

**SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE**  
**(AUTONOMOUS), COIMBATORE – 641 020**  
**B.Sc, PROGRAMME IN ELECTRONICS AND COMMUNICATION SYSTEMS**  
**Under Choice Based Credit System (CBCS) 2014 – 2015 onwards**  
**SCHEME OF EXAMINATION**

<b>SEMESTER – I</b>									
S. NO.	COURSE CODE	PART	COURSE TITLE	HRS / WK	CRED ITS	EXAM HRS	MAX MARKS		
							INT	EXT	TOT
01	15UGC1TA1	I	Tamil – I	6	3	3	25	75	100
02	16UGC1EN1	II	English – I	6	3	3	25	75	100
03	13UEC1C01	III	Core – 1: Circuit and Network Analysis	4	4	3	25	75	100
04	13UEC1AL1	III	Allied- 1: Mathematics – I	6	5	3	25	75	100
05	13UEC2CP1	III	Core Practical– 1: Circuit and Network Analysis @	3	-	-	-	-	-
06	13UEC2CP2	III	Core Practical - 2: Semiconductor Devices @	3	-	-	-	-	-
07	15UGC1ENS	IV	Environmental Studies *	2	2	3	-	75	75
<b>TOTAL – I</b>				<b>30</b>	<b>17</b>	<b>-</b>	<b>100</b>	<b>375</b>	<b>475</b>

<b>SEMESTER – II</b>									
S. NO	COURSE CODE	PART	COURSE TITLE	HRS / WK	CRED ITS	EXAM HRS	MAX MARKS		
							INT	EXT	TOT
01	15UGC2TA2	I	Tamil – II	6	3	3	25	75	100
02	16UGC2EN2	II	English – II	6	3	3	25	75	100
03	13UEC2C02	III	Core - 2: Semiconductor Devices	4	4	3	25	75	100
04	13UEC2AL2	III	Allied -2: Mathematics – II	6	5	3	25	75	100
05	13UEC2CP1	III	Core Practical– 1: Circuit and Network Analysis	3	3	3	40	60	100
06	13UEC2CP2	III	Core Practical - 2: Semiconductor Devices	3	3	3	40	60	100
07	16UGC2VAE	IV	Value Education *	2	2	3	-	75	75
<b>TOTAL – II</b>				<b>30</b>	<b>23</b>	<b>-</b>	<b>180</b>	<b>495</b>	<b>675</b>

**SEMESTER – III**

S. NO	COURSE CODE	PART	COURSE TITLE	HRS/ WK	CREDITS	EXAM HRS	MAX MARKS		
							INT	EXT	TOT
01	13UEC3C03	III	Core – 3: Electrical Machines and Instruments	4	4	3	25	75	100
02	13UEC3C04	III	Core – 4: Digital Electronics	4	4	3	25	75	100
03	13UEC3C05	III	Core – 5: Principles of communication systems	5	5	3	25	75	100
04	15UEC3AL3	III	Allied- 3: Programming in C	4	4	3	15	60	75
05	13UEC4CP3	III	Core Practical – 3: Electronic Circuits @	3	-	-	-	-	-
06	13UEC4CP4	III	Core Practical – 4: Digital Electronics @	3	-	-	-	-	-
07	16UEC4CP5	III	Core Practical – 5: Electronic Communication @	3	-	-	-	-	-
08	13UEC4AP1	III	Allied Practical 1: Computer Programming in C & C++ @	2	-	-	-	-	-
09	13UEC3NM1	IV	NME: Java Programming	2	2	2	-	50	50
TOTAL – III				30	19	-	90	335	425

**SEMESTER – IV**

S. NO	COURSE CODE	PART	COURSE TITLE	HRS/ WK	CREDITS	EXAM HRS	MAX MARKS		
							INT	EXT	TOT
01	16UEC4C06	III	Core – 6: Antenna and Wave Propagation	4	4	3	25	75	100
02	16UEC4C07	III	Core – 7: Electronic Circuits	4	4	3	25	75	100
03	16UEC4EL1	III	Elective-I: One from Group – I	5	5	3	25	75	100
04	15UEC4AL4	III	Allied- 4: Object Oriented Programming with C++	4	4	3	15	60	75
05	13UEC4CP3	III	Core Practical – 3: Electronic Circuits @	3	3	2	40	60	100
06	13UEC4CP4	III	Core Practical – 4: Digital Electronics @	3	3	3	40	60	100
07	16UEC4CP5	III	Core Practical – 5: Electronic Communication @	3	3	3	40	60	100
08	13UEC4AP1	III	Allied Practical 1: Computer Programming in C and C++	2	2	2	20	30	50
09	13UEC4NM2	IV	NME : HTML	2	2	2	-	50	50
10	15UGC4NSS	V	Extension Activities -NSS	-	1	-	25	25	50
	15UGC4NCC		NCC						
	15UGC4SPO		Sports						
TOTAL – IV				30	31	-	250	575	825

<b>SEMESTER – V</b>									
S. NO	COURSE CODE	PART	COURSE TITLE	HRS/ WK	CRED ITS	EXAM HRS	MAX MARKS		
							INT	EXT	TOT
01	13UEC5C08	III	Core - 8 : T.V and Satellite Communication	5	5	3	25	75	100
02	13UEC5C09	III	Core - 9: Modern Instrumentation	4	4	3	25	75	100
03	13UEC5C10	III	Core - 10: Linear IC's and its Applications	4	4	3	25	75	100
04	13UEC5EL2	III	Elective-II: One from Group – II	5	5	3	25	75	100
05	17UEC5CP6	III	Core : Basic and practical aspect of electronics	3	3	3	-	100	100
06	13UEC6CP7	III	Core Practical - 7: Linear IC's and Instrumentation @	3	-	-	-	-	-
07	13UEC6EP1	III	Elective Practical - 1: Microprocessor and Microcontroller@	3	-	-	-	-	-
08	13UEC6CPR	III	Project Work @	3	-	-	-	-	-
TOTAL –V				30	21	-	100	400	500

<b>SEMESTER – VI</b>									
S. NO	COURSE CODE	PART	COURSE TITLE	HRS/ WK	CRED ITS	EXAM HRS	MAX MARKS		
							INT	EXT	TOT
01	13UEC6C11	III	Core - 11: Biomedical Instrumentation	5	5	3	25	75	100
02	16UEC6C12	III	Core - 12: Optical Fiber Communication	5	4	3	25	75	100
03	13UEC6C13	III	Core - 13: PC Hardware Fundamentals	4	4	3	25	75	100
04	13UEC6EL3	III	Elective-III: One from Group – III	5	5	3	25	75	100
05	13UEC6CP8	III	Core Practical - 7: Linear IC's and Instrumentation	3	3	3	40	60	100
06	13UEC6EP1	III	Elective Practical - 1: Microprocessor and Microcontroller	3	3	3	40	60	100
07	13UEC6CPR	III	Project Work	5	5	-	40	60	100
TOTAL –VI				30	29	-	220	480	700

\* Common Syllabus Offered by college

@ Exams will be conducted in the even semester

# NME Course offered by Computer Science Department

SEMESTER – III									
S. NO	COURSE CODE	PART	COURSE TITLE	HRS/ WK	CREDITS	EXAM HRS	MAX MARKS		
							INT	EXT	TOT
01	16UCS3NM1	IV	Non Major Elective – 1: Microprocessor Fundamentals	2	2	2	-	50	50
SEMESTER – IV									
S. NO	COURSE CODE	PART	COURSE TITLE	HRS/ WK	CREDITS	EXAM HRS	MAX MARKS		
							INT	EXT	TOT
01	16UCS4NM2	IV	Non Major Elective – 2: PC Hardware Fundamentals	2	2	2	-	50	50

Course	Credits	Marks
Tamil	6	200
English	6	200
Part III: Core & Elective	99	2500
Allied	20	400
Environment Studies	2	75
NME	4	100
Value Education	2	75
NSS / NCC	1	50
Total	140	3600

### List of Electives

#### Group – I

1. 8085 Microprocessor and Interfacing
2. PCB Design and Fabrication
3. Domestic Electric and Electronics Appliances

#### Group – II

1. 8051 Microcontrollers and its Applications
2. Industrial and Power Electronics
3. Network Communications

#### Group – III

1. Embedded systems Design
2. Digital and Mobile Communication
3. Robotics and Automation

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**Unit – I: Passive Components**

Resistors: Introduction - Classification of Resistors - Fixed Resistors - Variable Resistors - Colour coding of Resistors.

Inductors: Types of Inductors - Inductance of a coil - Energy stored in an Inductor.

Capacitors: Factors affecting Capacitance - Types of Capacitors.

