BACHELOR OF SCIENCE (ELECTRONICS AND COMMUNICATION)

REGULATIONS

ELIGIBILITY

Candidates seeking admission to the first year of the Bachelor of Science in Electronics and Communication should have passed the Higher Secondary Examination conducted by the Government of TamilNadu or an Examination accepted as equivalent thereto by the syndicate, subject to such conditions as may be prescribed thereto 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.

DURATION OF THE COURSE

The course shall extend over a period of three years comprising of six semesters with two semesters in one academic year. There shall not be less than 90 working days for each semester. Examination shall be conducted at the end of every semester for the respective subjects.

OBJECTIVES OF THE COURSE

The Curriculum is designed to attain the following learning goals which students shall accomplish by the time of their graduation:

- To demonstrate substantial understanding of basic concepts in the field of electronics and communication.
- To keep the learning process in pace with the current technological global trends.
- To Incorporate all advancements in existing and emerging technologies which give the students a holistic and pragmatic view of the present scenario.
- To Train and Equip the students to meet the corporate benchmark.
- To create an interest in research in the field of electronics and communication.

SCHEME OF EXAMINATION							
Subject Code	**Subject**	**Hrs of Instruction**	**Exam Duration (Hrs)**	**Maximum Marks**			**Credit Points**
				CA	**CE**	**Total**	
First Semester							
Part I							
15UTALA101/ 15UHILA101/ 15UMMLA101/ 15UFRLA101	Tamil I / Hindi I/ Malayalam I/ French I	5	3	25	75	100	3
Part II							
15UENLA101	Foundation English I	5	3	25	75	100	3
Part III							
15UECM101	Core I: Physics of Materials and Semiconductor Devices	4	3	25	75	100	4
15UECM102	Core II: Fundamentals of Information Technology	4	3	25	75	100	4
15UMAECA101	Allied I: Basic Mathematics	5	3	25	75	100	4
15UECMP101	Core Practical I	3	3	40	60	100	2
Part IV							
15UVE101	Value Education I: Yoga	2	3	25	75	100	2
	Total	**28**				**700**	**22**
Second Semester							
Part I							
15UTALA201/ 15UHILA201/ 15UMMLA201/ 15UFRLA201	Tamil II/ Hindi II/ Malayalam II / French II	5	3	25	75	100	3
Part II							
15UENLA201	Foundation English II	5	3	25	75	100	3
Part III							
15UECM201	Core III: Digital Electronics	4	3	25	75	100	4
15UECM202	Core IV: Electric Circuits	4	3	25	75	100	4
15UMAECA201	Allied II : Algebra and Calculus	5	3	25	75	100	4
15UECMP201	Core Practical II	3	3	40	60	100	2

Part IV							
15UVE201	Value Education II: Environmental Studies	2	3	25	75	100	2
	Total	**28**				**700**	**22**
Third Semester							
Part I							
15UTALA301/ 15UHILA301/ 15UMMLA301/ 15UFRLA301	Tamil III / Hindi III/ Malayalam III/ French III	5	3	25	75	100	3
Part II							
15UENLA301	Foundation English III	5	3	25	75	100	3
Part III							
15UECM301	Core V: Electronic Circuits	5	3	25	75	100	5
15UCSECA301	Allied III : Programming in C	3	3	25	75	100	3
15UECMP301	Core Practical III	3	3	40	60	100	2
15UCSECAP301	Allied Practical I: Programming in C	2	3	40	60	100	2
Part IV							
15UECSBC301	SBC I: Electronic Instrumentation Systems	2	3	25	75	100	2
	NMEC I	2	3	25	75	100	2
Non Credit							
15ULS301	Career Competency Skills I	1	-	-	-	-	-
	Total	**28**				**800**	**22**
Diploma*							
Fourth Semester							
Part I							
15UTALA401/ 15UHILA401/ 15UMMLA401/ 15UFRLA401	Tamil IV / Hindi IV/ Malayalam IV/ French IV	5	3	25	75	100	3
Part II							

15UENLA401	Foundation English IV	5	3	25	75	100	3
Part III							
15UECM401	Core VI: Microprocessor and Interfacing	5	3	25	75	100	5
15UCSECA401	Allied IV : Object Oriented Programming with C++	3	3	25	75	100	3
15UECMP401	Core Practical IV	3	3	40	60	100	2
15UCSECAP401	Allied Practical II: Object Oriented Programming with C++	2	3	40	60	100	2
Part IV							
15UECSBC401	SBC II: Nano Science & Applications	2	3	25	75	100	2
	NMEC II	2	3	25	75	100	2
Non Credit							
15ULS401	Career Competency Skills II	1	-	-	-	-	-
	Total	**28**				**800**	**22**
Diploma*							
Fifth Semester							
Part III							
15UECM501	Core VII: Communication Engineering	6	3	25	75	100	5
15UECM502	Core VIII: Computer Networks	6	3	25	75	100	5
15UECM503	Core IX: Microcontroller and Applications	6	3	25	75	100	5
15UECM504	Core X: IC's and Applications	5	3	25	75	100	4
15UECM505	Core XI: Consumer Electronics (100% External Evaluation & Self Study)	-	3	-	100	100	2
15UECMP501	Core Practical V	3	3	40	60	100	2
Part IV							
15UECSBC501	SBC III: Power Electronics	2	3	25	75	100	2
Part V							

15UECE501	Extension Activity	-	-	-	-	-	2
	Total	**28**				**700**	**27**
Sixth Semester							
	Part III						
15UECM601	Core XII: Mobile and Cellular Communication	5	3	25	75	100	4
15UECM602	Core XIII: Embedded Systems	5	3	25	75	100	4
15UECM603	Core XIV: Biomedical Instrumentation	5	3	25	75	100	4
15UECM604	Core XV: Electronic Media	4	3	25	75	100	3
15UECM605	Core XVI: VLSI Design and VHDL (100% Internal Evaluation)	4	3	100	-	100	3
15UECMP601	Core Practical VI	3	3	40	60	100	2
15UECPR601	Mini Project & Viva-Voce	-	-	40	60	100	5
	Part IV						
15UECSBC601	SBC IV: Advanced Communication Systems	2	3	25	75	100	2
	Total	**28**				**800**	**27**
					Grand Total	**4500**	**142**

*** Students have to undergo a Diploma Course during the Second year of their course of study.**

NON MAJOR ELECTIVE COURSE (NMEC)

The department offers the following two subjects during Semester III and Semester IV as Non Major Elective Course for the students of other departments.

S.No	Semester	Course Code	Subject
1	III	15UECN301	Computer Hardware and Maintenance
2	IV	15UECN401	Basic and Digital Electronics

DIPLOMA COURSE

(Student shall select any one of the following Diploma Course during the Semester III and complete the course at the end of Semester IV)

S.No	Subject Code	Subject	Duration
1	15UECD401	Diploma in PC Hardware and Maintenance	90 Hours (45 Hrs in each semester)
2	15UECD402	Diploma in PCB Design and Technology	90 Hours (45 Hrs in each semester)

FOR COURSE COMPLETION

Students shall complete:

- Language subjects (Tamil/ Hindi /Malayalam/French and English) in I, II, III and IV Semesters.
- Value Education Yoga and Environmental Studies in I and II Semesters respectively.
- Allied subjects in I, II, III and IV semesters.
- One Diploma Course during Semester III and Semester IV.
- Non Major Elective Courses (NMEC I and NMEC II) during Semester III and Semester IV.
- Subjects with Self study and 100% external evaluation in V semester
- Skill Based Courses (SBC) from Semester III to Semester VI.
- Extension Activity in V semester.
- 100% internal evaluation subject in Semester VI.
- A Mini Project & Viva-Voce at the end of VI semester, but they have to carry out their Project work from V Semester onwards.

TOTAL CREDIT DISTRIBUTION

PART	Credits	Marks
PART- I		
Tamil/Hindi /French (4 X 3 Credits)	12	400 (4X100 Marks)
PART-II		
English (4 X 3 Credits)	12	400 (4X100 Marks)
PART-III		
Core Subjects (16 Papers)		
(5 X 5 Credits)		500 (5X100 Marks)
(8 X 4 Credits)		800 (8X100 Marks)
(2 X 3 Credits)		200 (2X100 Marks)
(1 X 2 Credits)	82	100 (1X100 Marks)
Core Practical (6 Practicals)		
(6 X 2 Credits)		600 (6X100 Marks)
Core Project		
(1 X 5 Credits)		100 (1X100 Marks)
Allied (4 Papers +2 Practicals)		
(2 X 4 Credits)	18	200 (2X100 Marks)
(2 X 3 Credits)		200 (2X100 Marks)
(2 X 2 Credits)		200 (2X100 Marks)
PART-IV		
Value Education (2 X 2 Credits)		200 (2X100 Marks)
NMEC (2 X 2 Credits)	16	200 (2X100 Marks)
SBC (4 X 2 Credits)		400 (4X100 Marks)
PART-V		
Extension Activity (1 X 2 Credits)	2	-
Total Credits	**142**	**4500**

15UECM101	**CORE I: PHYSICS OF MATERIALS AND SEMICONDUCTOR DEVICES**	**SEMESTER - I**

Total Hours: 50

OBJECTIVES:

1. To understand the basics of Atom, Bonds and Semiconductors.
2. To analyze the functions of Basic Electronic Components.
3. To study the Construction, Operation and Applications of Diodes, Special diodes and Transistors.

CONTENTS

UNIT - I **(10 Hours)**

Structure of Solids–Crystalline Structures – Structure of Atom – Atomic number-Valence electrons - Energy level diagram – Bonding in solids: Ionic bond-Covalent bond-Metallic bond.

UNIT – II **(10 Hours)**

Introduction of Semiconductor, Intrinsic and Extrinsic semiconductors – Donors and Acceptors – Majority and Minority Charge carriers of N and P type Semiconductors – Mobile and Immobile charges – Hall effect – Energy band diagrams for Conductors, Insulators and Semiconductors – Depletion layer.

UNIT – III **(10 Hours)**

Junction diode- Construction, Characteristics, Static resistance, Dynamic resistance, Average ac resistance, Diode applications – Zener diode – Construction –Characteristics – LED- LCD- Tunnel diode- PIN diode- Varactor diode- Varistor- Introduction to Solar Cell.

UNIT – IV **(10 Hours)**

Transistor – Operation of Transistor – Configuration and Characteristics of CB, CE and CC- Basics of Transistor Biasing – Transistor Amplifier.

UNIT - V **(10 Hours)**

Field Effect Transistors: JFET- MOSFET- Operation -V-I Characteristics. Power Electronic Devices: SCR-TRIAC–DIAC-UJT- Operation- V-I Characteristics – Applications.

TEXT BOOK:

1. *Sedha, R.S.* 2012. **A Text Book of Applied Electronics.** [Second Edition]. S.Chand, New Delhi.

REFERENCE BOOKS:

1. *Theraja, B.L.* 2008. **Basic Electronics.** [Second Edition]. S.Chand, New Delhi.
2. *Metha, V.K. and Shalu Metha.* 2005. **Principles of Electronics.** [Eighth Edition]. S.Chand, New Delhi.
3. *Bakshi, U.A and Godse, A.P.* 2009. **Electronic Devices.** [First Edition]. Technical Publications, Pune.

15UECM102	CORE II: FUNDAMENTALS OF INFORMATION TECHNOLOGY	SEMESTER – I

Total Hours: 50

OBJECTIVES:

The subject aims to build the concepts regarding:

1. Major components of Computer System and its working principles.
2. Operating System and basic terminologies of Networks.
3. Role of Information Technology in Electronic Communication.

CONTENTS

UNIT - I **(10 Hours)**

Data and Information: Introduction - Types of Data - A Simple Model of a Computer - Data Processing Using a Computer - Desktop Computer. **Acquisition of Number and Textual Data:** Introduction- Input Units - Internal Representation of Numeric Data – Representation of Characters in Computers – Error-Detecting Codes.

