P.E.S. COLLEGE OF ENGINEERING, MANDYA

(An Autonomous Institution)

SCHEME OF TEACHING AND EXAMINATION (Draft copy)

VII Semester B.E Electronics and Communication Engineering

Sl No	Course Code	Course Title	Teaching Depart-ment	Hours/ Week L:T:P	Credit	Examination Marks		
						CIE	SEE	Total
1.	P08EC71	WIRELESS MOBILE COMMUNICATION (HC)	E & C	4:0:0	4	50	50	100
2.	P08EC72	ANALOG CMOS VLSI DESIGN (HC)	E & C	4:0:0	4	50	50	100
3.	P08EC73	OPTICAL FIBER COMMUNICATIONS (HC)	E & C	4:0:0	4	50	50	100
4.	P08EC74	LINUX AND EMBEDDED REAL TIME SYSTEMS PROGRAMMING (HC)	E & C	4:0:0	4	50	50	100
5.	P08EC75	ELECTIVE-2 (Group-B) * (PS)	E & C	4:0:0	4	50	50	100
6.	P08EC76	ELECTIVE-3 (Group-c) ** (OS)	E & C	2:2:0	3	50	50	100
7.	P08EC77	COMPUTER COMMUNICATION NETWORK AND VLSI LABORATORY	E & C	0:0:3	1.5	50	50	100
8.	P08EC78	EMBEDDED SYSTEM PROGRAMMING LABORATORY	E & C	0:0:3	1.5	50	50	100
9.	P08EC79	INDUSTRIAL VISIT #		MANDATORY				
				Total	26	400	400	800

Visit shall be arranged during vacation after examination of 7th semester and a visit report shall be submitted to the department.

HC : Hard Core (4 Credits) – 4 Courses	OS : Other Subjects(3 Credits) – 1 Course
PS : Professional Subject (4 Credits)- 1 Corse	

One Hour Lecture = Two Hours Tutorial/Practical = 1 Credit

Sl. No	Course Code	Elective(Group-B) Course Title	Sl. No	Course Code	Elective(Group-C) Course Title
1.	P08EC7B0	SATELLITE COMMUNICATION	1.	P08EC7C0	OPERATING SYSTEM
2.	P08EC7B1	WAVELET TRANSFORMS	2.	P08EC7C1	ARM PROCESSOR
3.	P08EC7B2	ARTIFICIAL NEURAL NETWORKS	3.	P08EC7C2	RADAR AND NAVIGATIONAL AIDS
4.	P08EC7B3	ARTIFICIAL INTELLIGENCE	4.	P08EC7C3	MULTIMEDIA COMMUNCIATIONS
5.	P08EC7B4	DATA STRUCTURES USING C++	5.	P08EC7C4	ROBOTICS
6.	P08EC7B5	MEDICAL IMAGING SYSTEMS	6.	P08EC7C5	INTERNET ENGINEERING
7.	P08EC7B6	SPEECH PROCESSING			
8.	P08EC7B7	BIOMEDICAL SIGNAL PROCESSING			
9.	P08EC7B8	CAD TOOLS FOR VLSI			
10.	P08EC7B9	ADAPTIVE SIGNAL PROCESSING			

* List of Electives-2 (Group-B) ** List of Electives-3 (Group-C)

WIRELESS MOBILE COMMUNICATION

Course code	: P08EC71	Total Hours	: 52
Credits	: 4-0-0	Hours Per Week	: 04

Part A Unit-I

Principles of wireless communication: History of wireless communication, Introduction, Mobile communications: basic concepts, definition of terms used, basic cellular system architecture and call procedure, cordless phones, paging systems, introduction to hands off and roaming.
Text: Ch:1 7 Hrs

Unit-II

Cellular System design fundamentals: Introduction, wireless network topologies, advantages and disadvantages of Ad-hoc and infrastructure network, cell concept and frequency reuse, advantages of small cells, interference coverage and capacity expansion techniques in cellular systems. Cell -splitting, sectoring, signal to interference ratio calculatio Text: 4.1 - 4.10
7 Hrs