**Unit - II**

**DC resistive circuits:** Voltage notation-Voltage reference point-Resistance in Series & Parallel -Voltage division rule- Current division rule-Capacitor in series and parallel - Filters using RC circuits: Low pass – High pass – Band pass filters.

**Unit – III**

**AC Circuit:** RMS value- Average value-Phasor diagram- AC through R,L&C circuit – AC through RL and RC series circuit-Power factor-Series and Parallel Resonance in RLC circuit - Graphical representation of resonance - Q-Factor of a series and parallel resonance circuit.

**Unit - IV**

**Ohm's Law - Kirchoff's Laws - Star -Delta and Delta-Star Conversion-** Mesh analysis-Super mesh analysis- Nodal analysis-Super node analysis. Simple problems in DC circuits.

**Unit - V**

**Network Theorems:** Superposition Theorem - Thevenin Theorem - Norton Theorem - Thevenin to Norton Conversion - Millman Theorem - Maximum Power Transfer Theorem - Problems.

**Books for Study:**

1. R.S.Sedha – “A Text Book of Applied Electronics” – S.Chand & Company Ltd., Reprint, 2010, (Unit I and II).
2. Ravish. R.Singh - “Basic Electrical and Electronics Engineering” TMHE PVT, 2010, (Unit III - V).

### **Unit-I**

**Diode: Construction and Characteristics and Application:** Clipping and clamping circuit. Diode breakdown: Zener and Avalanche breakdown. Special diode: Zener diode – Zener diode as a voltage regulator - Varicap - PIN and Tunnel diode.

### **Unit-II**

**Transistor:** Construction and operation-Amplifying action-CB, CE and CC configuration-Load line analysis-Operating point-Cut off and Saturation point. Transistor Biasing: Self bias-feed back bias and voltage divider bias - Transistor as a switch.

### **Unit-III**

**Field Effect transistor:** JFET construction-Working and Characteristics.FET biasing: Self bias and Voltage divider bias.FET as an amplifier: CS and CD in small signal model. MOSFET: Construction, Operation and Characteristics-Types of MOSFET - Introduction to CMOS.

### **Unit-IV**

**Power Electronics: Introduction** - SCR – DIAC - TRIAC – UJT – PUT - SBS – SUS –Construction-Operation and Characteristics-Applications.

### **Unit-V**

**Optoelectronic Devices:** Types of optical sources-Classifications of optoelectronic devices-LED – LCD - Photo diode - photo transistor – Light activated SCR - Solar cell – LDR – Applications.

### **Book for study**

1. V.K.Metha “Principles of Electronics”, S.Chand & Company Ltd., Ram Nagar, New Delhi-110055, Reprints 1999, (**Unit I to IV**).
2. S.Salivahanan “Electronic devices and circuits”, N.Suresh Kumar, A.Vallavaraj, TMH publishing company Ltd, New Delhi, 2001 (7Th reprints). (**Unit V**)

Course title: **Core Practical: Circuit and Network Analysis** Subject Code: 13UEC2CP1

Year: I

Semester: II

Credits: 3

Hrs/Week: 3

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**(ANY 18 EXPERIMENTS)**

1. Ohm's Law Verification
2. Kirchhoff's Laws Verification
3. Verification of Maximum Power Transfer Theorem
4. Verification of Super Position Theorem
5. Verification of Thevenin's theorem
6. Verification of Norton's Theorem
7. Verification of Millman's Theorem
8. Study on Transient Response RC Components
9. Impedance and Power Factor of RL Circuits
10. Star to Delta and Delta to Star Transformation
11. Series Resonance Circuit - RLC.
12. Parallel Resonance Circuit – RLC.
13. Study of Transformer Ratio
14. Calibration of Low Range Ammeter - Potentiometer
15. Calibration of Low Range Voltmeter- Potentiometer
16. Calibration of High Range Ammeter - Potentiometer
17. Calibration of High Range Voltmeter- Potentiometer
18. Study of Capacitor Network
19. Study of Resistor Network
20. Measurement of L & C using Bridge
21. Measurement of Resistance - Potentiometer
22. Measurement of Resistance - Wheatstone Network

**Program: B.Sc Electronics and Communication System**

Course title: **Core Practical: Semiconductor Devices**

Subject Code: 13UEC2CP2

Year: I

Semester: II

Credits: 3

Hrs/Week: 3

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**(ANY 18 EXPERIMENTS)**

1. Determination of band gap energy of Silicon.
2. Determination of band gap energy of Germanium.
3. PN junction diode characteristics.
4. Zener diode characteristics.
5. Characteristics of CE configuration.
6. Characteristics of CB configuration.
7. Study of self bias circuit.
8. Study of voltage divider bias circuit.
9. FET characteristics.
10. Solar cell characteristics.
11. Photo diode characteristics.
12. Study of Integrator circuits using RC components.
13. Study of Differentiator circuit using RC components.
14. Clipping circuits.
15. Clamping circuits.
16. Low pass filters.
17. High pass filters.
18. Bands pass filters.
19. Band stop filters.
20. Diac characteristics.
21. UJT characteristics.
22. Triac Characteristics.



**Program: B.Sc Electronics and Communication System**

Course title: **Core : Electrical Machines and Instruments**

Subject Code: 13UEC3C03

Year: II

Semester: III

Credits: 4

Hrs/Week: 4

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### **Unit-I DC Machines**

**DC generators: Principles-Single loop-Practical generator** - Types of generator – EMF equation. DC motors: Principle-Comparison of generator and motor-Torque equation-Back EMF-Types of motor-Speed control of DC motor.

### **Unit-II AC Machines**

**AC Generator - Induction motor: Principle-Construction-Working. Special machines: Stepper motor-Step angle-Permanent Magnet Stepper motor. Synchronous motor: Types-Applications of synchronous motor. Servo motor: AC and DC servo motor.**

### **Unit-III Transformers**

**Transformers: Working principle-Construction-Core and Shell type-EMF equation-Transformation ratio-Parts of transformer-Losses and testing- Three phase and Auto transformer.**

### **Unit-IV Instruments**

Types of Instruments: D'Arsonal galvanometer-PMMC-Moving Iron-Thermocouple and Rectifier type Instruments. Extension of Instruments: Ammeter shunt and Voltmeter multiplier-Multimeter.

### **Unit-V Meters**

**Energy meter: Single phase induction type meter-Poly-phase energy meter. Wattmeter: Power in AC and DC circuit-types of meter-Induction type watt meter-Power measurements in poly phase circuits.**

### **Books for study**

1. D.S.Dhokal, "Basic Electrical Engineering with numerical problem" Vol – I & II  
(Unit I to III)
2. A.K.Shawney "A course in Electrical and Electronic Measurement and Instrumentation"  
(Unit IV &V)

**Program: B.Sc Electronics and Communication System**

Course title: **Core : Digital Electronics**

Subject Code: 13UEC3C04

Year: II

Semester: III

Credits: 4

Hrs/Week: 4

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**Unit-I**

**Number system: Binary-Decimal-Octal and Hexadecimal numbers. Codes: ASCII-Excess-3-BCD and Gray code. Basic logic gates:** NOT, OR, AND, NAND and NOR-Universal logic gates: NOR and NAND. Boolean algebra: Boolean operation-Logic expression-Rules and Laws - DeMorgan's theorems - Simplification of Boolean expression - Karnaugh Map.

**Unit-II**

**Arithmetic Circuits:** Binary addition, Subtraction, Multiplication and Division- Adders-Parallel Adders-. Data-Processing Circuits: Decoder-Encoder-BCD to Binary conversion-Binary to Gray and Gray to Binary conversion-Multiplexer and Demultiplexer-Parity generator and checker-Comparator.

**Unit-III**

**Flip-Flops: RS and Gated Flip-Flop-D and E triggered Flip-Flop-JK and MS Flip-Flop. Shift Register:** Serial In-Serial Out, Serial In-Parallel out types shift registers. Counters: Asynchronous and synchronous counter-Decoding gates-Decade counter - Up-Down counter-Digital clock.

**Unit-IV**

D/A and A/D Conversion: Variable and Resistor network-Binary ladders-D/A Accuracy and Resolution. A/D conversion: Simultaneous and counter method-Continuous and Dual-Slope conversion method-A/D Accuracy and Resolution.

**Unit-V**

**Memories:** Basic terms and ideas-Magnetic memory-Optical memory-Memory addressing-ROMs, PROMs and EPROMs-RAM-Sequential programmable logic devices-Flash memories.