UNIT - II **(10 Hours)**

Data Storage: Introduction - Memory Cell - Physical Devices Used as Memory Cells - Random Access Memory - Read Only Memory - Secondary Memory - Floppy Disk Drive - Compact Disk Read Only Memory (CDROM) - Archival Store. **Central Processing Unit:** The Structure of a Central Processing Unit- Specification of a CPU - Interconnection of CPU with Memory and I/O Units.

UNIT - III **(10 Hours)**

Computer Networks: Introduction - Local Area Network (LAN) - Applications of LAN - Wide Area Network (WAN) – Internet. Output Devises: Introduction- Video display devises- Touch screen display- E-Ink display-Printers. **Computer Software:** Introduction - Operating System - Programming Languages –Programming Languages-Application based Languages.

UNIT - IV **(10 Hours)**

Data Organization: Introduction - Organizing a Database - Structure of a Database - Database Management System. **Processing and Displaying textual data:** Introduction-Word processor-Desktop publishing- Markup languages. **Processing Multimedia data:** Introduction-Graphics processing- Audio signal processing

UNIT - V **(10 Hours)**

Internet Applications: Introduction - E-mail - The World Wide Web - Information Retrieval from the World Wide Web - Other Facilities Provided by Browsers - Audio on the Internet – Accessing Pictures and Video via Internet.

TEXT BOOK:

1. *Rajaraman, V.* 2008. **Introduction to Information Technology.** [First Edition]. Prentice Hall of India Pvt. Limited, New Delhi.

REFERENCE BOOKS:

1. *Nagpal, D.P*. 2010. **Computer Fundamentals**. [First Edition, Revised]. S.Chand & Company Ltd, New Delhi.
2. *Alexis Leon and Mathews Leon*. 1999. **Fundamentals of Information Technology.** [First Edition]. Leon TECHWorld, New Delhi.

15UMACSA101/ 15UMACAA101/ 15UMAECA101	ALLIED I: BASIC MATHEMATICS (For B.Sc., Computer Science , BCA , B.Sc., Electronics and Communication)	SEMESTER – I

Total Hours: 50

Note: Proof of theorems and proof of examples are excluded.

OBJECTIVES:

1. To learn the basic concepts about sets and Relations
2. To study in detail about straight line.
3. To study Numerical methods which are used to solve Algebraic equations.

CONTENTS

UNIT – I **(10 Hours)**

Set Theory: Introduction – Sets – Types of sets – Cardinality of a Set – Subset and Superset – Power set – Operations on Sets - Applications.

Chapter – 2 (Section 2 to 2.4, 2.6, 2.7)

UNIT – II **(10 Hours)**

Relations: Binary relations – Inverse Relations – Types of Relations – Types of Relations and Relation Matrix – Equivalence Relation – Partial order relation – Closures of relation.

Chapter – 3 (Section 3.1, 3.2, 3.11 to 3.14, 3.16)

UNIT – III **(10 Hours)**

Straight Line: Equations of a straight line passing through two given points – Equations of a straight lines in terms of the intercepts it makes on the axes – Other forms of a equation of a straight lines – Point of intersection of two straight lines.

Chapter – 2 (Section 1, 2, 7, 8)

UNIT – IV **(10 Hours)**

Solution of Numerical Algebraic and transcendental Equations: Bisection Method – False position method – Iteration method – Newton-Raphson method (Problems only).

Chapter – 3 (Section 3.1 to 3.4)

UNIT – V **(10 Hours)**

Algebraic Equations: Gauss Elimination method – Gauss Jordan method – Gauss - Seidal method – Inversion of matrix by using Gauss Elimination method and Cramer's rule (Problems Only).

Chapter – 4 (Section 4.2, 4.3, 4.9)

TEXT BOOKS:

1. *AcharjaSree Kumar.* 2005. **Fundamental approach to Discrete Mathematics**. [First Edition]. New Age International Publishers, New Delhi.
2. *ManicavachagomPillai, T.K. and Natarajan, T.* 2000. **Analytical Geometry of Two Dimensions**. Viswanathan Printers and Publishers Ltd.
3. *Kandasamy, P., Thilagavathy, K. and Gunavathi, K.* 2001. **Numerical Methods**. [Third Edition]. S.Chand and Company Ltd., New Delhi.

15UECMP101	CORE PRACTICAL I	SEMESTER – I

OBJECTIVES:

1. To enhance the Practical knowledge in the field of Circuit designing, Characteristics of devices, Break over voltage, Break down voltage of Semiconductor devices and Signal frequency filtering concepts.
2. To understand the operation of Analog circuits, Control circuits and Industrial applications.

Experiments:

1. V-I Characteristics of Junction Diode.
2. V-I Characteristics of Zener Diode.
3. Photoconductivity in Semiconductor.
4. Solar Cell Characteristics.
5. Transistor Characteristics (CE Configuration).
6. Transistor Characteristics (CB Configuration).
7. FET Characteristics.
8. SCR Characteristics.
9. TRIAC Characteristics.
10. DIAC Characteristics.

REFERENCE BOOKS:

1. *Poorna Chandar, S and Sasikala,B.* 2006. **Electronics Laboratory Primer, A Design approach.** S.Chand, New Delhi.
2. *Sedha,R.S.* 2012. **A Text book of Applied Electronics.**[Fourth Edition].S.Chand, New Delhi.

15UVE101	VALUE EDUCATION I: YOGA மனவளக்கலையோகா	SEMESTER - I

Total Hours: 30

CONTENTS

UNIT - I **(6 Hours)**

YOGA AND PHYSICAL HEALTH

1:1Physical Structure-Three bodies- Five limitations

1:2Simplified Physical Exercises - Hand Exercises - Leg Exercises- Breathing Exercises – eye Exercises - Kapalapathi

1:3Maharasanas 1-2– massages – acu-puncture – Relaxation

1:4Yogasanas-Suriya Namaskar – Padamasana –Vajrasanas – Chakrasanas(Side) – Viruchasanas –Yoga muthra –Patchimothasanas-Ustrasanas–Vakkarasanas Salabasanas.

UNIT - II **(6 Hours)**

ART OF NURTURING THE LIFE FORCE AND MIND

2:1Maintaining the youthfulness - postponing the ageing process

2:2 Sex and spirituality– significance of sexual vital fluid – Married Life–Chastity.

2:3 Ten Stages of Mind

2:4 Mental Frequency – Methods for Concentration

UNIT - III **(6 Hours)**

SUBLIMATION

3:1 Purpose and Philosophy of life

3:2 Introspection – Analysis of Thought

3:3 Moralization of Desires

3:4 Neutralization of Anger

UNIT - IV **(6 Hours)**

HUMAN RESOURCESDEVELOPMENT

4:1 Eradication of worries

4:2 Benefits of Blessings

4:3 Greatness of Friendship

4:4 Individual Peaceand World Peace

UNIT - V **(6 Hours)**

LAW OF NATURE

5:1 Unified Force – Cause and Effect System
5:2 Purity of thought and Deed and Genetic Centre
5:3 Love and Compassion
5:4 Cultural Education –Five fold Culture

TEXT BOOK:

1. Manavalakalai Yoga – World Community Service Center
   VethathiriPathippagam,
   156, Gandhij Road, Erode – 638 001.
   PH: 0424 – 2263845.

REFERENCE BOOKS:

1. Yoga for Modern Age
2. Journey of Consciousness
2. Simplified Physical Exercises – World Community Service Center
   VethathiriPathippagam,
   156, Gandhij Road, Erode – 638 001.
   PH: 0424 – 2263845.

15UECM201	CORE III: DIGITAL ELECTRONICS	SEMESTER – II

Total Hours: 50

OBJECTIVES:

1. To enhance the knowledge in the field of Digital electronics, Simplification of digital circuits, Combinational circuit implementations, binary addition and Subtraction circuits.
2. To learn the Design process of Registers, Counters and the conversion of Analog signal into Digital signal.
3. To impart the Concepts used in designing of digital computers Embedded circuits, VLSI systems, Automatic digital control circuits and Panel meters.

CONTENTS

UNIT - I: Number Systems (10 Hours)

Binary signals – Binary Number System – Decimal Number System –Octal Number System – Hexadecimal Number System – BCD – Gray code – Excess-3 Code – Parity codes – ASCII code –Number Conversions.

UNIT - II: Boolean algebra and Logic Gates (10 Hours)

Logic Gates – Logic gates using discrete components -Universal gates. Fundamental concepts of Boolean algebra – Basic Laws of Boolean algebra – Demorgan's theorem – Fundamental Products – Sum of Products – Product of Sums- Karnaugh's Map Method- Quine Mccluskey Method.

UNIT - III: Digital Combinational Circuits (10 Hours)

Binary Addition and Subtraction – Signed and Unsigned Binary Number's – Addition in 1's and 2's Complement – Addition in 9's and 10's Complement – Half Adder and Full Adder – Parallel Adder – Half and Full Subtractor – Multiplexer – Demultiplexer – Encoder - Decoder.

UNIT - IV: Flip Flop and Sequential Logic Circuits (10 Hours)

RS, D, JK, T and JK Master -Slave flip flops – Shift register – Serial in Serial out, Serial in Parallel out, Parallel in Serial out- Parallel in Parallel out – Counters: Binary Counter– BCD Counter – Modulus Counters and their design -Ring counter– UP/DOWN counter.

UNIT - V: D/A and A/D Conversions (10 Hours)

D/A converters-Variable Resister network – Binary Ladder – D/A Accuracy and Resolution. A/D converters – Simultaneous Conversion –Counter type A/D Converter- Successive Approximation Converter – Dual slope A/D converter – A/D Accuracy and Resolution.

TEXT BOOK:

1. *Virendra Kumar.* 2009. **Digital Technology Principles and Practice.** [First Edition]. New Age International Publications, New Delhi.

REFERENCE BOOKS:

1. *Donald,P.Leach, Albert Paul Malvino and Goutam Saha.* 2008. **Digital Principles and Applications.** [Sixth Edition]. Tata Mc Graw Hill, New Delhi.
2. *Basavaraj,.B.* 2003. **Digital Fundamentals.** [First Edition]. Vikas Publications House Private Limited, 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.

15UECM202	CORE IV: ELECTRIC CIRCUITS	SEMESTER – II

Total Hours: 50

OBJECTIVE:

1. To provide the details about the basic concepts of Electricity, Components and their properties, Nature of AC and DC Circuits and Network Theorems.

CONTENTS

UNIT I: Electricity and Components (10 Hours)

Volt Unit of Potential Difference – Charge in Motion is Current – Resistance is Opposition to Current – Direction of the Current – Direct Current and Alternating Current – Sources of Electricity – Types of Resistors – Resistor Color Coding – Series and Parallel Combination of Resistors – Capacitance – Parallel Capacitance - Series Capacitance – Inductance – Inductance in Series or Parallel.

UNIT II: DC and AC Circuits (10 Hours)

Ohm's Law – Electrical Power – Energy – Kirchoff's 1st Law (Current Law) – Kirchoff's 2nd Law (Voltage Law) – Maxwell's Mesh Method (Current Analysis) – Nodal Method (Voltage Analysis) – Simple Problems. Alternating Current Fundamentals: Average and Effective (RMS) Values – Real Power – Power Factor.

UNIT III: Network Theorems (10 Hours)

Series Voltage Divider – Super Position Theorem – Thevinin's Theorem – Norton's Theorem – Millman's Theorem – Star Connections- Delta Connections - Simple Problems.

UNIT IV: Reactance and Resonance (10 Hours)

Capacitive Reactance - Series and parallel Capacitive Reactance – Inductive Reactance– Series and Parallel Inductive Reactance – Resonance – Resonance Effect – Series Resonance – Parallel Resonance.

