VIII Semester

P.E.S. COLLEGE OF ENGINEERING, MANDYA
(An Autonomous Institution)

SCHEME OF TEACHING AND EXAMINATION (Draft copy)

VIII 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.	P08EC81	LOW POWER VLSI DESIGN(SC)	E & C	2:2:0	3	50	50	100
2.	P08EC82	OPERATIONS RESEARCH(SC)	E & C	2:2:0	3	50	50	100
3.	P08EC83	ELECTIVE-4 (Group-D) * (OS)	E & C	2:2:0	3	50	50	100
4.	P08EC84	ELECTIVE-5 (Group-E) ** (OS)	E & C	2:2:0	3	50	50	100
5.	P08EC85	PROJECT WORK	E & C	0:0:6	10	100	100	200
6.	P08EC86	TOPIC SEMINAR	E & C	0:0:3	2	50		50
				Total	24	350	300	650

SC : Soft Core (3 Credits) – 2 Courses	OS : Other Subjects(3 Credits) – 2 Course

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

* List of Electives-4 (Group-D)

** List of Electives-5 (Group-E)

Sl. No	Course Code	Elective (Group-D)Course Title	Sl. No.	Course Code	Elective (Group-E) Course Title
1.	P08EC8D0	GSM	1.	P08EC8E0	NETWORK SECURITY
2.	P08EC8D1	NANO ELECTRONICS	2.	P08EC8E1	MOBILE COMPUTING
3.	P08EC8D2	ADHOC WIRELESS NETWORKS	3.	P08EC8E2	BIOMETRICS
4.	P08EC8D3	MEMS AND MICROSYSTEMS	4.	P08EC8E3	OPTICAL COMPUTING
5.	P08EC8D4	ERROR CONTROL CODING			
6.	P08EC8D5	OPTICAL NETWORKS			

LOW POWER VLSI DESIGN

Course code	P08EC81	Total Hours	: 52
Credits	: 3-0-0	Hours Per Week	: 04

Part A

Unit-I

Introduction

Sources of power dissipation

Designing for low power

Physics of power dissipation in MOSFET devices

MIS Structure Long channel MOSFET

Sub-micron MOSFET Gate induced Drain leakage.

Text: 1.1 to 1.3, 2.2

6 Hours

Unit-II

Power dissipation in CMOS

Short circuit dissipation Dynamic dissipation

Load capacitance.

Low power design limits

Principles of low power design Hierarchy of limits fundamental limits

Material limits Device limits Circuit limits System limits

Text: 2.3 and 2.4

7 Hours

Unit-III

SYNTHESIS FOR LOW POWER:

Behavioral Level Transforms

Algorithm level transforms,

Power-constrained Least squares optimization for adaptive and non-adaptive filters Circuit activity driven architectural transformations

Architectural driven voltage scaling, Power optimization using operation reduction Power optimization using operation substitution,

Pre- computation

Text: 4.1 only

7 Hours

Unit-IV

SYNTHESIS FOR LOW POWER: Contd.,

Logic Level optimization for low power

FSM and Combinational logic synthesis Technology Mapping

Circuit level

Circuit level transforms CMOS Gates Transistor Sizing

Text: 4.2 and 4.3

6 Hours

Part B

Unit-V

DESIGN AND TEST OF LOW-VOLTAGE CMOS CIRCUITS:

Introduction Circuit Design style

Leakage current in Deep sub-micron transistors,

Deep Sub micrometer device design issues

Key to minimizing short channel effect

Text: 5.1 to 5.5
6 Hours

Unit-VI

Low voltage design techniques
Reverse Vgs steeper sub threshold swing multiple threshold voltage
Testing deep sub micrometer IC's with elevated intrinsic leakage
Multiple supply voltage
Text: 5.6 to 5.8
6 Hours

Unit-VII

LOW ENERGY COMPUTING USING ENERGY RECOVERY TECHNIQUES: Energy dissipation in transistor channel using an RC model,
Energy recovery circuit design
Designs with partially reversible logic,
Supply clock generation.
Text: 7.1 to 7.4
7 Hours

Unit-VIII

SOFTWARE DESIGN FOR LOW POWER:
Introduction Sources of software power dissipation,
Software power estimation Software power optimization.
Text: Chapter 8 (8.1 to 8.4)
7 Hours

TEXT BOOK:
1. Low-Power CMOS VLSI Circuit Design,
Kaushik Roy and Sharat C Prasad, Wiley Student Edition, 2009

REFERENCE BOOK:
1. Practical Low Power Digital VLSI Design, Gary K. Yeap,
Kluwer Academic Publisher, 2002.