**Books for study**

1. Thomas L.Floyd, "Digital Fundamentals", Universal Book Stall, New Delhi-100002. Second edition. (Unit-I-III).
2. Donald P.Leach, "Digital Principles and Applications", Albert Paul Malvino and Goutam Saha, TMH Publishing Company, New Delhi, Sixth edition, (Unit IV-V)

## Program: B.Sc Electronics and Communication System

Course title: **Core : Principles of Communication Systems** Subject Code: 13UEC3C05  
Year: II Semester: III Credits: 5 Hrs/Week: 5

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### **UNIT I: AM AND SSB MODULATION:**

Noises: External and Internal noise-Noise calculation-Noise figure- Amplitude modulation: frequency spectrum –Representation and Power relations of AM wave. Generation of AM: Basic requirement-Grid modulated class C amplifier-Plate modulated class C amplifier. SSB system: Balanced modulator. SSB generation: filter system – phase shift method.

### **UNIT II: FM MODULATION**

**Frequency and phase modulation:** Mathematical representation of FM-Frequency spectrum of the FM wave-Phase modulation. Noise and Frequency Modulation: Effect of noise on carrier-Pre-emphasis and de-emphasis-Comparison of wideband and narrowband FM. Generation FM: FM methods-Direct method-AFC-Indirect method– Comparison between FM and AM systems- FM generation: Direct method and indirect method.

### **UNIT III: PULSE COMMUNICATION**

**Pulse Modulation: sampling theorem – PAM – PWM – PPM –PCM** - Differential PCM – Delta modulation –adaptive delta modulation – FSK – ASK –PSK.

### **UNIT IV: BROAD BAND COMMUNICATION SYSTEM**

Multiplexing – frequency division multiplexing – time division multiplexing – wave length division multiplexing – coaxial cable systems- micro wave links – optical communication systems – submarine cables.

### **UNIT V: RADIO TRANSMITTER AND RECEIVER**

**AM transmitter - Super heterodyne receiver:** RF amplifier – Local oscillator – Mixer – IF amplifier – AM detector – AGC – Communication receivers – FM transmitter - FM receivers: Amplitude limiter – FM demodulators – Ratio detector - Stereo FM receiver – SSB receiver.

#### **Books for study:**

1. George Kennedy – “Electronic communication systems”, III Edition, McGraw-hill Book Company. (Unit I & II)
2. Sanjeev Gupta – “Electronic communication systems”, Kanna publications, 1992. (Unit III & V)

#### **Books for reference:**

1. D.Roddy & J.Coolen – “Electronic communication”, PHI, 3<sup>rd</sup> edition, 1989.

**Program: B.Sc. Electronics and Communication System**

Course title: **Allied: - Programming in C**

Subject Code: 15UEC3AL3

Year: II

Semester: III

Credits: 4

Hrs/Week: 4

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**UNIT I**

**Overview of C:** Importance of C – Basic Structure of C programs – Executing a ‘C’ Program – Sample Programs;

**Constants, Variables and Data Types:** Character Set – C tokens – Keywords and Identifiers – Constants – Variables – Data Types – Declaration of Variables – Assigning Values to Variables – Declaring a Variable as Constant.

**UNIT II**

**Operators and Expressions:** Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Operator – Some Computational Problems – Type Conversions in Expressions – Operator Precedence and Associativity – Mathematical Functions;

**Managing Input and Output Operations:** Reading a Character – Writing a Character – Formatted Input – Formatted Output.

**UNIT III**

**Decision Making and Branching:** Decision Making with IF Statement – Simple IF Statement – The IF ... ELSE Statement – Nesting of IF ... ELSE Statement – The ELSE IF Ladder – The Switch Statement – The ?: Operator – The GOTO Statement;

**Decision Making and Looping:** The WHILE Statement – The DO Statement – The FOR Statement – Jumps in LOOPS.

**UNIT IV**

**Array:** One-dimensional Arrays – Declaration of One-dimensional Arrays – Initialization of One-dimensional Arrays – Two-dimensional Arrays – Initializing Two-dimensional Arrays – Multi-dimensional Arrays;

**User-defined Functions:** Elements of User-defined Functions – Definition of Functions – Return Values and their Types – Function Calls – Function Declaration – Category of Functions – No Arguments and no Return Values – Arguments with Return Values – No Arguments but Return Multiple Values – Nesting of Functions.

**UNIT V**

**Pointers:** Introduction – Understanding pointers – Accessing the Address of a Variable – Declaring Pointer Variables – Initialization of Pointer Variables – Accessing a Variable through its Pointers;

**File Management in C:** Introduction – Defining and Opening a File – Closing a File – Input /Output Operations on Files – Error Handling During I/O Operations – Random Access to Files – Command Line Arguments.

**TEXT BOOK:**

1. Programming in ANSI C, Fifth Edition, E. Balagurusamy, Tata McGraw Hill Education Private Limited, New Delhi, 2011.

**Program: B.Sc Electronics and Communication System**

Course title: **Core : Antenna and Wave Propagation**

Subject Code: 16UEC4C06

Year: II

Semester: IV

Credits: 4

Hrs/Week: 4

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**UNIT I: MICROWAVES**

Introduction – Maxwell’s Equation – Ampere’s law – Faraday’s law – Gauss law – Wave Equation – TEM/TE/TM & HE wave equations – Waveguides: Rectangular waveguides – Circular waveguides.

**UNIT II: RADIO WAVE PROPAGATION**

**Fundamentals of Electromagnetic Waves**– Effect of Environment. Propagation of Waves: Ground waves- Sky wave propagation-Space waves- Tropospheric Scatter Propagation- Exterritorial Communications.

**UNIT III: ANTENNAS**

Basic considerations –Electromagnetic radiation- Wire radiator in space: Current and Voltage Distribution-Resonant antennas, Radiation Patterns and Length calculation- Nonresonant antenna. Terms and Conditions: Antenna gain and effective Radiated Power-Antenna Resistance-Bandwidth, Beam width and Polarization. Types of antenna: Yagi-Uda antenna- Rhombic antenna-Horn antenna-Lens antenna.

**UNIT IV: MICROWAVE TUBES**

Microwave Triodes-Multi cavity klystron – Reflex klystron - Magnetron – Traveling wave tube – Backward wave Oscillators – Fundamentals, Operation and Applications.

**UNIT V: RADAR SYSTEMS**

Radar fundamentals –Radar range equation – Pulsed Radar system: Basic pulsed radar system-Antenna scanning & tracking - Display methods – Moving Target Indicator. Other Radar System: CW Radar –FM Radar-Applications.

**Books for study:**

1. N.Kulkarni – ‘Microwave and Radar Engineering’, Umesh Publications, Second Edition. (Unit I).
2. George Kennedy ‘Electronic Communication Systems’ TMH Publishing Company Limited, Third Edition.1998.(Unit-II to V)

**Book for Reference**

3. Dennis Roddy and John Coolen, ‘Electronic Communications’ Pearson, Fourth Edition, 2011.
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## Program: B.Sc Electronics and Communication System

Course title: **Core :Electronic Circuits**

Subject Code: 16UEC4C07

Year: II

Semester: IV

Credits: 4

Hrs/Week: 4

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### Unit - I: Power Supplies

Introduction – Linear mode power supply - Rectifiers: Half and Full Wave Rectifiers - Ripple Factor - Rectification Efficiency - Transformer Utilization Factor - Filter s: Inductor Filter - Capacitor Filter s - LC Filter - Pi Filter – Introduction to Voltage Regulator .

### Unit - II: Amplifiers

Introduction – Classification - Single stage amplifiers: CE, CC and CB amplifiers - Small signal Analysis - FET Amplifiers: CS and CD amplifiers - Multi Stage Amplifier - Coupling Methods - Frequency Response of RC Coupled Amplifier - Transformer Coupled Amplifier - Direct coupled Amplifier - Tuned Amplifier .

### Unit - III: Power Amplifiers

Amplifier classification based on biasing condition - Class A large signal amplifier - Transformer coupled class A Audio power amplifier - Efficiency of class A amplifier - Class B amplifier - Efficiency of class B amplifier - Class B Push pull amplifier – Cross over distortion - Class C Amplifier - Introduction to class D and class S amplifiers

### Unit - IV: Feedback Amplifiers

Introduction - Basic concept of Feedback – Advantages of Negative Feedback: Gain, stability, Increased Bandwidth, Decreased Distortion, Decreased Noise. Types of Feedback Connections: Voltage series feedback – Voltage shunt feedback – Current series feedback-Current shunt feedback -Comparison of feedback connection

### Unit - V: Oscillators and Waveform Generators

Introduction - Classification of Oscillators – Nature of sinusoidal oscillation - oscillator circuit - Frequency of oscillatory circuit - The Barkhausen criterion. Tuned Circuit Oscillator: Tuned base oscillator - Hartley Oscillator - Colpitts Oscillator - RC Oscillator : Phase Shift oscillator - Wien Bridge Oscillator - Crystal Oscillator . Multivibrators – Schmitt trigger (Transistor only).