UNIT V: DC and AC Voltage Sources (10 Hours)

Batteries – General Features of Batteries **–** Constant Voltage and Constant Current Sources – Alternating Current Applications – Voltage and Current Values for a Sine Wave – Frequency – Period – Wavelength – Phase Angle – Single Phase and Three Phase Power – 60 Hz AC Power Line.

TEXT BOOK:

1. *Bernard Grob* . 2010. **Basic Electronics.** [Eighth Edition].Tata Mc Graw Hill, New Delhi.

REFERENCE BOOKS:

1. *Arumugam.M, Premkumar.N.* 2007. **Electric Circuit Theory** [Fifth Edition]. Khanna Publishers ,New Delhi.
2. *Theraja, B.L.* 2008. **Basic Electronics.** [Second Edition]. S.Chand, New Delhi.
3. *Sedha.R.S,* 2004, **A Text book of Applied Electronics**. [Fourth Edition] S.Chand, New Delhi.

15UMACSA201/ 15UMACAA201/ 15UMAECA201	ALLIED II: ALGEBRA AND CALCULUS (For B.Sc., Computer Science , BCA , B.Sc., Electronics and Communication)	SEMESTER – II

Total Hours: 50

Note: Proof of the theorem and proof of examples are excluded.

OBJECTIVES:

1. To learn about advanced properties of matrices.
2. To learn various methods of solving algebraic equations and manipulation of roots.
3. To learn basic concepts of differentiation and integration.

CONTENTS

UNIT – I **(10 Hours)**

Matrices: Rank of a Matrix – Eigen Values and Eigen vectors – Cayley Hamilton Theorem.

UNIT – II **(10 Hours)**

Theory of Equations: Imaginary and Irrational Roots – Relation between roots and co-efficient (Problems based on A.P, G.P, and H.P)

UNIT – III **(10 Hours)**

Differentiation: Differential co-efficient of a sum or difference – Product rule – Quotient Rule – Function of function rule.

UNIT – IV **(10 Hours)**

Successive differentiation: The n^{th} derivative – Leibnitz formula for n^{th} derivative of a product.

UNIT – V **(10 Hours)**

Methods of integration: Integrals of functions involving $\sqrt{a^2 + x^2}$ – Integration by parts – Bernoulli's formula.

TEXT BOOK:

1. *Vittal, P.R.* 2002. **Allied Mathematics**. [Third Edition]. Margham Publications, Chennai.

REFERENCE BOOKS:

1. *ManicavachagomPillay, T.K., Natarajan, T. and Ganapathy, K.S.* 2010. **Algebra (Vol-II)**. S.Viswanathan(Printers and Publishers)Pvt. Ltd., Chennai.(For UNIT-I).

2. *ManicavachagomPillay, T.K., Natarajan, T and Ganapathy, K.S.* 2010. **Algebra (Vol-I).**S.Viswanathan (Printers and Publishers) Pvt. Ltd., Chennai. (For UNIT - II).

3. *ManicavachagomPillay, T.K. and Narayanan, S.* 2010. **Calculus (Vol-I)(Differential Calculus)**.S.Viswanathan (Printers and Publishers) Pvt. Ltd., Chennai. (For UNITS - III and IV).

4. *ManicavachagomPillay, T.K. and Narayanan, S.* 1997. **Calculus (Vol-II) (Integral Calculus).** S.Viswanathan (Printers and Publishers) Pvt. Ltd., Chennai. (For UNIT - V).

15UECMP201	CORE PRACTICAL II	SEMESTER II

OBJECTIVES:

1. To learn the Practical knowledge in the field of Simplification of circuits, Fundamental functions of ICs, Combinational and Sequential circuit implementations.
2. To enhance the circuit designing skills, Arithmetic and logical functions, Registers, Counters and Conversion of Digital signal to Analog signal.
3. To understand the circuit concepts, designing of digital computers.

Experiments:

1. Verification of Ohm's law and Kirchoff's Laws.
2. Verification of Thevenin's and Norton's Theorem
3. Verification of Maximum Power transfer theorem.
4. Verification of Logic gates and Universal gates using IC's.
5. Half and Full Adder.
6. Half and Full Subtractor.
7. Multiplexer and Demultiplexer.
8. Encoder and Decoder.
9. Flip Flops – RS, D and JK.
10. Shift Register (Serial in Serial Out, Serial in Parallel Out)
11. Binary Counter.
12. Digital to Analog Converter.

REFERENCE BOOKS:

1. *Poorna Chandar,S and Sasikala,B. 2006*. **Electronics Laboratory Primer A Design Approach.** S.Chand, New Delhi.
2. *Donald P.Leach.,Albert Paul Malvino and Goutam Saha. 2008*. **Digital Principles and Applications.** [Sixth Edition]. Tata Mc Graw Hill, New Delhi.

15UVE201	VALUE EDUCATION II: ENVIRONMENTAL STUDIES	SEMESTER - II

Total Hours: 30

CONTENTS

UNIT - I **(6 Hours)**

Environment– Definition– Scope– Structure and function of ecosystems- producers, consumers and decomposers- Energy flow in the ecosystem- Ecological succession– food chain, food webs and ecological pyramids– Conceptof sustainabledevelopment.

UNIT - II **(6 Hours)**

Natural resources: Renewable- air, water, soil, land and wildlife resources. Non–renewable – Mineral coal,oil and gas. Environmental problems relatedtothe extraction and use of naturalresources.

UNIT - III **(6 Hours)**

Biodiversity– Definition– Values– Consumption use, productive social, ethical,aesthetic and option values threatsto bio diversity – hotspots of bio diversity– conservation of bio- diversity: in– situEx – situ. Bio– wealth - National andGlobal level .

UNIT - IV **(6 Hours)**

EnvironmentalPollution :Definition– causes, effects andmitigation measure s– Air pollution, Waterpollution, Soil pollution,Noisepollution, Thermal pollution– Nuclear hazards – Solid wastes acid rain–Climate change and global warming environmental laws and regulations inIndia– Earth summit.

UNIT - V **(6 Hours)**

Population and environment – Population explosion – Environment and human health – HIV/AIDS – Women and Child welfare – Resettlement and Rehabilitation of people, Role of information technology in environmental health – Environmental awareness.

TEXTBOOK:

1. Department of Biochemistry. Environmental Studies (Study Material). Published by K.S.Rangasamy College of Arts & Science (Autonomous). Tiruchengode

REFERENCE BOOK:

1. *Erach Bharucha*. 2005. **Textbook of Environmental studies**. Universities press. PVT. Ltd.

15UECM301	CORE V: ELECTRONIC CIRCUITS	SEMESTER – III

Total Hours: 50

OBJECTIVES:

1. To provide adequate knowledge about the principles involved in Electronic Devices and associated Circuits.
2. To provide exposure on the process of various types of Amplifiers and Oscillators.

CONTENTS

UNIT – I Rectifiers, Filters and Regulators: (10 Hours)

Rectifier: Half Wave Rectifier- Full Wave – Bridge Rectifier –Average and RMS Values- Ripple Factor and Efficiency – Filters- Voltage Stabilization by Zener Diode – IC Voltage Regulator – Current Limit and Overload Protection

UNIT – II Transistors Biasing (10 Hours)

Operating point, DC and AC load line in CE amplifier – Graphical analysis- Thermal Stability - Thermal Runaway- Transistor Biasing circuits – Base bias, Base bias with Emitter feedback, Base bias with Collector feedback – Voltage Divider bias-Stability.

UNIT – III Amplifiers: (10 Hours)

Two port network – h parameters- CE amplifier design – Common Source FET amplifier design – DC amplifier – RC coupled amplifier and frequency response- Class A Transformer coupled power amplifier – Class B push pull amplifier – Complimentary Symmetry amplifier - Emitter follower.

UNIT – IV Feedback and Oscillators: (10 Hours)

Feedback Amplifier – Positive and Negative feedback and their advantages – Current and Voltage feedback circuits – Barkhausen's conditions for stabilized oscillation- Hartley oscillator- Colpitt's oscillator – Phase Shift, Wien bridge and Crystal oscillator – UJT relaxation oscillator

UNIT- V Wave shaping circuits and Multivibrators: (10 Hours)

Clipping and clamping circuits - biased clipper-integrating and differentiating circuits -RC time constants- Multivibrators - Astable - monostable and bi - stable multivibrators -using transistors.

TEXT BOOK:

1. *Sedha.R.S,* 2012, **A Text book of Applied Electronics**. [Fourth Edition].S.Chand, New Delhi.

REFERENCE BOOKS:

1. *Mehta. V.K, Rohit Mehta.* 2013, **Principles of Electronics**. [Eleventh Revised Edition]. S.Chand, New Delhi.

2. *David Bell*, 2008, **Electronic devices and circuits** [Fifth Edition]– PHI India, New Delhi.

3. *Salivahanan, 2011*- **Electronic devices and circuits** [Second Edition] Tata Mc Graw hill, New Delhi.

15UCSPHA301/ 15UCSECA301	ALLIED III: PROGRAMMING IN C (For the students of B.Sc., Physics and Electronics and Communication)	SEMESTER - III

Total Hours: 50

OBJECTIVES:

On completion of the course the students shall have knowledge on:

1. Basic principles of Programming using C.
2. How to solve the given problem in the form of coding by using C?

CONTENTS

UNIT - I **(10 Hours)**

Overview of C: History of C - Importance of C – Sample Programs - Basic Structure of C Programs- Executing a 'C' program. **Constants, Variables, and Data Types :** Introduction - Character Set - C Tokens - Keywords and Identifiers - Constants - Variables - Data Types - Declaration of Variables – Declaration of Storage Class- Defining Symbolic Constants - Overflow and Underflow of Data. **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 Operators - Type Conversions in Expressions.

UNIT - II **(10 Hours)**

Managing Input and Output Operations: Reading a Character - Writing a Character - Formatted Input - Formatted Output. **Decision Making and Branching:** Decision making with IF statement – Simple IF statement – The IF…..ELSE statement – Nesting of IF…..ELSE statements – 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 - III **(10 Hours)**

Arrays: Introduction – One-Dimensional Arrays - Declaration of One-Dimensional Arrays - Initialization of One-Dimensional Arrays – Two- Dimensional Arrays - Initializing Two-Dimensional Arrays – Multi-Dimensional Arrays - Dynamic Arrays. **Character Arrays and Strings:** Declaring and Initializing String Variables - Reading Strings from Terminal - Writing Strings to Screen - Arithmetic Operations on

Characters - Putting Strings Together - Comparison of Two Strings - String Handling Functions.

UNIT - IV **(10 Hours)**

User-defined Functions: Need for User-Defined Function - A Multi-Function Program - Elements of User-Defined Function - Definition of Functions - Return Values and their Types - Function Calls - Function Declaration - Category of Functions - No Arguments and No Return Values – Arguments but No Return Values – Arguments with Return Values – No Arguments but Returns a Value – Functions that Return Multiple Values - Nesting of Functions - Recursion - Passing Arrays to Functions - Passing Strings to Functions – The Scope, Visibility and Lifetime of Variables. **Structures and Unions:** Defining a Structure - Declaring Structure Variables - Accessing Structure Members - Structure Initialization - Copying and Comparing Structure Variables - Operations on Individual Members - Array of Structures - Arrays within Structures - Structures within Structures - Structures and Functions - Unions - Size of Structures - Bit Fields.

UNIT - V **(10 Hours)**

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. *Balagurusamy, E*. 2009. **Programming in ANSI C.** [Fourth Edition]. Tata Mc-Graw Hill, New Delhi.

