



**Sri Indu Institute of
Engineering & Technology**

Recognized Under 2(f) of UGC Act 1956
Approved by AICTE, New Delhi
Affiliated to JNTUH, Hyderabad.

COURSE FILE

ON

DIGITAL SIGNAL PROCESSING LAB

Course Code – EC604PC

III B.Tech II-SEMESTER

A.Y.: 2022-2023

Prepared by

Mr. T. NARESH
Assistant Professor

Head of the Department
Electronics and Communication Engg. Dept
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 510

PRINCIPAL
Sri Indu Institute of Engineering & Tech.
Sheriguda(VIII), Ibrahimpatnam
R.R. Dist. Telangana-501 510.



DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Name of the Physical laboratory	DIGITAL SIGNAL PROCESSING LAB
Course Code	EC604PC
Room No	C-002
Name of the lab In charge	T.NARESH
Name of the faculty In charge	T.NARESH

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INSTITUTE VISION AND MISSION

Vision:

To become a premier institute of academic excellence by providing the world class education that transforms individuals into high intellectuals, by evolving them as empathetic and responsible citizens through continuous improvement.

Mission:

IM1: To offer outcome-based education and enhancement of technical and practical skills.

IM2: To Continuous assess of teaching-learning process through institute-industry collaboration.

IM3: To be a centre of excellence for innovative and emerging fields in technology development with state-of-art facilities to faculty and students' fraternity.

IM4: To Create an enterprising environment to ensure culture, ethics and social responsibility among the stakeholders.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

DEPARTMENT VISION AND MISSION

Vision:

To become a recognized center in the field of Electronics and Communication Engineering by producing creative engineers with social responsibility and address ever-changing global challenges.

Mission:

DM1: To facilitate an academic environment that enables student's centric learning.

DM2: To provide state-of-the-art hardware and software technologies to meet industry requirements.

DM3: To continuously update the Academic and Research infrastructure.

DM4: To Conduct Technical Development Programs for overall professional caliber of Stake Holders.

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PROGRAM EDUCATIONAL OBJECTIVES

Program Educational objectives are to Promote:

- PEO1:** Graduates with a strong foundation in Electronics and Communication Engineering, Science and Technology to become successful in the chosen professional career.
- PEO2:** Graduates with ability to execute innovative ideas for Research and Development with continuous learning.
- PEO3:** Graduates inculcated with industry based soft-skills to enable employability.
- PEO4:** Graduates demonstrate with ability to work in interdisciplinary teams and ethical professional behavior.

PROGRAM SPECIFIC OUTCOMES

- PSO 1: Design Skills:** Design, analysis and development a economical system in the area of Embedded system & VLSI design.
- PSO 2: Software Usage:** Ability to investigate and solve the engineering problems using MATLAB, Keil and Xilinx.

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PROGRAM OUTCOMES

1. **ENGINEERING KNOWLEDGE:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **PROBLEM ANALYSIS:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **DESIGN/DEVELOPMENT OF SOLUTIONS:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **MODERN TOOL USAGE:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. **THE ENGINEER AND SOCIETY:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **ENVIRONMENT AND SUSTAINABILITY:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **ETHICS:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **INDIVIDUAL AND TEAM WORK:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **COMMUNICATION:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions.
11. **PROJECT MANAGEMENT AND FINANCE:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **LIFE-LONG LEARNING:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech. in ELECTRONICS AND COMMUNICATION ENGINEERING
COURSE STRUCTURE & SYLLABUS (R18)

Applicable From 2018-19 Admitted Batch

III YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	EC501PC	Microprocessors & Microcontrollers	3	1	0	4
2	EC502PC	Data Communications and Networks	3	1	0	4
3	EC503PC	Control Systems	3	1	0	4
4	SM504MS	Business Economics & Financial Analysis	3	0	0	3
5		Professional Elective-I	3	0	0	3
6	EC505PC	Microprocessors & Microcontrollers Lab	0	0	3	1.5
7	EC506PC	Data Communications and Networks Lab	0	0	3	1.5
8	EN508HS	Advanced Communication Skills Lab	0	0	2	1
9	*MC510	Intellectual Property Rights	3	0	0	0
		Total Credits	18	3	8	22

III YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	EC601PC	Antennas and Propagation	3	1	0	4
2	EC602PC	Digital Signal Processing	3	1	0	4
3	EC603PC	VLSI Design	3	1	0	4
4		Professional Elective-II	3	0	0	3
5		Open Elective-I	3	0	0	3
6	EC604PC	Digital Signal Processing Lab	0	0	3	1.5
7	EC605PC	e-CAD Lab	0	0	3	1.5
8	EC606PC	Scripting Languages Lab	0	0	2	1
9	*MC609	Environmental Science	3	0	0	0
		Total Credits	18	3	8	22

EC604PC: DIGITAL SIGNAL PROCESSING LAB**B.Tech. III Year II Semester**

L	T	P	C
0	0	3	1.5

The Programs shall be implemented in Software (Using MATLAB / Lab View / C Programming/ Equivalent) and Hardware (Using TI / Analog Devices / Motorola / Equivalent DSP processors).

Note: - Minimum of 12 experiments has to be conducted.

List of Experiments:

1. Generation of Sinusoidal Waveform / Signal based on Recursive Difference Equations
2. Histogram of White Gaussian Noise and Uniformly Distributed Noise.
3. To find DFT / IDFT of given DT Signal
4. To find Frequency Response of a given System given in Transfer Function/ Differential equation form.
5. Obtain Fourier series coefficients by formula and using FET and compare for half sine wave.
6. Implementation of FFT of given Sequence
7. Determination of Power Spectrum of a given Signal(s).
8. Implementation of LP FIR Filter for a given Sequence/Signal.
9. Implementation of HP IIR Filter for a given Sequence/Signal
10. Generation of Narrow Band Signal through Filtering
11. Generation of DTMF Signals
12. Implementation of Decimation Process
13. Implementation of Interpolation Process
14. Implementation of I/D Sampling Rate Converters
15. Impulse Response of First order and Second Order Systems.



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Website: <https://siiet.ac.in/>

Digital Signal Processing Lab

CO's, PO's, PSO's MAPPING

Class: III ECE- C

Course Outcomes

After completing this course, the student will be able to:
C 326.1 Apply knowledge of digital filter design for various applications.
C326.2. Analyze various signals in transform domain.
C326.3. Apply MultiMate concepts in different areas.
C326.4. Perform real time experiments on processors such as audio and speech processing.
C326.5. Work with MATLAB functions
C326.6. Enable students to analyze and design different signals & filters using MATLAB.

Mapping of course outcomes with program outcomes:

High -3 Medium -2 Low-1

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C326.1	3	-	2	1	-	1	-	-	-	-	-	-	1	2
C326.2	2	3	-	2	-	-	-	-	-	-	-	-	1	3
C326.3	-	-	-	2	3	2	-	-	-	-	-	-	1	2
C326.4	-	3	-	1	2	-	-	-	-	-	-	1	1	3
C326.5	3	-	-	1	-	2	-	-	-	-	1	-	1	3
C326.6	-	3	-	2	2	-	1	-	-	-	-	-	1	2
C326	2.7	3	2	1.5	2.3	1.6	1				1	1	1	2.5



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Digital Signal Processing Lab