### Books for Study:

1. S. Salivahanan, N. Suresh Kumar, A. Vallavaraj, "Electronic Devices and Circuits", TMH Publishing Company Ltd., Seventh Reprint 2001.(Unit-I)
2. R. S. Sedha, "A test book of Applied Electronics", S Chand and Company Ltd., 2nd Edition, 2001(Unit-IV and V)

### Books for Reference:

1. V.K. Mehta, "Principles of Electronics", S Chand and Company Ltd., 2nd Edition, 2001.

**Program: B.Sc. Electronics and Communication System**

Course title: **Allied: - Object Oriented Programming with C++**

Subject Code: 15UEC4AL4

Year: II

Semester: IV

Credits: 4

Hrs/Week: 4

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**Unit - I**

Soft ware Evolution – A look at Procedure-Oriented Programming - Object Oriented Programming Paradigm – Basic concept of Object-Oriented Programming – Benefits of OOP –Object Oriented Languages – Applications of OOP.

**Unit - II**

What is C++? – Applications of C++ - A simple C++ Program – An Example with Class – Structure of C++ Program – Tokens, keywords, identifiers and constants – Basic Data Types – User-defined data types – Storage Classes – Derived data types – Operators in C++ - Manipulators. Control structures.

**Unit - III**

Functions in C++ : The Main function – Function Prototyping – Call by reference – Return by reference – Inline functions – Default Arguments – Const Arguments – Recursion – Function Over loading – Math library Functions.

Classes and Objects : Specifying a Class – Defining Member Functions – A C++ Program with Class – Arrays within a Class – Static Data Members – Static Member Functions.

**Unit - IV**

Operator over loading and Type Conversions: Defining Operator overloading - Over loading Unary Operators – Over loading Binary Operators – Overloading Binary Operator using Friends - Rules for Over loading Operators – Type Conversions.

Inheritance: Defining Derived Classes – Single Inheritance, Multi-Level Inheritance - Multiple Inheritance, Hierarchical Inheritance – Hybrid Inheritance.

**Unit - V**

Pointers, Virtual Functions and Polymorphism: Introduction – Pointers - Pointers to Object – This Pointer - Virtual Functions – Pure Virtual Functions.

Working with Files : Introduction – Classes for File Stream Operations – Opening and Closing a File – Detecting end-of-file – File pointers and their Manipulations – Sequential Input and Output Operations – Updating a File: Random Access – Command-Line Arguments.



**Book for Study:**

1. E. Balagurusamy - 'Object Orient ed Programming wit h C++' Fift h Edit ion, Tata McGraw Hill Education Privat e Limit ed, 2011.

**Books for Reference**

1. Bjarne Stroustrup - 'The C++ Programming La nguage' 2<sup>nd</sup> Edit ion, Addison Wesley 1991.
2. Rumbaugh - 'Object Orient ed Met hods and Des ign' Prent ice Hall of India,1995.
3. Grady Booch - 'Object Orient ed Analys is a nd Design', The Benja min and Cummins Publications 1993.

**Program: B.Sc Electronics and Communication System**

Course title: **Core Practical: Electronic Circuits**

Subject Code: 13UEC4CP3

Year: II

Semester: IV

Credits: 3

Hrs/Week: 3

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**(ANY 18 EXPERIMENTS)**

- 1) Half Wave & Full Wave Rectifier
- 2) LC & Pi filters
- 3) Zener diode as a voltage regulator
- 4) Voltage Doubler & Tripler
- 5) Common Emitter Amplifier
- 6) Emitter Follower
- 7) RC – Coupled Amplifier
- 8) Feed-Back Amplifier
- 9) Class A Power Amplifier
- 10) Class B Power Amplifier
- 11) UJT – Relaxation Oscillators
- 12) Hartley Oscillator
- 13) Colpitts Oscillator
- 14) Phase Shift Oscillator
- 15) Wien Bridge Oscillator
- 16) Free Running Multivibrator
- 17) Mono-Stable Multivibrator
- 18) Bistable Multivibrator
- 19) Crystal Oscillator
- 20) Schmitt Trigger
- 21) Blocking Oscillator
- 22) Clapp Oscillator

**Program: B.Sc Electronics and Communication System**

Course title: **Core Practical: Digital Electronics**

Subject Code:

Year: II

Semester: IV

Credits: 3 13UEC4CP4

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**(ANY 18 EXPERIMENTS)**

1. Construct ion of 5VDC Power Supply
2. Digit al IC's Characteristics
3. Logic Gates Using IC's
4. Verification o f Demorgan's T heorems
5. NAND & NOR as Universal Building Block
6. Code Converters
7. Shift Register & Ring Counter
8. Half Adder & Full Adder
9. Half Subtractor & Full Subtractor
10. Up-Down Counter
11. Encoder & Decoder
12. Study o f 7490
13. Decade Counter
14. Mult iplexer & Demultiplexers
15. Study o f Flip-Flops
16. Analog to Digital Converter
17. Digit al to Analog Converter
18. Pulse Generators
19. MOD-Counters
20. Four Bit Binary Adder
21. BCD Adder
22. Parity Generators and Checkers

**Program: B.Sc Electronics and Communication System**

Course title: **Core Practical:Electronic Communication** Subject Code: 16UEC4CP5

Year: II

Semester: IV

Credits: 3

Hrs/Week: 3

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**(ANY 18 EXPERIMENTS)**

1. AM Generation and Detection
2. FM Generation and Detection
3. RF Amplifier
4. Study of Yagi-Uda Antenna
5. Pulse Amplitude Modulation
6. Pulse Width Modulation
7. Pulse Position Modulation
8. FSK Generation and Detection
9. ASK Generation and Detection
10. PSK Generation and Detection
11. Frequency Division Multiplexing and DeMultiplexing
12. Time Division Multiplexing and DeMultiplexing
13. Generation of PCM and Detection
14. Generation of Delta Modulation and Detection
15. Phase modulation
16. Study of Fiber Optical analog Link
17. Study of Propagation loss in Optical Fiber
18. Study of bending loss in Optical Fiber
19. Measurement of Numerical Aperture
20. Characteristics of Fiber Optic digital Communication Link

**Program: B.Sc Electronics and Communication System**

Course title: **Allied Practical: Computer Programming in C and C++** Subject Code:13UEC4AP1  
Year: II Semester: IV Credits: 2 Hrs/Week: 2

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(ANY 18 PROGRAMS)

**C PROGRAMS**

1. Binary to gray.
2. Grey to Binary
3. Binary to Decimal.
4. Decimal to Binary.
5. Matrix Addition.
6. Matrix Subtraction.
7. Palindrome.
8. Fibonacci.
9. Mirror no check.
10. Factorial.
11. Biggest of Three Numbers

**C ++ PROGRAMS**

1. Binary to gray.
2. Grey to Binary
3. Binary to Decimal.
4. Decimal to Binary.
5. Matrix Addition.
6. Matrix Subtraction.
7. Palindrome.
8. Fibonacci.
9. Mirror no check.
10. Factorial.
11. Biggest of Three Numbers

**Program: B.Sc Electronics and Communication System**

Course title: **Core : TV and Satellite Communication**

Subject Code: 13UEC5C08

Year: III

Semester: V

Credits: 5

Hrs/Week: 5

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**Unit - I**

**Scanning - Flicker - Vertical Resolution - Kell Factor - Horizontal Resolution - Interlaced Scanning - Video Signal Components** - Horizontal & Vertical Synchronous & Blanking standards - Complete Channel Bandwidth - Vestigial Sideband - Composite Video Signal Camera Tubes - Plumbicon - Vidicon - Block Diagram of TV Transmitter

**Unit - II**

**Monochrome Receivers** – Quarter wave matching section - balun - Receiver block diagram – Vestigial Sideband Correction - Choice of IF - Sound Separation - VHF Tuner Block diagram - Video IF Section - block diagram - Block Diagram of Vertical deflection system - Block Diagram of Horizontal deflection system

**Unit - III**

**ESSENTIAL OF COLOUR TELEVISION:** Compatibility- Frequency Interleaving Colour Perception- Three Colour Theory-Tristimulus Value of Spectral Colour- Luminance, hue, saturation-colour TV camera -production of colour difference signal - Modulation of Color difference signal values of luminance and polarity of colour difference signals.