Unit-III

Network Planning: channel assignment strategies and capacity expansion, fixed channel allocation (FCA), Dynamic channel allocation (DCA), Handoffs and roaming strategies, Umbrella cell approach.Text : 4.11 – 4.15
6 Hrs

Unit-IV

Different generations of wireless networks, first generation basic cellular radio network, AMPS control channels and call handling, PCS second generation CTS , EIA/TIA interim standard 54(IS-54) & USDC control channels migration from AMPS to IS -95 systems.Text: 5.2- 5.8
6 Hrs

Part B Unit-V

Global system for mobile communication: GSM reference architecture, protocol architecture of GSM, mobility management mechanism, handoff, feedback maho-strategy, security requirements, GPRS network services, GPRS transmission plane protocol reference model.Text : 5.9 - 5.17
7 Hrs

Unit-VI

Short messaging services (SMS), CDMA technology, CDMA for wireless, CDMA digital cellular standards (IS-95). Text: 5.18 - 5.21
6 Hrs

Unit-VII

PSTN & wireless Networks: Difference between wireless and fixed telephone networks, routing protocols in wireless networks, circuit switching and packet switching, packet switching network, Cellular Digital Packet Data[CDPD], Advanced

Radio Data Information System[ARDIS], Ram Mobile Data[RMD].Text: 3.6 to 3.10

6 Hrs Unit-VIII

Wireless Geo-location and Intelligent cell concepts: architecture, intelligent cell concept in building communication processing –gain intelligent cells, spectrum allocation, spectrum efficiency, Digital cellular system, outdoor propagation models.
Text: 7.2 -7.9, 7.10, 7.11.

7 HrsTEXT BOOK:1. Wireless and Mobile Communication by Sanjeev Kumar,

New age International Publishers-2008 Edition.REFERENCE BOOK:

1. Mobile Cellular Telecommunication, Lee W.C.Y, Mc Graw Hill, 2002.

ANALOG CMOS VLSI DESIGN

Course code	: P08EC72	Total Hours	: 52
Credits	: 4-0-0	Hours Per Week	: 04

Part A Unit-I

Basic MOS Device Physics
General Considerations MOS I/V Characteristics
Second-Order Effects MOS Device Models
Single-Stage Amplifiers
Basic Concepts Common-Source Stage Source Follower
Common-Gate Stage Cascode Stage Choice of Device Models
Text: 2.1 to 2.4 and 3.1 to 3.6

7 Hours

Unit-II

Differential Amplifiers
Single-Ended and Differential Operation Basic Differential Pair
Common-Mode Response Differential Pair with MOS Loads Gilbert Cell
Text: 4.1 to 4.5

6 Hours

Unit-III

Passive and Active Current Mirrors
Basic Current Mirrors Cascode Current Mirrors Active Current Mirrors
Text: 5.1 to 5.3

6 Hours

Unit-IV

Bandgap References
General Considerations Supply-Independent Biasing
Temperature-Independent References
PTAT Current Generation Constant-*Gm* Biasing
Speed and Noise Issues Case Study
Text: 11.1 to 11.7

7 Hours

Part B Unit-V

Introduction to Switched-Capacitor Circuits
General Considerations Sampling Switches Switched-Capacitor Amplifiers
Switched-Capacitor Integrator Switched-Capacitor Common-Mode Feedback
Text: 12.1 to 12.5

7 Hours

Unit-VI

Oscillators
General Considerations Ring Oscillators LC Oscillators

Voltage-Controlled Oscillators Mathematical Model of VCOs
Text: 14.1 to 14.5
6 Hours

Unit-VII

Phase-Locked Loops
Simple PLL Charge-Pump PLLs Nonideal Effects in PLLs
Delay-Locked Loops Applications
Text: 15.1 to 15.5
7 Hours

Unit-VIII

Short-Channel Effects and Device Models
Scaling Theory Short-Channel Effects
MOS Device Models Process Corners
Analog Design in a Digital World
Text: 16.1 to 16.5
6 Hours

TEXT BOOK:
1. Design of Analog CMOS Integrated Circuits
Behzad Razavi, Tata Mcgraw Hill, 2001
REFERENCE BOOK:
1. CMOS Analog Circuit Design
Phillip E. Allen, Douglas R. Holberg, Oxford University Press, 2003
2. CMOS Circuit Design, Layout and Simulation
R. Jacob Baker, Harry W. Li, David E. Boyce, Prentice Hall of India, 2005

