and prompt attendance, as agreed upon with supervisor. The submission of report is written at the end of the internship by the student to the institute which form part in the awarding of the degree certificate.

INTERNSHIPS OUTCOME

An internship provides the student the opportunity to build upon, apply, and assess the concepts that are developed through the College's curriculum and to further the student's professional growth through a meaningful "real-world" job experience. Internships.

6. QUESTION PAPER PATTERN FOR ALL UG COURSES

MARK DISTRIBUTION FOR THEORY (EXTERNAL)

TIME : 3 HOURS MAXIMUM MARKS : 75

PASSING MINIMUM : 30 MARKS

Part A 15x1=15

(Answer All Questions)

(Three Questions from Each Unit)

Part B 5x2=10

(Answer Any Two Questions)

(One Questions from Each Unit)

Part C 5x10=50

(Answer All Questions)

(One Question from Each Unit with Internal Choice)

Mark Distribution for Theory (Internal)

Max. Marks: 25 Passing Minimum: 10 Marks

Subject Level Cycle Test and Model Exam	:	15
Subject Level Assignment	:	5
Subject Level Attendance	:	5
Total	**:**	**25**

MARK DISTRIBUTION FOR PRACTICALS (EXTERNAL)

TIME: 3 HOURS; MAXIMUM MARKS: 60 ; PASSING MINIMUM : 24 MARKS

PRACTICAL EXAM : 50 MARKS & RECORD : 10 MARKS

Submission of Record Note Books for Practical Exams: Candidates appearing for the Practical Exams must submit Bonafide Record Note Book, otherwise the candidate will not be permitted to appear for the practical exam**.**

Mark Distribution for Practical (Internal)

Max. Marks: 40 Passing Minimum: 16 Marks

Year Through; Lab Performance	:	10
Model Practical's	:	20
Year Through; Lab Attendance	:	10
Total	**:**	**40**

7. PROJECT WORK OR ONE CORE PAPER:

A Candidate can submit **SOFTWARE or HARDWARE or HARDWARE cum SOFTWARE** based project and has to demonstrate the Project with Project Report in the University Project Viva Voce Examination conducted at the end of the sixth semester.

MARK DISTRIBUTION FOR PROJECT REPORT: 80 MARKS

MARK DISTRIBUTION FOR VIVA VOCE : 20 MARKS

Instead of Project Work ; Core Paper – IX "BIOMEDICAL INSTRUMENTS " may be offered in the VI th Semester.

8. PASSING MINIMUM :

A candidate shall be declared to have passed the examination only if the candidate secures a minimum of 40% in the University examination and with an overall total of 40 out of 100.

9. RESTRICTIONS TO APPEAR FOR THE EXAMINATIONS

Candidates who fail in any of the course of Part I , II , III , IV & Part V of UG Degree examinations shall complete the course concerned within 5 years from the date of admission to the said programme and should they fail to do so, they shall take the examination in the revised syllabus prescribed for the immediate next batch of candidates.

If there is no change in the syllabus they shall appear for the examination in that course with the syllabus in vogue until there is a change in the syllabus. In the event of removal of that course consequent to change of regulation and / or curriculum after 5-year period, the candidates shall have to take up an equivalent course in the revised syllabus as suggested by the Chairman and fulfill the requirements as per the regulation curriculum for the award of the degree.

10. IMPROVEMENT OF MARKS IN THE SUBJECTS ALREADY PASSED

Candidates desirous of improving the marks awarded in a passed subject in their first attempt shall reappear once within a period of subsequent two semesters. The improved marks shall be considered for classification but not for ranking. When there is no improvement, there shall not be any change in the original marks already awarded.

11. CLASSIFICATION OF SUCCESSFUL CANDIDATES

A candidate who passes all the examinations in Part I to P art V securing following CGPA and Grades shall be declared as follows for Part I or Part II or Part III.

CGPA	GRADE	CLASSIFICATION OF FINAL RESULT
9.5 - 10.0	O +	First Class -Exemplary
9.0 and above but below 9.5	O	
8.5 and above but below 9.0	D++	First Class with Distinction
8.0 and above but below 8.5	D+	
7.5 and above but below 8.0	D	
7.0 and above but below 7.5	A++	First Class
6.5 and above but below 7.0	A+	
6.0 and above but below 6.5	A	
5.5 and above but below 6.0	B+	Second Class
5.0 and above but below 5.5	B	
4.5 and above but below 5.0	C+	Third Class
4.0 and above but below 4.5	C	

12. RANKING

A candidate who qualifies for the UG degree course passing all the examinations in the first attempt, within the minimum period prescribed for the course of study from the date of admission to the course and secures I or II class shall be eligible for ranking and such ranking shall be confined to

10% of the total number of candidates qualified in that particular branch of study; subject to a maximum of 10 Ranks. The improved marks shall not be taken into consideration for ranking.

13. COMMENCEMENT OF THIS REGULATION:

These regulations shall take effect from the academic year 2021-2022, i.e., for students who are to be admitted to the first year of the course during the academic year 2021-2022 and thereafter.

14. COURSE EQUIVALENCE:

The Three Year Course in the Bachelor of Science in Electronics & Communication is Equivalent to :

- B.Sc. Electronics
- B.Sc. Industrial Electronics
- B.E.S. (Bachelor of Electronic Science)

15. COURSE OBJECTIVES:

The syllabus of B.Sc., Electronics and Communication is enriched and necessary changes have been made in the course pattern and papers. This will enable the students to acquire the **Basic & Fundamental Knowledge In Both Theory And Practical's.**

16. ACADEMIC OPPORTUNITIES:

After successful completion of this course ; students can pursue higher degree courses like M.Sc., (Electronics) / M.Sc., (Electronic Science) / M.Sc., (Applied Electronics) / M.Sc., (Electronics & Instrumentation) / M.Sc., (Cyber Forensics & Information Security) M.Sc., (Criminology & Criminal Justice Science) / M.Sc., (Computer Science) / MCA / M.Sc., (Nano Science and Technology) / M.Sc., HRD Psycholgy / M.Sc., (Energy Science) / M.Sc., Environomental Science) / M.Sc., Library & Information Science) / M.Sc., YOGA / MBA / MA., (Defense & Strategic Studies / MA., Yoga / MA., Public Administration / MA., Political Science etc

17. JOB OPPORTUNITIES:

The Students are eligible for placement in Army, Navy, Airforce, Civil Aviation Sectors, Space & Radio Astronomy Sectors, T.V. Broad Casting Stations, All India Radio, BSNL , TNEB , ITES (IT Enabled Software Services) , Telecommunication Sectors, Banking and Railway Services and as Computer Hardware & Instrument Service Professionals. A Wide variety of Self – Employment Opportunities are also available.

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER I

L	T	P	C
4	0	0	4

CORE I - SEMICONDUCTOR DEVICES

COURSE OBJECTIVES:

This course provides the important aspect of semiconductors and devices like diodes, Transistor, JFET and MOSFET.

Course Outcomes: After completion of this course, student able to	
CO1	Understand the band diagram, type of semiconductors and charge carrier life time.
CO2	Understand of capacitors and types of diodes breakdown
CO3	Demonstrate the transistor and their types
CO4	Understand the fundamentals for construction of different type of JFET.
CO5	To study the operating principles of MOSFET.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Atom**	Structure of Atom - Atomic Number - Valence Electrons - Bonding in Conductors - Insulators - Semiconductors - Energy Band Diagram of Conductors - Insulators - Semiconductors - Intrinsic Semiconductor - Extrinsic Semiconductor - P Type Semiconductor - N type Semiconductor - Carrier Life Time. .	10
II	**PN Junction Diode**	Theory of PN Junction Diode - Energy Band Structure - Diode Current Equation - Diode Resistance - Depletion Capacitance - Diffusion Capacitance - Effect of Temperature - PN Junction Diode as a Rectifier - Zener Diode -	10

		Avalanche Break Down - Zener Break Down - Zener Diode as a Voltage Regulator.	
III	**Transistor**	Operation of PNP & NPN Transistor - CB, CE, CC Configuration and Characteristics - Transistor as an Amplifier.	10
IV	**JFET**	Construction - Operation - Output & Transfer Characteristics of P Channel & N Channel JFET - Characteristic Parameters of the JFET - Biasing the FET - Comparison of JFET & BJT - Comparison of P Channel & N Channel JFET - Applications of JFET - JFET as a Voltage Variable Resistor.	10
V	**MOSFET**	Construction, Operation, Output & Transfer Characteristics of P Channel & N Channel Depletion MOSFET - Construction, Operation, Output & Transfer Characteristics P Channel & N Channel Enhancement MOSFET - Biasing the MOSFET - Comparison of P Channel MOSFET with N Channel MOSFET - Comparison of JFET with MOSFET - Handling Precautions for the MOSFET.	10

REFERENCE BOOKS :

1. Electronic Devices & Circuits - Salivahanan - TMH - 2nd Edition
2. A Text Book of Applied Electronics - R.S. Sedha - S. Chand-Rs.395/-

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTR - I

L	T	P	C
2	0	0	2

SKILLED BASED ELECTIVE COURSE

SBEC I - APPLIED ELECTRIC CIRCUITS

(IN DEPTH THEORY & ANALYSIS NOT REQUIRED)

COURSE OBJECTIVES:

- To understand and acquire knowledge about various circuit theorem.
- To make students strong in electric circuit designing.
- To learn the different laws and implement in circuits and also compare its gain.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Examine the basic components in series and parallel connection.
CO2	Have a thorough understanding of the different circuit laws.
CO3	Understand various circuit theorems.
CO4	Analyse RMS & Power parameters of AC circuits.
CO5	Acquire the knowledge of RLC and its applications.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Circuit components**	Resistors, Capacitors & Inductors in Series and Parallel - Factors governing the Resistance of a Resistor, Capacitor & Inductor - Colour Coding of Resistors - Energy Stored in a Capacitor - Energy Stored in an Inductor – Various Other Passive & Active Devices -	05

		Simple Problems.	
II	**Circuit laws**	Ohms Law - Kirchoff's Voltage Law - Kirchoff's Current Law - Current Division - Voltage Division - Star Connection - Delta Connection - Series Circuits - Parallel Circuits - Series & Parallel Circuits - Open Circuit - Short Circuit - Simple Problems.	05
III	**Theorems**	Super Position Theorem – Thevenin's Theorem – Norton's Theorem – Millman's Theorem Maximum Power Transfer Theorem – Simple Problems	05
IV	**Ac circuit basics**	Sinusoidal and Non Sinusoidal Waveforms – Peak Value – Peak to Peak Value – Average Value – RMS Value – Period and Frequency Measurement - Power Factor - Real Power – Reactive Power – Simple Problems.	05
V	**Reactance, impedance & resonance**	Capacitive Reactance – Inductive Reactance – Impedance – RL and RC in Series and Parallel – RLC in Series and Parallel – Series Resonance - Parallel Resonance - Simple Problems	05

Books for Reference

1. Circuits And Networks: Analysis And Synthesis - Sudhakar &
Shyam Mohan - TMH - IV Edition
2. Basic Electronics – Bernard Grob – Mcgraw Hill.
3. Circuit Theory – Salivahanan – S.Chand – Rs.395/-

L	T	P	C
4	0	0	4

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER II

CORE II - APPLIED DIGITAL ELECTRONICS

COURSE OBJECTIVES:

- To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronic circuits.
- To prepare students to perform the analysis and design of various digital electronic circuits.
- To learn the design process of registers, counters and conversion of analog to digital conversion and vice-versa.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Examine the structure of various number systems and its application in digital design.
CO2	Have a thorough understanding of the fundamental concepts and minimization techniques used in digital electronics.
CO3	Understand various combinational logic circuits and its applications
CO4	Analyse and design various sequential logic circuits and its applications.
CO5	Analyze the logic levels and apply them for the design of analog to digital conversion and vice versa.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction

I	**Number systems**	Binary Signals – Binary Number System – Decimal Number System - Octal Number System – Hexadecimal Number System – Conversion from One Number System to Another Number System - BCD – Gray code – Excess – 3 Code – ASCII code.	10
II	**Boolean algebra**	Binary Addition, Subtraction, Multiplication & Division - 1's and 2's Complement Subtraction - 9's & 10's Complement Subtraction - Basic laws of Boolean Algebra - Duality Theorem – De Morgan's Theorem - Sum of Products – Product of Sum - Two Variable, Three Variable & Four Variable Karnaugh Maps .	10
III	**Combinational Elements**	Logic Gates: AND, OR, NOT, EX-OR, EX-NOR, NAND & NOR - Logic Gates using Discrete Components - NAND & NOR as Universal Gates - Half & Full Adder – Half & Full Subtractor - Encoder - Decoder - Multiplexer - Demultiplexer - Implementation using 74147, 7442, 74153 & 74155 IC's.	10
IV	**Sequential Elements**	Flip Flops: RS - Clocked RS - JK - Master Slave JK - D & T Flip Flops – Shift Registers : SIPO – SISO – PIPO – PISO – Shift Left – Shift Right - Ring counter – Twisted Ring Counter . Counters: Hexadecimal Up - Hexadecimal Down - Modulo Up - Modulo Down - UP/DOWN Counters - Implementation Using 7476, 7495, 7493 & 7490 IC's.	10

V	**A/D AND D/A Conversion**	Parallel Comparator Type of ADC - Counter Ramp Type of ADC - Successive Approximation Type of ADC - Dual Slope Type of ADC - ADC Accuracy and Resolution - Binary weighted Resistor type of DAC - R-2R Ladder Type of DAC - DAC Accuracy and Resolution - Implementation using ADC 0809 & DAC 0800 IC's.	10

Books for study

1. *Anand Kumar*. 2008. **Fundamentals of Digital Circuits.** [Second Edition]. PHI.
2. *Salivahanan.* 2004. **Digital Circuits and Design.** [Fourth Edition]. S.Chand.