**Unit - IV**

**COLOUR TV TRANSMISSION AND RECEPTION:** Colour burst – PAL system of colour TV transmission and reception – cancellation of phase error – PAL encoder – PAL decoder – PAL Colour receiver – colour picture tubes: Delta gun colour picture tube – precision in line colour picture tube –Trinitron colour picture tube.

**Unit - V**

**PRINCIPLES OF SATELLITE COMMUNICATION:** Orbital aspects – height of geostationary orbit –geostationary satellite –communication satellite – station keeping – satellite frequency plans and allocation –satellite uplinks –satellite downlinks –satellite transponders Satellite access: frequency division multiple access –time division multiple access – demand access systems

**Book for Study:**

1. R.R. Gulati - Monochrome and Color Television, Wiley Eastern Ltd, 1984. (Unit I – II)
2. J.S.Chitode “Communication engineering”, Technical Publications, Pune, Second Revised Edition, 2004. (Unit-III - V)

**Books for Reference:**

1. A.M.Dhake - Television and Video Engineering, Tata McGraw Hill, 1999.

**Program: B.Sc Electronics and Communication System**

Course title: **Core : Modern Instrumentation**

Subject Code: 13UEC5C09

Year: III

Semester: V

Credits: 4

Hrs/Week: 4

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**Unit-I Qualities of Measurement**

Introduction - Performance Characteristics - Static Characteristics - Errors In Measurement – Types of Static Error – Sources of Error – Dynamic Characteristics- - Statistical Analysis- Standard – Electrical standards – Atomic frequency and time standards.

**Unit-II Bridges**

Introduction- Wheatstone Bridge- Kelvin's Bridge- Capacitance Comparison Bridge- Wien's Bridge- Schering Bridge - Inductance Comparison Bridge - Maxwell's Bridge - Hay's Bridge.

**Unit-III Signal Analysis Instruments**

Oscilloscope: Basic principle – CRT features - Block Diagram - Vertical Amplifier - Horizontal Deflection System – CRT connections – Dual trace oscilloscope – Probes for CRO – Applications of oscilloscope – Introduction to Digital Storage Oscilloscope - Basic Wave Analyzer - Frequency Selective Wave Analyzer - Heterodyne Wave Analyzer- Harmonic Distortion Analyzer - Spectrum Analyzer.

**Unit-IV Transducer**

Introduction - Electrical Transducer – Selection of transducer –Active & Passive transducers - Resistive transducer: Strain gauges – Resistance thermometer – Thermistor - Inductive transducer: LVDT - Capacitive Transducer – Piezoelectric transducer – Photo electric transducer - Photovoltaic cell.

**Unit-V Data Acquisition Systems**

Introduction - Objective of a DAS-Signal conditioning of the input-Single channel DAS-Multi channel DAS-Computer Biased DAS - Data Loggers-Sensor based Computer Data Systems-Digital Transducer.

**Book for Study:**

1. Electronics Instrumentation - H.S. Kalsi, Third Edition, TMH Publishing Company Limited, 2010.

**Books for Reference:**

1. Electronic Instrumentation & Measurement Techniques - W.D.Cooper & A.D. Helfrick
2. Instrumentation Devices & Systems - C S Rangan, G.R. Sharma, V.S.V.Mani

Course title: **Core : Linear IC's and Its Applications** Subject Code: 13UEC5C10 Year: III  
Semester: V Credits: 4 Hrs/Week: 4

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**Unit - I: Operational Amplifiers**

Introduction – Block diagram of Operational Amplifiers – Ideal Op-amp – Parameters – Inverting Amplifier – Non-Inverting Amplifier – Voltage follower - Differential Amplifier – CMRR – AC and DC characteristics.

**Unit - II: Op-Amp Applications**

Scale changer – Summing Amplifier – Subtractor – Instrumentation amplifier – Voltage to current converter – Current to voltage converter – Log and Antilog amplifier – Multiplier and Divider - Differentiator - Integrator — Electronic analog computation.

**Unit - III: Comparators and Waveform Generators**

Introduction – Comparator – Applications – Schmitt trigger – Square wave generator – Monostable multivibrator – Triangular wave generator – Wien bridge oscillator – Function generator.

**Unit - IV: Voltage Regulator**

Introduction – Series regulator - IC voltage regulators – Fixed voltage series regulator - IC 723 General purpose regulator - Current limit protection - Current Fold back – Current boosting –Switching regulator.

**Unit - V: Timer and Phase-Locked Loops**

Introduction - Description of Functional diagram of 555 – Monostable operation – Astable operation – Applications – Schmitt trigger – PLL: Introduction – Basic principles – Phase detector – Comparator – VCO – Low pass filter - PLL Applications.

**Books for Study:**

1. D.Roy Choudhury, Shail B. Jain, “ Linear Integrated Circuits”, New Age International Publishers, Third Edition 2007.

**Book for Reference:**

1. Ramakant A Gayakwad, “Op-Amps and Linear Integrated Circuits”, PHI, 4<sup>th</sup> edition 2004.
2. Botkar K.R, “Integrated Circuits”, Khanna Publishers, 9<sup>th</sup> Edition 2000.



Course title: <b>Core : Bio Medical Instrumentation</b>	Subject Code: 13UEC6C11
Year: III	Semester: VI
Credits: 5	Hrs/Week: 5

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#### **Unit - I: Introduction to Biomedical Instrumentation**

Bio metrics – Introduction to the Man Instrument system - components of the man Instrument system – Physiological system of the body-Problems encountered in measuring a living system – Resting and action potentials – Propagation of action potentials – The Bio- electric potentials.

#### **Unit - II: Transducers & Electrodes**

Transducer for Bio medical applications: Force – Pressure – Flow – Temperature. Electrode Theory – Biopotential electrodes: Micro electrodes – Body surface electrodes – Needle electrodes – Biochemical transducers: Reference electrodes – pH electrode – Blood gas electrodes.

#### **Unit - III: Bio-potential Recorders**

Introduction – Characteristics of the recording system – Electrocardiography(ECG)–Electroencephalography(EEG)–Electromyography(EMG) – Blood Pressure meters– Blood flow meters – Cardiac output measurements.

#### **Unit - IV: Operation Theatre Equipment**

Introduction – Surgical diathermy – Shortwave diathermy – Microwave diathermy – Ultrasonic diathermy – Ventilators – Anesthesia machine – Elements of Intensive care monitoring – Pace maker – Defibrillator – Heart-Lung machine – Kidney machine.

#### **Unit - V: Advances in Biomedical Instrumentation**

Introduction – computers in medicine – Lasers in medicine – Endoscope – Cryogenic surgery – Nuclear imaging techniques – Computer tomography Thermograph – Ultrasonic Imaging systems – Magnetic resonance imaging – Positron emission tomography – Digital subtraction angiography – Bio- feed back instrumentation – Bio materials.

#### **Books for Study:**

1. Leslie Cromwell, Fred J. Weibe II, Erich A. Pfeiffer, “Bio medical Instrumentation and measurements”, Prentice Hall of India Pvt Limited, Second edition 1995, (Unit I - II).
2. Dr. M. Arumugam, “Bio medical Instrumentation”, Anuradha agencies, Publishers, First edition 1993 (Unit III - V)

#### **Books for Reference:**

1. R.S.Khandpur, “Handbook of Bio medical Instrumentation”, Tata McGraw Hill Publishing co. Ltd, second edition 2003.

**Program: B.Sc Electronics and Communication System**

Course title: **Core : Optical Fiber Communication**

Subject Code: 16UEC6C12

Year: III

Semester: VI

Credits: 4

Hrs/Week: 4

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**Unit-I**

**Introduction - Propagation of light waves** in optical fiber-Acceptance angle and Acceptance cone - Numerical Aperture-Classification of Optical fiber-Other latest developed fiber.

**Unit-II**

**Fiber fabrication:** Classification of fabrication techniques-External and Internal CVD-Axial vapor deposition-Multi element glasses- Phasil system-Comparison of various methods. Fiber drawing and coating - Cable construction – Strength member - Cable testing - Cable selection criteria - Fiber losses.

**Unit-III**

**Light sources:** LED and Laser-Basic construction and Operation. Detector: Classification and Characteristics of Detectors. Couplers: Types and working of couplers. Splicing: Types -Steps involved in splicing - Losses in splicing and Connectors.

**Unit-IV**

Communication Systems: Introduction- Transmitter for fiber optic communications- High performance Transmitter circuits- Laser Transmitter-Transmitter design- Fiber optic receiver- High performance receiver-Design of fiber optic receiver- Repeaters-Fiber based modems: Transreceiver.