REFERENCE BOOKS:

1. *Suresh K. Srivastava*. 1999. **C in Depth**. [First Edition], BPB Publications, New Delhi.
2. *Yashavant Kanetkar*. 1999**. Let Us C**. [Third Edition]. BPB Publications, New Delhi.
3. *Thamarai Selvi, S. and Murugesan, R*. 1999. **C for all**. [First Edition]. Anuradha Agencies, Kumbakonam.

15UECMP301	CORE PRACTICAL III	SEMESTER –III

OBJECTIVES:

1. To observe the output of rectifiers and wave shaping circuits.
2. To study the operation of amplifiers and their frequency response.
3. To construct oscillators and observe the output wave forms.

Experiments:

1. Half and Full wave Rectifiers.
2. Regulated Power Supply using Zener diode and IC's.
3. RC Coupled Amplifier – Single stage.
4. Hartley oscillator
5. Colpitts Oscillator.
6. Clipping Circuits.
7. Clamping Circuits.
8. Astable Multivibrator using transistor.
9. Monostable Multivibrator using transistor.
10. Bistable Multivibrator using transistor.

REFERENCE BOOKS:

1. *Poorna Chandar,S and Sasikala,B.* 2006. **Electronics Laboratory Primer A Design Approach.** S.Chand, New Delhi.

2. *Salivahanan,* 2011. **Electronic devices and circuits.** [Second Edition]. Tata McGraw hill, New Delhi.

15UCSPHAP301/ 15UCSECAP301	**ALLIED PRACTICAL I: PROGRAMMING IN C (For the students of B.Sc., Physics and Electronics and Communication)**	**SEMESTER - III**

LIST OF PRACTICAL:

1. Program to Find the Sum of N Natural Numbers.
2. Program to Check whether a Given Number is Prime or Not.
3. Program to Find the Roots of Quadratic Equation.
4. Program to Reverse the Given Number.
5. Program to Sort the Given Numbers in Ascending or Descending Order.
6. Program to Generate Fibonacci Series.
7. Matrix Manipulation
    a. Program to Perform Matrix Addition.
    b. Program to Perform Matrix Subtraction.
    c. Program to Perform Matrix Multiplication.
    d. Program to Perform Matrix Transpose.
8. String Handling
    a. Program to Reverse a Given String.
    b. Program to Check whether the Given String is Palindrome or Not.
9. Program to Find the Factorial using Recursion.
10. Program to Implement the Concept of Structures.
11. Program to Implement the Concept of Union.
12. Program for Random File Organization.

15UECSBC301	SBC I : ELECTRONIC INSTRUMENTATION SYSTEMS	SEMESTER – III

Total Hours: 25

OBJECTIVES:

1. To acquire adequate knowledge about the various principles involved in electronic measurements and operation of important electronic instruments.
2. To learn the details of various analog electronic instruments which are used to measure voltage, current and power.

CONTENTS

UNIT - I **(5 Hours)**

Qualities of Measurements: Introduction – Performance Characteristics Static Characteristics – Dynamic Characteristics – Error in Measurement – Types of Error – Standards.

UNIT - II **(5 Hours)**

Meters: Basic Meter Movement _ DC Ammeter – DC Voltmeter - AC Voltmeter – Multimeter – Digital Multimeter - Digital Frequency Meter.

UNIT - III **(5 Hours)**

CRO- Introduction – Basic Principle – CRT Features – Block Diagram of Oscilloscope – Dual Trace Oscilloscope – Measurement of Frequency by Lissajous Method – Measurement Procedure – Digital Storage Oscilloscope.

UNIT - IV **(5 Hours)**

Signal Generators: Introduction- Standard Signal Generator – AF Sine and Square Wave Generator –Function Generator – Square and Pulse generator- Random noise generator.

UNIT- V: **(5 Hours)**

Transducers: Introduction – Resistive Transducer – Strain Gauges – Thermistor – Inductive Transducer – LVDT – Capacitive Transducer – Piezo Electric Transducer – Photo Conductive Cells.

TEXT BOOKS:

1. *Kalsi, H.S.* 2004. **Electronic Instrumentation.** [Second Edition]. Tata McGraw-Hill Publishing Company Ltd., New Delhi.

REFERENCE BOOKS:

1. *Albert, D. Helfrick and William David Cooper.* 2009. **Electronic Instrumentation and Measurement Techniques.** [Second Edition]. Prentice Hall of India Limited, New Delhi.
2. *Rangan, C.S., Sarma, G.S and Mani, V.S.V*. 2006. **Instrumentation Devices and Systems.** [Second Edition]. Tata McGraw-Hill, New Delhi.

15ULS301	CAREER COMPETENCY SKILLS I	SEMESTER – III

Total Hours: 15

OBJECTIVE:

To enhance employability skills and to develop career competency

CONTENTS

UNIT – I **(3 Hours)**

Speed Maths: Squaring of Numbers - Multiplication of Numbers - Finding Square Roots - Finding Cube Roots - HCF, LCM - Decimals - - Averages - Powers and Roots.

UNIT – II **(3 Hours)**

Problems on ages- Ratio and proportion- Chain rule-Percentages- Simple and Compound Interest.

UNIT – III **(3 Hours)**

Time and Work- Time and Distance- Problems on Trains

UNIT – IV **(3 Hours)**

Analogies - Sentence Formation - Sentence Completion - Sentence Correction - Idioms & Phrases - Jumbled Sentences-- Reading Comprehension –Deriving conclusions

UNIT – V **(3 Hours)**

Tenses- Articles and Preposition - Change of Voice - Change of Speech - Synonyms & Antonyms - Phrasal Verbs-One Word Substitution- Odd Man Out - Spelling & Punctuation

15UECM401	CORE VI: MICROPROCESSOR AND INTERFACING	SEMESTER- IV

Total Hours: 50

OBJECTIVES:

1. To understand the significance of microprocessor in digital computer system.
2. To study the microprocessor hardware and operation of each block.
3. To study the 8085 microprocessor architecture with assembly language instructions.
4. To learn writing programs in 8085 assembly language.

CONTENTS

UNIT – I: Microcomputer system and Hardware (10 Hours)

Microprocessor- Introduction – The 8085 Microprocessor-Bus timings- Demultiplexing address and data bus- Generating control signals- Detailed block diagram of 8085- 8085 registers- Decoding and executing an instruction.

UNIT – II: Basic instruction and Programming techniques (10 Hours)

Introduction to assembly language programming- Instruction format- Addressing modes-Instruction set of 8085 microprocessor: Data Transfer Instructions – Arithmetic Instructions – Logical Instructions – Branching Instructions-Machine Control Instructions.

UNIT – III: Advanced technique in Programming (10 Hours)

Programming 8085: Counters and Time delays-Time delay using one register-Register pair-Advanced Programming: Zero to Nine Counter -Stack– Subroutine-Advanced subroutine concepts.

Interfacing 8085: Basic interfacing concepts-Interfacing output displays-Seven segment display interfacing-Interfacing input keyboards- Memory mapped I/O Vs Peripheral I/O-Interfacing memory chip-The 8085 Interrupts- Direct memory access.

UNIT – IV: Programmable Interfacing devices (10 Hours)

The 8279 Programmable keyboard and display interface-The 8255 Programmable peripheral interface- The 8253 Programmable interval timer-The 8259 Programmable interrupt controller.

UNIT – V: Applications of Microprocessor (10 Hours)

LED Interface-Flashing LED's-Seven segment display interface-D/A converter interface to 8085-A/D converter interface to 8085-Temperature controller-Data transfer Methods: Asynchronous data transfer.

TEXT BOOKS:

1. *Ramesh, S. Gaonkar.* 2006. **Microprocessor Architecture Programming and Application with 8085/8080A.** [Fifth Edition]. Penram Publications, New Delhi.(UNITS I to IV)
2. *Vijayendran, V.* 2011. **Fundamentals of Microprocessor 8085 (Architecture, Programming & Interfacing).** Viswanathan.S. (Printers & Publishers) Pvt. Ltd., Chennai. (UNIT V).

REFERENCE BOOKS:

1. *Srinath, N.K.* 2005. **8085 Microprocessor Programming and Interfacing.** [First Edition]. PHI India, New *Delhi*.
2. *Douglas,V.Hall.* 2003.**Microprocessors and interfacing: Programming and Hardware**.[Second Edition]**,** Tata McGraw Hill, New Delhi.

15UCSECA401	ALLIED IV: OBJECT ORIENTED PROGRAMMING WITH C++	SEMESTER – IV

Total Hours: 50

OBJECTIVES:

On completion of the course the students shall have knowledge on:

1. Basic concepts of Object-Oriented Programming.
2. Extending Real Business System using C++ Programming.

CONTENTS

UNIT - I **(10 Hours)**

Principles of Object- Oriented Programming: Basic Concepts of Object -Oriented Programming - Benefits of OOP - Object-Oriented Languages - Applications of OOP. **Beginning with C++:** Structure of C++ Program . **Tokens, Expressions and Control Structures:** Tokens – Keywords - Identifiers and Constants – Basic Data Types – User-Defined Data Types – Declaration of Variables- Dynamic Initialization of Variables – Reference Variables – Operators in C++ - Scope Resolution Operator - Expressions and their Types – Control Structures.

UNIT - II **(10 Hours)**

Functions in C++: The Main Function - Function Prototyping – Call by Reference-Return by Reference - Inline Functions – Default Arguments-Function Overloading-Friend and Virtual Functions - Math Library Functions.

UNIT - III **(10 Hours)**

Classes and Objects: Introduction - Specifying a Class-Defining Member Functions – Making an Outside Function Inline-Nesting of Member Functions-Private Member Functions- Arrays within a class. **Constructors and Destructors**: Introduction-Constructors-Parameterized Constructors – Multiple Constructors in a Class-Copy Constructor - Destructors.

UNIT - IV

(10 Hours)

Operator Overloading and Type Conversions: Introduction-Defining Operator Overloading-Overloading Unary Operators- Overloading Binary Operators-Rules for Overloading Operators. **Inheritance: Extending Classes**: Introduction-Defining Derived Classes-Single Inheritance-Making a Private Member Inheritable-Multilevel Inheritance-Multiple Inheritance-Hierarchical Inheritance-Hybrid Inheritance.

UNIT - V **(10 Hours)**

Pointers, Virtual Functions and Polymorphism: Introduction –Pointers – this Pointer - Pointers to Derived Classes-Virtual Functions. **Working with Files**: Introduction-Classes for File Stream Operations-Opening and Closing a File-Detecting end-of-file – More about Open (): File Modes- File Pointers and Their Manipulations—Sequential Input and Output Operations.

TEXT BOOK:

1. *Balagurusamy, E.* 2007. **Object Oriented Programming with C++**. [Third Edition]. Tata McGraw Hill, New Delhi.

REFERENCE BOOKS:

1. *Herbert Schildt.* 2006. **The Complete Reference C++.** [First Edition]. Tata McGraw Hill, New Delhi.
2. *Venugopal, K. R., Rajkumar, B.* and *Ravisankar, T.* 1997. **Mastering C++.** [First Edition]**.** Tata McGraw Hill, New Delhi.

15UECMP401	CORE PRACTICAL IV	SEMESTER - IV

OBJECTIVES:

1. To convert the assembly language program into machine level opcodes.
2. To interface various system with 8085 microprocessor and control their operation.

Experiments:

1. 8-bit Addition, Subtraction.
2. 8-bit Multiplication, Division.
3. 16- bit Addition, Subtraction.
4. Finding Maximum / Minimum numbers in an array.
5. Ascending / Descending order of an array.
6. ADC Interfacing.
7. DAC Interfacing.
8. Traffic light control.
9. Display Interfacing.
10. Serial port Interfacing

REFERENCE BOOK:

1. *Swami, G.T.* 2006. **Microprocessor 8085 Lab Manual.** [First Edition]. Firewall media, New Delhi.

