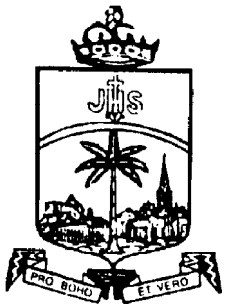
M.Sc. ELECTRONICS

SYLLABUS: 2010-2012

CHOICE BASED CREDIT SYSTEM
(CBCS)



St. JOSEPH'S COLLEGE (Autonomous)

Re-accredited with A⁺ Grade by NAAC

College with Potential for Excellence by UGC

TIRUCHIRAPPALLI - 620 002, INDIA

FEATURES OF CHOICE BASED CREDIT SYSTEM

PG COURSES

The Autonomous (1978) St. Joseph's College, Reaccredited with A+ Grade from NAAC (2006), had introduced the Choice Based Credit System (CBCS) for PG courses from the academic year 2001 – 2002. As per the guidelines of Tamil Nadu State Council of Higher Education (TANSCHE) and the Bharathidasan University, the College has reformulated the CBCS in 2008 – 2009 by incorporating the uniqueness and integrity of the college.

OBJECTIVES OF THE CREDIT SYSTEM

- To provide mobility and flexibility for students within and outside the parent department as well as to migrate between institutions
- To provide broad-based education
- To help students learn at their own pace
- To provide students scope for acquiring extra credits
- To impart more job oriented skills to students
- To make any course multi-disciplinary in approach

What is credit system?

Weightage to a course is given in relation to the hours assigned for the course. Generally one hour per week has one credit. For viability and conformity to the guidelines credits are awarded irrespective of the teaching hours. The following Table shows the relation between credits and hours.

Sem.	Specification	No. of Papers	Hour	Credit	Total Credits
I – IV	Core Courses (Theory & Practical)	14	6	14 x 5	70
	Project	1	--	1 x 5	Additional
I – IV	3 – Core Electives	3	4	3 x 4	12
	2 – Inter Dept. Courses (IDC)	2	4	2 x 4	08
I – IV	SHEPHERD – Extension Activity	~	70	5	Additional

Total Minimum Credits	90
Total Additional Credits (Compulsory)	10
Other Additional Credits (Dept. Specific)	....

However, there could be some flexibility because of practical, field visits, tutorials and nature of project work.

For PG courses a student must earn a minimum of 90 credits and 10 compulsory credits as mentioned in the above table. The total number of courses offered by a department is 20. However within their working hours a few departments can offer extra credit courses.

Course Pattern

The Post Graduate degree course consists of three major components. They are Core Course, Elective Course and Inter Department Course (IDC) . Also 2 compulsory components namely Project / Project related items and Shepherd, the extension components are mandatory.

Core Course

A core course is the course offered by the parent department, totally related to the major subject, components like Practical, Projects, Group Discussion, Viva, Field Visit, Library record form part of the core course.

Elective Course

The course is also offered by the parent department. The objective is to provide choice and flexibility within the department. The student can choose his/her elective paper. Elective is related to the major subject. The difference between core course and elective course is that there is choice for the student. The department is at liberty to offer three elective courses any semester. It must be offered at least in two different semesters. The Staff too may experiment with diverse courses.

Inter Department Course (IDC)

IDC is an inter departmental course offered by a department for the students belonging to other departments. The objective is to provide mobility and flexibility outside the parent department. This is introduced to make every course multi-disciplinary in nature. It is to be chosen from a list of courses offered by various departments. The list is given at the end of the syllabus copies. Two IDC s must be taken by students which are offered in Semester II & III.

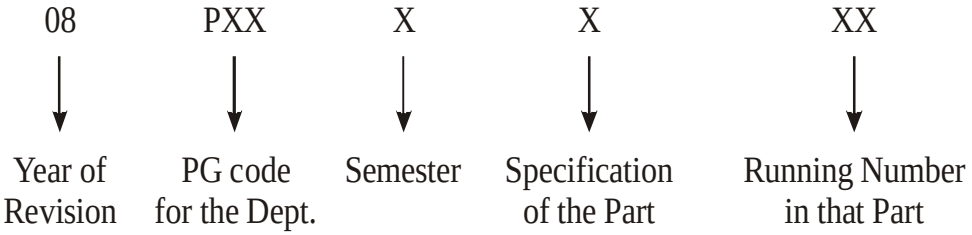
Day College (Shift-I) student may also take an IDC from SFS (Shift-II) course and vice versa

This provision enables students to earn extra credits. For the Shift – I students it is offered in their last hour and for the Shift-II

(Course) students in their first hour. The IDC are of application oriented and inter-disciplinary in nature.

Subject Code Fixation

The following code system (9 characters) is adopted for Post Graduate courses:



01 – Core Courses: Theory & Practical
02 – Core electives
03 – Additional Core Papers (if any)
04 – Inter Departmental Courses
05 – Project (compulsory)
06 – Shepherd (compulsory

CIA Components

The CIA Components would comprise of two parts: (1) Test Components conducted by Controller of Examination (COE) and (2) Teacher specific component. The two centralized tests will be conducted by the COE (Mid-Semester Test & End-Semester Test) for 30% each administered for 1 hour and 30 minutes duration. The remaining 40% would comprise of any four components as listed below and will be carried out by the faculty concerned for that paper.

- Assignment, Quiz (Written / Objective), Snap test, Viva-Voce, Seminar, Listening Comprehension, Reading Comprehension, Problem Solving, Map Reading, Group Discussion, Panel Discussion, Field Visit, Creative Writing, Open Book Test, Library Record, Case Study.
- As a special consideration, students who publish papers in referred journals would be exempted from one of the teacher specific internal components in one of the papers. At the beginning of each semester, the four internal components would be informed to the students and the staff will administer those components on the date specified and the marks acquired for the same will be forwarded to the Office of COE.

Question Pattern

Pattern	Mid & End Semester Test	Semester Exam
Part A : 1. Objective 2. Fill up 3. True or False	10 x 0.5 = 05 {6} {2} {2}	20 x 1 = 20 {10} {5} {5}
Part B: Either or Type Theory based questions Problem	1 x 3 = 03 1 x 6 = 06	3 x 4 = 12 1 x 8 = 08
Part C: Comprehensive	2/3 x 8 = 16	4 x 15 = 60

Evaluation

For each course there are formative continuous internal assessment (CIA) and semester examinations (SE) in the weightage ratio 50:50. Once the marks of CIA and SE for each course are available, the Overall Percentage Mark (OPM) for a student in the programme will be calculated as shown below:

$$OPM = \frac{\sum_i C_i M_i}{\sum_i C_i}$$ where Ci is the credit earned for that course in any semester and Mi is the marks obtained in that course.

The Scheme of Over-all Results is as follows:

	PG	
Class	Arts (OPM)	Science (OPM)
SECOND	50 to 59.99	50 to 59.99
FIRST	60 to 74.99	60 to 79.99
DISTINCTION	75 & Above	80 & Above

The performance in Compulsory credits in Project and Project related items and in Shepherd programme is indicated by a pass and is not taken into account for computing OPM.

Declaration of Result

Mr. /Ms. _____ has successfully completed M.Sc. / M.A. degree course in _____. The student's overall average percentage of marks is _____ and has completed the minimum 90 credits. The student has acquired 10 more compulsory credits from Project and Shepherd courses. The student has also acquired _____ (if any) extra credits from courses offered by the parent department.

