# Indira Gandhi Delhi Technical University For Women

## Department of Electronics and Communication Engineering

## DIGITAL SIGNAL PROCESSING (DSP) & VERY LARGE SCALE INTEGRATION (VLSI) LABORATORY

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|---|---|
| **FACULTY INCHARGE** | **Dr. Pankaj Gupta** |
| **TECHNICAL ASSISTANT** | **Ms. Neetu Meena** |

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## FACILITIES (SOFTWARE AND HARDWARE)

1. FPGA Boards (Count: 05)
2. HP desktops (Count: 19)
   - 2.1 Processor: Intel(R) Core(TM) i7 CPU 3.40 GHz
   - 2.2 RAM: 4.00 GB and 8.00 GB
   - 2.3 System Type: 64 bit Operating System Windows 8
3. MATLAB R2022a (Campus-Wide License)

# Indira Gandhi Delhi Technical University For Women

## Department of Electronics and Communication Engineering

## SIGNAL & SYSTEMS LABORATORY

**SEMESTER-III (B.TECH-ECE)**

**SUBJECT CODE: BEC- 203**

**Room No.- E-109 A**

## LIST OF EXPERIMENTS

1. Write a program to generate various signals and sequences.
2. Write a program to perform basic operations on matrices.
3. Write a program to perform operation on signals and sequences.
4. Write a program to verify Gibbs phenomenon.
5. Write a program to find Fourier Transform and Inverse Fourier Transform.
6. Write a program to verify the properties of Fourier Transform.
7. Write a program to find Z-Transform.
8. Write a program to perform convolution between signals and sequences.
9. Write a program to compute auto correlation and cross correlation.
10. Write a program to show gaussian noise.

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## Department of Electronics and Communication Engineering

## HARDWARE DESCRIPTION LANGUAGE LABORATORY

**SEMESTER-I (M.TECH VLSI DESIGN)**

**SUBJECT CODE: MVD-105** **Room No. E-109 A**

## LIST OF EXPERIMENTS

1. Write a VHDL code for Logic Gates.
2. Write a VHDL code for Half Adder and Full Adder.
3. Write a VHDL code for Half Subtractor and Full Subtractor.
4. Write a VHDL code for Multiplexer.
5. Write a VHDL code for De-Multiplexer.
6. Write a VHDL code for Encoder and Decoder.
7. Write a VHDL code for 4 Bit Parallel Adder.
8. Write a Verilog code for Logic Gates.
9. Write a Verilog code for Binary Adder.
10. Write a Verilog code for Multiplexer and De-Multiplexer.

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## Department of Electronics and Communication Engineering

## CMOS ANALOG CIRCUIT DESIGN LABORATORY

**SEMESTER-I (M.TECH VLSI DESIGN)**

**SUBJECT CODE: MVD-101** **Room No. E-109 A**

## LIST OF EXPERIMENTS

1. To study and familiarize LTSPICE/PSPICE.
2. To simulate the I-V characteristics of a simple n-MOSFET using LTSPICE/PSPICE.
3. To simulate the schematic of the CMOS inverter using LTSPICE/PSPICE.
4. To plot input-output characteristics of a single-stage MOSFET amplifier.
5. To design and analyse the characteristics of Common Source with Resistive Load.
6. To plot Voltage transfer characteristics (VTC) curve of CMOS inverter.
7. To design and analyse the characteristics of Common Source with Diode Load.
8. To design and analyse the characteristics of Common Source with current source as Load.
9. To simulate the schematic of the diffrential amplifier using LTSPICE/PSPICE.
10. To implement a research paper using Cadence/TCAD/LTSPICE.

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## Department of Electronics and Communication Engineering

## SEMICONDUCTOR DEVICES AND DIGITAL INTEGRATED CIRCUITS LABORATORY

**SEMESTER-I (M.TECH VLSI DESIGN)**

**SUBJECT CODE: MVD-103** **Room No. E-109 A**

## LIST OF EXPERIMENTS

1.To understand the basics and working of Pspice software.

(a) To simulate and analyse Voltage Divider circuit.

(b) To simulate and analyse Nodal Analysis circuit.

2.To plot the characteristics of P-N Junction Diode.

3.To plot input-output characteristics of a single-stage MOSFET amplifier.

4.To plot voltage transfer characteristics (VTC) curve and input-output characteristics of pulse waveform in CMOS inverter.

5.To plot input-output characteristics of pulse waveform in CMOS NAND gate.

6. (a) To plot input-output characteristics of pulse waveform in CMOS NOR gate.

(b) To plot input-output characteristics of pulse waveform of CMOS XOR gate.

7.To plot the characteristics of Bandgap reference circuit (BGR).

8.To design and analyze the characteristics of a Self-Cascode Current Mirror.

9.To analyze the transient characteristics of Inverting Operational Amplifier.

10.To plot the characteristics of Voltage Regulator.

11.To plot the drain and transfer characteristics of JFET.

12.To design and analyze the characteristics of common gate (CG) with active load.

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## Department of Electronics and Communication Engineering

## ADVANCED IC PROCESSING LABORATORY

**SEMESTER-I (M.TECH VLSI DESIGN)**

**SUBJECT CODE: MVD-107** **Room No. E-109 A**

## LIST OF EXPERIMENTS

1. To simulate the forward I-V characteristics of a PN junction diode using TCAD.
2. To simulate C-V characteristics of a PN junction diode using TCAD.
3. To simulate a Diode Rectifier Circuit using TCAD.
4. To simulate the I-V characteristics of a MOSFET Device Structure using TCAD.
5. To modify models and parameters of MOSFET in material regions and at boundaries and simulate Id-Vg curve using TCAD.
6. To simulate the I-V characteristics of a MOSFET Inverter Device Structure using TCAD.
7. To implement a Research Paper.