LIST OF EXPERIMENTS AND THEIR CO, PO/PSO MAPPING

S.No	Name of The Experiment	CO	PO	PSO
1	Generation of Sinusoidal Waveform /Signal based on Recursive Difference Equations	2,5	1,2,4,6,11	1,2
2	Histogram of White Gaussian Noise and Uniformly Distributed Noise.	4,5	1,2,4,5,6,11	1,2
3	To find DFT / IDFT of given DT Signal	2,5	1,2,4,6,11	1,2
4	To find Frequency Response of a given System given in Transfer Function/ Differential equation form.	2,5	1,2,4,6,11	1,2
5	Obtain Fourier series coefficients by formula and using FET and compare for half sine wave.	5,6	1,2,4,5,6,7,11	1,2
6	Implementation of FFT of given Sequence	5,6	1,2,4,5,6,7,11	1,2
7	Determination of Power Spectrum of a given Signal(s).	5,6	1,2,4,5,6,7,11	1,2
8	Implementation of LP FIR Filter for a given Sequence/Signal	1,6	1,2,3,4,5,6,7	1,2
9	Implementation of HP IIR Filter for a given Sequence/Signal	1,6	1,2,3,4,5,6,7	1,2
10	Generation of Narrow Band Signal through Filtering	1,5	1,3,4,6,11,	1,2
11	Generation of DTMF Signals	2,5	1,2,4,6,11	1,2
12	Implementation of Decimation Process.	3,4,5	1,2,4,5,6,7,11,12	1,2
13	Implementation of Interpolation Process	3,4,5	1,2,4,5,6,7,11,12	1,2
14	Implementation of I/D Sampling Rate Converters	3,4,5	1,2,4,5,6,7,11,12	1,2
15	Impulse Response of First order and Second Order Systems.	3,4,5	1,2,4,5,6,7,11,12	1,2



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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Class Timetable

CLASS: III-B.Tech ECE-C

A.Y:2022-23

SEMESTER: II

LH: C-203

TIME/ DAY	I 9:40-10:30	II 10:30 -11:20	III 11:20-12:10	IV 12:10-1:00	1:00- 1:30	V 1:30-2:20	VI 2:20-3:10	VII 3:10-4:00
MON	DSP	ESD	VLSID	A&P(T)/DSP(T)	L U N C H	e-CAD LAB / DSP LAB		
TUE	A&P	IM	DSP	VLSID		ESD	CO-CU/DAA	
WED	ESD	FAI	A&P	DSP(T)/VLSID(T)		DSP	IM	LIB
THU	VLSID	ES	SL LAB			A&P	ESD	COUN
FRI	ES	A&P	ESD	VLSID(T)/A&P(T)		FAI	IM	SPORTS
SAT	VLSID	DSP	VLSID(ADJUNCT)			DSP LAB / e-CAD LAB		

*(T) – Tutorial Concern Faculty

Course Code	Course Name	Name of the Faculty	Course Code	Course Name	Name of the Faculty
EC601PC	A&P-Antennas and Propagation	Dr.K.Srinivasa Reddy	EC604PC	DSP LAB-Digital Signal Processing Lab	T.Naresh/ Dr.K.Srinivasa Reddy/K.Padma
EC602PC	DSP-Digital Signal Processing	T.Naresh	EC605PC	e-CAD LAB-e – CAD Lab	G.Swathi/ B.Ashwini/A.Apsara
EC603PC	VLSID-VLSI Design	G.Swathi	EC606PC	SL LAB-Scripting Languages Lab	Ch.Prabhakar/B.Ashwini/K.Bhaskar Reddy
EC613PE	ESD-Embedded System Design(Professional Elective-II)	K.Mallaiah	-	FAI-Fundamentals of Artificial Intelligence	K.Bhaskar Reddy
VLSID (ADJUNCT)	VLSID(ADJUNCT)	G.Chandra sekhar	*MC609	ES-Environmental Science	K.Mounika
MT600OE	IM-Industrial Management (Open Elective-I)	K.V.Nagamani	COUN	Counseling	P.Srilatha/Y.Rajani
			SPORTS	Sports	P.Srilatha/K.Padma
			LIB	Library	M.Srilatha/P.Krishna Rao
			CO-CU/DAA	Co-Curricular/Dept. Assoc. Activities	A.Sindhuja/G.Swathi/G.Amitha

Class Incharge

Head of The Department
 Electronics and Communication Engg
 SRI INDU INSTITUTE OF ENGG & TECH
 R.R.Dist-501 510

