BHARATHIAR UNIVERSITY, COIMBATORE – 641 046.

M.PHIL / PH.D (FT / PT) – ELECTRONICS
PART I – SYLLABUS
(Effective from the academic year 2006 – 2007 onwards)

PAPER I – RESEARCH METHODOLOGY

UNIT I : ***RESEARCH METHODOLOGY***

Meaning of Research – Objectives of Research – Motivation in Research – Types, Approaches and significance – Methods Versus Methodology – Research in Scientific Methods – Research Process – Criteria for Good Research – Problem Encountered by Research in India – Funding Agencies.

UNIT II : RESEARCH DESIGN

Research Problem: Selecting the Problem – Necessity of Defining the Problem – Techniques involved in defining the problem – Research Design – Needs and Features of Good Design – Different Research Designs – Basic Principles of Experimental Designs.

UNIT III : METHODS OF DATA COLLECTION AND USE OF COMPUTER AND INTERNET

The methods of Measurement – Data types – The sources of Measurement – Different Error sources – Characteristics of Sound Measurement – Primary versus Secondary Data – The use of Computers in Research – The Library and Internet – Use of Search engines – Virtual Libraries – Keeping in track with your Research.

UNIT IV : RESEARCH COMMUNICATION

Meaning of Research report – Allocable time – Essentials of a Scientific Report – Types of Report – Write up steps in Drafting Reports – Presentation of Sampling Error in the Report – Presentation of Inconclusive Results in Report – Components of Research report.

UNIT V : INSTRUMENTATION MEASUREMENT AND ANALYSIS

Measurement and Errors – Types of Errors – Sources of Errors – Cathode Ray Oscilloscope – Basic Principle and Block diagram – Storage Oscilloscope – Digital Storage Oscilloscope – Magnetic Tape Recorders – XY Recorders – Strip Chart Recorders – Digital Recorders of Memory type – Frequency Synthesized Signal Generator – Heterodyne Wave Analyzers and Application – Automatic and Computing Counters.

REFERENCE BOOKS;

1. C.R.Kothari – *Research Methodology Methods and Techniques* – Wishwa Prakasam Publications, IInd Edition – Unit I, II.
2. P.Saravanavel – *Research Methodology* – Kitlab Mahal, Sixth Edition – Unit IV
3. Ross – *Research an Introduction.*
4. Donald R.Cooper and Pameela S.Schinder – *Business Research Methods* – Tata Mcgraw Hill – Sixth Edition.
5. N.Subramaniam – *Introduction to Computers.*
6. Albert D.Helfrick and William D.Cooper – *Modern Electronic Instrumentation*

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PAPER II – GENERAL ELECTRONICS

UNIT I : ***MATERIAL SCIENCE***

Structure of solids – Crystalline and non Crystalline states – Inorganic Solids – Polymers – Classification, Structure, Crystallinity of long chain polymer – Crystalline Imperfection – Free electron theory – Super conducting materials – Semiconductors – Terminology and Classification – Steps in fabrication of Integrated Circuits – Dielectric Materials – Polarization – Temperature and Frequency effects – Electric Break Down.

UNIT II : ***DIGITAL SYSTEM DESIGN***

Signal conditioning and data conversion – Introduction – Sample and Hold Circuits – Analog Multiplexer and Demultiplexer – D/A Converter – types – A/D Converter – Successive A/D Conversion – Flash A/D Converter – Counter Type A/D Converter – Dual Slope A/D Converter – Integrator and Differentiator circuits – Electronic analog computation.

UNIT III : ***ADVANCED COMMUNICATIONS SYSTEMS***

Type of Signals – Analog and Digital Signals – Spectrum of Signals – Time Division Multiplexing – Frequency Division Multiplexing – 3 Channel and 12 Channel Carrier Signal – Computer Communication systems – Microwave Links : Line of Sight (LOS) Link – Tropospheric Links – Quadruple Diversity Systems – Satellite Communications – Choice of Orbit FDMA, TDMA, SAPDE – Optical Communication – Modulation and Detection – ISDN – Mobile Communications.

UNIT IV : ***MICROCONTROLLERS AND EMBEDDED SYSTEMS***

Introduction to 8051 Microcontroller – Flip Flops – Memories in Intel 8051 based Microcontroller – 8051 Micro controller Architecture: CPU , Addressing mode, External addressing, Interrupts – 8051 Instruction Set.

Embedded system Software Architecture: Round Robin – Round Robin with Interrupts – Function Queue Scheduling Architecture – Real Time Operating Systems Architecture – Selecting an Architecture – Tasks and Task States – Task and Data – Semaphores and Shared Data.

UNIT V : ***VLSI FABRICATION TECHNIQUES***

An overview of Wafer fabrication – Wafer processing – Oxidation – Patterning – Diffusion – Ion Implantation – Deposition – Silicon Gate NMOS Process – CMOS Process – N-Well – Twin tub – Silicon on Insulator – CMOS Process Enhancement – Inter Connect circuit elements.

REFERENCE BOOKS :

1. V.Raghavan – *Material Science and Engineering* – Prentice Hall of India , 4th Edition.- Unit I
2. Jacob Millman & Arvin Grabel – *Microelectronics* – McGraw Hill Publications , 2nd Edition – Unit II.
3. Anokh singh – *Principles of Communication Engineering* – S.Chand & Co., New Delhi – Unit III
4. Dhanpat Rai – *Introduction to Microprocessor and Micro Controller* – Prentice Hall Publications – 3rd Edition – Unit IV
5. Myke Predko – *Programming and Customizing the 8051 Microcontroller* – Tata McGraw Hill – Unit IV
6. David E.Simon – *An embedded Software Primer* – Low Price Edition – Addision Wesley – Unit IV
7. Neil.H.E. Weste, Kaamaran Eshraghian – *Principles of CMOS VLSI Design* – Addision Wesley Publication – 2nd Edition.
8. Pucknell Eshraghian – *Basic VLSI Design* – Prentice Hall Edition.