15UCSECAP401	ALLIED PRACTICAL II: OBJECT ORIENTED PROGRAMMING WITH C++	SEMESTER - IV

LIST OF PRACTICAL:

1. Program using Class and Objects.
2. Program using Inline Function.
3. Program using Friend Function.
4. Program using Constructor and Destructor.
5. Program using Function Overloading.
6. Program using Overloading Unary Operator.
7. Program using Overloading Binary Operator.
8. Program using Single Inheritance.
9. Program using Hierarchical and Hybrid Inheritance.
10. Program using Multiple and Multilevel Inheritance.
11. Program using Pure Virtual Function.
12. Program using Sequential File Operations.

15UECSBC401	SBC II: NANO SCIENCE AND APPLICATIONS	SEMESTER- IV

Total Hours: 25

OBJECTIVES

1. To understand about a manufacturing technology, used to inexpensively fabricate most products with molecular precision and which are consistent with physical law.
2. Identify grand challenges and directions for future research in the field of Nano science.

UNIT-I **(5 Hours)**

Introduction-Why nanotechnology-Grasping the essence of nanotechnology: Finding out what it is-The definition-The applications-The history-Why you want nanotechnology in your life-security-Health care-Resources.

UNIT-II **(5 Hours)**

Picking apart objects with spectroscopy-Infrared (IR) spectroscopy-Ultraviolet-visible spectroscopy-Atomic force Microscope (AFM).

UNIT-III **(5 Hours)**

Scanning Electron Microscope (SEM) - Transmission Electron Microscope (TEM) - Scanning Tunneling Microscope (STM)-Magnetic Resonance Force Microscopy (MRFM).

UNIT-IV **(5 Hours)**

Nanotubes-Using nanotubes and nanowires-Self assembly-The Energy challenge-Using nanotechnology to make solar cells Affordable-Using nanotechnology to reduce energy consumption.

UNIT-V **(5 Hours)**

Semiconductor types are completely into nanotechnology-Mining the medical possibilities of nanotechnology- Making nanotechnology materials for others-Nano inside India.

TEXT BOOK:

1. *Richard Booker, Earl Boysen,* 2005, **Nanotechnology**.[First Edition] Wiley India Pvt. Ltd, New Delhi.

REFERENCE BOOKS:

1. *Mark Ratner, Daniel Ratner,* 2003, **Nanotechnology.** .[First Edition] Pearson Education Inc. New Delhi.
2. *Fahrber W R,* 2005, **Nanotechnology and Nanoelectronics.**[First Edition] Springer (India) private Limited, New Delhi.

15ULS401	CAREER COMPETENCY SKILLS II	SEMESTER – IV

Total Hours: 15

OBJECTIVE:

To enhance employability skills and to develop career competency

CONTENTS

UNIT – I **(3 Hours)**

A to Z Placement Terms-Assertiveness and Self Confidence-Career Opportunities-Skill set (Industry Expectations)

UNIT – II **(3 Hours)**

Principles of Communication (LSRW)-Describing Objects / Situations / People-Information Transfer - Picture Talk - News Paper and Book Review

UNIT – III **(3 Hours)**

Self Introduction - Situational Dialogues / Role Play (Telephonic Skills) - Oral Presentations- Prepared -'Just A Minute' Sessions (JAM)

UNIT – IV **(3 Hours)**

Dress code- Body Language- - Manners and Etiquettes -Resume Writing

UNIT – V **(3 Hours)**–

Presentation Skills **–** Group Discussion-Interviewing Techniques- Mock Interview

15UECM501	CORE VII: COMMUNICATION ENGINEERING	SEMESTER –V

Total Hours: 50

OBJECTIVES:

1. To understand the fundamentals of Electronic communication, Modulation schemes, transmitters and receivers.
2. To analyze the operation of antennas and methods of propagating waves.
3. To explore the operation of Microwave devices and satellites.

CONTENTS

UNIT – I (10 Hours)

Introduction to Electronic Communication – Elements of communication system- Electromagnetic Spectrum- Bandwidth. Amplitude Modulation: Modulation index- Sidebands and frequency domain- AM Power distribution- Single Side Band Communications.

UNIT – II (10 Hours)

Amplitude Modulator - Balanced Modulator- SSB Circuits. Frequency Modulation: FM Principles – Sidebands and Modulation index- Phase Modulation. Frequency Modulators- Phase Modulators. Radio Transmitters: AM Transmitter- FM Transmitter.

UNIT – III (10 Hours)

Communication Receivers: TRF Receiver- Super Heterodyne AM Receiver- Intermediate Frequency Selection and Images- Noise- AGC- FM Receiver - Single Side Band Transceiver- Frequency Synthesizer.

UNIT – IV (10 Hours)

RF Wave Propagation- Ground Wave- Sky Wave- Space wave- Microwave techniques: Microstrip- Strip line- Waveguide- Cavity Resonators- Klystron- Reflex Klystron –Magnetron- Traveling Wave Tube.

UNIT – V (10 Hours)

Transmission Lines- Antenna Fundamentals- Antenna Types-Microwave Antennas: Horn antenna- Parabolic antenna. Satellite Communication: Satellite orbits- Angle of inclination and elevation- Transponder- Satellite subsystems- Satellite earth system.

TEXT BOOK:

1. *Louis, E. Frenzel*. 2007. **Communication Electronics.** [Third Edition]. Tata McGraw Hill, New Delhi.

REFERENCE BOOKS:

1. *George Kennedy and Bernard Davis*. 2008. **Electronic Communication Systems.** [Fourth Edition]. Tata McGraw Hill, New Delhi.
2. *Robert, J. Schoenbeck*. 1992. **Electronic Communications.** [Second Edition]. Universal Book Stall, New Delhi.
3. *Dennis Roddy and Jhon Coolen*. 2011. **Electronic Communications. [**Fourth Edition]. Pearson, New Delhi.

15UECM502	CORE VIII: COMPUTER NETWORKS	SEMESTER-V

Total Hours: 50

OBJECTIVES:

1. To understand the need for data communication and computer networks.
2. To study about the operation of networking and internetworking devices.
3. To study about advanced networking technologies.

CONTENTS

UNIT – I **(10 Hours)**

Introduction – Data Communications –Components- Networks– The Internet – Protocols and Standards – The OSI Model – Functions of the Layers.

UNIT – II **(10 Hours)**

Signals- Analog and Digital- Periodic and Aperiodic- Time and Frequency Domains- Composite Signals. Digital to Digital Conversion- Digital to Analog Conversion- ASK-FSK-PSK-QAM. Multiplexing – FDM – WDM – Synchronous and Statistical TDM.

UNIT – III **(10 Hours)**

Spread Spectrum -Frequency Hopping Spread Spectrum –Direct Sequence Spread Spectrum – Guided Media: Twisted pair cable- Coaxial Cable- Fiber optic cable. Switching: Circuit switched Networks – Datagram and Virtual circuit networks. Structure of a Switch -Dial –Up MODEMS – Digital Subscriber Line.

UNIT – IV **(10 Hours)**

Data Link Control: Framing-Flow and error control- HDLC. Basics of Carrier Sense Multiple Access– IEEE Standards – Standard Ethernet - Fast Ethernet – Gigabit Ethernet – Connecting Devices – Repeater – Bridge – Router- Gateway.

UNIT – V **(10 Hours)**

Frame Relay –Architecture and Layers –ATM Design goals – Architecture – ATM Layers –- IPv6 datagram format- UDP Datagram format- TCP Datagram format – Domain Name System– Electronic Mail- File Transfer.

TEXT BOOK:

1. *Behrouz,A. Forouzan.* 2009. **Data Communication and Networking.** [Fourth Edition]. Tata McGraw Hill, New Delhi.

REFERENCE BOOKS:

1. *William Stalings.* 2002. **High Speed Networks and Internets.** [Second Edition]. PHI, New Delhi.
2. *Tanenbaum, A.S.* 2003. **Computer Networks.** [Fourth Edition]. PHI, New Delhi.
3. *Larry, L. Peterson and Bruce, S. Davie.* 2007. **Computer Networks: a systems approach.** [Fourth Edition]. PHI, New Delhi.

15UECM503	CORE IX : MICROCONTROLLER AND APPLICATIONS	SEMESTER –V

Total Hours: 50

OBJECTIVES:

1. To understand the basics of Micro controller architecture and memory systems.
2. To learn the assembly language programming instructions and writing programs.
3. To study about real time programming techniques using embedded systems.

CONTENTS

UNIT – I (10 Hours)

Microprocessor and Microcontroller- The 8051 Microcontroller- features-Architecture of 8051: Processor- Memory- Digital I/O port and peripherals- Pin diagram of 8051- Memory organization- External memory interfacing- Stacks.

UNIT – II (10 Hours)

8051 addressing modes and instruction set: Instruction syntax- Data types- Subroutines- Addressing modes- Instruction timings- 8051 instructions- Data transfer instructions.

UNIT – III (10 Hours)

Arithmetic instructions: Add- Subtract-Multiplication- Division - Logical instructions- Branch instruction- Bit manipulation instructions.

UNIT –IV (10 Hours)

8051 Parallel I/O Ports- Port structure and operation- 8051 interrupt structure- 8051 Timers/Counters- Operation modes- 8051 serial communication- Serial communication modes.

UNIT – V (10 Hours)

8051 based system design- Traffic light control: Introduction-Switching circuit-8051 hardware interface- Operation sequence- Time of the day clock. Washing machine control: Washing cycle- Control system design – Software.

TEXT BOOKS:

1. *Udayashangara,V and Mallikajunaswamy,M.S.* 2009. **8051 Microcontroller Hardware, Software and applications.** [First Edition]. Tata McGraw Hill, New Delhi.(UNITS I to IV)
2. *Krishna Kant.* 2010. **Microprocessors and Microcontrollers architecture, programming and system.** [First Edition]. PHI Learning Private Ltd., New Delhi.(UNIT V)

REFERENCE BOOKS:

1. *Kenneth, J.Ayala.* 2004. **8051 Microcontroller, the Architecture, Programming and Applications.** [Second Edition]. Pearson International Publishing (I) Pvt. Ltd., New Delhi.
2. *Scott Mackenzie, I and Raphael, C.-W. Phan.* 2009. **The 8051 Microcontroller.** [Fourth Edition]. Pearson International Publishing (I) Pvt. Ltd., New Delhi.
3. *Muhammad Ali Mazidi and Janice Gillispie* Mazidi. 2009. **The 8051 microcontroller and Embedded System.** [Fourth Edition]. Pearson International Publishing (I) Pvt. Ltd., New Delhi.

15UECM504	CORE X: IC'S AND APPLICATIONS	SEMESTER –V

Total Hours: 50

OBJECTIVES:

1. To understand the step by step fabrication process of monolithic IC's.
2. To analyze the parameters of logic families.
3. To study the operation of various digital circuits using digital IC's.

CONTENTS

UNIT – I **(10 Hours)**

Integrated Circuit fabrication: Introduction and fundamentals of Monolithic IC technology – Basic planar processes: Silicon wafer preparation-Epitaxial growth-Oxidation-Photolithography-Diffusion-Ion implantation-Isolation technique-Metallization – Fabrication of a circuit – Active and passive components of ICs: Fabrication of monolithic Diodes – Monolithic transistors.

UNIT – II **(10 Hours)**

Digital IC families: RTL, DTL, (Modified Integrated Circuit) – HTL, TTL, ECL and I^2L Logic families – Characteristics. CMOS logic – CMOS device driving TTL circuits, TTL device driving CMOS Gates.

UNIT – III **(10 Hours)**

Operational Amplifier: Operational Amplifier – Ideal Operational Amplifier – Operational Amplifier Parameters – Inverting – Non Inverting Amplifier – Applications – Subtractor – Integrator – Differentiator- Differential Amplifier – Instrumentation Amplifier.