Books for Reference

1. *Donald,P.Leach, Albert Paul Malvino and Goutam Saha*. 2008. **Digital Principles and Applications.** [Sixth Edition]. Tata Mc Graw Hill, New Delhi.
2. *Virendra Kumar*. 2009. **Digital Technology Principles and Practice.** [First Edition]. New Age International Publications, New Delhi.
3. *Jacob Millman and Christos Halkias.* 2011. **Integrated Electronics Analog and Digital Circuits and Systems.** [Second Edition]. Tata Mc Graw Hill Publishing Company Limited, New Delhi.
4. *Thomas, L.Floyd*. 2006. **Digital Fundamentals.** [Ninth Edition]. Pearson Education, New Delhi.

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER II

L	T	P	C
2	0	0	2

SKILLED BASED ELECTIVE COURSE

SBEC II - POWER ELECTRONICS

(IN DEPTH THEORY & ANALYSIS NOT REQUIRED)

COURSE OBJECTIVES:

- To understand and acquire knowledge about various power semiconductor devices.
- To provide the students a deep insight in to the working of different switching devices with respect to their characteristics.
- To study the principle of operation, design and synthesis of different types of power supplies and their applications.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Ability to express characteristics of SCR, TRIAC, DIAC and UJT
CO2	Acquire knowledge about fundamental concepts and methods to turn ON and turn OFF the thyristor.
CO3	Understand the design principle of triggering circuit of SCR
CO4	Explain the switching principle and applications
CO5	Remember the working principle of various types of power supplies.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Thyristor Characteristics**	Simple Theory & Characteristics of SCR - DIAC, TRIAC - UJT. UJT as an Oscillator.	05

II	**Methods of Turn ON & Turn OFF**	AC gate Triggering - R Triggering - RC Triggering - DC gate Triggering - Pulse gate Triggering – Natural Commutation - Force Commutation – Self - Impulse - Resonant - Complementary - External -Load side - Line Side.	05
III	**Triggering SCR**	Triggering of series connected SCR's - Triggering of Parallel Connected SCR's – Current & Voltage Protection - Snubber Circuit.	05
IV	**Static Switches**	Single Phase AC Switches - Three Phase AC Switches - Three Phase Reversing Switches - AC Switches for Bus Transfer - DC Switches - Solid State Relays.	05
V	**Power Supplies**	Switched mode DC Power Supplies - Resonant DC Power Supplies - Bidirectional Power Supplies - Switched mode AC Power Supplies - Resonant AC Power Supplies - Bidirectional AC Power Supplies.	05

Books for study

1. Power Electronics - Muhammed H. Rashid - PHI - 2nd Edition
2. Power Electronics – Jaganathan – PHI – II Edition.

Books for Reference

1. *Singh M D and Khanchandani K B ,2007*, **Power electronics**[Second Edition],Tata Mcgraw hill, Newdelhi.
2. *Mithal.G.K,2000* , **Industrial electronics and control** [Eighteenth Edition],Tata Mcgraw hill , Newdelhi
3. *Theraja B.L, Theraja.A.K, 2003*, **Electrical Technology** [First Edition], S.Chand, Newdelhi.

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER I & II

L	T	P	C
2	2	2	4

CORE PRACTICAL I - BASIC ELECTRONICS LAB

(ANY HARDWARE BASED SIMULATION TOOL MAY ALSO BE USED)

(Any 22 Experiments)

COURSE OBJECTIVES:

Basic electronics laboratory is the gateway of the electronics & communication engineering world. At the very beginning the students get familiarized with the various electronics instruments & components which basically equip them to construct complex circuits in near future. In this lab students build up preliminary electronic circuits and verify the results with theoretical concepts. Lab experiments are designed in such a fashion that the engineering skill of the students starts to enrich**.**

COURSE OUTCOMES: After completion of this course, student able to

CO1	Ability to express characteristics of DIODES,BJT,THYRISTORS
CO2	To understand the basic theorems and to verify their operation
CO3	To understand the basic digital circuits and to verify their operation
CO4	Learn the basics of gates & Construct basic combinational circuits and verify their functionalities
CO5	Learn about Shift registers & counters

Syllabus

1. Colour Coding of Resistors
2. PN Junction Diode Characteristics.
3. Zener Diode Characteristics.
4. CE Input Characteristics.
5. CE Output Characteristics.
6. SCR / TRIAC Characteristics.

7. DC Regulated Power Supply Using Zener Diode.
8. Verification of Ohm's Law.
9. Verification of Kirchoff's Current Law.
10. Verification of Kirchoff's Voltage law.
11. Verification of Thevenin's Theorem / Norton's Theorem.
12. Verification of Millman's Theorem
13. Verification of Maximum Power Transfer Theorem
14. Inductance Calculation Using Series or Parallel Resonance.
15. Transient Response of an RC Circuit.
16. Truth Table Verification of Basic Gates (Any Two)
17. Logic Gates Using Discrete Components (Any One).
18. +5V Regulated Power Supply.
19. NAND or NOR as a Universal Gate (Any One Gate).
20. Verification of De Morgan's Theorem.
21. Truth Table Verification of Half Adder & Full Adder
22. Truth Table Verification of Half Subtractor & Full Subtractor.
23. Encoder Using 74147 IC
24. Decoder Using 7442 IC
25. Multiplexer Using 74153 IC
26. Demultiplexer Using 74155 IC
27. MS JK Flip Flop Using 7476 IC
28. Parallel In Parallel Out Shift Register Using 7495 IC
29. Up Counter Using 7490 IC or 7493 IC.
30. Clock Generation Using NAND or NOR Gate.

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER III

L	T	P	C
4	0	0	4

CORE III - ELECTRONIC CIRCUITS

COURSE OBJECTIVES:

To analyze and describe the applied electronics principles used to develop circuits and systems & To understand the fundamentals of the alternating current. To apply the basic tools and test equipment used to construct, troubleshoot, and design standard electronic circuits.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Understand the basics of electrical energy and practical implementation of electrical fundamentals.
CO2	solve design problems on rectifiers, filters and power supply circuits.
CO3	Understand various types of amplifier.
CO4	Examine the basic components of feedback &its types.
CO5	Acquire the knowledge about oscillators, Multivibrators and Wave shaping circuits.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Power s upply's**	Half Wave Rectifier - Full Wave Rectifier - Bridge Rectifier - Average value - RMS value - Form factor - Peak factor - Ripple factor - Efficiency - TUF - PIV - Filters: C, L, LC, CLC, CRC – Voltage Regulators :Series Regulators - Shunt Regulators - IC Voltage Regulators (78XX & 79XX)..	10

II	**Transistor biasing**	Bias Stability - Thermal runaway - Methods of transistor Biasing - Bias compensation - Wave Shaping Circuits – RC & RL Circuits – Clipping & Clamping Circuits – Voltage Doubler – Tripler – Quadrupler.	10
III	**Types of amplifiers**	Class A Amplifier - Class B Amplifier - Class AB Amplifier - Push Pull Amplifier - Complementary symmetry Push Pull Amplifier - Class C Amplifier – Multistage Amplifiers: RC Coupled Amplifier - Transformer Coupled Amplifier - Direct Coupled Amplifier.	10
IV	**Feedback**	Basics concepts of Feedback - Effects of negative feedback on gain, Bandwidth, Distortion, Noise, Input Impedance and Output Impedance - Types of Negative Feedback - Voltage Series - Voltage Shunt - Current Series and Current Shunt Feedback	10
V	**Oscillators**	Classification of Oscillators - Barkhausen Criterion - Hartley Oscillator - Colpitt Oscillator - Clapp Oscillator - Phase Shift Oscillator - Wein Bridge - Crystal Oscillator - Frequency stability of Oscillators - Astable Multivibrator - Monostable Multivibrator Bistable Multivibrator - Schmitt Trigger.	10

REFERENCE BOOKS:

1. Electronic Devices & Circuits - S. Salivahanan - TMH - II Edition
2. AText Book of Electronic Devices & Circuits – R. S. Sedha – S.Chand Rs.325/-

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER III

L	T	P	C
2	0	0	2

NONMAJOR ELECTIVE COURSE I

GROUP A - PAPER I -BASIC ELECTRONICS -I

(IN DEPTH THEORY & ANALYSIS NOT REQUIRED

COURSE OBJECTIVES:

This course provides the important aspect of semiconductors and devices like diodes, Transistor, JFET and MOSFET & to understand and acquire knowledge about various circuit theorem, make students strong in electric circuit designing.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Understand the fundamentals for construction & different type of Diode, BJT.
CO2	Understand the fundamentals for construction of different type of JFET, MOS, etc
CO3	Understand various circuit Laws.
CO4	Examine the basic components in series and parallel connection.
CO5	Analyze RMS & Power parameters of AC circuits.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Semiconductor theory**	Intrinsic Semiconductor – Extrinsic Semiconductor - Theory of PN Junction Diode - Zener Diode - Avalanche Breakdown - Zener Break Down - Operation of PNP & NPN Transistor - CB, CE, CC Configuration and Characteristics - Transistor as an Amplifier.	05

II	**Electronic components**	Simple Theory & Use of: Resistors, Capacitors, Inductors, Diodes, Zener diodes, Transistors, FET, MOSFET, UJT, SCR, DIAC, TRIAC, LED, Seven Segment Display, Basic Gate IC's, Transformers, LDR, Switches, Microphone, Loudspeaker, Buzzers, Fuse.	05
III	**Circuit laws**	Ohm's Law - Kirchoff's Current Law - Kirchoff's Voltage Law - Voltage Division - Current Division - Series Circuits - Parallel Circuits - Series & Parallel Circuits - Open Circuit - Short Circuit.	05
IV	**Resistors, capacitors & inductors**	Resistor Resistors, Capacitors & Inductors in Series and Parallel-Factors governing the Resistance of a , Capacitor & Inductor - Colour Coding of Resistors - Energy Stored in a Capacitor - Energy Stored in an Inductor	05
V	**Waveforms**	Sinusoidal Waveform - Non-Sinusoidal Waveforms - Peak Value - Peak to Peak Value - Average Value - RMS Value – Period & Frequency Measurement.	05

REFERENCE BOOKS :

1. Electronic Devices & Circuits - Salivahanan - TMH - 2nd Edition
2. Principles of Electronics- V.K. Mehta - S. Chand.
3. Circuits & Networks - Sudhakar - TMH - 4th Edition.

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER III

L	T	P	C
2	0	0	2

NON MAJOR ELECTIVE COURSE I

GROUP A- PAPER II -BIO MEDICAL ELECTRONICS – I

(IN DEPTH THEORY & ANALYSIS NOT REQUIRED)

COURSE OBJECTIVES:

- To Illustrate origin of bio potentials and its propagations
- To understand the different types of electrodes and its placement for various recordings
- To understand various physiological recordings and its measurements
- To learn the medical imaging equipment and techniques for surgeries.
- To summarize therapeutic equipment and Patient monitoring techniques for biological operations.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Differentiate different bio potentials and its propagations.
CO2	Illustrate different electrodes and its placement for bio potentials recordings and measurements
CO3	Demonstrate various electrophysiological recordings and measurements
CO4	Explain medical imaging equipment's using in surgeries
CO5	Demonstrate different therapeutic equipment's and Patient monitoring techniques

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction

I	**Introduction**	Introduction to Human Physiology – Micro Electrodes – Skin Surface Electrodes – Needle Electrodes – Reference Electrodes.	05
II	**Meters & recorders**	Digital Thermometer – Sphygmo Manometer - Electronic Sthethoscope – ECG - EEG – EMG	05
III	**Cardio Tocography**	Cardio Tocography - Electro Oculography - Electro Retinography - Poly Somnography Blood Flow Meter - Doppler – Audiometer	05
IV	**Operation theatre equipments**	Upper Endoscope - Lower Endoscope - ENT Endoscope	05
V	**Diathermy**	Diathermy - Surgical Diathermy- Micro Wave Diathermy - Multipara Patient Monitor.	05

REFERENCE BOOKS :

1. Biomedical Instrumentation & Measurements – Ananda Natarajan – PHI - Rs.275/-
2. Biomedical Instrumentation and Measurements - Leslie Cromwell - PHI - 2nd Edition.
3. Bio-Medical Instrumentation - Dr.M.Arumugam - Anuradha Agencies - 2nd Edition
4. Handbook of Biomedical Instrumentation - R.S.Khandpur - TMH
5. Medical Instrumentation, Application And Design – John G.Webster – WEL - 3rd Edition
6. A Text of Book of Medical Instruments – Ananthi – New Age International – Rs.275/-
7. Internet : Additional Reference For All Units.