**Unit-V**

Measurements: Introduction- Numerical Aperture- Fiber attenuation- Scattering loss- Dispersion loss- Refractive Index- Cut-off wavelength- Bending loss- Mode field diameter.

**Book for study**

1. Subir Kumar Sarkar, “Optical fibers and fiber optic communication system”, S.Chand & Company Ltd, 1997.

**Book for reference**

1. *Gerd Keiser “ Optical Fiber Communications ” 3rd edition Aug 20, 2013.*
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**Program: B.Sc Electronics and Communication System**

Course title: **Core: PC Hardware Fundamentals**

Subject Code: 13UEC6C13

Year: III

Semester: VI

Credits: 4

Hrs/Week: 4

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**Unit - I**

**Evolution of PC – Specifications – PC System** – I/O ports – Mother Board – BIOS-Bus Stand – SMPS – PC Memory Organization – Memory Package.

**Unit - II**

Magnetic Storage Fundamentals – Diskette Basics – Data Recoding Formats – Disk Organization in Dos – Floppy Disk Drive – Floppy Disk – Controller – Installation and Configuration – Hard Disk Drive Sub-Assemblies – Hard Disk Controller – Interface Types.

**Unit - III**

**I/O Devices:** Key Board – Mouse – Scanner – Digitizer – Digital Camera – Video Basics – VGA

Monitors – Display Controller – Display Adaptors.

**Unit - IV**

CD-Rom Disk & Drive – Sound Blaster – Video on the PC – Dot Matrix Printer – Plotter – Printer controller – Laser printer – Inkjet Printer.

**Unit - V**

**Computer Installation & Maintenance – Room Preparation Power supply – PC Installation – Post – Troubleshooting of Mother Board, Keyboard, Floppy/Hard Disk Devices & Printers – Diagnostic Software's – Data Security.**

**Book for Study:**

1. D. Balasubramanian – Computer Installation and Service – Tata McGraw Hill.

**Book for Reference:**

1. Peter Norton – Inside the PC – Prentice Hall of India.
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**Program: B.Sc Electronics and Communication System**

Course title: **Core : Basic and Practical Aspect of Electronics**  
Year: III

Semester: V

Credits: 3

Subject Code: 17UEC5CP6

Hrs/Week: 3

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We have Prepared 500 questions from general electronics course from these questions only 100 multiple choice questions are randomly given as online mode. Questions are in designing and analyzing aspects

**Program: B.Sc Electronics and Communication System**

Course title: **Core Practical: Linear IC's and Instrumentation** Subject Code: 13UEC6CP7

Year: III

Semester: VI

Credits: 3

Hrs/Week: 3

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**(ANY 18 EXPERIMENTS)**

**USING OPERATIONAL AMPLIFIER**

1. Parameters
2. Frequency Response and Gain
3. Input and Output Impedance
4. Adder and Subtractor
5. Integrator and Differentiator
6. Sine, Square and Triangular Wave Generator
7. Wien Bridge Oscillator
8. Phase Shift Oscillator
9. Inverting and Non-Inverting
10. Voltage Follower
11. Voltage Shunt Feed Back
12. Voltage Series Feed Back
13. Current Shunt Feed Back
14. Current Series feed back
15. Hartley Oscillator
16. Colpitts Oscillator
17. Schmitt Trigger Using 741
18. Study of VCO and PLL
19. Study of Parameter – IC 555
20. Schmitt Trigger – Using IC 555
21. Instrumentation Amplifiers
22. Voltage Regulator

**Program: B.Sc Electronics and Communication System**

Course title: **Elective Practical: Microprocessor and Microcontroller**

Sub Code: 13UEC6EP1 Year: III

Semester: VI Credits: 3

Hrs/Week: 3

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**Any 18 Experiments (9 from 8085 and 9 from 8051)**

**8085 Microprocessor Experiments:**

1.8-Bit Addition and Subtraction

2.16-Bit Addition and Subtraction

3.8-Bit multiplication and Division

4. Block Data transfer

5. Maximum, Minimum Number in an Array

6. Ascending and Descending Order

7. Series Addition

8. Complements

9. DAC Interface

10. ADC interface

11. Stepper motor Interface

**8051 Microcontroller Experiments:**

1.8-Bit Addition and Subtraction

2.16-Bit Addition and Subtraction

3.8-Bit multiplication and Division

4. Block Data transfer

5. Maximum, Minimum Number in an Array

6. Ascending and Descending Order

7. Series Addition

8. Complements

9. Logical Programs

10. Addition- C programming

11. Ascending and Descending Order- C programming

## ELECTIVES

### **Program: B.Sc Electronics and Communication System**

Course title: **Elective-I: 8085 Microprocessor and Interfacing** Subject Code: 13UEC4EL1

Year: II

Semester : IV

Credits : 5

Hrs/Week:5

#### **UNIT – I Microprocessor Fundamentals**

Introduction – Block diagram – Evolution – CPU – Memory: Cache memory – Memory Hierarchy – Primary & Data Memory – Buses: Architecture – Types – Applications.

#### **UNIT – II Microprocessor Architecture**

Introduction – Intel 8085 Architecture: ALU – Timing and control unit – Registers – Data and address bus – Pin Configuration – Instruction word size - Instruction cycle: Fetch operation – Execute operation – Machine cycle and state – Instruction and data flow – Timing diagram: Timing diagram for OP code fetch cycle – Memory read – I/O read – Memory write – I/O write.

#### **UNIT – III Instruction Set**

Introduction - Instruction and Data formats - Addressing modes - Intel 8085 instructions – Data transfer group – Arithmetic group – Logical group – Branch group – Stack, I/O and machine Control group.

#### **UNIT – IV Programming**

Introduction - Assembly language – High level languages – Stack - subroutines – Delay subroutines - Debugging of problems - simple examples – 8 bit Addition and Subtraction of binary and Decimal numbers – Complements – Shift masking – Finding Maximum and Minimum in an array – Arranging a series of numbers – Multiplication, Division –Block Data transfer.

#### **UNIT – V Interfacing Devices**

Address space partitioning – memory and I/O interfacing – Data transfer schemes – 8255 Programmable peripheral interface – 8257 Programmable DMA controller – 8259 Programmable Interrupt controller – 8251 Programmable communication interface – 8253 Programmable interval timer – 8279 Programmable keyboard/Display interface.

#### **Book for Study:**

2. B.Ram, “Fundamentals of Microprocessor and Microcontrollers”, Dhanpat Rai Publications, Fifth Reprint, 2008.

#### **Books for Reference:**

2. Ramesh S.Gaonkar, “Microprocessor Architecture, Programming and Applications with the 8085” Penram International publishing (P) Ltd, Fifth Edition, 1995.
-

Course title: **Elective-I: PCB Design and Fabrication**

Subject Code: 13UEC4EL1

Credits: 5

Year: II

Semester: IV

Hrs/Week: 5

**Unit - I**

Types of PCB –Single, Double, Multi-layer PCB'S-Flexible PCB-Contact between sides of PCB'S (clinched wires, rivets, placed through holes, via-holes, no plated holes) - PCB sizes-Layout approaches-Procedures-Documentation-Layout check. Resistance of printed conductors- Capacitance between printed conductors-Inductance of printed conductors-Spacing of conductors- Width of signal, supply and ground lines-Component placing, mounting and package density.

**Unit - II**

General consideration-Basic methods-Ink drawing-Black taping- Two layer, three layer artwork - Red/Blue taping - Diazo films- Cut & Strip Method-General artwork rules-Artwork check and inspection..Film master preparation - Emulsion parameters - Dimensional stability of film masters - Temperature and humidity.

**Unit - III**

Camera Tubes - Dark room considerations - Film processing photo-resists - Coating of Wet film resists – Processing - Dry film resists. Etching methods and machines – Etching - Ferric chloride.

**Unit - IV**

Copper Clad Laminates – Manufacture - Properties Electrical, Physical, Bond - Types of Laminates - Resins – Classification. Reflections - TTL, CMOS & ECL IC's - Matching with additional elements - Cross talks - Ground and supply line noise - Electromagnetic interference.

**Unit - V**

Solders and soldering techniques: Introduction - Principles of solder connections - Solder alloys - Soldering fluxes - Soldering techniques - Solder mask - Reflow soldering practice - Testing and quality control - Safety, Health and MEDICAL aspects IN soldering practice. Component assembly techniques: Preparation and mounting of components - Organization of non - Automatic PCB assembly - Lead cutting and soldering - PCB cleaning after soldering.