OPTICAL FIBER COMMUNICATIONS

Course code	: P08EC73	Total Hours	: 52
Credits	: 4-0-0	Hours Per Week	: 04

Part A

Unit-I

Basics optical laws and definitions, optical fiber modes and configurations, mode theory for circular waveguides, single-mode fibers, graded index fiber structure, fiber materials, photonic crystal fibers, fiber fabrication, mechanical properties of fibers, fiber optic cables.
Text: 2.2 to 2.11
6 Hours

Unit-II

Attenuation, signal distortion in fibers, characteristics of single mode fibers, topics from semiconductor physics, LEDs, laser diodes, line coding.
Text: 3.1 to 3.3, 4.1 to 4.4.
6 Hours

Unit-III

Source to fiber power launching, lensing schemes for coupling improvement, fiber to fiber joints, LED coupling to single mode fibers, fiber splicing, optical fiber connectors.
Text: 5.1 to 5.6
7 Hours

Unit-IV

Physical principles of photodiodes, photo detector noise, detector response time, fundamental receiver operation, digital receiver performance, eye diagrams, coherent detection, burst mode receivers, analog receivers. Text: 6.1 to 6.3, 7.1 to 7.6

7 Hours

Part B

Unit-V

Point to point link, power penalties, error control, overview of analog links, carrier to noise ratio, multichannel transmission techniques, RF over fiber, radio over fiber links, microwave photonics. Text: 9.1 to 9.6

6 Hours

Unit-VI

Overview of WDM, passive optical couplers, isolators and circulators, fiber grating filters, dielectric thin film filters, active optical components, tunable light sources.
Text: 10.1 to 10.5, 10.8, 10.9.

6 Hours

Unit-VII

Basic applications and types of optical amplifiers, semiconductor optical amplifiers, erbium-doped fiber amplifiers, network concepts, network topologies, SONET/SDH, High speed lightwave links, optical Add/Drop multiplexing.
Text: 11.1 to 11.3, 13.1 to 13.5

7 Hours

Unit-VIII

Optical Networks: Network concepts, network topologies, SONET/SDH, High speed light wave links, optical add/drop multiplexing, optical switching.
Text: 13.1 to 13.6

7 Hours

TEXT BOOK:

Optical Fiber Communications, Gerd Keiser, Mc Graw Hill, 4th Edition

REFERENCE BOOKS:

1. John M. Senior, Pearson Education 2nd Edition
2. Introduction to Fiber Optics, Sterling, Cengage Learning India, 4th Edition
3. Fiber Optic Communciation, Joseph Palais, Pearson Education, 4th Edition
4. Optical Communication Systems, Johan Gowar, PHI, 2nd Edition, 2001

LINUX AND EMBEDED REAL TIME SYSTEMS PROGRAMMING

Course code	: P08EC74	Total Hours	: 52
Credits	: 4-0-0	Hours Per Week	: 04

Part A

Unit-I

BOOTING LINUX

The target PBRS, The linux boot process, the linux root file system, creating the root file system, installing the TFTP server, installing minicom, booting the embedded planet RPX – CLLF, booting the bright star engineering media engine, booting the Tri-M MZ104 and the COTS PC with a flash IDE drive, boot comparision,
DEBUGGING

Introducing gdb, local debugging, remote debugging, network mounting the root file system

Text 1 : (Chapter:4(Page nos 65 – 119) & Chapter :5(page nos:121-133))

7 Hours

Unit-II

INTERFACING

ASYNCHRONOUS SERIAL COMMUNICATION INTERFACING

The project trailblazer asynchronous serial hardware, development environment, linux serial communications,

PARALLEL PORT INTERFACING

Control using the parallel port, standard parallel port control with port I/O, standard parallel port control using ppdev, developing a custom device driver, standard parallel port control using custom device driver liftmon_snowcon.