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SEMESTER III

NON MAJOR ELECTIVE COURSE I

L	T	P	C
2	0	0	2

GROUP A- PAPER III - CELLULAR PHONES

(IN DEPTH THEORY & ANALYSIS NOT REQUIRED)

COURSE OBJECTIVES:

To get knowledge about Cellular Radio, Elements of a Cellular Network, Cellular Telephony, Radio Propagation and its applications & the mobile servicing and Software Repairing.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Understand the fundamental concepts of Cellular.
CO2	Understand the different accessing technology.
CO3	Understand the hardware & software of mobile
CO4	Understand the servicing of mobile
CO5	Understand the other mobile service tools

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Basics**	Working of a Telephone - Local Exchange - Initiating a call - Calling a Number - Making a Connection - Answering a Call - Conversation - Ending a Call - Hook Switch - Transmitter - Receiver - Ringer - Cellular Mobile Telephone System - Mobile Phone Service Area - Mobile Fraud Call.	05

II	**Access technologies**	GSM - CDMA - GPRS - EDGE - WCDMA - UMTS - HSDPA - Satellite Phones - GPS - Mobile Browsers - WAP.	05
III	**Hardware/ Software**	Types of: Wireless Options, Batteries, Memory Cards, Messaging, Ring Tones, Keypad Types, Display Types. Handset Form Factor - SMS Abbreviations - Mobile OS.	05
IV	**Hardware/ software repairing**	Hardware/Software Repairing - Various Locks - Installation of : UFS Driver, UFS Suite & Flashing Files - IMEI Number Detection - Mobile GSM Utility Codes (Any Five of Nokia Set)	05
V	**Other mobile service tools**	Ultrasonic Cleaner - Computer Connectors - SIM Card Reader - Memory Card Reader - Mobile Virus - Virus Prevention - Removing Virus - Health Hazards with Mobiles - SAR.	05

REFERENCE BOOKS :

1. Modern Mobile Phone Introduction & Servicing - Manahar Lotia - BPB - Rs.75/- (Unit - I)
2. Modern Mobile Phone Repair Using Computer Software & Service Devices - Manahar Lotia - BPB - 120/- (Units I, IV & V)
3. Modern Mobile Phone Unlocking & Utility Codes For GSM & CDMA Phones - Manahar Lotia - BPB - Rs.99/- (Unit - IV).
4. Mobile Telephony - Digit Magazine - Supplement - Jan 2006 - Jasubhai Digital Media Publications. (Unit II & III)
5. Blue Tooth Technology – CSR Prabhu & A Prathap Reddi – PHI - Rs.250/-

6. Mobile & Personal Communication Systems & Services - Raj Pandya - PHI – Rs.250/-

7. INTERNET : ADDITIONAL REFERENCE FOR ALL UNITS.

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER IV

CORE IV - 8085 MICROPROCESSOR & INTERFACING

L	T	P	C
4	0	0	4

COURSE OBJECTIVES:

To understand the features and applications of 8085 microprocessor & exploit the abilities for the design and peripheral interfacing with real time domains

COURSE OUTCOMES: After completion of this course, student able to

CO1	Understand the evolution of processor and 8085 architectures.
CO2	Learn the instruction and to create the ALP.
CO3	Investigate the instruction format and machine cycle fetch.
CO4	Compute and design for time delay and counters.
CO5	Design and development of interfacing and applications.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**8085 Microprocessor**	Signals on 8085 – Architecture of 8085 – Demultiplexing the Bus - Generating Control Signals – Fetching, Decoding and Execution of an Instruction– Memory Mapping for a8K Memory Chip - Study of EPROM (2764) & Study of RWM (6264).	10

II	**Instruction set**	Data Transfer – Arithmetic – Logical – Branching - Machine Control Instructions - Stack & Stack Operations - Simple Programs.	10
III	**Timing Diagram**	Addressing Modes - Instruction Format - Memory Read Machine Cycle (MOV C, A & MVI A,32) - Memory Write Machine Cycle (MVI M, 48) - Timing Diagram of IN & OUT Instruction - Interrupt System of 8085.	10
IV	**Peripherals**	Time Delay Program – Signals on 8255 – I/O Mode – BSR Mode - Interfacing With: Switches & Matrix Keyboard.	10
V	**Interfacing**	Interfacing With: LED'S - Single & Multiple Seven Segment Displays - LCD - ADC 0809 - DAC 0800 – Stepper Motor - Traffic Light Control System.	10

REFERENCE BOOKS :

1. Microprocessor Architecture, Programming and Applications With the 8085/8080A – Ramesh.S Gaonkar - New Age International – 5th Edition.
2. Introduction to Microprocessor -AP Mathur - TMH – 3rd Edition
3. Microprocessor and its Applications – S. Malarvizhi – Anuradha Publications
4. Fundamentals of Microprocessors and Micro Controllers – B.Ram – Dhanpat Rai – IV th Edition

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER III & IV

L	T	P	C
2	2	2	4

CORE PRACTICAL II - ELECTRONIC CIRCUITS LAB

(ANY HARDWARE BASED SIMULATION TOOL MAY ALSO BE USED)

(Any 22 Experiments)

Course Objectives

The objective of the course is to equip the students with in-depth basic concepts and understanding of the principles of operation, construction, and characteristics of basic electronic equipment, and their utilization in basic electronics building blocks (or modules) and their performances practically. The techniques of analysis and design of basic building blocks of modern technology using device would be emphasized.

COURSE OUTCOMES: After completion of this course, student able to

CO1	To develop hands-on skills and knowledge about the electronic devices such as oscilloscopes, function generators, multimeter, etc.
CO2	To implement different types of electronic circuits using the techniques, skills.
CO3	To analyze complex networks of resistors, inductors, capacitors subject to both direct (non-time-varying) and alternating voltages and currents.

Syllabus

1. Amplitude and Frequency Measurement Using CRO
2. Half Wave Rectifier with Capacitor Filter
3. Full Wave Rectifier with Capacitor Filter
4. Bridge Rectifier with Capacitor Filter
5. Regulated Dual Power Supply Using 78XX & 79XX
6. Positive & Negative Clipping at 0V
7. Positive & Negative Clamping at 0V
8. Voltage Doubler / Voltage Tripler / Voltage Quadrupler

9. Basic Differentiator & Basic Integrator
10. Hartley Oscillator Using Transistor
11. Colpitt's Oscillator or Clapp Oscillator Using Transistor.
12. Phase Shift/ Wein Bridge Oscillator Using Transistor.
13. Crystal Oscillator Using Transistors.
14. UJT as an Oscillator.
15. Astable Multivibrator Using Transistors
16. Monostable Multivibrator Using Transistors.
17. Bistable Multivibrator Using Transistors
18. Schmitt Trigger Using Transistors.
19. Single Stage RC Coupled Amplifier.
20. Two Stage RC Coupled Amplifier
21. Emitter Follower.
22. Push Pull Complementary Symmetry Emitter Follower.
23. Power Amplifier Using LM 380 IC.
24. Firing Angle Control Using SCR (Half Cycle / Full Cycle).
25. Lamp Dimmer
26. Automatic Street Light Control.
27. Transistor Chopper.
28. Burglar Alarm or Fire Alarm
29. Power Transistor Inverter (40W / 20W)
30. Commutation Techniques (Any Two)

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER III & IV

L	T	P	C
2	2	2	4

CORE PRACTICAL III

(ANY EMBEDDED BASED SIMULATION TOOL MAY ALSO BE USED)

(Any 22 Experiments)

8085 MICROPROCESSOR & INTERFACINGLAB

Course Objectives

To expose students to the operation of typical microprocessor (8085) **simulation tool/** trainer kit. solve different problems by developing different programs & to develop the quality of assessing and analyzing the obtained data.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Identify relevant information to supplement to the Microprocessor.
CO2	Set up programming strategies and select proper mnemonics and run their program on the training boards/simulator.
CO3	**Practice** different types of programming keeping in mind technical issues and evaluate possible causes of discrepancy in practical experimental observations in comparison.
CO4	Develop testing and experimental procedures on Microprocessor **analyze** their operation under different cases.
CO5	**Prepare** professional quality textual and computational results, incorporating accepted data analysis and synthesis methods, simulation software, and word-processing tools.

Syllabus

1. Addition of Two; 8 Bit Numbers & Subtraction of Two; 8 Bit Numbers
2. Multiplication of Two; 8 Bit Numbers
3. Division of Two; 8 Bit Numbers
4. BCD Addition

5. BCD Subtraction
6. FILL
7. BLOCK MOVE
8. 1's & 2's Complement of a 16 Bit Number.
9. Smallest / Largest of; N Numbers.
10. Ascending / Descending Order of; N Numbers.
11. Sum of N; 8 Bit Numbers.
12. Multi Byte Addition.
13. 3 Digit Decimal to Two digit Hexadecimal Conversion.
14. Two digit Hexadecimal to 3 digit Decimal Conversion.
15. ADC Interface.
16. DAC Interface.
17. Waveform Generation Using DAC.
18. Stepper Motor Interface.
19. Interface with Switches & Interface with LED's
20. Hex Keyboard Interface.
21. Interface with Single Seven Segment Display.
22. Interfacing with Multiple Seven Segment Displays.
23. Interface with LCD's.
24. Interfacing with Solid State Relay.
25. Moving Display.
26. Blinking Display.
27. Digital Clock.
28. Traffic Light Control.

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER V

L	T	P	C
5			5

CORE V - ELECTRONIC COMMUNICATION SYSTEMS

COURSE OBJECTIVES:

Learn about theoretical bounds on the rates of Electronic Communication System and represent a digital signal using several modulation methods. Draw signal space diagrams compute spectra of modulated signals and apply redundancy for reliable communication.

COURSE OUTCOMES: At the end of course, student will be able to:

CO1	Understand the basics of EM, space diagram, spectrum, propagation.
CO2	Learn the generation and detection of Modulation and base band system.
CO3	Understand the generation, detection, Transmitter of FM.
CO4	Learn the AM & FM Receiver
CO5	Evaluate the performance of PCM, DPCM and DM in a digital communication system

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Propagation of radio waves**	Introduction to EM waves – Reflection and refraction of radio waves at the surface of the earth – Ground wave propagation-Sky wave propagation – Space wave propagation – Structure of the Atmosphere – Critical frequency - Skip distance – Maximum Usable frequency (MUF) – Virtual height.	**10**
II	**Am generation & transmission**	Need for modulation – Amplitude modulation – Frequency Spectrum of the AM Wave - Modulation Index – Power relations in the AM	**10**

		Wave – AM generation – AM Transmitter. - Forms of Amplitude Modulation – Evolution of SSB – Balanced Modulator – Methods of SSB Generation – Vestigial side band Transmission.	
III	**Fm generation & transmission**	Frequency Modulation - Frequency Spectrum of the FM Wave – Modulation Index – Effect of Noise – Adjacent & Co-Channel Interference – Wide Band & Narrow Band FM-FM Generation – Direct and Indirect methods - FM Transmitter – Pre-Emphasis.	**10**
IV	**Am & fm reception**	AM Receiver – TRF Receiver – Super Heterodyne Receiver – Image Frequency Rejection – Frequency Changing & Tracking – Choice of IF – AM Detection – AGC – SSB Detection. FM Receiver – Amplitude Limiter – De-Emphasis – FM Detection – Balanced Slope Detector – Phase Discriminator – Ratio Detector.	**10**
V	**Pulse modulation**	PAM Modulation & Detection – PWM Modulation & Detection - PPM Modulation & Detection - Sampling Theorem – Quantization & Quantization Error – PCM Modulation & Detection - Companding - ASK – FSK – BPSK – QPSK – DPSK	**10**

REFERENCE BOOKS :

1. Electronic Communication Systems - Kennedy - TMH – IV Ed
2. Electronic Communication Systems - Roddy & Collen – PHI – IV Ed
3. Electronic Communications – Sanjeev Gupta – Khanna Publications .
4. Principles of Communication Engineering – Anokh Singh – S. Chanda

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER V

CORE VI - IC's AND THEIR APPLICATIONS

L	T	P	C
5			5

COURSE OBJECTIVES:

This course elaborates the production methods of IC's and various application of them including logic, OP- AMPs**.**

COURSE OUTCOMES: After completion of this course, student able to

CO1	Understand the method of IC's fabrication Techniques.
CO2	Study the various circuits of Logic operations using ICs.
CO3	Get the knowledge of various OP-Amp circuits
CO4	Study the principle of Filter.
CO5	Study the principle of Timer& Phase locked loop circuits.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Ic fabrication process**	Introduction - Basic Planar Process - Fabrication of a Typical Circuit - Active and Passive Components - Fabrication of FET, MOSFET & CMOS.	10
II	**Logic family' s**	Characteristics of IC's - Diode Logic - Transistor Logic - RTL - DCTL - IIL - DTL - HTL - TTL - CMOS – ECL- Comparison of Logic Families.	10

III	**OP – AMP ' S**	Introduction - The ideal OP-AMP - OP-Amp Stages - OP-Amp Parameters - Inverting &NonInverting Amplifier - Adder - Subtractor - Multiplier - Divider - Integrator - Differentiator - V to I Converter - I to V Converter.	10
IV	**Filters**	Low Pass Filter – High Pass Filter – Band Pass Filter – Band Reject Filter - Solving of Simultaneous Equations – Solving of Differential Equations.	10
V	**555 Timer & 565 PLL**	555: Functional Diagram -Astable Operation - Monostable Operation - Linear Ramp Generator. PLL: Basic Principle – 565 PLL - Frequency Translation - Frequency Multiplier - Frequency Divider - AM Detection – FM Detection.	10

REFERENCE BOOKS :

1) Linear IC's – Roy Choudhury – NAI – 4th Edition. (UNIT I)

2) Electronic Circuits – Salivahanan – TMH - II Edition (UNIT II)

3) OP-Amps - Gayakwad - PHI - 4th Edition - (UNIT III, IV & V)

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER V

L	T	P	C
5			5

ELECTIVE I - PAPER I-Group A
8051 MICROCONTROLLER AND INTERFACING

COURSE OBJECTIVES:

