

**Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution are stated and displayed on website and communicated to teachers and students**

- 1 Anna University Curriculum and Syllabus /CO-PO Mapping
- 2 Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)
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## 1. Anna University Curriculum and Syllabus /CO-PO Mapping

S.no	Programme	Branch	Link
1	UG	Civil	<a href="http://www.dgct.ac.in/naac/academic-planner/civil/index.php">http://www.dgct.ac.in/naac/academic-planner/civil/index.php</a>
2	UG	Computer Science and Engineering	<a href="http://www.dgct.ac.in/naac/academic-planner/cse/index.php">http://www.dgct.ac.in/naac/academic-planner/cse/index.php</a>
3	UG	Electronics and Communication Engineering	<a href="http://www.dgct.ac.in/naac/academic-planner/ece/index.php">http://www.dgct.ac.in/naac/academic-planner/ece/index.php</a>
4	UG	Electrical and Electronics Engineering	<a href="http://www.dgct.ac.in/naac/academic-planner/eee/index.php">http://www.dgct.ac.in/naac/academic-planner/eee/index.php</a>
5	UG	Mechanical	<a href="http://www.dgct.ac.in/naac/academic-planner/mech/index.php">http://www.dgct.ac.in/naac/academic-planner/mech/index.php</a>
6	PG	CAD/CAM	<a href="http://www.dgct.ac.in/naac/academic-planner/me-mech/index.php">http://www.dgct.ac.in/naac/academic-planner/me-mech/index.php</a>
7	PG	Computer Science and Engineering	<a href="http://www.dgct.ac.in/naac/academic-planner/me-cse/index.php">http://www.dgct.ac.in/naac/academic-planner/me-cse/index.php</a>
8	PG	Communication System	<a href="http://www.dgct.ac.in/naac/academic-planner/me-ece/index.php">http://www.dgct.ac.in/naac/academic-planner/me-ece/index.php</a>
9	PG	Structural Engineering	<a href="http://www.dgct.ac.in/naac/academic-planner/me-civil/index.php">http://www.dgct.ac.in/naac/academic-planner/me-civil/index.php</a>

## 2. Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

	<b>Programme Outcomes (POs)</b>
PO1	Apply the knowledge of mathematics, science, engineering fundamentals to the solution of complex problems in Mechanical Engineering.
PO2	Identify, formulate, research literature, and analyze complex Mechanical Engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design solutions for complex Mechanical engineering problems and design system components or processes that meet t h e specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	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 related to Mechanical Engineering.
PO5	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex Mechanical engineering activities with an understanding of the limitations
PO6	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.
PO7	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	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, and give and receive clear instructions.
PO11	Demonstrate knowledge and understanding of t h e 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.
PO12	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.

## Programme Specific Outcomes (PSOs)

<b>Civil Engineering</b>	
PSO1	To comprehend the basics of load and moment transfer in steel and concrete structures and to apply acquired knowledge in the analysis of structures
PSO2	To understand and get trained in various modern equipments exist in the civil engineering field
<b>Computer Science and Engineering</b>	
PSO1	Design, develop, test and maintain strategies in software project development to deliver a quality product for business success.
PSO2	Design, develop, test and maintain software in area of algorithms, system software, web design, multimedia, big data analytics and networking for efficient design for computer based system
<b>Electronics and Communication Engineering</b>	
PSO1	Ability of the students to design and develop embedded solution for engineering applications.
PSO2	Ability of the students to design and implement communication sub systems.
<b>Electrical and Electronics Engineering</b>	
PSO1	Design, develop, test and maintain strategies in software project development to deliver a quality product for business success.
PSO2	Design, develop, test and maintain software in area of algorithms, system software, web design, multimedia, big data analytics and networking for efficient design for computer based system.
<b>Mechanical Engineering</b>	
PSO1	Ability of the graduates to perform in advanced machining by out-ri-val of schooling thro' u internship between institutes – industry.
PSO2	Graduates will demonstrate the ability to design a system using complex modeling and analysis software thro' u continuing education.
PSO3	Graduates will be exposed to industrial practices and acquire the ability to serve in core industry.