Text 1: (Chapter:6(Page nos 139 – 153) & Chapter :7(page nos:161-201))

6 Hours

Unit-III

USB INTERFACING

Learning about USB, project trailblazer USB hardware,

MEMORY I/O INTERFACING

The hardware design process, developing lift monitoring and snowmaking control for the media engine, developing lift monitoring and snowmaking control for the RPX - CLLF,

Text 1: (Chapter:8(Page nos 205 – 220) & Chapter :9(page nos:227-262)

6 Hours

Unit-IV

SYNCHRONOUS SERIAL COMMUNICATION INTERFACING

Temperature sensing and display, SPI communication and the LM70,I2C communication with the Philips semiconductor SAA1064.

USING INTERRUPTS FOR TIMING

Linux timing sources, measuring interrupt latency, implementing the race timer

Text 1: (Chapter:10(Page nos 277 – 305) & Chapter :11(page nos:321-350))

7 Hours

Part B

Unit-V

EMBEDED/REAL –TIME OPERATING SYSTEM CONCEPTS

Architecture of the kernel, tasks and task scheduler, interrupts service routines, semaphores, mutex, mailboxes, message queues, event registers, pipes signals, timers, memory management, priority inversion problem

OVERVIEW OF EMBEDDED/REALTIME OPERATING SYSTEMS

Off-the-shelf operating systems ,Embedded operating systems, Real-time operating systems, Handheld operating systems.

Text 2: (Chapter:7(Page nos :181 – 203) & Chapter :8(page nos:205-216))

6 Hours

Unit-VI

PROGRAMMING IN LINUX

Overview of UNIX Linux, shell programming, System programming.

PROGRAMMING IN RTLinux

Overview of RTLinux,Core RTLinux API, Program to display a message periodically, Semaphore management,Mutex management, Case study :Appliance control by RTLinux system.

Text 2: (Chapter:11(Page nos :241 – 270) & Chapter :12 (page nos:277-298))

6 Hours

Unit-VII

EMBEDDED SOFTWARE DEVELOPMENT ON 89C51 MICROCONTROLLER PLATFORM

Development environment, cross platform development tools, Application development.

EMBEDDED SOFTWARE DEVELOPMENT ON AVR MICROCONTROLLER PLATFORM

Development environment, cross platform development tools, Application development.

EMBEDDED SYSTEMS APPLICATIONS USING INTEL STRONG ARM PLATFORM

Architecture of prayog, Applicatons, Advanced applications.

Text 2: (Chapter:17(Page nos : 404 – 414) , Chapter :18(page nos:415-426) & Chapter :19(Page nos : 427-459))

7 Hours

Unit-VIII

RFID SYSTEMS

RFID system, RFID applications, RFID tag, RFID reader, Application development using RFID,OOPS for embedded systems, embedded C++.

DSP BASED EMBEDDED SYSTEMS

Need for DSP based embedded systems, An overview of digital signal processing, Applications of DSP, Digital signal processor architecture, DSP based embedded system design process, DSP algorithm implementation using MATLAB.

Text 2: (Chapter:20(Page nos :461 – 492) & Chapter :21(page nos:494-525))

7 Hours

TEXT BOOKS :

1. Embedded Linux :Hardware, Software and Interfacing.
   CRAIG HOLLABAUGH., Pearson 2009
2. Embedded Real time systems: concepts, design and programming
   2005 edition, by Dr. K.V.K.K.PRASAD. Dreamtech Press(2007)

REFERENCE BOOKS:

1. Real –Time systems design and analysis,: Phillip A. Laplante.
   Willey India,3rd Edition 2005
2. Real-Time systems by JANE W.S. LIU ,fourth impression ,Pearson 2007.
3. Real-Time systems by, C .M. Krishna, Kang G. Shin ,Mc Hill 1997
4. Embedded Realtime Systems Programming
   Sriram V Iyer, Pankaj Gupta, TMH, 2007
5. Linux for Embedded and Real Time Applications, Dong Abbolt,
   Newnes Publications, 2003.

COMPUTER COMMUNICATION NETWORK AND VLSI LABORATORY

Course code : P08EC
Credits : 0-0-1.5 Hours Per Week : 03

I. EXPERIMENTS ON PCS
(TO BE COMPLETED IN 3 LAB SESSIONS)

a. Write a program in 'C' program to simulate bit / character stuffing in frames.

b. Write a 'C' program to stimulate the shortest path algorithm

c. Write a 'C' program to encrypt a given message and decrypt it.

d. Write a 'C' program to find the minimum spanning tree of a subset.

e. Write a 'C' program to compute the polynomial code checksum

(CRC code checksum) for CRC – CCITT.