Principal
 SRI INDU Institute of Engineering & Tech
 Ibrahimpatnam



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DIGITAL SIGNAL PROCESSING LAB

LAB EXTERNAL EXAM QUESTION PAPER

1. Write a Matlab program for the Generation of Sinusoidal Waveform / Signal based on Recursive Difference Equations
2. Write a Matlab program for the Histogram of White Gaussian Noise and Uniformly Distributed Noise.
3. Write a Matlab program for the To find DFT / IDFT of given DT Signal
4. Write a Matlab program for finding the To find Frequency Response of a given System given in Transfer Function/ Differential equation form.
5. Write a Matlab program for finding Obtain Fourier series coefficients by formula and using FET and compare for half sine wave.
6. Write a Matlab program for the Implementation of FFT of given Sequence
7. Write a Matlab program for Determination of Power Spectrum of a given Signal(s).
8. Write a Matlab program for Implementation of LP FIR Filter for a given Sequence/Signal.
9. Write a Matlab program for the Implementation of HP IIR Filter for a given Sequence/Signal
10. Write a Matlab program for the Generation of Narrow Band Signal through Filtering
11. Write a Matlab program for Generation of DTMF Signals
12. Write a Matlab program for Implementation of Decimation Process
13. Write a Matlab program for Implementation of Interpolation Process
14. Write a Matlab program for Implementation of I/D Sampling Rate Converters
15. Write a Matlab program for Impulse Response of First order and Second Order Systems.



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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

III ECE Regular Lab External Exams Timetable

A.Y: 2022-23

SEM: II

S.No.	Name of the Lab	Year/ Sec	Date & Time of the Lab Exam	Name of the Lab Internal Examiners
1	Digital Signal Processing Lab	III ECE-A	03.07.2023(FN)	Mr.T.Naresh
		III ECE-B	04.07.2023(FN)	Mr.T.Naresh
		III ECE-C	05.07.2023(FN)	Mr.T.Naresh
2	e-CAD Lab	III ECE-A	04.07.2023(FN)	Mrs.S.Alekhya
		III ECE-B	05.07.2023(FN)	Mr.K.Srikanth
		III ECE-C	03.07.2023(FN)	Mrs.S.Alekhya
3	Scripting Languages Lab	III ECE-A	05.07.2023(FN)	Mr.M.Sagar
		III ECE-B	03.07.2023(FN)	Mr.K.Anup Kumar
		III ECE-C	04.07.2023(FN)	Mr.D.Nagaraju
4	Computer Vision Lab	III CSE(IOT)	03.07.2023(FN)	Mr.K.Srikanth
5	IoT Lab	III CSE(IOT)	04.07.2023(FN)	Mr.I.Venu

Timings: - FN: 10:00 AM To 01: 00 PM


Head of the Department
Electronics and Communication Engg. Dept
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

III ECE Regular Lab External Examiners from GNITC

A.Y: 2022-23

SEM: II

S.No.	Name of the Lab	Year/ Sec	Date & Time of the Lab Exam	Name of the Lab Internal Examiners	Name of the Lab External Examiner & Contact Details
1	Digital Signal Processing Lab	III ECE-A	03.07.2023	Mr.T.Naresh	Mr.M. Ravinder Asst Prof 9491108268
		III ECE-B	04.07.2023	Mr.T.Naresh	Mr.D Naresh Asst Prof 9885248584
		III ECE-C	05.07.2023	Mr. T.Naresh	Dr.Md.Rashid Mahmood Prof 9999254431
2	e-CAD Lab	III ECE-A	04.07.2023	Mrs.S.Alekhya	Prof.A Mohan Prof 9989298588
		III ECE-B	05.07.2023	Mr.K.Srikanth	Dr. B. Mythily Devi Asst Prof 8985858946
		III ECE-C	03.07.2023	Mrs.S.Alekhya	Mr.ChNarasimhulu Asst Prof 9849825884
3	Computer Vision Lab	III CSE (IOT)	03.07.2023	Mr.K.Srikanth	Mr NVS. Murthy Asst Prof 9701196375
4	IoT Lab	III CSE (IOT)	04.07.2023	Mr.I.Venu	Mr D .Surendra Rao Assoc Prof 9849935889