COURSE DETAIL

SEM	SUB. CODE	SUBJECT TITLE	HRS/ WK	CREDITS
I	10PEL1101	DESIGN OF ANALOG CIRCUITS	6	5
	10PEL1102	DESIGN OF DIGITAL CIRCUITS	6	5
	10PEL1103	MICROPROCESSORS AND PROGRAMMING	6	5
	10PEL1104	ELECTRONICS PRACTICAL – I	8	5
	10PEL1201A	ELECTIVE - I: SENSORS AND TRANSDUCERS	4	4
	10PEL1201B	ELECTIVE - I: COMMUNICATION SYSTEMS	(4)	(4)
		TOTAL FOR SEMESTER I	30	24
II	10PEL2105	SIGNALS AND SYSTEMS	6	5
	10PEL2106	EMBEDDED SYSTEM I - MICROCONTROLLERS AND PROGRAMMING WITH IDE's	6	5
	10PEL2107	VLSI DESIGN AND VHDL PROGRAMMING	6	5
	10PEL2108	ELECTRONICS PRACTICAL – II	8	5
	10PEL2401	IDC – I: ELECTRONICS IN COMMUNICATION	4	4
		TOTAL FOR SEMESTER II	30	24
III	10PEL3109	DIGITAL SIGNAL PROCESSING	6	5
	10PEL3110	EMBEDDED SYSTEM II - INTERFACING TECHNIQUES AND RTOS	6	5
	10PEL3111	ELECTRONICS PRACTICALS – III	8	5
	10PEL3202A	ELECTIVE - II: PROGRAMMABLE LOGIC CONTROLLERS AND PROGRAMMING	4	4
	10PEL3202B	ELECTIVE - II: MOBILE COMMUNICATION	(4)	(4)
	10PEL3112	MINI PROJECT AND IPT	5	5
	10PEL3402	IDC – II: COMPUTER HARDWARE	4	4
		TOTAL FOR SEMESTER III	33	28
IV	10PEL4113	PROGRAMMABLE DIGITAL SIGNAL PROCESSOR AND MATLAB	6	5
	10PEL4114	POWER ELECTRONICS	5	5
	10PEL4501	PROJECT WORK	10	5
	10PEL4203A	ELECTIVE - III: MEDICAL ELECTRONICS	4	4
	10PEL4203B	ELECTIVE - III: MEMS AND NANO ELECTRONICS	(4)	(4)
		LIBRARY	2	
		TOTAL FOR SEMESTER IV	27	19
	10PELPCC4601	EXTENSION SERVICE: SHEPHERD		5
I - IV	TOTAL FOR ALL SEMESTER		120	100

SEM: I Hours: 6
10PEL1101 Credit: 5

DESIGN OF ANALOG CIRCUITS

Objective:

- To learn the designing concepts of Analog circuits
- To deal analog circuits with PSPICE environment

UNIT- I: TRANSISTORS

Introduction to semiconductors – Transistor construction – Transistor operation common base configuration – Common emitter configuration – Common collector configuration – Comparison of configuration – Voltage divider bias – Eber's Moll model of a transistor – H parameters: meaning of H parameters – Analysis formulas – CE analysis – Miller effect capacitance – High frequency response BJT amplifier.

UNIT - II: JFET AND MOSFET

JFET: structure – Biasing – Drain curve – Transconductance curve – MOSFET: depletion type MOSFET – Biasing depletion type – Applications of depletion type – Enhancement type MOSFET – Biasing enhancement type – Applications of enhancement – VMOS.

UNIT - III: OPERATIONAL AMPLIFIERS

Introduction – Differential Amplifier – Single-input Balanced-output and Single-input Unbalanced-output Differential amplifier – Block diagram of Op-Amp – The ideal Op-amp – Equivalent Circuit – Ideal voltage transfer curve – Offset voltage – Offset current – CMRR – Slew rate – Open loop op-amp configuration – Voltage series feedback amplifier – Voltage shunt feedback amplifier – Frequency response – Compensation Network – High frequency op-amp equivalent circuit – Open loop voltage gain and closed loop frequency response.

UNIT - IV: OPERATIONAL AMPLIFIER AND ITS APPLICATIONS

Summing, scaling and averaging amplifier – Instrumentation Amplifier – Integrator – Differentiator – Filters – First order low-pass and high-pass Butterworth filter – Band pass filter – Band reject

filter – All pass filter – Oscillator – Principle – Square wave, triangular wave generator – Comparator – Zero crossing detector – Schmitt trigger – Sample and hold circuit – V to I with floating & grounded load – Low voltage ac voltmeter – 555 timer – Monostable and Astable multivibrator.

UNIT - V: PSPICE

Introduction to PSPICE – getting started with PSPICE – Creating new file – placing the components – parameter checking – Simulating. Basic circuits – KVL – KCL – Voltage divider arrangement – CE transistor characteristics – CE Transistor amplifier- 555 applications – Astable – Monostable – Op-amp basic circuits – Inverting – Non inverting – Summing amplifier.

BOOKS FOR STUDY

1. Robert Boylstead and Louis Nashelstky, "Electronics Devices and Circuit Theory", 8th Edition, Prentice Hall India.
2. Malvino A.P, "Principles of electronics", 5th Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi.
3. Ramakant A.Gayakwad, "Op-Amps and Liner Integrated Circuits', Third Edition. Prentice Hall India.

Unit	Book	Chapters and Sections
1	1	3.1 – 3.4; 3.6 – 3.7; 4.5
	2	9.2, 9.3, 9.4
	1	11.8, 11.9
2	2	12.1; 13.1 – 13.7
3	3	1.1, 1.2, 1.6, 1.7, 2.3, 3.3, 3.4, 3.5, 3.2, 6.10, 3.6, 4.3, 4.4, 6.2, 6.3, 6.6, 6.7, 6.8.
4	3	7.5, 7.6, 7.12, 7.13, 8.3, 8.4, 8.5, 8.8, 8.9, 8.10, 8.11, 8.15, 8.16, 9.2, 9.4, 9.15,7.8,10.4,10.5
5		Material prepared by the Department of Electronics

BOOKS FOR REFERENCE

1. Donald. L Schilling Charless Belove, "Electronic Circuits", 3rd Edition Tata McGraw- Hill Publishing Company Limited, New Delhi.

SEM: I Hours: 6
10PEL1102 Credit: 5

DESIGN OF DIGITAL CIRCUITS

Objective: To discuss about the designing principle of digital circuits.

UNIT – I: LOGIC FUNCTIONS AND COMBINATIONAL LOGIC DESIGN

Logic map – K-maps – Four variables – SOP - Prime implicant determination Tabular Method: Binary adders: Full adder, Ripple carry adder, Carry lock ahead adder, Binary Subtractor, Multiplexers: Multiplexers as general purpose logic circuit, Decoders and Encoders: De multiplexers, n to 2^n line decoder, Tree decoder, Decoder as general purpose logic circuits &code conversion, Read only memory-Other LSI programmable logic.

UNIT - II: SEQUENTIAL CIRCUIT COMPONENTS

Introduction to sequential circuits-Latches and Flip flops: SR Latch, Timing problems and clocked SR Latches, JK Latch, Master slave Latch, Delay flip flop, T flip flop, Flip flop Excitation Requirements-Registers: Serial load shift registers, Parallel load shift register, Parallel to serial conversion, Universal registers.

UNIT - III: SYNCHRONOUS SEQUENTIAL MACHINES & DESIGN

Basic concepts - State assignments - General design procedure - State equivalence and machine minimization - Machines with finite spans - Synchronous counters-Algorithmic state machines - Asynchronous inputs.

UNIT - IV: FAULT DIAGNOSIS, TESTING AND A SIMPLE COMPUTER DESIGN

Introduction - Fault detection and location - Fault detection table-Compact testing techniques-Signature analysis - The scan path testing technique - Designing for testability - Building blocks - Register transfer language - Macro and Micro operations - Design of control unit - Programming computer.

UNIT - V: LABVIEW FOR DIGITAL CIRCUITS

Getting started with Lab VIEW virtual instruments: Building a virtual instrument-Launching Lab VIEW-Opening a new VI from a template-Adding a control to front panel-Changing a signal type-Wiring objects on block diagram-Running a VI-Modifying a signal-Displaying two signals on a graph-Customizing the knob control-Customizing a wave from graph-Customizing a VI – Acquiring data and communicating with instruments.

BOOK FOR STUDY

1. Norman Balabaniam/Bradly Carlson, "DIGITAL LOGIC DESIGN PRINCIPLES", John Wiley & sons, Inc. New York/ Chichester/ Weinhein/ Brisbane/ Toronto/ Singapore.
2. Brian Holds worth/Clive woods, "DIGITAL LOGIC DESIGN", Fourth edition, Published by Elsevier.
3. Donald P Leach/Albert Paul Malvino/Goutam Saha, "DIGITAL PRINCIPLES AND APPLICATIONS", Tata McGraw-Hill Publishing Company Limited, New Delhi.
4. National instruments, "Lab VIEW manual"

Unit	Book	Chapters and Sections
1	1	(Chapter 3) –Title 2, 8. (Chapter 4)- Full
2	1	(Chapter 5)-Full
3	1	(Chapter 6)-Full
4	2 3	13.1, 13.2, 13.9,13.13 - 13.16 (Chapter 16)-Full
5	4	(Chapter 1)-Full (Chapter 2)-Full (Chapter 4)-Full

BOOKS FOR REFERENCE

1. Virendrakumar, "Digital Technology, Principles and Practice", New Age International Publications.

SEM: I Hours: 6
10PEL1103 Credit: 5

MICROPROCESSORS AND PROGRAMMING

Objective: To learn the Concepts of 8085 and 8086 microprocessors and to develop assembly language programs

UNIT-I: INTEL 8085 ARCHITECTURE AND INSTRUCTION SET

Introduction to INTEL8085 - Register structure- Pin details and functions - Instruction cycle – Timing diagram - Instruction set - Addressing modes - Status flags - data transfer group – Arithmetic group – Logical group – Branch – Stack, I/O and machine control group

UNIT-II: MEMORY AND I/O INTERFACING TECHNIQUES

Address space partitioning – Memory and I/O interfacing – DMA controller 8257-Data transfer schemes – Interrupts of INTEL 8085 – interfacing and programming 8255 – 8259 programming and interfacing- 8251 programming and interfacing – 8253 programming and interfacing - programmable interval timer interfacing- 8279 keyboard interfacing.