To understand the basics of micro controller architecture and memory systems. learn the assembly language programming instructions and writing programs & to exploit the abilities for the design and peripheral interfacing with real time domains.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Understand the evolution of microcontroller8051 architectures, pin functions and bus timing.
CO2	Learn the instruction format, and to create the assembly language program with looping techniques.
CO3	Investigate the interfacing techniques for keyboard and optical devices.
CO4	Compute and design for converter and real time applications.
CO5	Design and development of memories.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**8051 Microcontroller**	Features - Signals - Architecture - RAM Structure - SFR's - Power Saving Modes - Interrupt logic - Timer Logic - Serial Logic	10

II	**Instruction set**	Data transfer - Arithmetic – Logical – Bit manipulation – Branching Instructions – Stack & Stack Operations– Addressing Modes- Simple Programs.	10
III	**Interfacing with IO**	Interfacing With : Switches & Matrix Keyboard - LED'S - Single & Multiple Seven Segment Displays – LCD.	10
IV	**Interfacing with Application**	Interfacing With : ADC 0809 IC – DAC 0800 IC - Stepper Motor – DC Motor – Traffic Light Control System.	10
V	**Memories**	ROM – PROM – EPROM(2764) - EEPROM – NVRAM - Static RWM (6264)-Dynamic RWM (TC511000) - RWM Refreshing – Pseudostatic RWM.	10

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REFERENCE BOOKS :

1. The 8051 Microcontroller Embedded Systems – Mazidi & Mazidi - Pearson - 2nd Edition.

2. Introduction to Microprocessor -AP Mathur - TMH – 3rd Edition (Unit- V)

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER V

L	T	P	C
5			5

ELECTIVE I - PAPER II-Group A
PIC16F877 MICROCONTROLLER AND INTERFACING

COURSE OBJECTIVES:

1. Through this course, the students will be exposed to hardware details of PIC16F877 MICROCONTROLLER with the related signals and their implications.
2. They will also learn programming and interfacing of PIC16F877.
3. They will also be aware of the interfacing and its application.
4. Lastly the students will have a basic idea on memory.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Understand the architecture of PIC16F877 MICROCONTROLLER.
CO2	Impart the knowledge about the instruction set.
CO3	Interface LCD, Keyboard, ADC, DAC, Sensors, Relays, DC motor and Stepper motor with PIC16F877 microcontroller.
CO4	Understand the basic idea about Memories and its applications.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**PIC16f877 Microcontroller**	Features – Signals - Architecture – Memory Organization – Watch Dog Timer – Reset Types – Oscillator Types – Power Down Modes – I/O Ports – CCP Module – SSP Module. (USART, SPI, I2C & ICSP)	10

II	**Instruction set**	Byte Oriented – Bit Oriented - Literal & Control Instructions – Stack & Stack Operations - Addressing Modes– Simple Programs - Timer logic – interrupt logic – Serial Logic – ADC.	10
III	**Interfacing with IO**	Interfacing With: Switches & Matrix Keyboard - LED'S - Single & Multiple Seven Segment Displays – LCD.	10
IV	**Interfacing with Application**	Interfacing With: ADC 0809 IC – DAC 0800 IC - Stepper Motor – DC Motor – Traffic Light Control System.	10
V	**Memories**	ROM – PROM – EPROM(2764) - EEPROM – NVRAM - Static RWM (6264)-Dynamic RWM (TC511000) - RWM Refreshing – Pseudostatic RWM.	10

REFERENCE BOOKS :

1. PIC16F877 Data Book – MICROCHIP .
2. Fundamentals of Microcontrollers and Applications In Embedded Systems (With the PIC18 Microcontroller Family) – Ramesh S Gaonkar – PRI – RS.300/-
3. Design With Pic Microcontrollers – John B.peatman – Pearson
4. Introduction to Microprocessors – AP Mathur – TMH – 3rd Edition (UNIT - V).

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SEMESTER V

ELECTIVE I - PAPER III -Group A

PROGRAMMABLE LOGIC CONTROLLERS

L	T	P	C
5			5

COURSE OBJECTIVES:

To provide knowledge levels needed for PLC programming and operating, PLC functions, Data Handling processes & make the students how devices to which PLC input and output modules are connected.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Ability to gain knowledge on Programmable Logic Controller.
CO2	Create ladder diagrams from process control function
CO3	Understand the knowledge about varies type of PLC registers
CO4	Develop the PLC application program
CO5	Design the different type of PLC functions, Data Handling Function.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**PLC Basics**	Advantages and Disadvantages – Overall PLC System – Input & Output Modules – Printing PLC Information – CPU – Memory – Processor – I/O Modules – Power Supplies – Programming Equipment – Programming Formats – Construction of PLC Ladder Diagram – Processors Scanning Considerations – PLC Operational Faults – Input ON/OFF Switching Devices – Input Analog Devices – Output ON/OFF Devices – Output Analog Devices.	10

II	**PLC Programming**	Input Instructions – Outputs: Coils, Indicators & Others – Operational Procedures – Contact and Coil I/O Programming Examples (Any 3) – Digital Logic Gates – Boolean Algebra PLC Programming – Conversion Examples (Any 3) – Ladder Diagrams and Sequence Listings – Large Process Diagram Construction.	10
III	**PLC Functions**	General Characteristics of Registers – Module Addressing – Holding Registers – Input Registers: Single and Group – Output Registers: Single and Group – PLC Timer Functions – Examples of Timer Function Industrial Applications (Any 3) – PLC Counters – Examples of Counter Function Industrial Applications (Any 3).	10
IV	**Intermediate functions**	PLC Addition and Subtraction – PLC Repetitive Clock – PLC Multiplication, Division, Square Root, Trignometric and Log Functions – Other Arithmetic Functions – Basic Comparison Functions – Basic Comparison Function Applications (Any 3).	10
V	**Data handling functions**	Skip Function and Applications – MASTER CONTROL RELAY Function and Applications – Jump with Non Return– Jump with Return – MOVE Function & Applications – Moving Large Blocks of PLC Data – PLC Table and Register Moves – PLC FIFO Function – FAL – ONS – CLR And SWEEP Functions – Bit Patterns in a Register – Changing a Register Bit Status – Shift Register Functions and Applications. PLC Networking.	10

TEXT BOOK

Programmable Logic Controllers – John W. Webb & Ronald A. Reis – PHI – V Edition – Rs.295/-

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER V

ELECTIVE II - PAPER I-Group B

MODERN TELEVISION SYSTEMS

L	T	P	C
5			4

COURSE OBJECTIVES:

To introduce the basics of picture transmission and reception, analysis and synthesis of composite video signal, receiver and picture tubes and television camera tubes also study various colour television systems.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Understand the fundamental concepts of television standards.
CO2	Acquire the knowledge in basic principle of receiver circuits.
CO3	Distinguish the principle of vertical and horizontal sync separation.
CO4	Understand different colour television systems used worldwide and its compatibility.
CO5	Evaluate the detailed operation of camera and picture tube of monochrome and colour television.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Television Standards**	Aspect Ratio - Scanning – Number of Scanning Lines - Interlaced Scanning - Vertical Resolution and Horizontal Resolution – Horizontal & Vertical Sync Details - Composite Video Signal - Channel Bandwidth – Vestigial Side Band Transmission & Reception – Complete Channel Bandwidth – FM Channel	10

		Bandwidth – Allocation of Frequency Bands For TV Transmission - Positive and Negative Modulation – CCIR–B Standards.	
II	**Receiver Circuits**	RF Tuner –Tuner Types - Various Sections of a VHF Tuner – UHF Tuner – Electronic Tuning – Video IF Section – IF Amplifier – VSB Correction - Video IF Amp using IC CA 3068 - Video Detector Operation & Requirements – Video Amplifier Operation & Requirements – Coupling Methods – Video Amp Using IC TBA 890.	10
III	**Sync Separator**	Block Diagram – Vertical & Horizontal Sync Separation - Vertical O/P Stage & Requirements – Vertical O/P Stage IC's – EHT generation - S Correction – Line O/P Stage Using Transistors & IC CA 920 – AGC – Types of AGC - Sound Section – Sound Take Off Circuit – Inter Carrier Sound IF Amp – AM Limiting – FM Detection – Any One FM Detector - Sound Section IC CA 3065.	10
IV	**Colour Television**	Compatibility – Natural light – Colour perception – Three colour theory – Chromaticity diagram – Luminance, Hue and Saturation – Luminance & Colour difference signals - Frequency interleaving – Bandwidth for Colour Signal Transmission - Modulation of Colour Difference Signals - Colour TV Standards.	10

V	**Television Transmission & Reception**	Monochrome TV Camera Tubes (Any One) – Monochrome Picture Tube - Block diagram of Monochrome TV Transmitter and Receiver – Colour TV Camera – Colour Picture Tubes (Any One) – PAL-D Coder – PAL Decoder – Merits & Demerits - Low Voltage Power Supply – High Voltage Power Supply – SMPS - Merits & Demerits.	10

REFERENCE BOOKS :

1. Monochrome And Colour Television - Gulathi – Nai – Ii Edition
2. Colour Television Principles And Practice - Gulathi - Nai
3. Modern Television Practice - Gulathi - Nai - III Edition

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER V

L	T	P	C
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ELECTIVE II - PAPER II- Group B

RADAR AND NAVIGATIONAL SYSTEMS

COURSE OBJECTIVES:

To introduce the fundamental concepts of RADAR and navigational aids.

Expose the students to different types of RADAR systems and Navigation, get familiarize with recent technologies in methods of navigation.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Gain knowledge in the fundamental principle of RADAR.
CO2	Become familiar with fundamentals of different types of RADAR.
CO3	Gain in-depth knowledge about the different types of RADAR transmitter and receiver and their operations.
CO4	Understand the signal detection in RADAR and various detection techniques.
CO5	Understand the navigational aids and modern navigation methods.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Introduction to Radar**	Basic Radar –The simple form of the Radar Equation - Radar Block Diagram - Radar Frequencies – Applications of Radar – The Radar Equation - Transmitter Power - Pulse Repetition Frequency – Antenna Parameters - Other Radar Equation Considerations.	10
II	**MTI and Pulse Doppler Radar**	Doppler and MTI Radar- Moving Target Detector - MTI from a Moving Platform - Pulse Doppler Radar –	10

		Other Doppler Radar Topics - Tracking with Radar – Automatic Tracking with Surveillance Radars.	
III	**RADAR Transmitter and Receiver**	Linear Beam Power Tubes - Solid State RF Power Sources - Magnetron - Crossed Field Amplifiers - Other RF Power Sources - Other aspects of Radar Transmitter - The Radar Receiver - Superheterodyne Receiver - Duplexers and Receiver Protectors- Radar Displays.- Propagation Radar Waves - Atmospheric Refraction – Standard propagation - Nonstandard Propagation - The Radar Antenna - Reflector Antennas .	10
IV	**RADIO DIRECTION FINDING & RANGES :**	An Aural Null Direction Finder – The Goniometer - Automatic Direction Finders - The Commutated Aerial Direction Finder - The LF/MF Four course Radio Range - VHF Omni Directional Range - VOR Receiving Equipment - Loran-A Equipment - The Decca Navigation System - Decca Receivers - The Omega System.	10
V	**Methods of Navigation**	Operation of DME - TACAN Equipment. - Instrument Landing System - Ground Controlled Approach System – Microwave Landing System - Navigation Over the Earth - Components of an Inertial Navigation System.	10

REFERENCE BOOKS :

1. Introduction To Radar Systems - Skolnik – Tmh – Iii Edition 2003
2. Radar Principles - Peyton Z Peebles - John Wiley – 2004
3. Principles Of Radar - Jc Toomay - Phi Ii Edition - 2004
4. Microwave & Radar Engineering – Kulkarni – Umesh Publications
5. Radar System & Radar Aids To Navigation – Sen & Battachariya – Khanna Publications.