UNIT –IV **(10 Hours)**

Non linear and analog system: Comparator – Sample and Hold circuit- AC amplifier-V to I and I to V converter- Regenerative Comparator (Schmitt triggers) Astable Multivibrator – Monostable Multivibrator – Triangular wave generator – Sine Wave generator: Phase shift oscillator.

UNIT – V **(10 Hours)**

PLL and Timers: Basic Principles – Phase Detector Comparator: Analog Phase detector-Digital Phase detector- Voltage Controlled Oscillator – Phase Locked Loop – PLL Applications – Frequency Multiplication / Division – Frequency Translation -

555 Timer: Astable Multivibrator – Monostable Multivibrator - 8038 Function Generator-566 Waveform Generation.

TEXT BOOKS:

1. *Roy choudhury and Sahil Jain,D.* 2012. **Linear Integrated Circuits.** [Second Edition]. New age International, New Delhi.(UNITS I & UNITS III to V)
2. *Botkar, K.R.* 1993. **Integrated Circuits.** [Eighth Edition]. Khanna Publishers, New Delhi.(UNIT II)

REFERENCE BOOKS:

1. *Ramakant, A. Gayakwad.* 2000. **Op-amps and Linear Integrated Circuits.** [Fourth Edition]. Prentice Hall India, New Delhi.
2. *David, A. Johns and Ken Martin.* 2008. **Analog Integrated Circuit Design.** [First Edition]. Wiley India (P) Ltd., New Delhi.

15UECM505	CORE XI: CONSUMER ELECTRONICS (100% External Evaluation & Self Study)	SEMESTER-V

Total Hours: 50

OBJECTIVES:

1. To understand the properties of audio and video systems through self study.
2. To study the design issues and operation of domestic equipments
3. To analyze the operation of modern electronic gadgets

CONTENTS

UNIT - I: Principles of Audio and Video Systems

Types of waves – Longitudinal waves-Wave properties – Properties of sound waves-Transverse waves-Refraction and Reflection of waves-Echoes- Microphones: Moving coil microphones-Wireless microphones.

UNIT - II: Headphones and Loud Speaker

Headphones and headsets-Electret Electrostatic headphones-Loud speakers: Ideal and basic loud speaker-Permanent Magnet loud speaker-Loud speaker construction-Woofers-Horn type tweeters-Multispeaker systems-Crossover Networks.

UNIT - III: Optical Recording Systems

Disc-Processing audio signal-Readout from disc-Reconstruction of audio signal-Monophony-Stereophony-Quadraphony-Stereo Practice.

UNIT - IV: Remote Controls

Ultrasonic Transducers-Frequency signal encoding-PPM encoding-Ultrasonic transmitter -Troubleshooting remote control system.

UNIT - V: Electronic Gadgets

Facsimile (FAX)-FAX Machine - Basic operations-Group 3 FAX Machines. Xerography-Processes-Extension to a dynamic Copier. IN-CAR Electronics: Antilock Braking System(ABS) - Instrument panel displays-Ultrasonic Car safety belt system-Air bag system-Satellite based Car Navigation Systems.

TEXT BOOK:

1. *Bali,S.P.* 2007**. Consumer Electronics. [**First Edition**].** Pearson Education, New Delhi.

REFERENCE BOOKS:

1. *Chitode. J .S.* 2007. **Consumer Electronics. [**First Edition**].** Technical Publication, Pune**.**
2. *Philip Hoff and Philip Herbert Hoff.* 2010. **Consumer Electronics for Engineers. [**First Edition**].** Cambridge University Press, New Delhi.

15UECMP501	CORE PRACTICAL V	SEMESTER-V

OBJECTIVES:

1. To acquire the practical knowledge in the field of IC fabrication and designing.
2. To construct basic circuits for analog communication.
3. To perform arithmetic operations and interface devices using 8051 Microcontroller.

Experiments:

Integrated Circuits:

1.Inverting and Non Inverting amplifier.
2.Adder and Subtractor.
3.Differentiator and Integrator.
4.Astable & Monostable Multivibrators.

Communication:

5.Amplitude Modulator and Detector.
6.Voltage Controlled Oscillator.
7.Frequency Modulator.

8051 Microcontrollers:

8.Addition and Subtraction Multiplication and Division of 8 bit data.
9. Finding the Biggest and Smallest number in an array.
10. Stepper Motor Interface.

REFERENCE BOOK:

1. *Poorna Chandar, S and Sasikala, B.* 2006. **Electronics Laboratory Primer. A Design approach.** S.Chand, New Delhi.

15UECSBC501	SBC III: POWER ELECTRONICS	SEMESTER –V

Total Hours: 25

OBJECTIVES:

1. To Study the characteristics and operation of various Power Electronics Devices and their applications.
2. To design Power Electronic circuits for Industrial applications.
3. To understand Industrial Applications of various Electronics and Electromechanical devices.

CONTENTS

UNIT –I : Introduction to Power Electronics (5 Hours)

Power Electronic systems an Overview-Power Electronics System-Power Electronic Converters-Thyristor: Principles and Characteristics: Turn – on Method of a Thyrister – Turn – off methods: Natural Commutation – Forced Commutation.

UNIT – II: Choppers (5 Hours)

Basic Chopper Classification – Basic Chopper Operation: Step – Down Chopper, Step – up Chopper – Morgan Chopper – A.C Choppers – Multiphase Chopper.

UNIT – III: Inverters (5 Hours)

Classification of Inverters – Single phase Half Bridge Voltage – Source Inverters: Operation with Resistive Load , Circuit Analysis – Single phase Full Bridge Inverter: Operation with Resistive Load , Circuit Analysis – Pulse-Width Modulated(PWM) Inverter: Pulse – Width Modulated Half Bridge Inverter – Series Inverter : Basic Series Inverter.

UNIT –IV : Cycloconverters (5 Hours)

The Basic Principle of Operation – Single Phase to Single Phase Cycloconverter: Center-tapped Transformer Configuration, Bridge Configuration. Control of D.C and A.C Drives: Schemes for D.C Motor Speed Control

UNIT – V: Applications (5 Hours)

Uninterruptible Power Supply: On-Line UPS, OFF-Line UPS – SMPS: Isolated Flyback Converter, Discontinuous Mode – Battery Charger – Emergency Lighting System- Time Delay Circuit

TEXT BOOK:

1. *Singh M D and Khanchandani K B* ,2007, **Power electronics**[Second Edition],Tata Mcgraw hill, Newdelhi.

REFERENCE BOOKS:

1. *George M.Chute, Robert D.Chute,*2001, **Electronics in industry**[Fifth 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,* 1993, **Electrical Technology** [First Edition], S.Chand, Newdelhi.

15UECM601	CORE XII: MOBILE AND CELLULAR COMMUNICATION	SEMESTER – VI

Total Hours: 50

OBJECTIVES:

1. To understand the concepts of mobile communication.
2. To analyze various standards of mobile communication.
3. To study recent technologies in mobile communication with their architecture and protocols.

CONTENTS

UNIT – I: Introduction (10 Hours)

Introduction –Enabling concepts for mobile and personal communications: Terminal Mobility, Personal Mobility and Service Portability-The Intelligent Network Concept-Mobile and personal communications: Past, Present and Future – Related network aspects.

UNIT- II: The Cellular Concepts and Its Initial Implementations (10 Hours)

The cellular concepts–Multiple access technologies for cellular systems – Cellular system operation and planning: System Architecture-Location Updating and Call Setup-Handoff and Power Control– Initial implementations of cellular Concepts: Analog cellular system-The AMPS System-The TACS System.

UNIT – III: Telecommunication system (10 Hours)

Introduction – GSM: Mobile services – System architecture – Radio interface – Protocols – Localization and calling – Hand over – Security- UMTS and IMT – 2000**:** UMTS releases and standardization – UMTS system architecture – UMTS radio interface – UTRAN-CDMA-Spread Aloha multiple access - Comparison of S/T/F/CDMA.

UNIT - IV: Wireless LAN (10 Hours)

Infra red Vs Radio transmission-Infrastructure and ad-hoc network-IEEE 802.11: System architecture-Protocol architecture-802.11b-802.11a.

Bluetooth: Architecture – Radio layer – Base band layer – Security.

UNIT - V: Mobile network layer (10 Hours)

Mobile IP: Goals, assumptions and requirements-Entities and terminology-IP packet delivery-Registration-Tunneling and encapsulation-Optimizations-Reverse tunneling- Mobile ad-hoc networks: Routing-Destination sequence distance vector.

TEXT BOOKS:

1. *Rajapandya .* 2000. **Mobile and Personal Communication system and services.** [First Edition]. PHI India, New Delhi.(UNITS I and II)
2. *Jochen, H. Schiller, J.* 2009. **Mobile Communications.** [Second Edition]. Addition Wesley Publishers, New Delhi. (UNITS III to V)

REFERENCE BOOKS:

1. *Lee, W.C.Y.* 2011. **Mobile Cellular Communications: Analog and Digital systems.** [Second Edition]. TMH, New Delhi.
2. *Theodore, S. Rappaport.* 2002. **Wireless Communication**: **Principles and Practice. [**Second Edition]. Prentice hall of India, New Delhi.

15UECM602	CORE XIII: EMBEDDED SYSTEMS	SEMESTER – VI

Total Hours: 50

OBJECTIVES:

1. To understand the basics of micro controller architecture and memory systems.
2. To learn the assembly language programming instructions and writing programs using PIC Microcontroller.
3. To study about real time programming techniques using embedded systems.

CONTENTS

UNIT – I **(10 Hours)**

Embedded system and their characteristics- Von Newman and Harvard architecture- CISC Vs RISC- The PIC microcontroller overview- Architecture of PIC 16F84- Interrupt structure- Ports.

UNIT – II **(10 Hours)**

Counters and Timers-16F84 TIMER0 module- Applications- Watchdog timer- Power supply and reset- 16F84 instruction format- Addressing modes- 16F84 instruction set.

UNIT – III **(10 Hours)**

Memory overview- Dynamic RAM- Static RAM- EPROM- EEPROM-Flash memory- Microcontroller memory implementation- Program memory-16F84 Memory programming- Digital to analog conversion- Pulse width modulation – Data acquisition systems: acquiring ac signals- Analog to digital conversion - 16F84 ADC.

UNIT – IV **(10 Hours)**

Serial standards and protocols- Microwire and SPI- Inter-integrated circuit(I^2C) bus- An I^2C system example- RS232- Assemblers-A high level language survey- The C programming language- Using C in the embedded environment- The MPLAB- CXX Compilers.

UNIT – V **(10 Hours)**

Programmable Logic Controllers- Parts of a PLC - Principles of operation- Modifying the operation-PLCs verses computers- PLC size and Applications.

TEXT BOOKS:

1. *Tim Wilmshurst.* 2007. **A Small Scale Embedded System Design.** [First Edition]. Palgrave Publishers, New Delhi.(UNITS I to IV)
2. *Frank D. Petruzella*. 2010. **Programmable Logic Controllers**. [Third Edition]. TMH, NewDelhi.(UNIT V)

REFERENCE BOOKS:

1. *Manoharan, P.S., Kannan, P.S.* 2010. **Microcontroller based system design.** [First Edition]. SCI Tech Publishing Pvt. Ltd., Chennai.
2. *Raj Kamal.* 2008. **Embedded System, Architecture, Programming and Design.** [Second Edition]. Tata McGraw Hill, New Delhi.

15UECM603	CORE XIV: BIOMEDICAL INSTRUMENTATION	SEMESTER-VI

Total Hours: 50

OBJECTIVES:

1. To provide exposure to various physiological signal measurements and various assisting devices.
2. To enable the students to learn the basic principles of different instruments used in medical science.

CONTENTS

UNIT I: Basic Physiology (10 Hours)

Cells and their structures - Transport of ions through cell membrane - Resting and action potential - Bioelectric potentials – Different systems of human body- Electrodes – Types of electrodes.