UNIT-III: INTEL 8086 ARCHITECTURE & DATA TRANSFER INSTRUCTION

Introduction to 8086 microprocessor - internal architecture – execution unit – General purpose registers – instruction pointers – addressing modes – instruction set – constructing the machine codes for 8086 instructions – segment registers - Memory segmentation

UNIT-IV: 8086 ASSEMBLY LANGUAGE PROGRAMMING MINIMUM AND MAXIMUM MODE

Simple programs – finding average of two numbers – conditional and unconditional jump instructions – conditional flags – time ,delay loops – timing diagram – minimum mode – addressing memory and I/O ports – addressing and address decoding – maximum mode.

UNIT-V: ADVANCED MICROPROCESSORS

Introduction to 80386 – Pentium processors – APIC – MMX – SMM – P6 family of processors – SSE2 – SSE3 – HT technology – Pentium M processors – RISC machine – Parallel processing - Introduction to Multicore – Dual core – Core duo processor technology.

BOOKS FOR STUDY

1. B. Ram, "Fundamentals of Microprocessors and Microcomputers", Fourth edition, Dhanpat Rai & Sons

2. Douglas V. Hall, "Microprocessors and Interfacing Programming and Hardware", Second Edition, Tata McGraw-Hill.

Unit	Book	Chapters and Sections
I	1	3.1- 3.4, 4.1- 4.6.5
II	1	7.1 – 7.7.4, 7.9- 7.11, 7.12.5
III	2	2.11 – 2.20, 3.6 – 3.29
IV	2	4.1- 4.4, 4.8 – 4.33 7.1 – 7.42, 11.1 -11.10
V	2	15.6 – 15.24, 16.1 – 16.19,

Material prepared by the Department of Electronics

BOOKS FOR REFERENCE

1. K.R. Venugopal Rajkumar, "Microprocessor X86 Programming", New Delhi, BPB Publications, 2005.

2. M. Rafiquzzaman, "Microprocessors, Theory and Applications", Intel and Motorola (Revised edition), Prentice Hall India.

SEM: I Hours: 4
10PEL1201A Credit: 4

ELECTIVE - I: SENSORS AND TRANSDUCERS

Objective: To expose the working principle of sensors and transducers

UNIT - I: TRANSDUCERS

Introduction to measurement – Direct and indirect measuring methods – Accuracy – Errors – Transducers - resistive transducers – potentiometers – non-linear potentiometers function generators – strain gauges – types of strain gauges – resistance thermometers – variable inductance transducers – linear variable differential transformer – capacitive transducers – peizo electric transducers – Hall Effect transducers – magneto resistors

UNIT - II: MEASUREMENT OF NON-ELECTRICAL QUANTITY

Measurement of vibrations – seismic transducers – measurement of flow rate- measurement of thickness – measurement of humidity – measurement of sound using microphones – measurement of pH value – measurement of thermal conductivity- Measurement of pressure.

UNIT - III: INTEGRATED SENSORS

LM 35 temperature sensor – DS18s20 1-wire digital thermometer - TSOP 17 photo modules for PCM remote control system – TL173L linear hall effect sensor – KMZ51 magnetic field sensor – MPXV5004G pressure sensor – A1425 analog speed sensor – LM1830 water level sensor – HC610 humidity sensor – ICM105A VGA CMOS sensor

UNIT - IV: BIOSENSORS

Introduction - FET & MOSFET chemical sensor - Bio sensors - Ion exchange membrane electrodes- oxygen electrodes- CO_2

electrodes enzyme electrode -construction - ISFET for glucose, urea etc. Electrolytic sensors - optical sensor - fiber optic sensors.

UNIT -V: SIGNAL CONDITIONERS

Signal conditioning – Op-amp circuit used in instrumentation – Differential amplifier – Voltage follower – Instrumentation amplifier – Filters – Wheatstone bridge – AC bridges.

BOOK FOR STUDY

1. A. K. Sawhney, "A course in Electrical and Electronic Measurements and Instrumentation", Dhanpat Rai & Co. publishers

Unit	Book	Chapters and Sections
1	1	25.2-25.9,25.11-25.13,25.16,25.17,25.19,25.22-25.24
2	1	29.24 - 29.25; 29.40-29.43; 29.47, 29.15
3		Material prepared by the Department of Electronics
4		Material prepared by the Department of Electronics
5	1	31.3-31.5; 31.7-31.10

BOOK FOR REFERENCE

1. H. S. Kalasi, "Electronic Instrumentation", Tata McGraw-Hill publishers.
2. Albert D. Helbrick and William D.Cooper, "Modern Electronic Instrumentation and Measurement techniques", New Delhi: Prentice Hall of India, 1995.

SEM: I Hours: 4
10PEL1201B Credit: 4

ELECTIVE - I: COMMUNICATION SYSTEMS

Objective: To impart the concepts of Digital Modulation Techniques and the principles of Fiber optics communication.

UNIT-I: PULSE MODULATION SYSTEMS

The sampling theorem: low pass signals, band pass signals-PAM-channel bandwidth for a PAM signal-Natural sampling-Flat top sampling-PCM-Electrical representation of binary digits-the PCM system – companding - multiplexing PCM signal – Differential PCM - Delta modulation

UNIT-II: DIGITAL MODULATION TECHNIQUES

Phase shift keying-binary PSK-Differential PSK-Differentially encoded PSK (DEPSK)- Quadrature PSK-M ary PSK-FSK-Binary FSK-Similarity of BFSK and BPSK-M ary FSK.

UNIT-III: PRINCIPLES OF FIBRE OPTIC COMMUNICATION

Need for optical communication – introduction – physical nature of optical fibre – basic principle involved in optical fibre technology – fibre classification – acceptance angle, acceptance cone and numerical aperture of fibre – optical fibre bundles and cables – fiber splices, connector and couplers – fibre attenuation – dispersion in optical fibre – manufacturing of fibre – advantages/ disadvantages of using optical fibre as communication medium – various application area of optical fibre

UNIT-IV: FIBRE OPTICAL COMMUNICATION SYSTEMS

Light sources: light emitting diodes – LED operating characteristics – LASER principles – LASER diodes – LASER diode operating characteristics – distributed feedback LASER diode – optical amplifier. Light detectors: principles of photo detection – semiconductor photodiode – PIN photodiode – avalanche photo diode. Modulation methods and modulators-Switches-Transmitters-

Receivers-Repeaters- Transmitter design-Receiver design-Link design

UNIT – V: PAGING & WIRELESS DATA NETWORK

Introduction – Paging and Messaging system – Wireless Local Area Network – LAN – Ethernet Bridges – Radio LANs – IEEE 802.11 – Blue tooth – Wireless Bridges- Wireless Modem- Wireless Packet Data Services.

BOOK FOR STUDY

1. Taub and Schilling, "Principles of communication systems", 2nd edition, New Delhi: Tata McGraw Hill Ltd, 1998.
2. Anuradha De, "Optical fibre & LASER, principles & applications", New age international publishers.
3. Joseph C, Palais, "Fiber optic communications", fourth edition, Prentice Hall international Inc,
4. Agarwal, D.C, "Fiber optic communication" 2nd edition, Wheeler publishing, 1998.
5. Roy Blake, "Wireless Communication Technology", First Reprint, 2001, Thomson Asia P Ltd. Singapore.

Unit	Book	Chapters and Sections
1	1	5.1-5.5; 5.9-5.15
2	1	6.2 - 6.6; 6.8 - 6.10
3	2	1.7; 2.1 - 2.12
4	3	6.1 – 6.7; 7.1, 7.3 – 7.5
	4	5.3 – 5.7; 5.10; 6.2 – 6.4
5	5	Chapter 13

BOOK FOR REFERENCE

1. Taub and Schilling, "Electronic communications", Bell & Howell Company, 1992.
2. J. G. Proakis, "Digital Communication", 4th edition, Tata McGraw-Hill.
3. G. Keiser, "Optical Fiber Communications", 3rd edition, Tata McGraw-Hill.

SEM: II Hours: 6
10PEL2105 Credit: 5

SIGNALS AND SYSTEMS

Objective: To Acquire the basics of Signals, Systems and Transformations.