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SEMESTER V

ELECTIVE II - PAPER III Group B

SATELLITE, CABLE AND DTH SYSTEMS

L	T	P	C
5	0	0	4

COURSE OBJECTIVES:

- To introduce the basics concepts of Satellites and cable networks.
- To make the students assemble and troubleshoot DTH there self.
- Creates entrepreneurship opportunity.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Gain knowledge about history and basics of satellites
CO2	Acquire knowledge about cable TV network transmission techniques
CO3	Acquire knowledge about digital satellite TV network transmission techniques
CO4	Introduction of DTH Components
CO5	Installing the DTH & supporting peripherals

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Satellite systems**	Geo- Stationary Satellite – Satellite Communication System – Satellite Electronics – International and Regional Direct Broadcasting Satellites – Indian Domestic Satellites – Domestic Broadcasting Systems.	10

II	**Cable tv systems**	Cable Signal Sources – Cable Signal Processing – Cable Signal Distribution – Bidirectional Networks – Scrambling of TV Signals – Cable Signal Convertors.	10
III	**Digital satellite tv**	Digital Satellite Transmission – Digital Satellite Reception and Decoding – DTH TV – Digital TV Receiver – Merits of Digital TV Receiver – DTT.	10
IV	**Dth working**	DTH Antenna – DTH LNB – DTH Receiver – Additional Accessories – Complete DTH Process – Connecting more than One TV Receiver to a Single Dish , Connecting more than one tv to a Single Satellite Receiver – Connecting more than one Dish/LNB to a Single Receiver – Changing Satellite Channels – Need of Telephone Jack.	10
V	**Dish installation**	Site Survey – Dish Roof and Wall mounts – Adjusting the Azimuth and Elevation Settings – Dish Antenna Connection Procedures – Precautions - Trouble Shooting – Adjustment to Correct Position – LNB Testing – DD Direct Plus – Satellites Used – Comparison with Other DTH Systems – Reception of DD Direct Plus – Receiver Installation – TV/Radio Channels on DD Direct Plus.	10

REFERENCE BOOKS :

1. Modern TV Practice – R.R. Gulati – NAI – IIIrd Edition
2. Modern DTH Digital Satellite Receiver – Manahor Lotia – BPB – Rs.120/-
3. Composite Satellite and Cable TV – R.R. Gulati – NAI.
4. Satellite Communication - Dennis Roddy – TMH

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SEMESTER V

ELECTIVE II - PAPER IV - Group B

MOBILE COMMUNICATON & SERVICING

L	T	P	C
5	0	0	4

COURSE OBJECTIVES:

- To introduce the basics of Cellular structure and operation.
- It provides entrepreneurship opportunity& Practical oriented.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Understand the fundamental concepts of Cellular.
CO2	Acquire the knowledge in basic principle of BTS transmission.
CO3	Understand the different accessing technology.
CO4	Understand the chip level software servicing of mobile
CO5	Understand the servicing of mobile

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Mobile data communication**	Introduction – Cellular Radio – Elements of a Cellular Network – Cellular Telephony – Radio Propagation – Speech Coding – Error Coding and Error Corrrection.	10
II	**Mobility Management**	Mobility Management - Hand Off Management – Hard Hand Off – Soft Hand Off – Switching and Authentication – MTSO Interconnections- Circuit Switched and Packet Switched Data Services	10

		on Cellular Networks.	
III	**Multiple access technologies**	Introduction - Frequency division multiple access - Time division multiple access - Code Division Multiple Access – Spread Spectrum Techniques.	10
IV	**Mobile servicing**	Hardware/Software Repairing - Various Locks - Installation of : UFS Driver, UFS Suite & Flashing Files - IMEI Number Detection – Mobile Utility Codes.	10
V	**Other mobile service tools**	Ultrasonic Cleaner - Computer Connectors - SIM Card Reader - Memory Card Reader - Mobile Virus - Virus Prevention - Removing Virus - Health Hazards with Mobiles - SAR.	10

REFERENCE BOOKS

1. Wireless Communications And Networking – Made Simple – Satish Jain – BPB Publications. Rs. 135/- (Units : I , II & III)
2. Modern Mobile Phone Repair using Computer Software & Service Devices - Manahar Lotia - BPB - 120/- (Units IV & V)
3. Modern Mobile Phone Unlocking & Utility Codes For GSM & CDMA Phones - Manahar Lotia - BPB - Rs.99/- (Unit IV)
4. Mobile Cellular Telecommunication – II Edition - William CY Lee – TMH
5. Mobile Communications – Schiller – Pearson – II Edition.
6. Wireless Communications – Stalling – Pearson II Edition.
7. Mobile & Personal Communication Systems & Services - Raj Pandya - PHI – Rs.250/-

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER V

SKILLED BASED ELECTIVE COURSE

SBEC III - ELECTRONIC INSTRUMENTATION

(IN DEPTH THEORY & ANALYSIS NOT REQUIRED)

L	T	P	C
2	0	0	2

COURSE OBJECTIVES:

- To introduce the fundamental electronic instrumentation things.
- To expose the students to upgrade their knowledge in industry side.
- To get familiarize with recent instrumentation technologies.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Gain knowledge in the fundamental principle of electromechanical instruments.
CO2	Become familiar with Bridges Network circuits
CO3	Acquire the knowledge in different types of oscilloscopes.
CO4	Understand the signal generation techniques.
CO5	Understand the working function and application of transducer.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Electro mechanical indicating instruments**	DC Ammeter - DC Voltmeter - Voltmeter Sensitivity - AC Voltmeter - Considerations in Analog Voltmeter - Series & Shunt Type Ohmmeter - Calibration of DC Instruments – Study of a Typical Digital Multimeter.	05

II	**Bridges**	Wheatstone Bridge - Balance Equation of General AC Bridges – Capacitance & Inductance Comparison Bridge - Maxwell – Hay - Schering - Wien - Kelvin & Kelvin's Double Bridge .	05
III	**Oscilloscope**	Block diagram - CRT - Vertical Deflection System - Delay line - Horizontal Deflection System - CRT screens & Graticules - Oscilloscope Probes - Measurement of Frequency, Amplitude & Phase - Lissajou's Patterns. Protocols.	05
IV	**Signal generation & signal analysis**	Sample & Hold Circuit - Instrumentation Amplifier - Function Generator - Pulse Generator - Q Meter - Vector Impedance Meter - Wave Analyzer - Harmonic Distortion Analyzer .	05
V	**Transducers**	Resistive Transducers – Inductive Transducers - Capacitive Transducers - Piezo Electric Transducer - Thermo Electric Transducers – Temperature Transducers – Microphones & Loud Speakers.	05

REFERENCE BOOKS :

1. Electronic Instrumentation - H.S. Kalsi - TMH.
2. Modern Electronic Instrumentation & Measurement Techniques -Cooper - PHI.
3. Electronic Measurements & Instrumentation – Salivahanan – S.Chand - Rs.270/-

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SEMESTER V

SKILLED BASED ELECTIVE COURSE

L	T	P	C
2	0	0	2

SBEC IV - COMPETETIVE SKILLS

(SIMPLE THEORY ONLY)

50 Multiple Choice Questions. EACH QUESTION 1.5 MARKS.

TEN Multiple Choice Questions From Each Unit

COURSE OBJECTIVES:

To provide students with solid foundation in CSE so that they are able to use this knowledge in getting jobs and maintaining their jobs. To develop students with professional and ethical attitude, effective communication skills and the attitude of working in group/with people for successful careers.

COURSE OUTCOMES: After completion of this course, student able to

CO1	The ability to analyze a problem and to identify the appropriate Verbal reasoning.
CO2	The ability to apply nonverbal reasoning.
CO3	An understanding of professional, ethical and social responsibilities.
CO4	The ability to communicate effectively with a range of audiences.
CO5	The ability to succeed in competitive exams

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Verbal reasoning**	Analogy – Classification – Direction Sense Test – Logical Sequence of Words – Inserting The Missing Character – Situation Reaction Test.	05

II	**Non verbal reasoning**	Analytical Reasoning – Mirror Images – Water Images - Completion of Incomplete Pattern – Cubes and Dice.	05
III	**Arithmetical, ability**	Average – Problems on Age – Percentage – Profit & Loss – Ratio & Proportion – Chain Rule – Time & Work.	05
IV	**Logarithms**	Pipes & Cistern – Time & Distance – Problems on Trains - Boats & Streams – Simple Interest – Compound Interest –Logarithms.	05
V	**Charts**	Area – Calendar – Clocks – Heights & Distances – Bar Graphs – Pie Charts.	05

Reference Books

1. A Modern Approach To Verbal & Non Verbal Reasoning - Revised Edition – R.S. Aggarwal – S. Chand. (Units : I & II) – Rs.750/-
2. Quantitative Aptitude - Revised Edition - R.S. Aggarwal – S. Chand. Units : III , IV & V) – Rs.440/-
3. An Advanced Approach To Data Interpretation - R.S. Aggarwal – S. Chand.
4. Advanced Objective General Knowledge - R.S. Aggarwal – S. Chand
5. Objective General English - R.S. Aggarwal – S. Chand

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SEMESTER VI

CORE VII - PC HARDWARE NETWORKING & TROUBLESHOOTING

L	T	P	C
5	0	0	5

COURSE OBJECTIVES:

This course guides the complete view of hardware of the personal computer and possible troubleshooting.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Understand the motherboard types and connection with various types of RAM
CO2	Study the various versions of BIOS and their functions.
CO3	Get the knowledge of Keyboard and Mouse connections and their troubleshooting
CO4	Understand the basic of Hard disk and their connections, with CD and DVD storage devices & the printer types
CO5	Study the networking and their connections with assembling of PC in the cabinet.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Mother board**	Components - Support Circuits – Connectors - Installation - Troubleshooting – BIOS Beep Codes - Study of a Latest Motherboard - Form Factor - PC Assembly - Cabinet Form Factor .	10
II	**Memory systems**	Memory Modules - Cache Memory - Shadow Memory - Common Memory Errors - Battery - BIOS Functions- BIOS Setup – BIOS Upgrade.	10

III	**Input device Troubleshooting**	**KEYBOARD :** Organisation - Troubleshooting - Ergonomics **MOUSE :** Connection - Resolution - Installation - Troubleshooting..	10
IV	**Output device Troubleshooting**	**HARD DISK** : Form Factor - Storage Capacity - Disk Geometry - Interfacing – Installation , Formatting & Troubleshooting . **PRINTER:** Types , Interface & Troubleshooting.	10
V	**Networking**	**NETWORKING**: Setting up a Network – Preparation for Network Installation – Network Configuration – Sharing Computer – Sharing Printer – Troubleshooting Networking. **VIRUS :** Types - Working - Symptoms - Antivirus.	10

REFERENCE BOOKS:

1. Modern Computer Hardware Course - Manohar Lotia - BPB - Rs.360/-
2. Ibm Pc And Clones – Govindarajulu – Tmh
3. Ibm Pc Advanced Trouble Shooting And Repairing Guide – Robert .c.brenner - Phi.
4. Trouble Shooting, Maintenance & Repairing Pc's–stephen J.bigelow- Tmh – Ii Ed
5. Upgrading and Repairing PC's - Scott Mueller – Pearson - 18th - Edition.
6. DOS 6 & 6.22 An Introduction - Manohar Lotia – BPB – Rs.99/-
7. DOS 6 & 6.22 Companion - Satish Jain - BPB – RS.210/-

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L	T	P	C
5	0	0	5

SEMESTER VI

CORE VIII - NETWORK COMMUNICATION & SECURITY

COURSE OBJECTIVES:

- Describe various communications networks and their main component
- Identify the advantages and disadvantages of a network.
- Identify the function of a firewall, and how it keeps a computer secure and safe from viruses. Prepare a plan for anti-virus protection.

COURSE OUTCOMES: At the end of course, student will be able to :

CO1	Identify the components associated with Transmission methods.
CO2	Students will details of s network architecture, Topology technology etc
CO3	Understand networks protocols and network management .
CO4	The concept of encapsulation and its relationship to layering in the network model.
CO5	An ability to understand and analyze the issues in providing Quality-Of-Service for network multimedia applications such as Internet, telephony& network security

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Transmission methods**	Digital Signal Analog Transmission – Baud Rate - Analog Signal Digital Transmission – Parallel & Serial Communication – Asynchronous & Synchronous Communication – Simplex – Half Duplex - Full Duplex – Multiplexing - De-multiplexing - Types of Multiplexing.	**10**
II	**Network**	Mesh Topology – Star Topology – Tree	**10**

	topologies	Topology – Ring – Bus – Hybrid – Basics of Switching – Router & Routing – Internet Topology – Architecture of an ISP – Logical Types of Topology.	
III	**Network protocols**	OSI Model – Physical Layer – Data Link Layer – Network Layer – Transport Layer – Session Layer – Presentation Layer – Application Layer – Overview of Network Protocols.	**10**
IV	**Lan technologies**	Introduction – LAN Hardware – Implementing LAN – Fast LANS - Nonstandard LANS – Extending LANS – Virtual LANS – Token Passing Networks – FDDI – MAN – WAN.	**10**
V	**Internet access & network security**	Introduction – Dial up Access – Leased lines – DSL - Cable Modems – DTE – DCE Interface – RS-232 & RS-449 Interface – SONET. NETWORK SECURITY : Introduction – Types of Computer Attacks – Firewall – Virtual Private Network-Cryptography.	**10**

REFERENCE BOOKS :.

1. Data Communication & Networks - Achyut .S. Godbole & Atul Kahate – TMH – 2ED (Units : I , II , III & V)
2. Advanced Computer Networking (Concepts and Applications) - Satish Jain – BPB – Rs. 195/- (Unit : IV & V)
3. Data Communication And Networking (UPDATED EDITION) – Satish Jain – BPB Publications. Rs.270/-
4. Computer Networks – UYLESS BLACK – PHI - IIND EDITION .
5. Computer Networks – ANDREW. S. TANENBAUM – PHI.
6. Communication Protocol Engineering - Pallapa Venkataram and S.S.Manvi - PHI.
7. Networking Concepts And Netware – Anand – Himalaya Publications

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SEMESTER VI

CORE IX - BIOMEDICAL INSTRUMENTS

(Simple Theory Only) OR PROJECT WORK

L	T	P	C
5	0	0	5

COURSE OBJECTIVES:

To introduce an fundamentals of Human Physiology and explore the human body parameter measurements setups

COURSE OUTCOMES: At the end of course, student will be able to :

CO1	Understand the human physiology of biomedical system
CO2	Measure biomedical and physiological information
CO3	Discuss the application of Electronics in diagnostics and therapeutic area.
CO4	Make the students understand the concepts Pulse Oximeter and pace maker techniques
CO5	Give basic ideas about modern medical imaging application

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Introduction to Human Physiologys**	Introduction to Human Physiology – Micro Electrodes – Skin Surface Electrodes – Needle Electrodes – Reference Electrodes - Digital Thermometer – Sphygmo Manometer - Electronic Sthethoscope	**10**
II	**Recorders and meters**	ECG - EEG - EMG - – Cardio Tocography - Electro Oculography - Electro Retinography - Poly Somnography - Spirometer - Blood Flow	**10**

		Meter - Doppler - Audiometer	
III	**Ts**	TS. Upper Endoscope - Lower Endoscope - ENT Endoscope - - Diathermy - Surgical Diathermy- Micro Wave Diathermy - Multipara Patient Monitor.	**10**
IV	**Intensive carets**	Pulse Oximeter - Block Diagram & Sensor – Ventilator – Cardiac Monitor - ECG Holder - Defibrillator - Pace maker : Implantable and External Pacemakers - Infant Warmer - Infant Incubator - Baby Phototherapy – Nebulizer.	**10**
V	**Electrical safety of medical instruments**	Radiation Safety - Physiological Effects Due to 50 Hertz Current Passage - Micro Shock - Macro Shock - Electrical Accidents in Hospitals - Devices to Protect Against Electrical Hazards – SMPS in Medical Equipments. .	**10**

REFERENCE BOOKS :

1. Biomedical Instrumentation & Measurements – Ananda Natarajan – PHI RS.275/-
2. Biomedical Instrumentation And Measurements - Leslie Cromwell - PHI - 2nd Edition.
3. Bio-Medical Instrumention - Dr.M.Arumugam - Anuradha Agencies - 2nd Edition
4. Handbook Of Biomedical Instrumentation - R.S.Khandpur – TMH .
5. Medical Instrumention, Application And Design – John G.Webster - WEL - 3rd Edition
6. AText Of Book Of Medical Instruments – Ananthi – New Age Internationa Rs.275/-
7. Internet : Additional Reference for all Units.