UNIT II: Biopotential Recorders (10 Hours)

Electrical and mechanical activities of the heart - Typical Electrocardiogram (ECG) – ECG Lead Configurations – ECG recording setup - Electroencephalogram (EEG) – Brain waves – Placement of electrodes – EEG recording set up - Electromyography (EMG) – ERG – EOG.

UNIT III: Physiological Assist Devices (10 Hours)

Pacemakers – Energy requirement to excite heart muscles – Methods of stimulation- Defibrillators – Different types of defibrillators – AC defibrillator – DC defibrillator – Nerve and Muscle Stimulator – Stimulation of Nerves – Different types of Nerves – Heart Lung Machine – Blood Flow meters – Electromagnetic Blood Flow meters – Ultrasonic Blood Flow meters – LASER Blood Flow meters.

UNIT IV: Operation Theatre Equipments (10 Hours)

Surgical diathermy– Shortwave diathermy – Microwave diathermy – Ultrasonic diathermy – Blood Pressure Measurement. **Biotelemetry:** Elements of Biotelemetry – Design of a biotelemetry system – Problems in Implant Telemetry – Uses of Biotelemetry

UNIT V: Medical Imaging Systems (10 Hours)

Electron Microscope – X-Ray Machine - Computers in medicine – Lasers in Medicine – Computer Tomography (CT) – Ultrasonic imaging systems – Magnetic Resonance Imaging (MRI).

TEXT BOOK:

1. *Arumugam.M*. 2012. **Bio Medical Instrumentation**.[Second Edition]**.** Anuradha agencies Publications, Chennai.

REFERENCE BOOKS:

1. *Khandpur R.S*., 2008. **Hand book of Biomedical Instrumentation**.[Second Edition]**.** Tata McGraw Hill, NewDelhi.
2. *Leslie Cromwell., Fred J. Webell., Erich A. Pfeffer*. 2006, **Bio-medical Instrumentation and Measurements .[Second Edition].** Prentice Hall of India, New Delhi.

15UECM604	CORE XV: ELECTRONIC MEDIA	SEMESTER-VI

Total Hours: 50

OBJECTIVES:

1. To understand the concepts of sound and image
2. To analyze the representation of signals in various media
3. To understand the concept of storage and electronic media services and applications.

CONTENTS

UNIT - I: Sound and Audio (10 Hours)

Basic Sound Concepts- Computer representation- Audio Formats- Music- MIDI concepts- Devices- Speech- Generation Analysis- Transmission.

UNIT- II: Images and Graphics (10 Hours)

Digital Image Representation- Image format- Graphics format- Computer image Processing- Image synthesis- Image analysis- Image transmission.

UNIT - III: Video (10 Hours)

Video Signal Representation- Computer Video format- Data Compression- JPEG- Image Preparation- Lossy DCT mode- Lossless mode- MPEG: Video Encoding- Audio Encoding

UNIT - IV: Optical Storage Media (10 Hours)

Basic Technology- Compact Disk Digital Audio- CD ROM: Blocks- Modes- Logical Data format- Limitations- CD Write Once: Principles- Sessions.

UNIT - V: Applications (10 Hours)

Conversational Service: Video Conferencing- Video Phone- Messaging services- Retrieval Services- Tele Action Services- Tele Operation Services- Applications of Teleservices- Media Entertainment- Virtual reality- Interactive Video- Interactive audio- Games

TEXT BOOK:

1. *Ralf Steinmetz and Klara Nahrstedt.* 2009. **Multimedia: Computing, Communications & Applications.** [Sixth Edition]. Pearson Education, New Delhi.

REFERENCE BOOKS:

1. *Gokul, S.* 2000. **Multimedia Magic.** [Second Edition]. BPB Publications, New Delhi.
2. *Fred Halsall.* 2008. **Multimedia Communications: Applications, Networks, Protocols & Standards.** [Second Edition]. Pearson Education, New Delhi.

15UECM605	CORE XVI: VLSI DESIGN AND VHDL (100% Internal Evaluation)	SEMESTER – VI

Total Hours: 50

OBJECTIVES:

1. To understand the basics of MOS technology
2. To learn about the design and construction rules about MOS technology
3. To study the applications of VLSI design in various electronic equipments
4. To learn the basic VHDL programming

CONTENTS

UNIT- I: Introduction (10 Hours)

Basic MOS Structure- Basic MOS Transistor operation- MOS Transistor Switches- NMOS Fabrication-Basic CMOS technology- CMOS Process Enhancements-BiCMOS Technology

UNIT-II: MOS Device Characteristics (10 Hours)

Introduction- Static Behavior of the MOS transistor- Dynamic behavior of MOS Transistor- The Actual MOS transistor-NMOS inverter- determination of Pull-up to Pull down ratio($Z_{P.U}/Z_{P.D}$) for an NMOS inverter driven by another NMOS inverter- Pull-up to Pull down ratio for an NMOS inverter driven through one or more Pass transistor- Device Models for simulation.

UNIT –III: MOS Circuit Design Process (10 Hours)

MOS layers-Stick Diagrams- Stick layout using NMOS design- Stick layout using CMOS design- Design Rules & Layout-Double metal MOS process rules- Elements of Physical Design- Basic Concepts- Design Hierarchies.

UNIT-IV: VHDL Introduction (10 Hours)

History of VHDL – Capabilities of VHDL- Hardware abstraction- Basic terminology- Entity declaration- Architecture body declaration- Basic language elements- Configuration declaration – Identifiers- Data objects- Data types- Operators.

UNIT- V: Modeling in VHDL (10 Hours)

Basic Language element of VHDL-Behavioral Modeling**-** Structural Modeling- Dataflow Modeling- Subprograms and overloading-VHDL description of gates- Simple Programs.

TEXT BOOKS:

1. *Albert Raj* and *Latha.* 2002. **VLSI Design.** [First Edition]. PHI Publications, New Delhi.(UNITS I to III)
2. *Bhasker, J.* 1999. A **VHDL Primer.** [Third Edition]. Prentice Hall of India Publication, New Delhi.(UNITS IV &V)

REFERENCE BOOKS:

1. *Neil, H.E. Weste and Kamrun Eshraghian*. 2000. **Principles of CMOS VLSI Design. [**Second Edition], Pearson Education, New Delhi.
2. *Sze, S.M.* 2003. **VLSI Technology.** [Second Edition]. McGraw Hill Book Company, New Delhi.
3. *Prasanna Raj Cyril.* 2010. **Fundamentals of HDL Design: An Engineering Approach.** [First Edition]. Pearson Education, New Delhi.

15UECMP601	CORE PRACTICAL VI	SEMESTER – VI

OBJECTIVES:

1. To interface various applications with PIC Microcontroller.
2. To construct basic experiments in Digital Communication
3. To design and verify the operation of digital circuits using VLSI tools.

Experiments:

PIC Microcontroller:

1. LED Interface.
2. LCD Interface
3. Switch Interface
4. Buzzer Interface
5. Remote Relay Control.
6. DC Motor Control Interface.

Digital Communication:

7. Pulse Amplitude Modulation.
8. Pulse Width Modulation.
9. Amplitude Shift Keying.

VLSI Systems Design:

10. Verification of basic gates operation.
11. Design of Half Adder and Half Subtractor.
12. Design of Multiplexer and Demultiplexer.

REFERENCE BOOKS:

1. *Udayshankara.* 2011. **8051 microcontroller: hardware, software and applications.** [First edition]. Tata McGrawHill, New Delhi.
2. *Harprit Singh Sandhu*. 2011. **Making PIC Microcontroller Instruments and Controllers.** [First edition]. Tata McGrawHill, New Delhi.
3. *Bhasker, J.* 1999. **A VHDL Primer.** [Fourth Edition]. Prentice Hall of India Publication, New Delhi.

15UECSBC601	SBC IV: ADVANCED COMMUNICATION SYSTEMS	SEMESTER-VI

Total Hours: 25

OBJECTIVES:

1. To understand the concepts of Pulse and Digital Communication Systems
2. To impart the knowledge of familiar communication applications such as television and RADAR.

CONTENTS

UNIT I (5Hours)

Pulse Communication : Information in a Communication System – Coding – Noise in an Information Carrying Channel – Pulse Modulation Introduction – Pulse Amplitude Modulation(PAM)–Pulse Code Modulation(PCM).

UNIT II: (5 Hours)

Pulse Systems: Telegraphy – Telemetry – Characteristics of Data Transmission Circuits – Digital Codes – Error Detection and Correction.

UNIT III: (5 Hours)

Broadband Communication Systems: Short and Medium Haul Systems - Coaxial Cables - Fiber Optic Links - Microwave Links – Long haul systems- Submarine Cables.

UNIT IV: (5 Hours)

Radar Systems : Basic Principles – Fundamentals – Radar Performance Factors – Basic Pulsed Radar System – Antenna and Scanning – Display Methods.

UNIT V: (5 Hours)

Television Fundamentals : Introduction to Television – Television Systems and Standards -– Black and White Transmission- Beam Scanning – Blanking and Synchronizing Pulses- Black and White Reception – Fundamentals- Colour transmission and reception-Introduction- Compatibility-Color combinations.

TEXT BOOK:

1. *Kennedy ,Davis, 2008.* **Electronic communication Systems**[Fourth Edition]. Tata McGraw Hill, Newdelhi.

REFERENCE BOOKS:

1. *Louis E. Frenzel* - 2011. **Communication Electronics**[Third Edition]. Tata McGraw Hill, Newdelhi.
2. *Robert J. Schoenbeck,* 1992. **Electronic communications**[Second Edition]. Universal Book Stall, Newdelhi.
3. *Roddy Coolen,* 2011. **Electronic Communications [**Fourth Edision].Pearson, New Delhi.

15UECD401	DIPLOMA COURSE: 1. PC HARDWARE AND MAINTENANCE	SEMESTER-IV

Total Hours:90

CONTENTS

THEORY:

UNIT I: HARDWARE AND MOTHER BOARD ORGANIZATION OF PC

Introduction to computer organization – Components of PC: System unit – Monitor – Input device – Printers – Interfaces – I/O buses –Motherboard logic. POST sequence.

UNIT II: DRIVES

Introduction – Principles of Magnetic Storage – Floppy Disk Drive – Hard Disk Drive –Drive formatting – Physical & Logical formatting – IDE interface – SCSI interface – CD-ROM drive – Dios disk drive devices – FAT details.

UNIT III: PERIPHERALS

Introduction – Video display system – Video adapter – Color graphic adapter – CRT Display controller – Keyboard – Keyboard Interface – Mouse – Printer.

UNIT IV: I/O BUSES AND PORTS

Introduction – ISA bus – MCA bus – EISA bus – local buses – VL bus – PCI bus – AGP.

Introduction to parallel port – serial port – introduction to USB – features of USB – USB transfer – USB controller.

UNIT V: TROUBLESHOOTING

Introduction – Computer faults – Nature of faults – Types of faults – Diagnostic Programs and tools – Fault elimination process – Systematic troubleshooting procedure –Motherboard Problems – FDD, FDC problems - HDD, HDC problems – Monitor problems – Serial Port Problems – Keyboard Problems – SMPS Problems - Printer Problems.

LIST OF PRACTICALS:

1. Study of SMPS and Mother board
2. Study of Disk drives
3. Assembling and Disassembling a PC
4. Trouble shooting in the PC
5. Installation of Operating system

TEXT BOOKS

1. *Mathivanan, N.* 2010. **Microprocessors, PC hardware and Interfacing.** [First Edition].PHI India, New Delhi. (UNITS I to III)
2. *Govindarajalu, B.* 2002. **IBM PC and clones (Hardware, Trouble shooting and Maintenance).** [Second Edition]. Tata McGraw Hill, New Delhi. (UNITS IV & V)

15UECD402	DIPLOMA COURSE: 2. PCB DESIGN AND TECHNOLOGY	SEMESTER-IV

Total Hours:90

OBJECTIVES

1. To learn practical skills needed to design and produce Printed Circuit Boards.
2. To perform in PCB design by handling Analog/Digital/Mixed signals boards.
3. Analyze electronic components and interpret their specifications with regard to reliability and selection.