UNIT – I: INTRODUCTION TO SIGNAL AND SYSTEM

Signals: Definition – Classification of signals – Basic operations on signals – Types of signals. Systems: Definition – Classification of systems – Properties of systems – Properties of continuous-time linear time-invariant (LTI) system – Properties of discrete- LTI system.

UNIT – II: LAPLACE TRANSFORM

Definition – Representation of signals using Laplace transform – Region of Convergence (ROC) – Properties of Laplace transform – Initial value and final value theorem – Inverse of the Laplace transform – Analysis of passive networks using Laplace transform – Solution of differential equations using Laplace transform – Relationships between Laplace transform (LT) and continuous-time Fourier transform (CTFT).

UNIT – III: FOURIER SERIES

Continuous-time Fourier series (CTFS): Definition – Dirichlet condition – Fourier series representation of continuous-time periodic signal – Trigonometric Fourier series – Problems – Exponential Fourier series – Problems – Properties of CTFS. Discrete-time Fourier series (DTFS): Definition – Fourier series representation of discrete-time periodic signal – Calculation of DTFS coefficient – Properties of DTFS.

UNIT – IV: FOURIER TRANSFORM

Continuous-time Fourier Transform (CTFT): Definition – Dirichlet condition – CTFT representation of aperiodic signal – Properties of CTFT – Problems. Discrete Time Fourier Transform

(DTFT): Definition – DTFT representation of aperiodic signal – Properties of DTFT – Problems.

UNIT – V: Z -TRANSFORMS

Z-Transforms (Double and Single sided) – ROC conditions - Properties - Initial and final value theorems – – Relationship between the Z-transform and discrete-time Fourier transform – Relationship between the Z-plane and S-plane – Methods of inverse Z-transforms – Power series method (long-division) – Partial-fraction method – Residual method.

BOOK FOR STUDY

1. Poornachandra S., "Signals and System", Vijay Nicole imprints Pvt. Ltd., 2004

Unit	Book	Chapters and Sections
I	1	1.1 - 1.4, 2.1- 2.2.7, 3.4, 4.3
II	1	10.1, 10.2, 10.4, 10.7 - 10.9, 10.11 - 10.13
III	1	5.1, 5.2, 5.4, 6.1- 6.3
IV	1	7.1 - 7.4, 8.1- 8.3
V	1	11.1 - 11.4, 11.7 – 11.9, 11.12

BOOK FOR REFERENCE

1. Alan V. Opphenehim, Alan S. willsky and Hamid nawab S., "Signals and Systems", Second Edition, PHI, 2004.

2. Haykin, Simon and Barry van veen, "Signals and System", Second Edition, Wiley, 2003.

SEM: II Hours: 6
10PEL2106 Credit: 5

EMBEDDED SYSTEM I - MICROCONTROLLERS AND PROGRAMMING WITH IDEs

Objective: To provide basic concepts on two typical microcontrollers and develop skill in programming.

UNIT - I: 8051 MICROCONTROLLER

Introduction to 8051 microcontroller – flag bits and PSW – Register banks and stack – Jump –loop – call instructions – I/O port programming – Addressing modes – arithmetic and logic instructions

UNIT - II: PERIPHERALS OF 8051 AND KEIL IDE

8051Timer and counter programming - Serial communication- Interrupts programming – Introduction to Keil – Getting started with KEIL – creating project – entering new file – opening project – device selection –Creating new target –adding source file - compiling - debugging – peripheral selection – simulation - Viewing the content of registers and in ports – serial data – restricting the code size.

UNIT - III: INTRODUCTION TO AVR MICROCONTROLLERS

Introduction to AVR microcontrollers – microcontroller's series in AVR family – salient features of AVR controllers – AVR CPU core architecture – features of atmega8 – architecture of atmega8 – registers – program memory - SRAM – power management and sleep mode – methods of resetting microcontroller – principles of watch dog timer & brown out detector – I/O port structure & associated registers – instruction set summary

UNIT - IV: ATMEGA 8 PERIPHERALS & AVR STUDIO

Peripherals: EEPROM and associated registers – accessing EEPROM (Read & Write) – ADC block diagram – accessing ADC through free running & single conversion mode – analog comparator and its accessing – TWI – SPI – USART- Register organization: interrupts – timer/counter - AVR Studio: introduction – creating

projects – simulating a program – simulating peripherals – debugging – running a program

UNIT - V: MICROCONTROLLER REAL TIME APPLICATIONS:

8051 MICROCONTROLLER: Assembly language program: Interfacing a stepper Motor – C language programming: Interfacing an ADC 0809 – keypad interfacing – DAC 0808 interfacing – temperature sensor interfacing

AVR MICROCONTROLLER: Assembly language: LCD Interfacing. C language Programming: Interfacing LED - Driving Relays with AVR – using internal PWM of AVR microcontroller to control the speed of a DC motor.

BOOKS FOR STUDY

1. Muhammad Ali Mazidi, Janice Gillispie Mazidi., "The 8051 Microcontroller and Embedded systems", Pearson Education, 2004.
2. ATMEGA 8L Datasheet from ATMEL

Unit	Book	Chapters and Sections
I	1	Chapters 2, 3, 4, 5, 6, 7
II	1	Chapter 9, 10, 11 and Material prepared by the Department of Electronics for KEIL IDE
III	2	Relevant sections from data sheet
IV	2	Relevant sections from data sheet and Material prepared by the Department of Electronics for AVR studio
V	2	Material prepared by the Department of Electronics

BOOK FOR REFERENCE

1. Ayala, Kenneth, "The 8051 Microcontroller", Upper Saddle River, New Jersey Prentice Hall India, 2000.

SEM: II Hours: 6
10PEL2107 Credit: 5

VLSI DESIGN AND VHDL PROGRAMMING

Objective: To learn the basics of VLSI technology and VHDL programming

UNIT – I: SEMICONDUCTOR DEVICES FOR VLSI TECHNOLOGY

Basic MOS transistor – enhancement and depletion mode transistor action – NMOS fabrication – CMOS fabrication – BICMOS technology – pass transistor – nMOS inverter, CMOS and BICMOS inverter – latch-up in CMOS & BICMOS circuits - MOS layer – stick diagram – design rules and layout diagram – Lambda based design rules – contact cuts – Double metal MOS process rules – CMOS lambda based design rules- symbolic diagram.

UNIT – II: SCALING AND TESTING FOR VLSI SYSTEM

Basic circuit concepts – sheet resistance – capacitance – delays – driving large capacitive loads – propagation delays – wiring capacitance -Scaling factor for device parameter factors – limitation of scaling - switch logic –– Pass transistors and transmission gates - gate logic – the inverter -CMOS logic – Pseudo nMOS logic – Dynamic CMOS logic – Clocked CMOS – CMOS domino logic – n-p CMOS logic - real world VLSI design – Design styles and philosophy – The interface with the fabrication house – cad tools for design and simulation – aspects of design tools – Graphical entry layout – Design verification prior to fabrication - DRC – circuit extractors - test and test ability – System partitioning.

UNIT – III: BASIC CONCEPTS OF VHDL

VHDL Terms - Describing Hardware in VHDL - Entity - Architectures - Concurrent Signal Assignment - Event Scheduling - Statement Concurrency - Structural Designs - Sequential Behavior - Architecture Selection - Configuration Statements - Power of Configurations - behavioral modeling– transport versus inertial delay – simulation deltas – drivers – generics – block statements –

sequential processing – process statement – signal assignment Vs variable assignment – sequential statement.

UNIT – IV: DATA TYPES AND SYNTHESIS CONCEPTS OF VHDL

Object types – data types – file type caveats – subtypes Register transfer level description – constraints – attributes – technology libraries – synthesis – simple gate – IF control flow statements – case control flow statements – simple sequential statements – asynchronous reset – asynchronous preset and clear – more complex sequential statements – state machine example – RTL simulation – VHDL synthesis – function Gate-level verification – place and route – post layout timing simulation – static timing.

UNIT – V: CIRCUIT DESIGN AND SIMULATION USING QUARTUS-II IDE

Introduction to Quartus II IDE- creating project – creating schematic-loading programs – compiling – simulating – executing – Using DE1 kit- implementing the design in DE1 – interfacing an LED with DE1 – interfacing seven segments – interfacing ADC0808 with DE1 kit – interfacing DE1 with switches.

BOOKS FOR STUDY

1. Douglas A. Pucknell & Kamran Eshraghian, "Basic VLSI Design", 3rd edition, Prentice hall of India Pvt Ltd. New Delhi
2. Douglas L. Perry, "VHDL programming by example", 4th edition, Tata McGraw hill. New Delhi.