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SEMESTER VI

ELECTIVE III - PAPER I GROUPC

PCB DESIGN AND FABRICATION

L	T	P	C
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COURSE OBJECTIVES::

Understand the need for PCB and steps involved in PCB Design and Fabrication process.PCB (Printed Circuit Board) designing is an integral part of each electronics products and this program is designed to make students capable to design their own projects PCB up to industrial grade.

COURSE OUTCOMES: At the end of course, student will be able to :

CO1	Appreciate the necessity and evolution of PCB, types and classes of PCB.
CO2	Understand the steps involved in schematic, layout, fabrication and assembly process of PCB design.
CO3	Familiarize Schematic and layout design flow using CAM Tools.
CO4	This is a basic course for designing of PCB using software. Design (schematic and layout) and fabricate PCB for simple circuits.
CO5	Understand the environmental concerns

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Quick start & components**	PCB Introduction – Surface Mount and Through hole – Prototyping – Installing EAGLE Light Edition on Windows - Light Edition Limitations – Creating New Project – Drawing the Schematic –	**10**

		Electrical Rule Check – Laying out the Board – U.S. Versus European Circuit Symbols – Resistors – Capacitors – Transistors & Diodes – IC'S– Connectors – Other Components – Buying Components – Paper PCB.	
II	**Editing schematics & Pcb layout**	The Anatomy of the Schematic Editor – The Command Toolbar – Nets – Buses – Worked Examples. **PCB LAYOUT :** Experimenting – Layers – The Command Toolbar - The Grid – Sound Meter Layout (Through Hole) – Sound Meter Layout (Surface Mount) – Manual Layout.	**10**
III	**Pcb fabrication & pcb soldering**	Gerber Files – Loading a CAM Job – Running a CAM Job – Measure Twice, Cut Once – Submitting a job to a PCB Service – Instructions – Photoetching – Milling PCBs – Toner Transfer. **PCB SOLDERING** : General Tools - Tools for Surface Mount Devices – Soldering Through Hole PCB's – SMD Hand Soldering – SMT with Hot Air Gun – Using a Reflow Oven.	**10**
IV	**Commands & scripts**	Commands - Scripts – User Language Programs – Creating Library – Copying a Device from Another Library – The Part Editor – Devices , Symbols , and Packages – Editing a Part – Creating New Part.	**10**
V	**Environmental concerns**	Pollution Control in PCB Industry – Pollutiong Agents – Recycling of Water – Recovery Techniques – Air Pollution –	**10**

		Recycling of PCB's – Environmental Standards – Safety Precautions – Toxic Chemicals.	

REFERENCE BOOKS :

1. Make Your Own PCB's With EAGLE – Simon Monk – Mcgraw Hill (2014)
2. EAGLE MANUAL – Version V – Seventh Edition.
3. PCB Design Fabrication, Assembly and Testing – Dr. R.S. Khandpur – TMH.
4. PCB Design & Fabrication – Walter.C.Bosshart – TMH

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SEMESTER VI

L	T	P	C
5	0	0	5

ELECTIVE III - PAPER II - GROUP C

PROGRAMMING USING VERILOG HDL (SIMPLE CONCEPTS ONLY)

COURSE OBJECTIVES: Students will try to learn:

Understand the concepts of Verilog Language, Inspect how effectively ICs are embedded in package and assembled in PCBs for different application. Design and diagnosis of processors and I/O controllers used in VHDL.

COURSE OUTCOMES: At the end of course, student will be able to :

CO1	Describe the basic language features of Verilog HDL and the role of HDL in digital logic design.
CO2	Describe the basic concepts Verilog HDL
CO3	Describe Verilog model for sequential circuits and test pattern generation.
CO4	Design data flow modeling.
CO5	Synthesize different types of behavioral modeling.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Basic verilog topics**	Overview – Design Flow – Hierarchical Modeling Concepts – Design Methodologies –Modules – Instances – Components of Simulation.	**10**
II	**Basic concepts**	Lexical Conventions – White Space – Comments – Operators – Number Specification – Strings – Identifier and Keywords – Data Types–Nets–Registers –	**10**

		Vectors Arrays – Memories – Parameters– Strings–System Tasks and Compiler Directives.	
III	**Modules and ports**	Modules – Ports – Port Declaration – Port Connection Rules – Connecting Ports to External Signals – Gate Level Modeling – Gate Types.	**10**
IV	**Data flow modeling**	Continuous Assignment – Delays – Expression – Operators and Operands – Operator Types – Behavior Modeling - Structure Procedures – Procedural Assignments – Timing Controls.	**10**
V	**Behavioral modeling**	Conditional statements – Multiway Branching – Loops – Sequential and Parallel Blocks – Generate Blocks – Logic Synthesis with Verilog HDL - Impact of Logic Synthesis – Verilog HDL Synthesis – Synthesis Design Flow.	**10**

Text Book :

1. Verilog HDL – A Guide to Digital Design and Synthesis – Samir Palnitkar – Pearson - II EDITION.

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SEMESTER VI

ELECTIVE III - PAPER III - GROUP C

ELECTRONIC DEFENSE SYSTEMS

(SIMPLE THEORY ONLY)

L	T	P	C
5	0	0	5

COURSE OBJECTIVES: Students will try to learn:

Understand the concept of electronic warfare. and acquainted with the basic characteristics and requirements of electronic warfare receivers,the basic principles of electronic countermeasures ,its types and classes of ECM and the parameters of radars, and radar systems pertaining to ECM,

COURSE OUTCOMES: At the end of course, student will be able to :

CO1	Gain knowledge in the fundamental principle of Electronic defense system,weapon systems
CO2	Analyse the functioning and interrelations of subsytems in an electronic warfare system
CO3	Develope technical architecture of electronic intercept systems in preliminary system design level
CO4	Develope basic simulation and analysis tools for the assesment of a given ECM.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Electronic defense**	Introduction – Systems in Use in the Armed Forces – The Main Weapon Systems – Objectives & Organization of Electronic Defense – Operational Objectives - Information Operation & Warfare – Need for the Study of Weapon Systems.	**10**

II	**Weapon systems**	Artillery Systems – Missile Systems (Any 3) – Passive Antiradiation Missiles – Stealth Aircraft – Communication Systems – Information Operations.	**10**
III	**Electronic intercept systems**	Introduction – Radar Warning Receivers – Electronic Support Measures – Omnidirectional Antennas – Antennas for Direction Finding – Digital Receivers – Electronic Intelligent Systems – Advanced Passive Location Techniques – Infrared Intercept Systems – Communications ESM & Communication Intelligence.	**10**
IV	**Electronic countermeasure systems**	Introduction – Off Board Passive & Active ECM Systems – On Board Passive & Active ECM Systems – ECM Techniques (Any 3) – Infrared Countermeasures – Communications Countermeasures – Information Warfare.	**10**
V	**Electronic counter-countermeasure systems**	Introduction – Tracking Radar Counter-Countermeasures – Infared Counter-Countermeasures – Communications Counter – Countermeasures – New Electronic Defense Architectures.	**10**

Text Book :

1. Introduction To Electronic Defense Systems – Filippo Neri – New Age International – Second Edition - Rs.395/-

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER VI

ELECTIVE III - PAPER IV - GROUP C

NANO ELECTRONICS

(SIMPLE THEORY ONLY)

L	T	P	C
5	0	0	5

COURSE OBJECTIVES: Students will try to learn:

To introduce the nanoelectronics, nanodevices, spintronics and molecular electronics. Understand the divers electronic device fabrication describe the principle and the operation of nanoelectronic devices. In-depth technical knowledge in one or more areas of specialization.

COURSE OUTCOMES

CO1	Ability to perform simple analysis of Nanoelectronic devices and calculate the density of states in Nanoelectronic devices.
CO2	Ability to perform in-depth analysis of self assemblyin Nanoelectronic devices
CO3	Nano Electronics and Nano Micro fabrication course is designed to encompass all these aspects, viz., nano and micro regime design, simulation and fabrication and all types of IC's, micro fludics.
CO4	It is expected that, after undergoing this course, the students will acquire both theoretical knowledge and practical skills in diverse upcoming areas of current technology.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Introduction & ethical issues**	What is Nanotechnology - Advantages - Scope - Limits of Nanotechnology - Solutions cause Problems - Change causes	**10**

		Problems - Clean, Decentralized Production causes Problems - Even Wealth & Leisure cause Problems - Changing Employment causes Problems - Frequently Asked Questions.	
II	**Self assembly**	Bottom - Up Self Assembly - Top Bottom Assembly - Other Production Processes - MEMS Process - Deposition Processes - Lithography - Etching Processes.	**10**
III	**Instrumentation techniques**	AFM - SEM - TEM - Auger Electron Spectroscopy - LASER Induced Breakdown Spectroscopy.	**10**
IV	**Nano electronics & carbon nano tubes**	Triple Gate MOSFET & EJ-FET Properties - Carbon Nanotubes - Fabrication Methods - CNT Based Biosensors and Advantages - Properties of CNT - Fuel cells & Nanotech.	**10**
V	**Nano - bio**	Nanotechnology in Medicine - Working Outside TISSUES - Working Within Tissues. Applications : Killing Cancer Cells - Providing Oxygen - Artificial Mitochondria.	**10**

REFERENCE BOOKS :

1. Nano Technology - A Future Technology With Visions - Appin LABS - BPB – Rs.270/-

2. Nano : The Essentials "Understanding Nano Science & Nano Technology " - T Pradeep – TMH

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER VI

L	T	P	C
2	0	0	2

SKILLED BASED ELECTIVE COURSE

SBEC VI - LIFE DEVELOPMENT SKILLS

COURSE OBJECTIVES:

This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underly personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers. Prerequisite

COURSE OUTCOMES: After completion of this course, student able to

CO1	Define and Identify different life skills required in personal and professional life
CO2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
CO3	Develop an Preparing for a Job Interview
CO4	Understand the basics of teamwork and leadership
CO5	the basic mechanics of effective communication .

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Self analysis**	Self Analysis and Self Concept – Understanding Self : Attitude, Aptitude and Self Esteem – Assertiveness – Confidence Building – Motivation : Concept , Theories and Importance.	05
II	**Self development**	Introduction – Goal Setting : Concept, Setting Smart Goals – Emotion : Concept, Types, Emotioinal Intelligence – Creativity : Concept and Factors Enhancing Creativity – Stress Management – Health	05

		Management : Importance, Dietary Guidelines and Exercises – Time Management : Importance and process.	
III	**Looking for a job**	Identifying Different Sources Announcing Job Vacancies – Skimming, Scanning and Reading Advertisements in Detail – Writing Effective CVs – Covering Letters that Accompany CVs - Techniques of Writing Job Application Letters / Covering Letters – Preparing for a Job Interview.	05
IV	**Non – verbal skills**	Graphic Communication – Non Verbal Communication – Aspects of body Language – Formal Written Communication – Memos (Memoranda) – E-mails – Netiquette – Business Correspondents.	05
V	**Telephone skills**	Understanding Telephone Communication – Types of calls – Handling Calls – Leaving a Message – Making Requests – Asking for and Giving Information – Giving Instructions – Agreeing and Disagreeing – Making or Changing Appointments – Reminding – Making Complaints and Handling Complaints – Telephone Etiquette.	05

REFERENCE BOOKS :

1. Development Of Life Skills And Professional Practice– Shalini Verma – Vikas Publishing House Pvt Ltd., Rs. 200/- (Units : I & II)
2. Development Of Life Skills – II – Shalini Verma – Vikas Publishing House Pvt Ltd., Rs. 225/- (Units : III & IV)
3. A Course In Communication Skills - P. Kiranmai Dutt – Cambridge University Press India Pvt. Ltd., Foundation Books, Cambridge House, 4381/4, Ansari Road, Daryaganj, New Delhi -110 002. (Unit : V)

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER V & VI

CORE PRACTICAL IV

IC'S & COMMUNICATION LAB

L	T	P	C
2	2	2	4

(ANY HARDWARE BASED SIMULATION TOOL MAY ALSO BE USED)

(Any 22 Experiments)

COURSE OBJECTIVES:

The main aim of this lab is to teach the linear and non-linear applications of operational amplifiers (741). Students are made familiar with theory and applications of 555 timers. Students are made to Design combinational logic circuits using digital ICs & To acquire the basic knowledge of special function ICs

COURSE OUTCOMES:

CO1	Design and analyse the various digital circuits.
CO2	Design and analyse the various linear & nonlinear application of op-amp.
CO3	Design and analyse oscillators and multivibrator circuits using op-amp & Timers.
CO4	Design and analyse the various communication application of op-amp.
CO5	Practice the basic mechanics of convertions.