**Books for Study:**

1. Walter.C.Boshart - Printed Circuit Boards - Design and Technology - Tata McGraw Hill.



Course title: **Elective-I: Domestic Electric and Electronics Appliances**

Subject Code: 13UEC4EL1

Credits: 5

Year: II

Semester: IV

Hrs/Week: 5

**Unit – I Indicating System**

DC bell – AC bell – Buzzer – Two tone chime- Design and construction of bell circuits – Bell circuits with indicating system – Fire alarm system: Block diagram – Detectors – Manipulating circuit using SCR – Water level indicator: Block diagram – Level detectors.

**Unit – II Electric Wiring**

Introduction to power distribution system Symbols for electrical installations – Electrical accessories: Switches – Wires – Cables – Holders – Electrical lighting circuits – Protection circuits: Fuse – Fuse rating – Earthing system – Magnetic circuit breakers.

**Unit – III Audio System**

Tape Recorder: Mechanism – Block diagram of circuits – Maintenance Procedures – Public addressing system: Functional components – Block diagram – Typical PAS installation planning: Public meeting – Auditorium – Debating chamber – Foot ball stadium.

**Unit – IV Video System**

VCP & VCR Block diagram – Mechanism – Video Disk system – Closed circuit television: Block diagram – Camera installation procedure – Television set - Introduction to cable TV – MP3 Player – CD & DVD player.

**Unit – V Domestic Appliances**

Electronic clock – Grinder – Mixing machine – Washing machine – Electric oven – Microwave oven – Stabilizer – Refrigerator – Iron Box – Air cooler – Air conditioner – Mobile phone – UPS.

**Books for Study:**

1. P.P.Gupta, “Electrical Equipments”, Dhanpat Rai & Sons, Second Edition, 1993.
2. R.G.Gupta, “Audio and Video systems”, TMH Publishing Ltd, Eighth Edition, 2000.
3. Robert L. Goodman, “Maintaining & Repairing Video Cassette Recorders”, BPB Publications, First Edition, 1984.
4. R.C.Vijay, “Servicing Cassette Recorders and Two-in-one”, BPB Publications, Second Edition, 1990.

**Books for Reference:**

1. Ru.Van Wesel, Gordon J.King, “Video Hand Book”, Newness Technical Books, Second Edition, 1983.

**Unit-I Introduction & 8051 architecture:**

Microprocessors and microcontrollers- Z80 and the 8051- a microcontroller survey, development-systems for microcontrollers-8051 micro controller hardware-input/output pins- ports- ports and circuits- external memory-counters and timers- serial data i/o- interrupts.

**Unit-II 8051 Instruction set & Programming:**

Addressing modes- external data moves- code memory read- PUSH and POP opcodes-data exchanges- Byte-level logical operations- bit-level logical operations- rotate and swap operations-Flags- incrementing and decrementing- addition- subtraction- multiplication and division- decimal-arithmetic-Jump and call program range- jumps- calls and subroutines-interrupts and returns.

**Unit-III 8051 microcontroller design:**

Microcontroller specifications - 8051 micro controller design - testing the design - timing subroutines -look up tables for 8051- serial data transmission.

**Unit-IV Serial data communication & Introduction to other microcontrollers and buses:**

Network configuration - 8051 data communication modes – I<sup>2</sup>C - RS232 - ARM - PIC microcontrollers – CAN – USB - SPI & PCI etc families for buses.

**Unit-V Applications:**

Matrix Keyboard – LCD - pulse measurements-D/A and A/D conversions - multiple interrupts-RTC through DS1307-EEPROM.

**Books for Study:**

1. The 8051 Microcontroller - Kenneth J. Ayala - 3<sup>rd</sup> Editon-2005 – Delmar Learning.

**Book for Reference:**

1. The 8051 Microcontroller and Embedded Systems - Mazidi & Mazidi (PHI)

Course title: **Elective-II: Industrial and Power Electronics**

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Subject Code: 13UEC5EL2

Credits: 5

Year: III

Semester: V

Hrs/Week: 5

### **UNIT I**

Principles of single phase inverter, converter, cyclo converter and DC chopper – UPS – HVDC – static circuit breaker – battery charging circuit – SCR current limiting circuit breaker – static AC and DC switches – flasher circuits - time delay circuits – fan regulator using TRIAC – thyristor protection circuits: over current protection – over voltage protection – gate protection.

### **UNIT II**

**Welding and Heating:** resistance welding – types of resistance welding – electronic control in resistance welding: ignitron contractor – heat control – non synchronous timer – synchronous weld timer – sequence timer – energy storage welding systems – induction heating – applications of induction heating – dielectric heating – application of dielectric heating.

### **UNIT III**

Generation of ultrasonic waves – applications of ultrasonic – production of X rays – applications – Measurement of non electrical quantities: pressure measurements – displacement measurements – level measurements – flow measurements – measurement of thickness.

### **UNIT IV**

**Application in industrial systems:** Thermistor control of quench oil temperature – proportional mode pressure control system – strip tension controller – automatic weighing system – control of relative humidity in a textile moistening process – warehouse humidity controller.

### **UNIT V**

Industrial Robotic Systems: Parts of robotic systems – Classifications of robotic systems – robotic system configurations – degrees of freedom of robotic system – programming robotic systems – motions of robotic systems – sensor for robotic systems – mechanical parts – control systems. Microprocessor based industrial applications: Speed control of DC motor – measurement of physical quantities – water level indicator – firing angle control of thyristor.

### **TEXT BOOKS**

1. Harish C Rai, “Industrial and Power Electronics” 10th edition, Umesh publications 2002
  2. Timothy J Maloni, “Industrial Solid State Electronic Devices and Circuits” 2nd edition 1986
-

Course title: **Elective-II: Network Communications**

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Subject Code: 13UEC5EL2

Credits: 5

Year: III

Semester: V

Hrs/Week: 5

**Unit: I Networking Concepts**

Structure of the communication networks - Networks topologies - Telephone networking – Fundamentals of communication theory – Connecting the analog and digital world – Advantages of digital systems – Signal conversion - Synchronizing network components - classification of communication protocols.

**Unit: II Components and network distributed architecture**

**Layering:** Physical layer - Data link layer - Network layer - Transparent layer - Session layer-presentation layer - Application layer - Modems: Modulation techniques - other modems –Advances in modems - **Switching:** circuit switching – Message switching – Packet switching.

**Unit: III Communication Networks and protocols**

Asynchronous transfer mode- ATM logic connections-ATM cells –ATM service categories –protocols –Need for a protocols architecture-TCP/IP protocols architecture –Internet protocols architecture-CDMA.

**Unit: IV Local Area Network**

Introduction- LAN definition –Usage – Major components of LAN- LAN protocols – IEEE standards –CSMA CD –Token ring –Token bus –MAN-Fiber distribution data interface (FDDI)-Logical link control-other LAN (Ethernet, IBM, Token ring).

**Unit V: WAN**

Wireless network and wireless LAN overview - Wireless LAN requirements – Wireless LAN technology – IEEE 802 architecture – IEEE 802.11 architecture and services – IEEE 802.11 MAC – IEEE 802.11 physical layer – Wireless local loop – IEEE 802.16

**Books for Study:**

1. Uyles Black, "Computer networks" PHI, II edition, 1999
2. Uyles Black, "Data communication and distributed networks", PHI III edition, 1993.

### **Unit-I Introduction:**

Embedded systems – Processor Embedded into a system – Embedded hardware units and devices in a system – Embedded software in a system – Examples – Embedded system-on-chip (Soc) and use of VLSI circuit design technology – Complex systems design and processors – Design process in Embedded system – Formalization of system design – Design process and design examples – Classification – Hardware and skills requirements.

### **Unit-II Device drivers and interrupt service mechanism:**

Programmed-I/O Busy-wait approach without interrupt service mechanism – ISR concept – Interrupt sources – Interrupt servicing mechanism – Multiple interrupts – Context and the periods for Context switching, Interrupt latency and Deadline – Classification of processors interrupt service mechanism from Context-saving angle – Direct memory access – Device driver programming.

### **Unit-III Programming concepts and Embedded programming in C and C++:**

Software programming in ALP and C – C program elements: Header, source files and preprocessor directives – Program elements: Macros and Functions – Data types, Data structures, modifiers, Statements, Loops and Pointers – Object oriented programming – Embedded programming in C++.

### **Unit-IV Inter process Communication and Synchronization of processes, threads and tasks**

Multiple processes in an application - Multiple threads in an application – Tasks – Task states – Task and data – Clear-cut distinction between functions, ISRS and tasks by their characteristics – Concept of Semaphores – Shares data – Inter process communication – Signal function – Semaphore functions – Message Queue functions – Mailbox functions – Pipe functions – Socket functions – RPC functions.