Unit	Book	Chapters and Sections
I	1	1.1 – 1.11, 2.5-2.10, 2.12.3- 2.14, 3.1-3.3.4, 3.8
II	1	4.1-4.11, 5.1-5.6, 6.1-6.3.4.5, 10.8-10.13.4.2
III	2	Chapters 1, 2, 3
IV	2	Chapters 4, 9, 10, 11
V		Material prepared by the Department of Electronics

BOOK FOR REFERENCE

1. Neil H.E.Veste,TLW "Principles of CMOS VLSI Design" Addison Welsley NewDelhil

SEM: II Hours: 4
10PEL2401 Credit: 4

IDC – I: ELECTRONICS IN COMMUNICATION

Objective: To learn the Basic principles of Electronics communication systems.

UNIT – I: BASIC CONCEPTS AND LAWS

Introduction - Resistance – Capacitance – Inductance – Ohm's and Kirchhoff's laws – Semiconductors – Amplifiers – Piezoelectricity – Transducer – Microphone – Speakers – Laser – Digital signals.

UNIT-II: INTRODUCTION TO COMMUNICATION SYSTEMS

Introduction – Communication systems - Amplifiers – Modulation - Need for Modulation – Theory of amplitude modulation – frequency and Phase Modulation (Description only) – Comparison – Armstrong method - Description of SSB – Phase shift method.

UNIT –III: ANTENNAS AND RADIO RECEIVERS

Elementary consideration – Radiation mechanisms-elementary doublet-Antenna parameters and their definitions-effects of antenna height-folded dipole and its applications-parabolic reflectors-Helical antenna-Superhetrodyne receiver-radio frequency section characteristics-Communication receivers (block diagram only)-FM receiver (block diagram)

UNIT- IV: TELEVISION

Introduction to television theory – Details of Indian standard – Black and White transmission - Vidicon – Plumbicon – Scanning - TV tuner block diagram - Transmission and Reception of color TV.

UNIT –V: RADAR AND SATELLITE COMMUNICATION

Radar: Radar fundamentals- Basic principles- Factors governing RADAR performance.

Satellite communication: General principles-Classification-description-tracking-Satellite space craft system-Existing satellite systems and Organisations – Telegraphy – Modem – Coaxial Cable System – Optical Communication System.

BOOK FOR STUDY

Material prepared by the Department of Electronics.

SEM: III Hours: 6
10PEL3109 Credit: 5

DIGITAL SIGNAL PROCESSING

Objective: To impart the algorithms of Signal Processing.

UNIT – I: DISCRETE FOURIER TRANSFORMS AND FAST FOURIER TRANSFORM

Frequency analysis of discrete-time signal – Properties of DFT– Problems. IDFT: Definition – Problems. FFT: Definition – Radix-2 FFT algorithm – Decimation-in-time – decimation-in-frequency – Problems – Inverse FFT – Problems – Linear convolution: Cross table method – Matrix method – Circular convolution: Circle method – matrix method – DFT-IDFT method – Section convolution: Overlap-save method – overlap-add method.

UNIT – II: FINITE IMPULSE RESPONSE (FIR) FILTERS

Symmetric and antisymmetric FIR filters – Design of linear-phase FIR filters using windows: Rectangular – Blackman – Hamming – Hanning – Design of linear-phase FIR filters by frequency-sampling method – Optimum equiripple linear-phase FIR filter – Comparison of design methods for linear-phase FIR filter.

UNIT – III: INFINITE IMPULSE RESPONSE (IIR) FILTERS

IIR filter design by approximation of derivatives – Impulse invariance method – Bilinear transformation – Characteristics of analog filters: Butterworth – Chebyshev – Elliptic– Frequency transformation in the analog and digital domain.

UNIT – IV: DISCRETE-TIME SYSTEMS IMPLEMENTATION AND MULTIRATE DSP

Representation of numbers – Quantization of filter coefficients – Round-off effects in Digital filters. Multirate DSP: Introduction – Decimation by a factor D – Interpolation by a factor I – Sampling rate conversion by a rational factor I/D –Implementation of sampling rate conversion – Multistage implementation.

UNIT – V: APPLICATIONS OF DSP

Speech Processing – Speech analysis – Speech coding – Sub band coding – Channel vocoder – Homomorphic vocoder – Digital processing of audio signals – Radar signal processing – DSP based measurement system – Application of Multirate: Sub band coding of speech signals – Transmultiplexers.

BOOKS FOR STUDY

1. Poornachandra S., "Signals and System", Vijay Nicole imprints Pvt. Ltd., 2004

2. John G. Proakis, Dimitris G. Manolakis, "Digital Signal Processing Principles, Algorithm and Applications", 4th Edition, PHI, 2007.

3. Ramesh Babu P., "Digital Signal Processing", 4th Edition, Scitech Publication Pvt. Ltd, 2007.

Unit	Book	Chapters and Sections
I	1	9.1 - 9.6, 4.4 - 4.6
II	2	10.2.1 - 10.2.4, 10.2.7
III	2	10.3 - 10.4
IV	2	9.4 - 9.6, 11.1- 11.6
V	3	10.1- 10.10
	2	11.9.4, 11.10.2

BOOK FOR REFERENCE

1. Alan V. Opphenehim, Ronald W. Schafer, "Digital Signal Processing", 2nd Edition, PHI, 2004

2. Salivahanan S, Vallavaraj A, Gnanapriya C, "Digital Signal Processing", Tata McGraw Hill Publishing, 2003.

SEM: III Hours: 6
10PEL3110 Credit: 5

EMBEDDED SYSTEM II - INTERFACING TECHNIQUES AND RTOS

Objective:

- To know about the protocols and interfacing techniques using PIC microcontroller.
- To develop the skills in system interfacing through Serial and parallel port
- To learn the basic ideas of RTOS

UNIT - I: PIC MICROCONTROLLERS 16F87X

PIC microcontrollers – Harvard architecture and pipelining – Device overview – memory organization – Registers – I/O ports – Instruction set. Timer 0 – Timer1- Timer2 – capture compare PWM modules

UNIT – II: PROTOCOLS AND INTERFACING CONCEPTS WITH PIC MICROCONTROLLER:

I2C Transmission reception – SSP - USART–ADC – Oscillator selection – power on reset – PWRT – OST brown out reset- interrupts –watch dog timer. Interfacing with EEPROM – interfacing with RTC DS1307 – CAN interfacing – introduction to USB – Ethernet protocols

UNIT – III: SERIAL AND USB

Introduction to serial communication- serial communication formats- encoding types – RS232 standard – DB 9 pin descriptions – MAX 232 – hardware and software handshaking – null modem wiring – baud rate calculation – PC to PC communication – PC to microcontroller communication – using HyperTerminal – USB - Interfacing concepts.

UNIT - IV: REAL TIME OPERATING SYSTEMS

Round-Robin – Round-Robin with interrupts – Function – Queue-Scheduling Architecture – Real-Time-Operating system

Architecture – Selecting architecture – Task and Task states – Events and data – Semaphore and shared data.

UNIT - V: OPERATING SYSTEM SERVICES AND BASIC DESIGN CONCEPT:

Message queues – mail boxes – Pipes – Timer Functions – Event function – Memory management – Interrupt Routines in an RTOS environment – Basic design overview – principle – write short interrupt routines - Recommended task structure – Avoid creating and Destroying Tasks – Restricting RTOS – Underground Tank monitoring system – Resolving a timing problem – Deciding to use an RTOS – Dividing the work into tasks – Moving the system forward – Dealing with the shared data.

BOOKS FOR STUDY

1. 16F87X PIC microcontroller datasheet by MicroChip.
2. David E. Simon, “An Embedded system Software Primer”, Pearson Education, tenth Indian Reprint, 2004.

Unit	Book	Chapters and Sections
I	1	16F87X PIC datasheet
II		Material prepared by the Department of Electronics
III		Material prepared by the Department of Electronics
IV	2	5.1 -5.5, 6.1 – 6.3
V	2	7.1 -7.5, 8.1 – 8.3

BOOK FOR REFERENCE

1. John Peatman, “Design with PIC Microcontrollers”, Pearson Education, 2004
2. Rajkamal, “Embedded Systems Architecture, Programming and Design”, TATA McGraw-Hill, Third reprint, 2004.