2. Low Power Design Methodologies, Pedram Rabaey,
Kluwer Academic Publishers, 1997.

OPERATIONS RESEARCH

Course code	: P08EC82	Total Hours	: 52
Credits	: 3-0-0	Hours Per Week	: 04

Part A

Unit-I

Introduction and Overview of the Operations Research Modeling Approach
The Origins of Operations Research The Nature of Operations Research
The Impact of Operations Research Algorithms and OR Courseware
Defining the Problem and Gathering Data
Formulating a Mathematical Model Deriving Solutions from the Model
Testing the Model Preparing to Apply the Model
Implementation

Introduction to Linear Programming
Prototype Example — The Linear Programming Model
Assumptions of Linear Programming
Text: 1.1 to 1.4, 2.1 to 2.6 and 3.1 to 3.3

7 Hours

Unit-II

Solving Linear Programming Problems: The Simplex Method
The Essence of the Simplex Method — Setting Up the Simplex Method
The Algebra of the Simplex Method — The Simplex Method in Tabular Form
Tie Breaking in the Simplex Method — Adapting to Other Model Forms
Post-optimality Analysis — Computer Implementation
Text: 4.1 to 4.8

7 Hours

Unit-III

Duality Theory and Sensitivity Analysis
The Essence of Duality Theory — Economic Interpretation of Duality
Primal–Dual Relationships — Adapting to Other Primal Forms
The Role of Duality Theory in Sensitivity Analysis
The Essence of Sensitivity Analysis — Applying Sensitivity Analysis
Text: 6.1 to 6.7

6 Hours

Unit-IV

The Transportation and Assignment Problems
The Transportation Problem
A Streamlined Simplex Method for the Transportation Problem
The Assignment Problem — A Special Algorithm for the Assignment Problem
Text: 8.1 to 8.4

6 Hours

Part B

Unit-V

Network Optimization Models
Prototype Example — The Terminology of Networks
The Shortest-Path Problem — The Minimum Spanning Tree Problem
The Maximum Flow Problem — The Minimum Cost Flow Problem
The Network Simplex Method
A Network Model for Optimizing a Project's Time-Cost Trade-Off
Text: 9.1 to 9.8

6 Hours

Unit-VI

Queuing Theory
Prototype Example — Basic Structure of Queuing Models
Examples of Real Queuing Systems — The Role of the Exponential Distribution
The Birth-and-Death Process
Queuing Models Based on the Birth-and-Death Process
Queuing Models Involving Non-exponential Distributions
Priority-Discipline Queuing Models — Queuing Networks
The Application of Queuing Theory

Text: 17.1 to 17.10

7 Hours

Unit-VII

Dynamic Programming
A Prototype Example for Dynamic Programming
Characteristics of Dynamic Programming Problems
Deterministic Dynamic Programming Probabilistic Dynamic Programming
Conclusions
Text: 10.1 to 10.4

6 Hours

Unit-VIII

Game Theory
The Formulation of Two-Person, Zero-Sum Games
Solving Simple Games—A Prototype Example
Games with Mixed Strategies Graphical Solution Procedure
Solving by Linear Programming
Text: 14.1 to 14.4

7 Hours

TEXT BOOK:

1. Introduction to Operations Research, Frederick S. Hiller, Gerald J. Lieberman, Tata Mcgraw Hill, 8th Edition

REFERENCE BOOKS:

1. Operations Research An introduction,
   Hamdy A. Taha, Prentice Hall of India, 8th Edition

2. Operations Research-Schaum's Series
   Bronson and Naadimuthu, Tata Mcgraw Hill, 2nd Edition