HOD/EC of the Department
Electronics and Communication Engg. Dept
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Digital Signal Processing Lab

LAB OCCUPANCY CHART

A.Y: 2022-23

Year/Semester: III/II

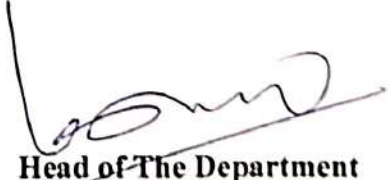
Lab No: C-002

Period/ Day	1	2	3	4	01:00 - 01:30	5	6	7
	9:40-10:30	10:30-11:2	11:20 – 12:10	12:10 – 1:00		1:30-2:20	2:20-	3:10-4:00
Monday		DSP Lab III ECE-A			L	DSP Lab III ECE-C		
Tuesday					U	DSP Lab III ECE-B		
Wednesday					N	MAINTANANCE		
Thursday		MAINTANANCE			C	DSP Lab III ECE-A		
Friday					H	DSP Lab III ECE-B		
Saturday						DSP Lab III ECE-C		

S.No.	Class	Faculty In-charge	Supporting Faculty
1	DSP Lab III ECE-A	Mr.Y RAJU	Dr T Ramakrishna
2	DSP Lab III ECE-B	Ms.Apasara	Ms.M.Srilatha
3	DSP Lab III ECE-C	Mr.T Naresh	Dr K Srinivas Reddy

S.No.	Class	Lab In-charge
1	DSP Lab II ECE-A, B&C	Mr.T Naresh


Lab In-charge


Head of The Department
Head of the Department
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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

- All students must observe the dress code while in the laboratory
- Foods, drinks and smoking are **NOT** allowed
- All bags must be left at the indicated place.
- The lab time table must be strictly followed.
- Be **PUNCTUAL** for your laboratory session.
- Experiment must be completed within the given time.
- Noise must be kept to minimum.
- Workspace must be kept clean and tidy at all time.
- Handle all apparatus with care.
- All students are liable for any damage to equipment due to their own negligence.
- All equipment, apparatus, tools and components must be **RETURNED** to their original place after use.
- Students are strictly **PROHIBITED** from taking out any items from the laboratory.
- Report immediately to the lab supervisor if any injury occurred.
- Report immediately to the lab supervisor if any damages to equipment.

BEFORE LEAVING LAB

- Place the stools under the lab bench.
- Turn off the power to all instruments.
- Please check the laboratory notice board regularly for updates.



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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