SEM: III Hours: 4
10PEL3202A Credit: 4

ELECTIVE - II: PROGRAMMABLE LOGIC CONTROLLERS AND PROGRAMMING

Objective:

- To learn the concepts of PLC
- To Deal with Ladder Logic programming and Simulation in IDE using OMRON and KEYENCE

UNIT-I: INTRODUCTION TO PLC, LADDER DIAGRAM FUNDAMENTALS

Introduction to PLC – PLC Vs Microcontroller – Basic Components and their Symbols – Control Transformers – Fuses – Switches – Relays – Time Delay Relays – Fundamentals of Ladder Diagram – Basic diagram framework – Wiring Reference Designators – Boolean Logic & Relay Logic – AND-OR & OR-AND – Ground Test – The Latch – Two handed Anti-Tie Down, Anti-Repeat – Combined Circuit – Machine Control Terminology.

UNIT-II: PROGRAMMABLE LOGIC CONTROLLER & FUNDAMENTAL PROGRAMMING

PLC Configurations – System Block Diagram – Update – Solve the Ladder – Physical Components Vs Program components – Light Control – Internal Relays – Disagreement Circuit - Majority Circuits – Oscillators – Holding Contacts - Always ON & OFF Contacts – Ladder Diagrams having complex Rung.

UNIT - III: ADVANCED PROGRAMMING TECHNIQUES AND OVERVIEW OF MNEMONIC PROGRAMMING CODE

Ladder Program execution Sequence – One Shot– JK-Flip Flop – Counters – Sequencers – Timers – Master control Relays and control Zones – AND Ladder Rung – Entering Normally Closed Contacts – OR Ladder Rung – Simple Branches – Complex Branches.

UNIT- IV: WIRING TECHNIQUES, ANALOG I/O & SENSORS

PLC Power Connection – input wiring – Inputs having a single common – Isolated inputs – Output wiring – Relay outputs – Solid state outputs – Analog (A/D) inputs – Analog (D/A) output – Sensor Output classification – Connecting Discrete sensors to PLC inputs – Proximity sensors – Optical Proximity Sensors.

UNIT- V: WORKING IN OMRON & KEYENCE IDE WITH LADDER LOGIC

Introduction to OMRON & KEYENCE – Creating a project – Ladder Programming – Compiling and Executing – Ladder Programs – Logic Gate functions (AND, OR, NOT, NAND, NOR, XOR) – Using Timers (ON delay timer, OFF delay timer, one shot pulse, flashing pulse), Counters – Using Calendar functions

BOOK FOR STUDY

1. John R. Hackworth, Frederick D. Hackworth, Jr., "Programmable Logic Controllers, Programming Methods and Applications", New Delhi: Pearson Education, 3rd edition.

Unit	Book	Chapters and Sections
1	1	Material prepared by the Department of Electronics (for 1st two topics), 1.1 – 1.3
2	1	2.2 – 2.6, 3.1 – 3.9
3	1	4.1, 4.2, 4.4, 4.8 – 4.11, 5.1 – 5.5
4	1	6.1 – 6.7, 7.1, 7.2, 8.1 – 8.3, 8.7
5	-	Material prepared by the Department of Electronics

BOOK FOR REFERENCE

1. John. W .Webb, Renoald A. Rein, "Programmable Logic Controller Principles and Application", Prentice Hall India, 5th Edition.

SEM: III Hours: 4
10PEL3202B Credit: 4

ELECTIVE - II: MOBILE COMMUNICATION

Objective: To learn the concepts of mobile communication

UNIT - I: TELECOMMUNICATION SYSTEMS

GSM: mobile services – system architecture – radio interface – protocols – localization and calling – handover – security – new data services

UNIT - II: MOBILE NETWORK LAYER

Mobile IP: goals, assumptions and requirements – entities and terminology – IP packet delivery – agent discovery – registration – tunneling and encapsulation – optimizations – reverse tunneling – IPv6 – IP micro-mobility support – Dynamic host configuration protocol

UNIT - III: MOBILE TRANSPORT LAYER

Traditional TCP: congestion control – slow start – fast transmit/ fast recovery – implications on mobility – classical TCP improvements: indirect TCP – snooping TCP – Mobile TCP - fast transmit/fast recovery – transmission/time-out freezing – selective transmission – transaction-oriented TCP – TCP over 2.5/3G wireless networks - Performance enhancing proxies.

UNIT - IV: WIRELESS APPLICATION PROTOCOL (version 1.x)

Architecture – wireless datagram protocol – wireless transport layer security – wireless transaction protocol – wireless session protocol – wireless application environment – wireless markup language – WML Script – wireless telephony application – push architecture – push/pull services – i-mode – syncML – WAP 2.0

UNIT - V: SYMBIAN OS FUNDAMENTALS

Object creation and destruction: dynamic objects – automatic objects – Error handling and clean up: kinds of error – panics – leave and trap harness – cleanup stack – Naming conventions: class names – data names – function names – macro names – Descriptors: types – modifiable and non-modifiable descriptors – class structure – using abstract classes in interfaces – literal_LIT – some standard descriptor functions – representing binary data – more on HBufc – active objects

BOOK FOR STUDY

1. Jochen Schiller, “Mobile communications”, Second edition, Pearson Education Ltd.,
2. Richard Harrison, “Advanced Symbian OS C++ programming for mobile phones”, volume 2, Wiley publication.

BOOK FOR REFERENCE

1. W. C. Y. Lee, “Mobile Communication Engineering”, 2nd edition, McGraw- Hill, 1998

Unit	Book	Chapters and Sections
1	1	4.1.1- 4.1.8
2	1	8.1.1 – 8.1.10;8.2
3	1	Chapter 9
4	1	10.3.1 – 10.3.12
5	2	1.1- 1.5

SEM: III Hours: 4
10PEL3402 Credit: 4

IDC – II: COMPUTER HARDWARE

Objectives: To learn the basic hardware configuration of a computer system.

UNIT-I: MOTHER BOARDS, CHIPSET, AND CONTROLLERS

Motherboard: Motherboard designs - Motherboard form factors-Motherboard connectors-Back panel connectors-Onboard connectors-Front panel connectors. Chipset and controllers: Chipset groupings-controller chips-Bus architecture-Keyboard controller-Chipset and their functions-chipset characteristics-Built in controller.

UNIT-II: BIOS AND SYSTEM RESOURCES

BIOS chips-ROM BIOS-BIOS setup-BIOS activities-Cold Boots Vs Warm Boots - BIOS startup screen - System configuration data - Standard settings - Advanced features - Plug and Play - Extended system configuration data.

UNIT-III: SECONDARY STORAGE DEVICES

Hard Disk Drive - Logic, controller boards - Connectors and Jumpers-Hard disk Interfaces-FDD-Formatting CD-ROM: Technology of the CD and CDROM.

UNIT-IV: EXPANSION SLOTS AND MONITOR

Expansion buses: Serial and parallel ports - USB & IEEE1394 Interfaces - Different cards. Monitor: PC monitor - CRT displays - Dots and Pixels - LCD's - Signals and connectors – Resolution.

UNIT–V: PRINTER, KEYBOARD AND MOUSE

Printer: Printer characteristics - Printer speed - Text and Graphics - Fonts-Print styles - Print sizes - Font classifications. Keyboard and Pointing devices: Keyboard layouts - Keyboard controllers - Keyboard cable. Mouse: Inside the Mouse - Mouse connectors -Wheel Mouse - Optical Mouse

BOOK FOR STUDY

Material prepared by the Department of Electronics.

SEM: IV Hours: 6
10PEL4113 Credit: 5

PROGRAMMABLE DIGITAL SIGNAL PROCESSOR AND MATLAB

Objective: To impart the basics about the PDSP's and to develop the Programming skills on MATLAB.

UNIT – I: ARCHITECTURE OF FIXED POINT PDSP

Multiplier and multiplier accumulator (MAC) – Modified bus structure and memory access schemes – Multiple access memory – Multi ported memory – VLIW architecture – Pipelining – Special addressing modes in PDSP's – On-chip peripheral – Architecture of TMS 320 C5X.

UNIT – II: ASSEMBLY LANGUAGE INSTRUCTION AND PROGRAMMING

Syntax – Addressing modes – Load / Store instruction – Addition/Subtraction instruction – Move Instruction – Multiplication instruction – NORM instruction – Program control instruction – Peripheral control – Program for familiarization of the addressing modes – Program for familiarization of the arithmetic instruction – Real time signal processing program.

UNIT – III: ARCHITECTURE OF FLOATING POINT PDSP

Introduction – Overview of TMS 320C3X devices – Internal Architecture – CPU – CPU register file – Memory organization – Cache memory – Peripheral – Data format – Addressing modes – Groups of addressing modes – Assembly language instruction – Processing real time signal – Serial port – Capture and display of sine wave.

UNIT– IV: MATLAB

Desk top tools – Command Window – Launch Pad – Help Browser – Work space browser – Editor/Debugger – Matrices – Expression – Working with matrices – Basic plotting – Flow control

– Data structures – Scripts and functions – Example Programs: Representation of basic signals.