### **Unit-V Real-time operating systems:**

OS services – Process management – Timer functions- Event functions – Memory management – Device, file and IO subsystems management – Interrupt routines in RTOS environment and handling of interrupt source calls – Real time operating systems – Basic design using an RTOS – RTOS task scheduling models, Interrupt latency and Response of the tasks as performance metrics – OS security issues.

### **Books for Study:**

1. Embedded Systems – Architecture, Programming and Design – Raj Kamal - Second Edition- 2008 – The McGraw Hill Companies.

Course title: **Elective-III: Digital and Mobile Communication**

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Subject Code: 13UEC6EL3

Credits: 5

Year: III

Semester: VI

Hrs/Week: 5

**Unit - I**

Introduction - Historical Developments - Sources & Signals - Basic Signal Processing operations in Digital Communications - Channels for Digital communications - Uncertainty, Information and Entropy - Source Coding Theorem - Huffman Coding - Discrete Memory less Channels - Mutual Information - Channel Capacity - Channel Coding Theorem - Differential Entropy and Mutual Information for Continuous Ensembles - Channel Capacity Theorem.

**Unit - II**

**Sampling Theorem** - Quadrature Sampling of Band Pass signals - Reconstruction of a Message Process from its Samples - Signal Distortion in Sampling - Practical Aspects of Sampling and Signal Recovery - Pulse Amplitude Modulation - Time Division Multiplexing.

**Unit - III**

**Pulse Code Modulation** - Channel Noise and Error Probability - Quantization noise and Signal to noise ratio - Robust Quantization - Differential Pulse code Modulation - Delta Modulation - Coding Speech at Low Bit Rates - Applications - Discrete PAM Signals - Power Spectra of Discrete PAM Signals – Inter symbol Interference - Nyquist’s Criterion for Distortion less Baseband Binary Transmission - Correlative Coding - Eye Pattern - Baseband M-ary PAM Systems - Adaptive Equalization for Data Transmission.

**Unit - IV**

**Digital Modulation Formats** - Coherent Binary Modulation Techniques - Coherent Quadrature - Modulation Techniques - Noncoherent Binary Modulation Techniques - Comparison of Binary and Quaternary Modulation Techniques - M-ary Modulation Techniques - Power Spectra - Bandwidth Efficiency - M-ary Modulation Formats Viewed in the Light of the channels capacity theorem - Effect of Inter symbol Interference - Bit Versus Symbol Error Probabilities - Synchronization – Applications.

**Unit - V:**

**Introduction to Mobile Communications - Introduction to Cellular Systems - GSM Architecture - Layer Modeling - Transmission - Data Service - Multiple Access Scheme - Channel Coding Interleaving - Radio resource management - Mobility management – Communication management - Network management - TDMA Architecture - Transmission and Modulation - CDMA – Terms of CDMA - Call Processing - Hand over Procedures.**

**Book for Study:**

1. Simon Haykin - Digital Communications, John Wiley & sons, 2005 (Unit – I- IV)
2. William C.Y. Lee - Mobile Cellular Telecommunication, McGraw Hill Publications, 1995 (Unit - V)

Course title: **Elective-III: Robotics and Automation**

Subject Code: 13UEC6EL3

Credits: 5

Year: III

Semester: VI

Hrs/Week: 5

**UNIT I CLASSIFICATION OF ROBOTIC SYSTEMS**

Basic structure of a robot - Classification of robots: Cartesian, Cylindrical, Spherical, Articulated, SCARA. Accuracy, resolution and repeatability of robots. Robot application in manufacturing: Material transfers - Machine loading and unloading - Processing operations - Assembly and inspection.

**DRIVES AND CONTROL SYSTEMS:** Hydraulic and Pneumatic systems: cylinders, control valves, hydro motor. Types of mechanical power drive, rotary to linear motion conversion mechanisms. Robot end effectors. Servomotors – operation, stepper motors - control loops using current and voltage amplifier. Robot controllers - configuration of robot controller.

**UNIT II SENSORS AND VISION SYSTEMS**

Types of sensors, tactile sensors, proximity sensors and speed sensors – Encoder, resolvers. Vision systems: Image processing and analysis, Segmentation, Feature extraction, Object Recognition.

**UNIT III ROBOT PROGRAMMING & AUTOMATION**

Lead through programming - Textual programming, programming examples - Social and Economical Aspects of Robots - Typical layouts of robots in Industries. **AUTOMATION:** Advantages of automation, building blocks of automation. Automatic feeding lines, material-handling devices, ASRS, transfer lines, automatic inspection, intelligent automation.

**UNIT IV PROGRAMMABLE LOGIC CONTROLLERS (PLC)**

Basics of PLC, Architecture of PLC, Advantages, Types of PLC, Types of Programming - Simple process control program's using Relay Ladder Logic. Introduction to PLC networking. Introduction to HMI, DCS and SCADA systems.

**UNIT V COMPUTER NUMERICAL CONTROL (CNC)**

Block diagram of a CNC control system, Advantages, Power supply, CPU. CNC and PLC interfacing, Control loops. Feedback devices in CNC machine, analog and digital CNC systems. Introduction to FMS.

**TEXT BOOK**

1. Michel P. Grover, “Automation Production systems and Computer Integrated manufacturing”, Prentice-Hall India, New Delhi, 1987. / Pearson Education, New Delhi.

**REFERENCES**

1. W. Bolton, “Mechatronics”, Pearson Education Asia, 2002.
2. K.S. Fu, R.C. Gonzalez and C S G Lee, “Robotics: Control, Sensing, Vision and Intelligence”, McGraw Hill, New Delhi, 1987.
3. Michel P. Grover, “Industrial Robotics - Technology, Programming and Applications”, McGraw Hill, New Delhi, 1986.

**Program: B.Sc Computer Science**

Course title: NME – 1: 8085 Microprocessor Fundamentals

Subject Code: 16UCS3NM1

Year: II

Semester: IV

Credits: 2

Hrs/Week: 2

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UNIT – I

**Microprocessor introduction** – Microprocessor act as a CPU – ALU – Timing and control unit – Registers – Data and address bus – Pin Configuration – **Instruction cycle – Fetch operation** – Execute operation – Machine cycle and state – Instruction and data flow – Timing diagram – Timing diagram for OP code fetch cycle – Memory read – I/O read – Memory write – I/O write.

UNIT – II

**8085 Machine cycle** – 8085 Assembly language – ASCII code – High level language – Instruction classification – Instruction word size – OP code format – Addressing modes – Intel 8085 instruction set – Data transfer group – Arithmetic group – Logical group – Branch group – Stack, I/O and machine Control group – Stacks – subroutines – Delay subroutines – Debugging of problems

UNIT – III

Assembly language simple examples – **8 bit Addition and Subtraction of binary and Decimal numbers – Complements** – Shift masking – Finding Maximum Minimum in an array – Arranging a series of numbers – Multiplication, Division – Multi byte addition and Subtraction – Block Data transfer .

**Book For Study:**

1. B.Ram “Fundamentals of Microprocessor and Microcontrollers” Dhanpat Rai Publications, Fifth Reprint, 2008.
2. Ramesh S. Gaonkar “Microprocessor Architecture, Programming, and Applications with the 8085” Penram International publishing (P) limited, Fifth Edition, 1995.



**Program:** B.Sc Computer Science

Course Title : PC Hardware Fundamentals

Subject Code : 16UCS4NM2

Year: II

Semester: IV

Credits: 2

Hrs/Week: 2

**Unit - I**

**Evolution of PC** – Specifications – **PC System** – I/O ports – Mother Board – BIOS-Bus Stand – SMPS – PC Memory Organization – Memory Package - Hard Disk Drive Sub-Assemblies – Hard Disk Controller.

**Unit – II**

I/O Devices: Key Board – Mouse – Scanner – **Digitizer – Digital Camera** – VGA Monitors – Display Controller – Display Adaptors - CD-Rom Disk & Drive – Sound Blaster – Video on the PC – Dot Matrix Printer – Plotter – Printer controller – Laser printer – Inkjet Printer.

**Unit – III**

Computer Installation & Maintenance – Room Preparation - Power supply – PC Installation – Post-Troubleshooting of Mother Board, Keyboard, Floppy/Hard Disk Devices & Printers – Diagnostic Software's – Data Security.

**Book for Study:**

1. D. Balasubaramanian – Computer Installation and Service – Tata McGraw Hill.

**Book for Reference:**

Peter Norton – Inside the PC – Prentice Hall of India

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PROJECT WORK

Subject Code: 13UEC6CPR

Credits: 5

Year: III

Semester: VI

Hrs/Week: 5

Develop Electronic Hardware working model suitable for real practical environment by implementing the theoretical and practical knowledge gained through the curriculum.