Syllabus

1. NAND GATE Implementation Using TTL.
2. NOT/NAND/NOR GATE Implementation Using IIL / CMOS.
3. OR /NOR GATE Implementation Using ECL.
4. Inverting / Non-Inverting Amplifier Using Op-Amp
5. Inverting / Non-Inverting Adder Using Op-Amp.
6. Subtractor Using Op-Amp.

7. Multiplier / Divider Using Op-Amp.
8. Differentiator / Integrator Using Op-Amp.
9. Low Pass / High Pass Filter Using Op-Amp.
10. Band Pass / Band Reject Filter Using Op-Amp.
11. Voltage to Current Converter (Grounded load).
12. Current to Voltage Converter.
13. Solving of Simultaneous Equations Using Op-Amp.
14. Square Wave Generation Using Op-Amp
15. Triangular Wave Generation Using Op-Amp
16. Phase Shift Oscillator Using Op-Amp.
17. Wein Bridge Oscillator Using Op-Amp.
18. Amplitude Modulation & Demodulation.
19. Pulse Amplitude Modulation &Demodulation.
20. Pulse Width Modulation & Demodulation.
21. Astable Multivibrator Using 555 IC
22. Monostable Multivibrator Using 555 IC Triangular
23. Waveform Generation Using 555 IC
24. Voltage Controlled Oscillator Using 555 IC
25. Schmitt Trigger Using 555 IC
26. Frequency Multiplication Using 565 IC
27. Binary Weighted Resistor Type of DAC
28. R - 2R Ladder Type of DAC.
29. ADC Using ADC 0809
30. DAC Using DAC 0800

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER V & VI

L	T	P	C
2	2	2	4

CORE PRACTICAL V- Group D

8051 MICROCONTROLLER & INTERFACING LAB

(ANY EMBEDDED BASED SIMULATION TOOL MAY ALSO BE USED

(Any 17 Experiments)

Course Objectives

To expose students to the operation of typical Microcontroller (8051) **simulation tool/** trainer kit. solve different problems by developing different programs & to develop the quality of assessing and analyzing the obtained data.

COURSE OUTCOMES: After completion of this course, student able to

CO1	**Identify** relevant information to supplement to the Microcontroller (8051).
CO2	Set up programming strategies and select proper mnemonics and run their program on the training boards.
CO3	**Practice** different types of programming keeping in mind technical issues and evaluate possible causes of discrepancy 2experimental observations in comparison.
CO4	Develop testing and experimental procedures on Microcontroller (8051) **analyze** their operation under different cases.
CO5	**Prepare** professional quality textual and computational results, incorporating accepted data analysis and synthesis methods, simulation software, and word-processing tools.

Syllabus

1. Addition of Two; 8 Bit Numbers & Subtraction of Two ; 8 Bit Numbers
2. Multiplication of Two ; 8 Bit Numbers
3. Division of Two ; 8 Bit Numbers
4. BCD Addition

5. BCD Subtraction
6. FILL
7. BLOCK MOVE
8. 1's & 2's Complement of a 16 Bit Number.
9. Smallest / Largest of ; N Numbers.
10. Ascending / Descending Order of ; N Numbers.
11. Sum of N ; 8 Bit Numbers.
12. Multi Byte Addition.
13. 3 -Digit Decimal to Two-digit Hexadecimal Conversion.
14. Two-digit Hexadecimal to 3-digit Decimal Conversion.
15. ADC Interface.
16. DAC Interface.
17. Waveform Generation Using DAC.
18. Stepper Motor Interface.
19. Interface With Switches & Interface with LED's
20. Hex Keyboard Interface.
21. Interface With Single Seven Segment Display.
22. Interfacing With Multiple Seven Segment Displays.
23. Interface With LCD's.
24. Interfacing With Solid State Relay.
25. Moving Display.
26. Blinking Display.
27. Digital Clock.
28. Traffic Light Control.

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER V & VI

CORE PRACTICAL V- Group D

L	T	P	C
2	2	2	4

16F877 MICROCONTROLLER & INTERFACING LAB

(ANY EMBEDDED BASED SIMULATION TOOL MAY ALSO BE USED

(Any 17 Experiments)

Course Objectives

To expose students to the operation of typical Microcontroller (**16F877**) **simulation tool/** trainer kit. solve different problems by developing different programs & to develop the quality of assessing and analyzing the obtained data.

COURSE OUTCOMES: After completion of this course, student able to

CO1	**Identify** relevant information to supplement to the Microcontroller (**16F877**).
CO2	Set up programming strategies and select proper mnemonics and run their program on the training boards.
CO3	**Practice** different types of programming keeping in mind technical issues and evaluate possible causes of discrepancy in practical experimental observations in comparison.
CO4	Develop testing and experimental procedures on Microcontroller (**16F877**) **analyze** their operation under different cases.
CO5	**Prepare** professional quality textual and computational results, incorporating accepted data analysis and synthesis methods, simulation software, and word-processing tools.

Syllabus

1. Addition of Two; 8 Bit Numbers & Subtraction of Two ; 8 Bit Numbers
2. Multiplication of Two ; 8 Bit Numbers
3. Division of Two ; 8 Bit Numbers

4. BCD Addition
5. BCD Subtraction
6. FILL
7. BLOCK MOVE
8. 1's & 2's Complement of a 16 Bit Number.
9. Smallest / Largest of ; N Numbers.
10. Ascending / Descending Order of ; N Numbers.
11. Sum of N ; 8 Bit Numbers.
12. Multi Byte Addition.
13. 3- Digit Decimal to Two- digit Hexadecimal Conversion.
14. Two -digit Hexadecimal to 3- digit Decimal Conversion.
15. ADC Interface.
16. DAC Interface.
17. Waveform Generation Using DAC.
18. Stepper Motor Interface.
19. Interface With Switches & Interface with LED's
20. Hex Keyboard Interface.
21. Interface With Single Seven Segment Display.
22. Interfacing With Multiple Seven Segment Displays.
23. Interface With LCD's.
24. Interfacing With Solid State Relay.
25. Moving Display.
26. Blinking Display.
27. Digital Clock.
28. Traffic Light Control.

B.SC. ELECTRONICS AND COMMUNICATION

SEMESTER V & VI

L	T	P	C
2	2	2	4

CORE PRACTICAL V

PLC PROGRAMMING LAB

(ANY EMBEDDED BASED SIMULATION TOOL MAY ALSO BE USED)

(Any 17 Experiments)

Course Objectives

To explain the basic concepts of a Programmable Logic Controller. Students will be able to state basic PLC terminology and their meanings. Students will be able to explain and apply the concept of electrical ladder logic, its history, and its relationship to programmed PLC instruction.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Students will be able to describe typical components of a Programmable Logic Controller.
CO2	Students will be able to explain and apply the concept of electrical ladder logic, its history, and its relationship to programmed PLC instruction.
CO3	Students will be able to explain the concept of basic digital electronics and data manipulation.
CO4	Students will be able to use timer, counter, and other intermediate programming functions
CO5	Students will be able to use timer, counter, and other intermediate programming functions

Syllabus

1. Study of PLC Symbols
2. Study of Various Logic Execution in Ladder Diagram.

3. Writing of Ladder Logic for Different Statements.
4. Ladder Diagram Development for Different Types of Logic Gates using Suitable Software
5. PLC Input - Output Wiring Methods
6. Operating Simple Loads using Relays , Switches and Pushbuttons
7. Different Applications of Push Buttons
8. Programming the PLC Via Ladder logic
9. Working of Different Types of Timers
10. Study & Implement ; ON delay timer in PLC
11. Study & implement ; OFF delay timer in PLC
12. Working Of Different Types of Counters
13. Study & Implementation of Up Counter in PLC Programming.
14. Study & Implementation of Down Counter in PLC Programming.
15. Interlocking
16. Sequencer
17. Sequential Operation of On/Off of A Set of Lights
18. Forward And Reverse Direction Control of Motors
19. Latching and Unlatching of motor
20. Prepare the Physical and Programmed Ladder Diagram for the Control Problem shown below & Implement the same.
21. PLC Programming for Bottle Filling Plant.
22. Procedure for Producing a Ladder Logic Diagram for Car Parking Simulation
23. Position Control for Satellite Dish DC Motors
24. Starting Three Phase Induction Motors Via Star-Delta Starter
25. Automatic Indication of Water Tank Level
26. Traffic Lights Indication

B.SC. ELECTRONICS AND COMMUNICATION

CIRCUIT IMPLEMENTATION USING ARDUINO UNO BOARDS COMMON FOR ALL PRACTICALS UNDER GROUP D

ANY FIVE

L	T	P	C
2	2	2	4

Course Objectives

To provide knowledge of different Smart System applications. To familiarize students with Arduino as IDE, programming language & platform. To provide knowledge of Arduino boards and basic components. Develop skills to design and implement various smart system application.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Familiar with Arduino environment and its applications.
CO2	Able to understand Arduino programming with C++.
CO3	Able to Design Smart systems applications.
CO4	Learn and understand about any new IDE, compiler, and MCU chip in Arduino

Syllabus

1. LED Control Through Push Buttons
2. Photo Resistor as Light Intensity Detector
3. DC Motor Direction Control using L293D
4. DC Motor Speed Control using L293D
5. Displaying Text on LCD Display
6. Scrolling Text on LCD Display
7. Interfacing 4 x 3 Keypad and LCD
8. Displaying Alphanumeric Characters on Dot Matrix Display
9. Display of Numeric Characters using 7 Segment Display.

10. Unipolar Stepper Motor Speed Control Using ULN2003A
11. LED Control Through Serial Communication
12. LED Control using Infrared
13. Displaying Current Date and Time on 16x2 LCD
14. Switching Control of AC Load using Triac
15. Voltage Regulation Across AC Load using Triac
16. Switching Control of AC Load Through SMS Text Message

REFERENCE BOOK

Arduino Projects for Engineers - Neerparaj Rai – BPB Publications – Rs. 297/-

B.SC. ELECTRONICS AND COMMUNICATION

APPLIED ELECTRONICS - I (ALLIED)

(For B.Sc CS, BCA, B.Sc IT, & B.Sc PHY)

I/II YEAR-I/III SEMESTER

L	T	P	C
4			4

COURSE OBJECTIVES:

- To study about the fundamentals of semiconductor.
- To gain the basic knowledge of electronic components and the function of power supply.
- To understand the operation of oscillator, amplifier and filters.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Understand the principle of semiconductor devices.
CO2	Have a thorough understanding of the fundamental concepts of electronic components
CO3	Analyze and design various the conceptual theory of the power supply.
CO4	Distinguish between the sinusoidal and non sinusoidal waveforms.
CO5	Acquire the knowledge on the types and principles of oscillators, amplifiers and filters.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Semiconductor Theory**	Intrinsic Semiconductor – Extrinsic Semiconductor - Theory of PN Junction diode - Zener Diode – Avalanche Breakdown - Zener Break down - Operation of PNP & NPN Transistor - CB , CE , CC Configuration and Characteristics - Transistor as an Amplifier.	10

II	**Resistors, Capacitors & Inductors**	Resistors, Capacitors & Inductors in Series and Parallel - Factors governing the Resistance of a Resistor, Capacitor & Inductor - Colour Coding of Resistors - Various Other Passive & Active Devices – Ohm's & Kirchoff Laws - Series Circuits – Parallel Circuits - Series & Parallel Circuits - Open Circuit - Short Circuit	10
III	**Power Supply's**	Half Wave Rectifier - Full Wave Rectifier - Bridge Rectifier - Capacitor Filter - Fixed IC Regulated Power Supply using 78XX - Dual IC Regulated Power Supply using 78XX & 79XX .	10
IV	**Waveforms**	Sinusoidal Waveform - Non-Sinusoidal Waveform - Peak Value - Peak to Peak Value - Average Value – RMS Value – Period & Frequency Measurement – Use of Digital Multimeter – Use of CRO.	10
V	**Oscillators , Amplifiers & Filters**	Barkhausen Criterion – Sinsoidal Oscillators : Hartley , Phase Shift & Crystal Oscillator . Non Sinusoidal Oscillators : Astable , Monostable & UJT as a Sawtooth Oscillator. Amplifiers : RC Coupled & Transformer Coupled Amplifiers. Filters : Low Pass , High Pass , Band Pass & Band Reject Filters .	10

Books for Study

1. Electronic Devices & Circuits - S. Salivahanan - TMH - II Edition

2. Circuits & Networks - Sudhakar - TMH - 4th Edition..

B.SC. ELECTRONICS AND COMMUNICATION

APPLIED ELECTRONICS - II (ALLIED)

(For B.Sc CS, BCA, B.Sc IT, & B.Sc PHY)

I/II YEAR-II/IV SEMESTER

L	T	P	C
4			4

COURSE OBJECTIVES:

- To study about the fundamentals concepts of transducers and op-amps.
- To gain the basic knowledge of IC and PCB fabrication process.
- To understand the fundamentals of communication principle, modulation techniques, transmission and reception.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Understand the principle and types of the various transducers.
CO2	analyze and deign basic op-amp circuits, non-linear circuits, comparator, signal generators, and oscillator.
CO3	acquire qualitative knowledge about the fabrication process of integrated circuit & PCB fabrication
CO4	Comprehend the working principle of the communication systems.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Transducers**	Resistive Transducers – Inductive Transducers - Capacitive Transducers - Piezo Electric Transducer - Thermo Electric Transducers – Temperature Transducers–Instrumentation Amplifier – Microphones & Loud Speakers.	10

II	**Op – Amp's**	Introduction - The ideal OP-AMP - OP-Amp stages - OP-Amp parameters - Inverting & Non Inverting Amplifier - Adder - Subtractor - Multiplier - Divider - Integrator - Differentiator - V to I Converter - I to V Converter.	10
III	**IC Fabrication Process**	Basic Planar Process - Fabrication of a Typical Circuit - Active and Passive Components - Fabrication of FET, MOSFET & CMOS - Thin & Thick Film Technology.	10
IV	**PCB Fabrication Process**	PCB Types – Layout & General Rules – Design Rules For Digital Circuit PCB's – Artwork – Properties & Types of Copper Clad Laminates – Photo Printing – Screen Printing – Types of Etchants – Manual Routing – Auto Routing – Design Rule Check.	10
V	**Communication Systems**	Need For Modulation – Amplitude Modulation & Detection - Frequency Modulation & Detection – AM Transmitter - AM Receiver – FM Transmitter - FM Receiver – Modulation & Detection of : PAM – PPM – PWM – PCM.	10

Books for Study

1. Electronic Devices & Circuits - S. Salivahanan - TMH - II Edition
2. PCB Design – Walter.C. Bosshart – TMH
3. Electronic Communication Systems - Kennedy - TMH – IV Edition .