# Indira Gandhi Delhi Technical University For Women

## Department of Electronics and Communication Engineering

## SOFT COMPUTING LABORATORY

**SEMESTER-VII (B.TECH- ECE)**

**SUBJECT CODE: BIT-405** **Room No. E-109 A**

## LIST OF EXPERIMENTS

1. To write a program in MATLAB to perform union, intersection and complement operations of fuzzy set.
2. To write a program in MATLAB to implement De-Morgan's law.
3. To write a program in MATLAB to plot triangular, trapezoidal and bell shaped membership functions.
4. To use fuzzy toolbox to model tips value that is given after a dinner based on quality (not good, satisfying, good and delightful) and service (poor, average or good) and the tip value ranges from Rs. 10 to 100.
5. To write a MATLAB program to find algebraic sum, algebraic subtraction, algebraic product, bounded sum, bounded subtraction and bounded product of two fuzzy sets.
6. To write a MATLAB program to generate ANDNOT function using McCulloch-Pitts neural net.
7. To implement a Research Paper.

# Indira Gandhi Delhi Technical University For Women

## Department of Electronics and Communication Engineering

## MODELLING & SIMULATIONS LABORATORY

**SEMESTER-V (B.TECH- ECE)**

**SUBJECT CODE: BAS-301** **Room No. E-109 A**

## LIST OF EXPERIMENTS

1.Write a program for random number generation.

2.Write a program for simulation of Single Server Queuing System.

3.Write a program for Monte-Carlo Simulation.

4.Write a program to find the solution of difference equations.

5.To model and simulate following problems:

a) Growth and Decay Model (exponential case only)

b) Predator-prey Model

c) Epidemic model of Influenza

6.To develop the following numerical programs for simulation of real life problems:

a) Trapezoidal rule

b) Simpson's rule

c) Euler's Method

d) Range-Kutta Methods

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## Department of Electronics and Communication Engineering

## INFORMATION THEORY & CODING LABORATORY

**SEMESTER-VI (B.TECH- ECE)**

**SUBJECT CODE: BEC-304** **Room No. E-109 A**

## LIST OF EXPERIMENTS

1. Write a program to find information and entropy of a given source.
2. Write a program to print the Entropy of a noise free channel.
3. Write a program to determine the entropy of a noise free channel.
4. Write a program for determination of various entropies and mutual information of a Given Binary symmetric channel.
5. Write a program for generation and evaluation of variable length source coding using Huffman Coding and decoding.
6. Write a program for encoding and decoding of Huffman code.
7. Write a program for error detecting and correcting using liner block code.
8. Write a program for coding & decoding of Cyclic codes.
9. Write a program for coding and decoding of convolutional codes.
10. Write a program for coding and decoding of BCH codes.

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## Department of Electronics and Communication Engineering

## ELECTROMAGNETIC FIELD THEORY LABORATORY

**SEMESTER-IV (B.TECH- ECE/ECE-AI)**

**SUBJECT CODE: BEC-206** **Room No. E-109 A**

## LIST OF EXPERIMENTS

1.To study cartesian, cylindrical and spherical coordinate systems.

2.To perform the addition of two vectors using MATLAB.

3.To perform and verify dot product of two vectors using MATLAB.

4.To perform and verify cross product of two vectors using MATLAB.

5.To perform and verify curl of vector field using MATLAB.

$A = x^2yz\, a_x + xz\, a_z$

6.To perform and verify divergence of vector fields using MATLAB.

$F1 = -(xa_x + ya_y)$,

$F2 = -xa_x - ya_y$, and

$F3 = -xa_x + ya_y$

7.To find and plot the gradient of scalar quantity using MATLAB.

$V = x * \exp(-x^2 - y^2)$

8.To plot a three-dimensional electromagnetic wave using MATLAB.

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## Department of Electronics and Communication Engineering

## PROGRAMMING WITH PYTHON LABORATORY

**SEMESTER-II (B.TECH-ECE)**

**SUBJECT CODE: BAI-110**

**Room No. E-109 A**

## LIST OF EXPERIMENTS

1. Write a program to demonstrate basic data types in python.
2. Write a program to perform different arithmetic operations in python.
3. Write a program to create, append and remove lists in python.
4. Write a program to demonstrate working with tuples in python.
5. Write a program to demonstrate working with dictionaries in python.
6. Write a program to find largest of three numbers.
7. Write a program specifying different functions in python.
8. Write a program to demonstrate string operations.
9. Write a program to find the largest of three numbers.
10. Write a program to convert temperature from Celsius to Fahrenheit or Fahrenheit to Celsius as per user's input choice.
11. Write a program to print prime numbers less than 25.
12. Write a program to check whether the given number is an even number or not.
13. PROJECT: To create a countdown timer.

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# DO'S AND DON'TS

| DO'S | DON'TS |
|---|---|
| • Enter and leave the lab as per the time table.<br>• Maintain strict discipline and silence in the lab.<br>• Proper handling of computer systems must be done.<br>• Be a keen observer while performing experiments in the lab.<br>• Keep your bags in the rack and the consumable items back to their original position after finishing off the experiment in the lab.<br>• Report any problems with the computer to the person in charge.<br>• Shut down the computer properly.<br>• Make entry in the register while occupying the computer. | • Do not leave the lab without prior permission of the Lab In-charge or Technical Assistant.<br>• Do not bring or eat any eatable item in the lab.<br>• Do not make noise or shout in the lab.<br>• Do not disturb the decorum or aesthetic view of the lab.<br>• Do not tamper with the lab or system settings.<br>• Do not install or download any software on any lab computer.<br>• Do not modify or delete any system files on any lab computer. |