UNIT – V: MATLAB PROGRAMMING

Discrete convolution – Stability test – Fast Fourier transform – Butterworth analog filter: Low-pass filter – Butterworth digital IIR filter: Low-pass filter – FIR filter design using Window techniques – IIR filter design using-bilinear transformation – Up sampling a sinusoidal signal – Down sampling a sinusoidal sequence.

BOOK FOR STUDY

1. Venkataramani B, Bhaskar M., "Digital signal processors - Architecture, Programming and Applications", First Reprint, TATA McGraw Hill, 2003.

Unit	Book	Chapters and Sections
I	1	2.1-2.8,3.1-3.14
II	1	4.1-4.9,6.2-6.4
III	1	7.1-7.8,8.1-8.4, 9.5 - 9.7
IV		Material prepared by the Department of Electronics
V		Material prepared by the Department of Electronics

BOOK FOR REFERENCE

1. Salivahanan S, Vallavaraj A, Gnanapriya C, "Digital Signal Processing", Tata McGraw Hill Publishing, 2003.

2. Rudra Pratap, "Getting started with MATLAB", version 6, Oxford university press, 2004.

SEM: IV Hours: 5
10PEL4114 Credit: 5

POWER ELECTRONICS

Objective: To discuss about the power electronics circuits in modern electronics devices

UNIT - I: FUNDAMENTAL OF POWER ELECTRONICS

Introduction to thyristors - Performance parameter of rectifiers-Phase control using SCR: Single phase half wave circuit with RL load and flywheel diode, Single phase full wave controlled rectifier with RL load, Three phase half controlled bridge with resistive load.-IGBT Fundamentals: Basic structure, Operation modes, output characteristics, Transfer characteristics, Switching characteristics, Latch up.

UNIT - II: TRIGGERING CIRCUITS FOR PHASE CONTROLLED RECTIFIERS

Magnetic firing circuit: Single phase circuit MMF Reset control, Voltage RESET control, Three phase magnetic amplifier firing circuit-Solid state firing circuit: Single phase inverse cosine firing circuit scheme, Carrier frequency gating circuit-Firing circuits using logic gates-Three phase inverse cosine control scheme-Timing wave multiplexing- Constant α firing scheme using UJT-Phase locked oscillator pulse timing controlled firing circuit.

UNIT - III: CHOPPERS

Chopper-Type A chopper- Series turn off chopper-Parallel capacitor turn of chopper-Single SCR chopper-Type B chopper-Type C four quadrant chopper-Pulse width modulated IGBT AC chopper: Introduction-Analysis-Triggering signal logic-Current sensing and over current protection-Application fields: (1)Energy saving control,(2) Voltage stabilizer, compensation of unbalanced system, (3) Filtering the upper harmonics,(4)Series compensation,(5) Excitation system of Brushless motor.

UNIT -IV: INVERTERS AND CYCLOCONVERTERS

Single-phase voltage source inverters-Voltage control in single- phase inverters-PWM inverters-Current source inverters-series inverters- Single-phase parallel inverters-Principle of cycloconverter operation

UNIT - V: DC AND AC MOTOR CONTROL

Introduction to DC motor control- DC motor –Single phase SCR drive – Three phase SCR drive –Application of IGBT in DC motor control for home appliances-Introduction to AC motor control – Induction motor characteristics –Speed control methods of induction motor – Synchronous motor control.

BOOK FOR STUDY

1. Dr. P. S. Bimbhra, “Power electronics”, Khanna publishers, Fourth edition 2006.

2. P. C. Sen, “Power electronics”, Tata McGraw-Hill Publishing Company limited, New delhi, Ninth reprint 1995.

Unit	Book	Chapters and Sections
1	1	3.7
	2	5.3, 5.7, 6.3
		Material prepared by the Department of Electronics
2	2	7.2, 7.2.1 – 7.2.3, 7.3, 7.3.1, 7.3.2, 7.6, 7.7.1 – 7.7.3, 7.11
3	2	9.40, 9.40.1 – 9.40.4, 9.40.8, 9.40.9
		Material prepared by the Department of Electronics
4	1	8.1,8.5,8.6,8.8,8.9,8.10,10.1
5	2	10.1 – 10.4, 10.13 – 10.15, 10.21
		Material prepared by the Department of Electronics

BOOK FOR REFERENCE

1. Power electronics devices, circuit system and application by Harish C. Rai

SEM: IV Hours: 4
10PEL4203A Credit: 4

ELECTIVE - III: MEDICAL ELECTRONICS

Objective: To get exposure in various measuring techniques in the field of bioelectronics

UNIT - I: ELECTRODES & TRANSDUCERS

Origin of bioelectric signals – recording electrodes – skin contact impedance – electrodes for ECG – electrodes for EEG – electrodes for EMG – electrical conductivity of electrode jellies and cream– transducers for biomedical parameters(table) – pressure transducers – pulse sensors – respiration sensors

UNIT - II: BIOMEDICAL RECORDERS

Basic recording system – general considerations for bioelectric recorder amplifiers – sources of noise in low level recording circuits – preamplifiers – main amplifier & driver stage – writing systems – electrocardiograph – phonocardiograph – electroencephalograph – Electromyograph

UNIT- III: MEASUREMENT & ANALYSIS TECHNIQUES IN BLOOD

Blood flow meters: Electromagnetic blood flow meter– Blood gas analyzers: blood pH measurement – measurement of blood pCO_2 – blood pO_2 measurement- Blood cell counters: methods of cell counting – coulter counters - automatic recognition and differential counting of cells

UNIT- IV: MODERN IMAGING SYSTEMS

X-ray machine – CT scanner: basic principle – contrast scale – system components – NMR: principles of NMR imaging – Fourier transform of the FID – Bloch equation - image reconstruction techniques – discrimination based on relaxation rates – basic NMR components – applications, biological effects and advantages of NMR imaging system

UNIT - V: ADVANCES IN BIOMEDICAL INSTRUMENTATION

Pacemakers- artificial heart valves – defibrillators - ventilators – audiometers – anesthesia machine – angiography – endoscope – cryogenic surgery

BOOK FOR STUDY

1. R. S. Khandpur, “Handbook of biomedical instrumentation”, Tata McGraw-Hill publisher, New Delhi
2. Dr. M. Arumugam, “Biomedical instrumentation”

Unit	Book	Chapters and Sections
1	1	Pg: 3-12; 14-30; 31-43; 54-57
2	1	Pg: 58-72; 94-117
3	1	Pg: 275-281; 335 – 348; 369-374; 380-384
4	1	Pg: 407-428; 432-457
5	2	5.2, 5.2.1, 5.2.2, 5.4, 5.5, 6.8, 7.7, 7.7.1-7.7.4, 7.12, 10.4, 10.5

BOOK FOR REFERENCE

1. Leslie Cromwell, Fred J. Weibell, Erich A. Pfeiffer, “Biomedical instrumentation and measurements”, 2nd edition, Prentice Hall of India pvt ltd.

SEM: IV Hours: 4
10PEL4203B Credit: 4

ELECTIVE - III: MEMS AND NANO ELECTRONICS

Objective: To discuss about the emerging trends like MEMS and NANO technology in the field of electronics.

UNIT - I: INTRODUCTION TO MEMS AND MEMS DESIGN

Microsystems Vs MEMS-Markets for Microsystems and MEMS-Case studies-Design: The Big picture-Modeling levels - Example: A position –control system.

UNIT -II: MICROFABRICATION

Overview-Wafer level processes: substrates-Wafer cleaning-Oxidation of silicon-Local oxidation-Doping-Thin film Deposition wafer Bonding.

UNIT - III: MICROSCALE TO NANO SCALE DEVICES

Introduction-Brief History of Micro electronic devices and technology- Nano scale MOSFET transistors: Silicon on insulator, strain, Hi_K gate dielectrics, Metal gate Electrodes - Optical detectors - Cooled CMOS, Double gate MOSFET-Beyond traditional CMOS.

UNIT- IV: NANO LITHOGRAPHY AND NANO MATERIALS

Introduction to Nano lithography-Cross cutting technologies-Emerging nano lithography-Carbon Nano tubes- Application of Nano tubes: for storage application ,for field emission , for sensor application ,and for electronic application – Introduction to Quantum dots-Introduction to nano composites.

UNIT -V: QUANTUM COMPUTATION AND MAGNETO RESISTIVE MATERIALS AND DEVICES

Nano structures for quantum computation-Quantum computation algorithms- Requirements for physical realizations of quantum computers-Introduction to magnetic materials and devices

– Acronyms for AMR, GMR, TMR, BMR and CMR-semiconductor spintronics.