II. CCN EXPERIMENTS USING HARDWARE
(TO BE COMPLETED IN 2 LAB SESSIONS)

a. Asynchronous and synchronous communication using RS232/ Optical fiber/ Twisted pair/ RJ45

b. Data Communication protocols.

i) Stop and wait protocol.
ii) Go-To-Back N-protocol
iii) Selective retransmission

III. ANALOG DESIGN

Analog Design Flow

1. Design an Inverter with given specifications*, completing the design flow mentioned below:
   a. Draw the schematic and verify the following
      i) DC Analysis
      ii) Transient Analysis
   b. Draw the Layout and verify the DRC, ERC
   c. Check for LVS
   d. Extract RC and back annotate the same and verify the Design
   e. Verify & Optimize for Time, Power and Area to the given constraint***
2. Design the following circuits with given specifications*, completing the design flow mentioned below:
   a. Draw the schematic and verify the following
      i) DC Analysis ii) AC Analysis iii) Transient Analysis
   b. Draw the Layout and verify the DRC, ERC
   c. Check for LVS
   d. Extract RC and back annotate the same and verify the Design.
      i) A Single Stage differential amplifier
      ii) Common source and Common Drain amplifier
3. Design an op-amp with given specification* using given differential amplifier Common source and Common Drain amplifier in library** and completing the design flow mentioned below:
   a. Draw the schematic and verify the following
      i) DC Analysis
      ii). AC Analysis

iii) Transient Analysis

b. Draw the Layout and verify the DRC, ERC

c. Check for LVS

d. Extract RC and back annotate the same and verify the Design.

4. Design a 4 bit R-2R based DAC for the given specification and completing the design flow mentioned using given op-amp in the library**.

a. Draw the schematic and verify the following

i) DC Analysis

ii) AC Analysis

iii) Transient Analysis

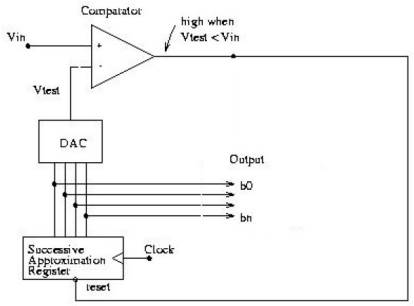
b. Draw the Layout and verify the DRC, ERC

c. Check for LVS

d. Extract RC and back annotate the same and verify the Design.

5. For the SAR based ADC mentioned in the figure below draw the mixed signal schematic and verify the functionality by completing ASIC Design FLOW.

[Specifications to GDS-II]



* Appropriate specification should be given.

** Applicable Library should be added & information should be given to the Designer.

*** An appropriate constraint should be given

LINUX and EMBEDDED SYSTEM PROGRAMMING LABORATORY

Course code : P08EC

Credits : 0-0-1.5 Hours Per Week : 03

A. PROGRAMMING IN LINUX

Familiarization of features of LINUX : Linux commands, file manipulation commands, editor, directory commands, I/O re direction, pipes and filters, file protection process commands, shell programming, system programming

B. PROGRAMMING IN RT LINUX

Exercises;

1. Write a program to display a message

2. Write a program to create 3 threads using semaphore management and to print alphabets A, B, C each ten times.
3. Write a program to illustrate MUTEX management to create two threads to print A

C. EMBEDDED SYSTEM PROGRAMMING

Write embedded C program for the following

1. To toggle LED
2. To glow an LED when switch is pressed
3. To send / receive data through UART port
4. To transfer a file from host to board
5. To obtain a string from the host system, calculate the CRC and send CRC value back to the host system
6. To encrypt a string received from a serial port using a simple encryption algorithm and transfer the encrypted string back to the host The encryption Algorithm can be, to start with very simple : a)Replace ‘a’ by ‘b’
   b)’b’ by ‘c’ and so on finally ‘z’ by ‘a’.