DIGITAL SIGNAL PROCESSING LAB

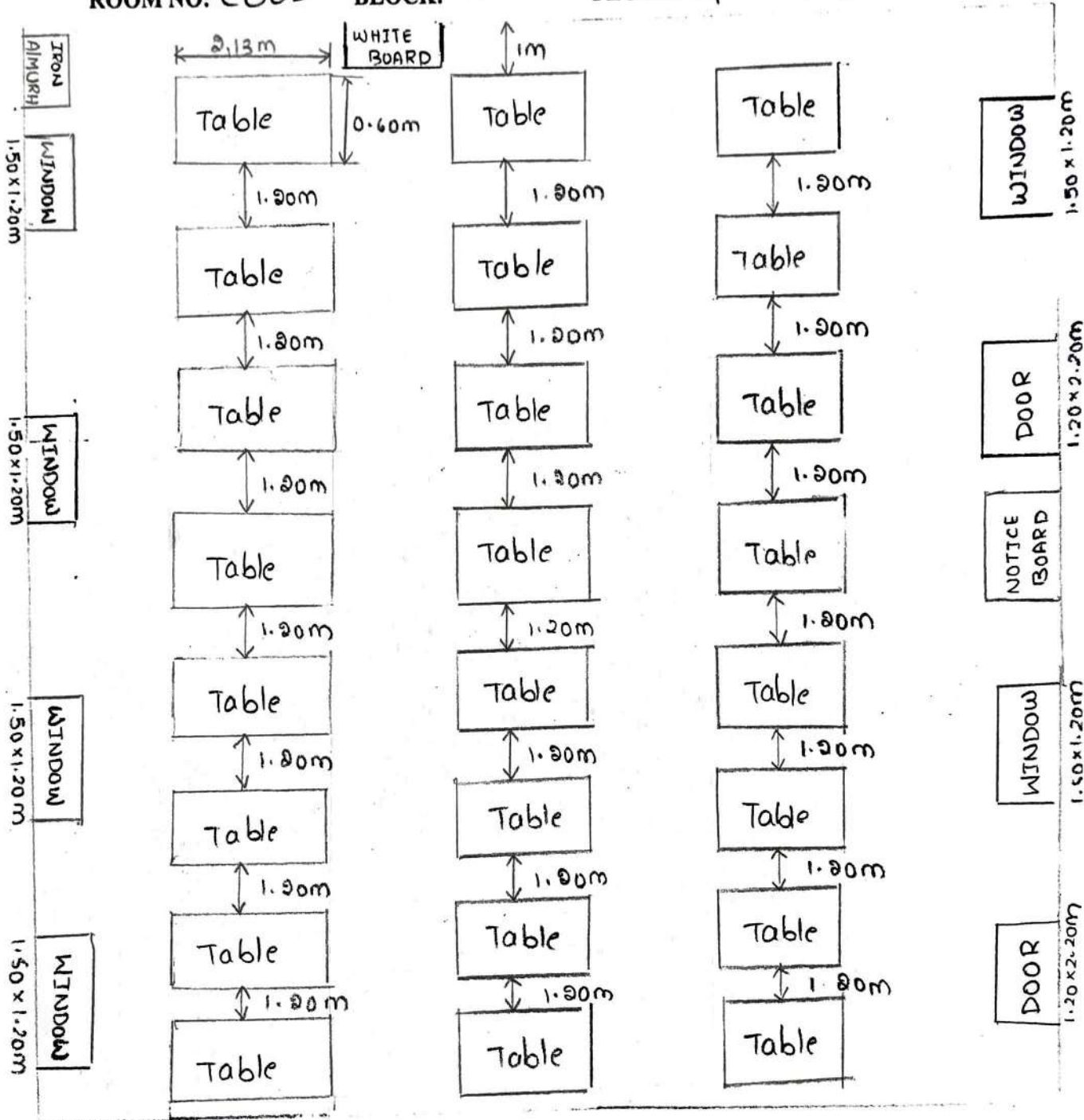
PHYSICAL LAB FLOOR PLAN

ROOM NO: C002

BLOCK: C

FLOOR: G1

DATE: 01-06-2023



Lab Area(In sqm) = $16 \times 9.6 = 153.6$

[Signature]
 Lab In-charge

[Signature]
 Head of The Department
 Electronics and Communication Engg. Dept
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 Sriperiyalur(V), Ioraninipattanam, R.H. Dindimuram



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LAB MANUAL LINK

<https://drive.google.com/file/d/1s59o6bnXXBvh3hJ9wc6vqh-wW3hWzsW5/view?usp=sharing>

Percentage of students scored more than target	97%	97%	100%
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CO Mapping with Exam Questions:

CO - 1	y	y	y
CO - 2	y	y	y
CO - 3	y	y	y
CO - 4	y	y	y
CO - 5	y	y	y
CO - 6	y	y	y

CO Attainment based on Exam Questions:

CO - 1	97%	97%	100%
CO - 2	97%	97%	100%
CO - 3	97%	97%	100%
CO - 4	97%	97%	100%
CO - 5	97%	97%	100%
CO - 6	97%	97%	100%

CO	Intrnal practical	DDE	Overall	Level
CO-1	97%	100%	98%	3
CO-2	97%	100%	98%	3
CO-3	97%	100%	98%	3
CO-4	97%	100%	98%	3
CO-5	97%	100%	98%	3
CO-6	97%	100%	98%	3

Attainment Level	
1	60%
2	70%
3	>80%

Attainment (Internal 1 Examination) = 3

Note:

A+A+CD+MG : AIM+APPARATUS+CIRCUIT DIAGRAM+MODEL GRAPH

T+P+C+R : THEORY+PROCEDURE+CALCULATION+RESULT

DDE : Day to Day Evaluation

Percentage of students scored more than target	97%	97%	100%
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CO Mapping with Exam Questions:

CO - 1	y	y	y
CO - 2	y	y	y
CO - 3	y	y	y
CO - 4	y	y	y
CO - 5	y	y	y
CO - 6	y	y	y

CO Attainment based on Exam Questions:

CO - 1	97%	97%	100%
CO - 2	97%	97%	100%
CO - 3	97%	97%	100%
CO - 4	97%	97%	100%
CO - 5	97%	97%	100%
CO - 6	97%	97%	100%

CO	Intrnal practical	DDE	Overall	Level
CO-1	97%	100%	98%	3
CO-2	97%	100%	98%	3
CO-3	97%	100%	98%	3
CO-4	97%	100%	98%	3
CO-5	97%	100%	98%	3
CO-6	97%	100%	98%	3

Attainment Level	
1	60%
2	70%
3	>80%

Attainment (Internal 1 Examination) = 3

Note:

A+A+CD+MG : AIM+APPARATUS+CIRCUIT DIAGRAM+MODEL GRAPH

T+P+C+R : THEORY+PROCEDURE+CALCULATION+RESULT

DDE : Day to Day Evaluation



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electronics and Communication Engineering

Course Outcome Attainment

Name of the faculty : T NARESH

Academic Year: 2022-2023

Branch & Section: ECE-C

Course Name: DSP LAB

Year: III

Semester: II

Course Outcomes	1st Internal Exam	2nd Internal Exam	Internal Exam	University Exam	Attainment Level
CO1	3.00	3.00	3.00	3.00	3.00
CO2	3.00	3.00	3.00	3.00	3.00
CO3	3.00	3.00	3.00	3.00	3.00
CO4	3.00	3.00	3.00	3.00	3.00
CO5	3.00	3.00	3.00	3.00	3.00
CO6	3.00	3.00	3.00	3.00	3.00
Internal & University Attainment:			3.00	3.00	
Weightage			70%	30%	
CO Attainment for the course (Internal, University)			2.10	0.90	
CO Attainment for the course (Direct Method)			3.00		

Overall course attainment level

3.00



SRI INDU INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Electronics and Communication Engineering

Program Outcome Attainment (from Course)

Name of Faculty:	T NARESH	Academic Year:	2022-2023
Branch & Section:	ECE-C	Year:	III
Course Name:	DSP LAB	Semester:	II

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		2	1		1							1	2
CO2	2	3		2									1	3
CO3				1	3	2							1	2
CO4		3		2	2	-						1	1	3
CO5	3			1	-	2					1		1	3
CO6		3		2	2	-	1						1	2
Course	2.67	3.00	2.00	1.50	2.33	1.67	1.00				1.00	1.00	1.00	2.50

CO	Course Outcome Attainment
	3.00
CO1	3.00
CO2	3.00
CO3	3.00
CO4	3.00
CO5	3.00
CO6	3.00
Overall course attainment level	3.00

PO-ATTAINMENT

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO Attainment	2.67	3.00	2.00	1.50	2.33	1.67	1.00				1.00	1.00	1.00	2.50

CO contribution to PO - 33%, 67%, 100% (Level 1/2/3)