BOOK FOR STUDY

1. Stephen D. Senturia, "Microsystem design", Spring international Edition, First Indian reprint 2006, Printed in India by Rashtriya printers, Delhi.

2. Massimiliano Di ventra, Stephane Evory and James R. Hefline, Jr., "Introduction to nanoscale science and technology", 2004, Kluwer Academic Publishers, Boston, Dordrecht, New York, London.

Unit	Book	Chapters and Sections
1	1	1.1 - 1.3, 2.1 - 2.3
2	1	3.1, 3.2, 3.2.1 – 3.2.6
3	2	9.1, 9.2, 9.7, 9.7.1 – 9.7.6, 9.8
4	2	1.1, 1.2, 1.6, 6.1, 6.6, 6.6.1, 6.6.3, 6.6.4, 6.6.7, 7.1, 8.1
5	2	12.1,12.2, 12.4, 13.1, 13.2.4, 13.3.6.3

BOOK FOR REFERENCE

1. Advanced magnetic NANO structures by K.P. Awasthi

2. Development in NANO technology by M. Balakrishna rao, K. Krishna Reddy NANO technology RISK, ETHICS and LAW by Geoffrey hunt & Michael Metha.

SEM: I Hours: 8
10PEL1104 Credit: 5

ELECTRONICS PRACTICAL – I (ANALOG EXPERIMENTS)

Any 12 Experiments:

1. Design of constant K filter & Attenuator.
2. Power control using SCR & UJT, TRIAC and DIAC.
3. CE amplifier design (High frequency).
4. FET amplifier design.
5. Power amplifier design. (Class A, B & C).
6. Oscillator design. (Phase shift-Colpitts- Hartley-Crystal)
7. 555 Applications (Square wave, linear ramp, Saw tooth generator, VCO).
8. Op-amp Application – Instrumentation amplifier, V-I and I-V. (4-20mA).
9. Active filters – LPF, HPF, BPF, Notch, APF.
10. Study of sensors (Thermal, optical, mechanical).
11. Study the Microwave - Characteristics
12. Power supply design
13. Plot the frequency response of two stages RC coupled amplifier and calculate the bandwidth.
14. Design of AC Bridge & wheat stone bridge.
15. Measure of level using capacitive probes.
16. Study of strain gauge and measurement of strain for a given sample.
17. Find the performance of a half wave diode rectifier and bridge rectifier using PSPICE

18. Measurement of OP-AMP parameters (Gain, input offset voltage, input offset current, Bias current, CMRR, output voltage, Slew rate).
19. Design of Clipper and clamper circuits.
20. OP-AMP based peak detector zero detector, precision rectifier and window detector design.
21. Study the characteristics of MOSFET.
22. Construct the step up chopper circuit (transistorized chopper).
23. Design of signal conditioning circuits for sensors.
24. Study of Bio sensors and chemical sensors.
25. Data acquisition of ECG signal.

SEM: II Hours: 8
10PEL2108 Credit: 5

ELECTRONICS PRACTICAL – II (DIGITAL, COMMUNICATION & MICROPROCESSOR EXPERIMENTS)

Any 16 Experiments:

1. Multiplexer & Demultiplexer design and study.
2. Encoder & decoder design and study.
3. Synchronous counter design and study.
4. Asynchronous counter design and study.
5. Design a multiplexer implementation to perform the inverse transformation.
6. BCD adder and Subtractor.
7. Shift registers design.
8. K-map design
9. D/A construction and IC study.
10. A/D construction and IC study.
11. Microprocessor programming - 8085.(basic arithmetic operations: addition, subtraction, multiplication and division)
12. Microprocessor programming – 8086(basic arithmetic operations: addition, subtraction, multiplication and division)
13. Simple program for sort and search using 8086.
14. Study of RAM, ROM & EPROM IC's
15. Programs involving string instructions 8085
16. Study of interrupt structures in 8085 & 8086
17. Interfacing & programming programmable Timer/Counter 8253-8085.

18. Study of PAM-PPM-PWM.
19. Study of BM-PCM
20. Fiber optic communication
21. Interfacing &Programming 8255 in various modes-8085.
22. Design a digital circuit for full adder truth table using LABVIEW
23. Sequence detector circuit design in LABVIEW.
24. Printer interfacing using 8085
25. LED and Seven segment display interfacing using 8085

SEM: III Hours: 8
10PEL3111 Credit: 5

ELECTRONICS PRACTICAL – III (MICROPROCESSOR, MICROCONTROLLER, DSP AND VHDL INTERFACING TECHNIQUE

Any 16 of the following:

1. Waveform Generation by interfacing with a DAC-8085.
2. Frequency Measurement –8085
3. Digital IC testing-8085
4. Interfacing an ADC and Data acquisition for temperature measurement.
5. Interfacing & programming programmable Communication Interface 8251-8085.
6. DC motor speed control-8085.
7. Elevator interface to Microprocessor-8085.
8. Interfacing a HEX keyboard-8086.
9. DSP programming - I.
10. DSP programming - II.
11. VHDL Programming – I working with schematic mode to study the basic gate functions.
12. VHDL programming – II Basic gate study through VHDL programs.
13. VHDL programming – III Interfacing LED and switches with DE1 kit.
14. VHDL programming – IV Multiplexer and Demultiplexer design and implementation through VHDL programming.
15. Interfacing DC motor with AVR's internal PWM.
16. Interfacing MMC with PIC microcontroller.

17. Interfacing LCD with AVR microcontroller.
18. Interfacing with Internal ADC of AVR.
19. Interfacing RTCDS1307 with PIC microcontroller.
20. Study the interrupt structures of 8051.
21. Interfacing matrix key board with AT89c51.
22. HEX to BCD, HEX to ASCII, DECIMAL to HEX conversion through 8051 programming.
23. PC to Microcontroller communication through serial port (AT89c51).
24. Interfacing DAC 0809 with parallel port.
25. MATLAB programming – Wave form generation and arithmetic programs (multiplication division, subtraction, addition. 3 X 3 Matrix multiplication and addition)

INTER DEPARTMENTAL COURSE - IDC

BIOCHEMISTRY

10PBC2401 APPLIED NUTRITION

10PBC3402 FIRST AID MANAGEMENT

BIOTECHNOLOGY

10PBT2401 BASIC BIOINFORMATICS

10PBT3402 BASIC GENOMICS & PROTEOMICS

CHEMISTRY

10PCH2401 HEALTH CHEMISTRY

10PCH3402 INDUSTRIAL CHEMISTRY

COMMERCE

10PCO2401 FINANCIAL ACCOUNTING FOR MANAGERS

10PCO3402 MANAGEMENT CONCEPTS & ORGANIZATIONAL BEHAVIOR

COMPUTER APPLICATIONS

10PCA2401 INTERNET CONCEPTS

10PCA2402 FOUNDATION OF COMPUTER SCIENCE

10PCA3403 COMPUTER APPLICATIONS FOR SOCIAL SCIENCES

10PCA3404 FUNDAMENTALS OF PROGRAMMING

COMPUTER SCIENCE

10PCS2401A FUNDAMENTALS OF IT

10PCS2401B WEB DESIGN

10PCS3402A FLASH

10PCS3402B DREAM WEAVER

ECONOMICS

10PEC2401 ECONOMICS FOR MANAGERS

10PEC3402 INDIAN ECONOMY

ELECTRONICS

10PEL2401 ELECTRONICS IN COMMUNICATION

10PEL3402 COMPUTER HARDWARE

ENGLISH

10PEN2401 BUSINESS ENGLISH

10PEN3402 INTERVEIW SKILLS AND GROUP DYNAMICS

HISTORY

10PHS2401 PUBLIC ADMINISTRATION

10PHS3402 APPLIED TOURISM

HUMAN RESOURCE MANAGEMENT

10PHR2401 FUNDAMENTALS OF HRM

10PHR3402 PERSONALITY AND SOFT SKILLS DEVELOPMENT

INFORMATION TECHNOLOGY

10PIT2401A FUNDAMENTALS OF IT

10PIT2401B WEB DESIGN

10PIT3402A FLASH

10PIT3402B DREAM WEAVER

MATHEMATICS

10PMA2401 OPERATIONS RESEARCH

10PMA3402 NUMERICAL METHODS

PHYSICS

10PPH2401 MODERN PHOTOGRAPHY

10PPH3402 MEDICAL PHYSICS

PLANT BIOLOGY & PLANT BIOTECHNOLOGY

10PPB2401 NANOBIOTECHNOLOGY

10PPB3402 REMOTE SENSIND AND GIS

TAMIL

10PTA2401 muRg gzpj NjuTj jkpo - 1

10PTA3402 muRg gzpj NjuTj jkpo - 2