# Scan of a Logbook for Course Outcomes(Cos), Program Outcomes(POs), Programme Specific Outcomes(PSOs) and CO/PO Mapping

## FACULTY PEDAGOGICAL AND STUDENT ASSESSMENT RECORD BOOK

(Electronics and Communication Engineering)

RC /



**DHIRAJLAL GANDHI COLLEGE OF TECHNOLOGY**  
( Approved by AICTE | Affiliated to Anna University, Chennai | Accredited by NAAC )

Opposite Salem Airport, Sikanampatty (PO), Omalur (TK), Salem, Tamil Nadu 636309  
Phone: 04290 233 333 | e-mail : principal@dgct.ac.in | office@dgct.ac.in | www.dgct.ac.in

### FACULTY PEDAGOGICAL AND STUDENT ASSESSMENT RECORD BOOK

FACULTY DETAILS	COURSE DETAILS
Name : V.Vanathie	Subject Code : EC 6553
Designation : AP	Subject Name : Discrete Time Signal Processing
Department : ECE	Semester & Sec : V & E
	Academic Year : 2019 - 2020
	Department : ECE
	Module Name : Signal Processing
	Module Coordinator : Ms.V.Vanathie

## VISION

To improve the quality of human life through multidisciplinary programs in engineering, architecture and management that are internationally recognized and would facilitate research work to incorporate social, economical and environmental development.

## MISSION

- To create a vibrant atmosphere that creates competent engineers, innovators, scientists, entrepreneurs, academicians and thinkers of tomorrow.
- To establish centre of excellence that provide sustainable solutions, to industry and society.
- To enhance capability through various value added programs, to meet the challenges of dynamically changing global needs.

STUDENTS DETAILS			
	BOYS	GIRLS	TOTAL
NO. OF DAYSCHOLARS	23	25	48
NO. OF HOSTELLERS	03	01	04
TOTAL	26	26	26

any

## EC8553 DISCRETE-TIME SIGNAL PROCESSING

### OBJECTIVES:

- To learn discrete fourier transform, properties of DFT and its application to linear filtering
- To understand the characteristics of digital filters, design digital IIR and FIR filters and apply these filters to filter undesirable signals in various frequency bands
- To understand the effects of finite precision representation on digital filters
- To understand the fundamental concepts of multi rate signal processing and its applications
- To introduce the concepts of adaptive filters and its application to communication engineering

### UNIT I DISCRETE FOURIER TRANSFORM

12

Review of signals and systems, concept of frequency in discrete-time signals, summary of analysis & synthesis equations for FT & DTFT, frequency domain sampling, Discrete Fourier transform (DFT) - deriving DFT from DTFT, properties of DFT - periodicity, symmetry, circular convolution. Linear filtering using DFT. Filtering long data sequences: overlap save and overlap add method. Fast computation of DFT - Radix-2 Decimation-in-time (DIT) Fast Fourier transform (FFT), Decimation-in-frequency (DIF) Fast Fourier transform (FFT). Linear filtering using FFT.

### UNIT II INFINITE IMPULSE RESPONSE FILTERS

12

Characteristics of practical frequency selective filters. characteristics of commonly used analog filters - Butterworth filters, Chebyshev filters. Design of IIR filters from analog filters (LPF, HPF, BPF, BRF) - Approximation of derivatives, Impulse invariance method, Bilinear transformation, Frequency transformation in the analog domain. Structure of IIR filter - direct form I, direct form II, Cascade, parallel realizations.

### UNIT III FINITE IMPULSE RESPONSE FILTERS

12

Design of FIR filters - symmetric and Anti-symmetric FIR filters - design of linear phase FIR filters using Fourier series method - FIR filter design using windows (Rectangular, Hamming and Hanning window), Frequency sampling method. FIR filter structures - linear phase structure, direct form realizations

### UNIT IV FINITE WORD LENGTH EFFECTS

12

Fixed point and floating point number representation - ADC - quantization - truncation and rounding - quantization noise - input / output quantization - coefficient quantization error - product quantization error - overflow error - limit cycle oscillations due to product quantization and summation - scaling to prevent overflow.

### UNIT V INTRODUCTION TO DIGITAL SIGNAL PROCESSORS

12

DSP functionalities - circular buffering - DSP architecture - Fixed and Floating point architecture principles - Programming - Application examples.