B.SC. ELECTRONICS AND COMMUNICATION

APPLIED ELECTRONICS LAB (ALLIED)

(For B.Sc CS, BCA, B.Sc IT, & B.Sc PHY)

I/II YEAR-II/IV SEMESTER

(ANY HARDWARE BASED SIMULATION TOOL MAY ALSO BE USED)

(Any 18 Experiments)

L	T	P	C
2	1	1	2

Course Objectives

To introduce electric circuits and its analysis &
to impart knowledge on solving circuits using network theorems,digital circuits & electronic circuits.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Analyse the characteristics of PN Junction diode, transistors
CO2	To impart knowledge on solving circuits using network theorems
CO3	Determine frequency response of RC circuits and simulate series, parallel resonant circuits.
CO4	Learn principal of digital Electronics .
CO5	Demonstrate the applications of op-amp & timer

Syllabus

1. PN Junction Diode Characteristics
2. CE Input Characteristics
3. CE Output Characteristics
4. Ohm's Law
5. Kirchoff's Current Law.
6. Kirchoff's Voltage Law.

7. Resistors in Series & Parallel
8. Capacitors in Series & Parallel
9. Measurement of Amplitude & Frequency Using CRO.
10. NAND as a UNIVERSAL GATE (AND / OR)
11. NOR as a UNIVERSAL GATE (AND /OR)
12. Verification of De Morgan's Theorem.
13. Truth Table Verification of BASIC Gates (Any one gate)
14. Half Adder / Full Adder
15. Half Subtractor / Full Subtractor.
16. Encoder Using 74147 IC
17. Decoder Using 7442 IC
18. Multiplexer Using 74153 IC
19. Demultiplexer Using 74155 IC
20. Clock Generation Using NAND / NOR GATE
21. Full Wave Rectifier With Capacitor Filter .
22. Dual IC Regulated Power Supply (78XX & 79XX).
23. Inverting Adder / Non-Inverting Adder Using Op-Amp
24. Subtractor Using Op-Amp
25. Low Pass Filter / High Pass Filter.

B.SC. ELECTRONICS AND COMMUNICATION

ELECTRONICS – I (ALLIED)
For B.Sc [MATHS,STATISTICS,MATHS (CA) , BIO CHEMISTRY,MICROBIOLOGY,BIO-TECH]

L	T	P	C
4			4

I/II YEAR-I/III SEMESTER

COURSE OBJECTIVES::

To understand operation of semiconductor devices.,DC analysis and AC models of semiconductor devices. To verify the theoretical concepts through laboratory and simulation experiments..

COURSE OUTCOMES: At the end of course, student will be able to :

CO1	Understand the current voltage characteristics of semiconductor devices,
CO2	Analyze dc circuits and relate ac models of semiconductor devices with their physical Operation,
CO3	Design and analyze of electronic circuits Laws
CO4	Evaluate frequency response to understand behavior of waveforms.

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Semiconductor theory**	Intrinsic Semiconductor – Extrinsic Semiconductor - Theory of PN Junction Dode - Zener Diode - Avalanche Breakdown - Zener Break Down - Operation of PNP & NPN Transistor - CB , CE , CC Configuration and Characteristics - Transistor as an Amplifier.	10

II	**Resistors , capacitors & inductors**	Resistors, Capacitors & Inductors in Series and Parallel - Factors Gverning Resistance , Capacitance & Inducatance - Colour Coding of Resistors - Energy Stored in a Capacitor - Energy Stored in an Inductor - Various Other Passive & Active Devices.	10
III	**Circuit laws**	Ohm's Law - Kirchoff's Current Law - Kirchoff's Voltage Law - Voltage Division - Current Division - Series Circuits - Parallel Circuits - Series & Parallel Circuits - Open Circuit - Short Circuit.	10
IV	**Waveforms**	Sinusoidal Waveform - Non-Sinusoidal Waveforms - Peak Value - Peak to Peak Value - Average Value - RMS Value – Period & Frequency Measurement	10
V	**Power supply**	Half Wave Rectifier - Full Wave Rectifier - Bridge Rectifier - Capacitor Filter - Fixed IC Regulated Power Supply using 78XX - Dual IC Regulated Power Supply using 78XX & 79XX.	10

REFERENCE BOOKS :

1. Electronic Devices & Circuits - S. Salivahanan - TMH - II Edition

2. Circuits & Networks - Sudhakar - TMH - 4thEdition.

B.SC. ELECTRONICS AND COMMUNICATION

ELECTRONICS – II (ALLIED)

L	T	P	C
4			4

For B.Sc [MATHS,STATISTICS,MATHS (CA),BIO CHEMISTRY,MICROBIOLOGY,BIO-TECH]

I/II YEAR-II/IV SEMESTER

COURSE OBJECTIVES:

- To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronic circuits.
- To prepare students to perform the analysis and design of various digital electronic circuits.
- To learn the design process of registers, counters and conversion of analog to digital conversion and vice-versa.

COURSE OUTCOMES: At the end of course, student will be able to :

CO1	Examine the structure of various number systems and its application in digital design.
CO2	Have a thorough understanding of the fundamental concepts and minimization techniques used in digital electronics.
CO3	Understand various Boolean algebra and its applications
CO4	Understand various combinational logic circuits and its applications
CO5	Analyze and design various Electronic circuits and its applications

Syllabus

Unit	Unit Title	Intended learning Chapters (Programme specific qualification attributes K1, K2, K3, K4)	Hours of Instruction
I	**Number systems**	Introduction - Binary Number System -	10

		Octal Number System - Decimal Number System - Hexadecimal Nmber System - Conversion From One System to Another.	
II	**Binary rules**	Binary Addition - Binary Subtraction - Binary Multiplication - Binary Division - 1's & 2's Complement Subtraction - 9's & 10's Complement Subtraction.	10
III	**Boolean algebra**	Logic GATES - NAND as a UNIVERSAL GATE - NOR as a UNIVERSAL GATE - Basis Laws of Boolean Algebra - Principle of Duality – De Morgan's Theorem.	10
IV	**Combinational elements**	Half Adder - Full Adder - Half Subtractor - Full Subtractor - Encoder - Decoder - Multiplexer – Demultiplexer.	10
V	**Electronic circuits**	Barkhausen Criterion – Sinusoidal Oscillators (Hartley , Phase Shift &Crystal Oscillator) - Amplitude & Frequency : Modulation & Detection – Amplifiers : RC Coupled & Transformer Coupled . Filters : Low Pass, High Pass , Band Pass & Band Reject Filters – Op-Amp's & Their Applications (Addition , Subtraction, Multiplication , Division , Differentiation and Integration).	10

REFERENCE BOOKS :

1. Digital Circuits & Design– Salivahanan-Vikas Pub - III Edition.

2. Electronic Devices & Circuits - S. Salivahanan - TMH - II Edition

B.SC. ELECTRONICS AND COMMUNICATION

ELECTRONICS LAB (ALLIED)

For B.Sc [MATHS,STATISTICS,MATHS (CA),BIO CHEMISTRY,MICROBIOLOGY,BIO-TECH]

I/II YEAR-II/IV SEMESTER

L	T	P	C
2	1	1	2

(ANY HARDWARE BASED SIMULATION TOOL MAY ALSO BE USED)

(Any 18 Experiments)

Course Objectives

To introduce electric circuits and its analysis & to impart knowledge on solving circuits using network theorems,digital circuits & electronic circuits.

COURSE OUTCOMES: After completion of this course, student able to

CO1	Analyse the characteristics of PN Junction diode, transistors
CO2	To impart knowledge on solving circuits using network theorems
CO3	Determine frequency response of RC circuits and simulate series, parallel resonant circuits.
CO4	Learn principal of digital Electronics .
CO5	Demonstrate the applications of op-amp & timer

Syllabus

1. PN Junction Diode Characteristics
2. CE Input Characteristics
3. CE Output Characteristics
4. Ohm's Law
5. Kirchoff's Current Law.
6. Kirchoff's Voltage Law.

7. Resistors in Series & Parallel
8. Capacitors in Series & Parallel
9. Measurement of Amplitude & Frequency Using CRO.
10. NAND as a UNIVERSAL GATE (AND / OR)
11. NOR as a UNIVERSAL GATE (AND /OR)
12. Verification of De Morgan's Theorem.
13. Truth Table Verification of BASIC Gates (Any one gate)
14. Half Adder / Full Adder
15. Half Subtractor / Full Subtractor.
16. Encoder Using 74147 IC
17. Decoder Using 7442 IC
18. Multiplexer Using 74153 IC
19. Demultiplexer Using 74155 IC
20. Clock Generation Using NAND / NOR GATE
21. Full Wave Rectifier With Capacitor Filter .
22. Dual IC Regulated Power Supply (78XX & 79XX).
23. Inverting Adder / Non-Inverting Adder Using Op-Amp
24. Subtractor Using Op-Amp
25. Low Pass Filter / High Pass Filter.

PROFESSIONAL ENGLISH – I

https://drive.google.com/file/d/1-edgjNpnnMIapLxZyqVH9z3jugy53CIm/view?usp=drive_web

PROFESSIONAL ENGLISH - II

https://mail.google.com/mail/u/0?ui=2&ik=6b5209cdff&attid=0.1&permmsgid=msg-a:r3514885601167464 04&th=17921a031456e9df&view=att&disp=inline&realattid=f_ko3v5ewj0

PERIYAR UNIVERSITY

SALEM – 636011, TAMIL NADU, INDIA
NAAC A Grade - State University - NIRF Rank 68

THE REGISTRAR

PU/AD-1/BOS MEETING/ B.Sc.E& C /2020 Date: 30-01-2020

BOARD OF STUDIES - MEETING NOTICE

I am, by direction, to inform that the meeting of the Board of Studies in **B.Sc. Electronics and Communication -UG (Affiliated Colleges)** is scheduled to be held on **12-02-2020 at 10.00 a.m.** at Food Court, Periyar University, Salem-11.

AGENDA

1. To frame the syllabus for **B.Sc. Electronics and Communication** from the academic year 2020-2021 and thereafter.
2. Any other item.

I request you to make it convenient to attend the above meeting on 12-02-2020. TA & DA will be paid as per the University norms.(Remuneration will be paid through ECS only)

30.1.2020
REGISTRAR i/c

To:

1.	Ms.S.Vennila Assistant Professor Dept. of Elec. & Communication, Government Arts College, Dharmapuri-636705. Ph:9952626888.	Chairman
2.	Thiru L.Dhatchinamurthy Assistant Professor, Dept. of Elec. & Communication,K.S.R College of Arts & Science, K.S.R. Kalvi Nagar,Tiruchengode – 637209. Ph:9894588233.	Member
3.	Thiru T.Suresh Assistant Professor & Head, Dept. of Elec. & Communication, Salem Sowdeswari College, Kondalampatti, Salem - 636010. Ph:9245519021.	Member
4.	Thiru S.Karthikeyan Assistant Professor, Dept. of Elec. & Communication, K.S.R. College of Arts Science, K.S.R. Kalvi Nagar, Thiruchengode – 637209. Namakkal Dt. Ph:9865650753.	Member

5.	Dr.R.Ramesh Assistant Professor, Department of Physics Periyar University, Salem-11 Ph:9790177663.	Member
6.	Dr.J.Kalyanasundar Assistant Professor, Department of Physics Periyar University, Salem – 636011. Ph:9965432165.	University Nominee
7.	Dr.R.S.Sabeenian, Professor & HOD/ECE, R&D Head – SONA SIPRO, Department of Electronics & Communication Engineering, Sona College of Technology, Salem – 636 005, India. Ph:9894859444.	External Member
8.	Mr. Prakash Manuel Joe J Associate Professor, Dept. of Electronics, PSG College of Arts and Science is a College, Avinashi Rd, PSG CAS, Civil Aerodrome Post, Peelamedu, Coimbatore, Tamil Nadu 641014.	External Member
9.	Thiru Gopalakrishan Manickam Technology Lead, Infosys Limited, Mahindra orld City, Chengalpet, Chennai-603004. Mobile:9842448433.	Industrial Personal
10.	Thiru S.Kannan Assistant Professor & Head, Dept. of Electronics & Communication, Muthayammal College of Arts and Science, Rasipuram, Namakkal-637408. Mobile:9943734799.	Alumni

Copy to:1. P.A to Vice-Chancellor
2. P.A to Registrar
3. The Librarian, Library, Periyar University.