CONTENTS

THEORY:

UNIT-I

Layout Planning: Introduction-Layout scale-Grid system-Board types: Single sided boards, Double sided boards-PCB production facilities.

PCB sizes: Mechanical stress-Other board size constraints: Electrical functioning, Testing and servicing, Modifications, Equipment Dimensions-Standard sizes.

UNIT-II

Layout Approaches: Materials and Aids: Simple Approach with sketching of components, Layout sketching with puppets-Procedures.

Documentation: Scope- circuit diagram-Component list-Layout sketch-Mechanical Drawing- Assembly Drawing.

UNIT-III

Photoprinting: Coating processes for wet-film resists: Flow coating, Roller coating, Dip coating, spraying, whirl coating.

UNIT-IV

Solders and Soldering techniques: Soldering technique: Iron soldering: Function of the bit, Soldering Iron design, Soldering with an Iron- Mass soldering: Dip soldering, Drag soldering, Wave soldering- Flux removal after soldering.

UNIT-V

Components Assembly techniques: Preparation and Mounting of components-Component lead preparation- component mounting-Lead cutting and soldering – PCB cleaning after soldering.

LIST OF PRACTICALS:

1. PCB layout design
2. Layout sketching and drilling
3. Etching
4. Study of Soldering
5. Study of Desoldering

TEXT BOOK:

1. *Walter C Bosshart*, 1996, **Printed Circuit Boards Design and Technology** [First Edition]**.** Tata Mcgraw-Hill, New Delhi.

15UECN301	NMEC I: COMPUTER HARDWARE AND MAINTENANCE	SEMESTER-III

Total Hours: 25

OBJECTIVES:

1. To enhance the students knowledge in the field of computer hardware.
2. To acquire the concepts and operation of computer hardware.

CONTENTS

UNIT – I: PC Hardware (5Hours)

Introduction-Hardware BIOS-The Personal computer family Old Generation and New Generation-Personal Computer Hardware-Central Processing Unit-Peripherals-New generation Personal Computer Hardware-AC Power Connections.

UNIT – II: Inside the System (5 Hours)

SMPS – Motherboard - Motherboard components - Speaker-EPROM / ROM types.

UNIT – III: Disk drive (5 Hours)

Floppy disk drives- Hard disk drives- Personal computer Expansion Boards- Power on Self Test sequence- CD-ROM - DVD

UNIT – IV: Peripherals (5 Hours)

Serial ports - Parallel Ports- Cathode Ray Tube- Liquid Crystal Display Panels-Keyboard - Mouse- USB - Video Conferencing.

UNIT – V: Installation and Maintenance (5 Hours)

Removing a Motherboard-Replacing Motherboard -Removing an FDD- Peripherals.

TEXT BOOK:

1. *Govindarajalu, B.* 2002. **IBM PC and clones (Hardware, Trouble shooting and Maintenance).** [Second Edition]. Tata McGraw Hill, New Delhi.

REFERNECE BOOKS:

1. *Scott Mueller.* 2000. **Upgrading and Repairing PC's.** [Eighteenth Edition]. PHI, New Delhi.
2. *Mathivanan, N.* 2004. **Microprocessors, PC Hardware and Interfacing**. [First Edition]. PHI Learning Pvt., Ltd., New Delhi.

3. *Jim Aspin wall and Mike Todd.* 1999. **Trouble shooting your PC.** [Fourth Edition]. IDG books India (P) Ltd., New Delhi.

15UECN401	NMEC II: BASIC AND DIGITAL ELECTRONICS	SEMESTER - IV

Total Hours: 25

OBJECTIVES:

1. To be able to define and explain the difference between direct and alternating currents.
2. To identify components by symbols and color coding schemes.
3. To implement simple logical operations using combinational logic circuits and analyzes them.
4. To construct and test simple latches and flip-flops using discrete gates.

CONTENTS

UNIT – I **(5 Hours)**

Introduction-Definition of Electronics-Development of Electronics-Application of Electronics: Digital Electronics-Power Electronics-Communication Electronics.

UNIT – II **(5 Hours)**

Electronics Components-Electron tubes-Visual Display Devices-Resistors-Resistor color code-Fixed Resistors-Wire wound Resistors-Variable Resistors-Decade Resistance box-Capacitor.

UNIT – III **(5 Hours)**

Semiconductor Diodes: PN Junction diode- Zener diode-Varactor diode-Photo diodes-Tunnel diode-LED-LCD-Transistors-Bipolar transistors.

UNIT – IV **(5 Hours)**

Digital Electronics: Number system and codes-Binary Arithmetic-Basic logic gates-Other logic gates (Exclusive OR gate, Exclusive NOR gate)-ASCII codes.

UNIT – V **(5 Hours)**

Flipflops: Definition- RS Flipflop- D Flipflop- JK Flipflop- Half adder- Full adder-Introduction to Microprocessor.

TEXT BOOK:

1. *Theraja, B.L.* 2008. **Basic Electronics.** [Second Edition]. S.Chand, New Delhi.

REFERENCE BOOKS:

1. *Sedha, R.S.* 2012. **A Text Book of Applied Electronics**. [Second Edition]. S.Chand, New Delhi.
2. *Donald, P.Leach, Albert Paul Malvino and Goutam Saha.* 2008. **Digital Principles and Applications.** [Sixth Edition]. Tata Mc Graw Hill, New Delhi.

GUIDELINES

1. SUBMISSION OF RECORD NOTE BOOKS AND PROJECT DISSERTATION:
Candidates appearing for Practical Examinations and Project Viva-voce shall submit Bonafide Record Note Books/ Dissertation prescribed for Practical/ Project Viva-voce Examinations, otherwise the candidates will not be permitted to appear for the Practical/ Project Viva-voce Examinations.

2. PASSING MINIMUM AND INTERNAL MARK DISTRIBUTION (Theory, Practical and Project)

(i) A. THEORY
The candidate shall be declared to have passed the Examination, if the candidate secure not less than 40 marks put together out of 100 in the Comprehensive Examination in each Theory paper with a passing minimum of 30 marks in External out of 75.

***Internal Marks Distribution** [CA- Total Marks: 25]*

Attendance	: 5 Marks
Assignment/Seminar	: 5 Marks (2 Assignments and 1 Seminar)
Internal Examinations	: 15 Marks
Total	**: 25 Marks**

B. (i) THEORY (If Internal Evaluation is for 100 Marks)
The candidate shall be declared to have passed the Examination, if the candidate secure not less than 40 marks out of 100 in the Comprehensive Examination (Internal Evaluation only).

***Internal Marks Distribution** [CA- Total Marks: 100]*

Attendance	: 10 Marks
Assignment and Seminar	: 30 Marks (2 Assignments and 1 Seminar)
Internal Examinations	: 60 Marks
Total	**: 100 Marks**

B. (ii) THEORY (If External Evaluation is for 100 Marks)
The candidate shall be declared to have passed the Examination, if the candidate secure not less than 40 marks out of 100 in the Comprehensive Examination.

(ii) PRACTICAL

The candidate shall be declared to have passed the Examination, if the candidate secure not less than 40 marks put together out of 100 in the Comprehensive Examination in each Practical paper with a passing minimum of 24 marks in External out of 60.

***Internal Marks Distribution** [CA- Total Marks: 40]*

Experiment	: 10 Marks (10-12 Experiments)
Attendance	: 5 Marks
Record	: 5 Marks
Internal Examinations	: 20 Marks
Total	**: 40 Marks**

Computer Practical Distribution

***Internal Marks Distribution** [CA- Total Marks: 40]*

Experiment	: 10 Marks (10-12 Experiments)
Attendance	: 5 Marks
Record	: 5 Marks
Internal Examinations	: 20 Marks
Total	**: 40 Marks**

(iii) PROJECT WORK/DISSERTATION

- The project work shall be carried out by the students individually in the V semester and has to complete the work at the end of VI Semester.
- Upon completion of the project work/dissertation the candidate will be required to appear for a viva-voce conducted by an external examiner.
- The Student has to attend 3 reviews before completing his/her Project.
- A candidate failing to secure the prescribed passing minimum in the dissertation shall be required to re-submit the dissertation with the necessary modifications.
- The assessment of students' performance in a semester is calculated by Continuous Internal Assessment (CA) for 40 marks and External Assessment for 60 marks.

The candidate shall be declared to have passed the Examination, if the candidate secure not less than 40 marks put together out of 100 in the Comprehensive

Examination in each Project with a passing minimum of 24 marks in External out of 60.

Internal Mark Distribution **[CA - Total Marks: 40 Marks]**

Reviews : 40 Marks (Three reviews)

(iv) CAREER COMPETENCY SKILLS I and II

a) On Line OBJECTIVES Examination (Multiple Choice questions)- Semester III

- 100 questions-100 minutes
- Twenty questions from each UNIT.
- On line examination will be conducted at the end of the III Semester.

b) Viva Voce- Semester IV

- A Student has to come in proper dress code and he/she should bring 2 copies of Resume for the Viva Voce.

- A student may be asked to
  - Give Self Introduction
  - Submit the resume to the examiner(s) and answer the questions based on it.
  - Speak on any given topic for at least two minutes.
  - Give a presentation for 10 minutes on a topic of their choice.
  - Sit with other students in a Group for a Discussion.

3. QUESTION PAPER PATTERN AND MARK DISTRIBUTION

(i) THEORY

Question Paper Pattern and Mark Distribution[Maximum Marks 75]

1. **PART – A (10 x 2 = 20 Marks)**
   Answer ALL questions
   Two questions from each UNIT

2. **PART – B (5 x 5 = 25 Marks)**
   Answer ALL questions
   One question from each UNIT with Internal Choice

3. **PART – C (3 x 10 = 30 Marks)**
   Answer ANY THREE questions
   Open Choice – 3 out of 5 questions
   One question from each UNIT

Question Paper Pattern and Mark Distribution[Maximum Marks 100]

1. **PART – A (10 x 2 = 20 Marks)**
   Answer ALL questions
   Two questions from each UNIT

2. **PART – B (5 x 7= 35 Marks)**
   Answer ALL questions
   One question from each UNIT with Internal Choice

3. **PART – C (3 x 15 = 45 Marks)**
   Answer ANY THREE questions
   Open Choice – 3 out of 5 questions
   One question from each UNIT

(ii) PRACTICAL

Question Paper Pattern and Mark Distribution [Maximum Marks 60]

Question Paper Pattern

- Practical Examinations shall be conducted at the end of every Semester.

External Marks Distribution [CE- Total Marks: 60]

i) Objective	: 10 Marks
ii) Circuit diagram/ Program	: 20 Marks
iii) Construction	:10 Marks
iv) Result Declaration	: 20 Marks
Total	**: 60 Marks**

Computer Practical Distribution

External Marks Distribution [CE- Total Marks: 60 (30+30)]

For each practical question the marks shall be awarded as follows:

i) Aim	: 5 Marks
ii) Algorithm/Flowchart	: 10 Marks
iii) Writing the Source Code	: 15 Marks
iv) Test and Debug the Source Code	: 15 Marks
v) Displaying the Output	: 10 Marks
vi) Result Declaration	: 5 Marks
Total	**: 60 Marks**

(iii) PROJECT WORK /DISSERTATION:

External Mark Distribution [CE – Total Marks: 60]

1. Project Construction & Operation	: 20 Marks
2. Documentation & Presentation	: 20 Marks
3. Viva -Voce	: 20 Marks
Total	**: 60 Marks**