TOTAL:60 PERIODS

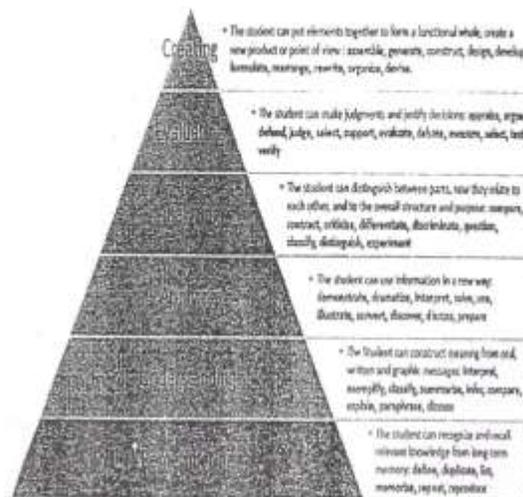
### OUTCOMES:

At the end of the course, the student should be able to

- Apply DFT for the analysis of digital signals and systems
- Design IIR and FIR filters
- Characterize the effects of finite precision representation on digital filters
- Design multirate filters
- Apply adaptive filters appropriately in communication systems



## Enabling Students to Understand Fundamental Concepts Better



It is of prime importance to teach students in such a manner that they achieve enhanced levels of learning in terms of Bloom's Taxonomy.

LEVELS	DESCRIPTIVE 'PROCESS' VERBS
<b>Remembering:</b> Recalling information, Recognising, listing, describing, retrieving, naming, finding.	define, label, listen, list, memorize, name, read, recall, record, relate, repeat, view
<b>Understanding:</b> Explaining ideas or concepts interpreting, summarising, paraphrasing, classifying, explaining.	describe, discuss, explain, express, identify, locate, recognize, report, restate, review, solve, tell
<b>Applying:</b> Using information in another familiar situation implementing, carrying out, using, executing.	apply, demonstrate, employ, illustrate, interpret, operate, practice, recognize, solve, use
<b>Analyzing:</b> Breaking information into parts to explore understandings and relationships Comparing, organising, deconstructing, interrogating, finding.	analyse, appraise, break apart, breakdown calculate, compare, contrast, debate, diagram, differentiate, examine, experiment, explain, inspect, inventory, question, relate, solve
<b>Evaluating:</b> Justifying a decision or course of action checking, hypothesising, critiquing, experimenting, judging.	appraise, assess, choose, compare, estimate (quality), evaluate, judge, predict (quality), rate, value, select
<b>Creating:</b> Generating new ideas, products, or ways of viewing things Designing, constructing, planning, producing, inventing.	arrange, assemble, collect, compose, construct, create, design, formulate, manage, organize, plan, prepare, propose, set up, write

In view of this, the following instructions are to be adhered to :

- ❖ Faculty is to plan and prepare well for every class they teach.
- ❖ They are to come up with innovative - newer ways of teaching to enable students to have a better understanding of all topics, especially basic concepts and principles.
- ❖ Such teachings aids may include animation (created by the faculty or accessed from the internet), video, lectures / presentations (sourced from NPTEL, EduSAT, IndoUS, A-VIEW - You - Tube, Khan Academy, E-Journals, etc..) and demonstrations using actual machinery / equipments / instruments / models / materials / simulating presentations.
- ❖ Faculty will respond, in a separate notebook, the name of the topics / concepts / principles taught and brief description of the teaching techniques developed by them to enable clear understanding of it by the student. At the end of the semester, the teaching - techniques notebook will become a useful teaching resource, which is to be updated every year (for each topic of the units in the course)
- ❖ The specific topics / concepts / principles, for which exclusive teaching / learning resources have been developed by faculty, are to be coded and the code number with name of the topic are to be listed in the table. The resources are to be deposited in the department library alongwith the teaching-techniques notebook for future reference / access / use.

**Note :** When a course is taught by more than one faculty, the teaching team may jointly develop the resource materials.

### Teaching Aids \*

1. Video Film (VF)
2. Power Point Presentation (PP)
3. Models (M)
4. Charts (C)
5. Animation (A)
6. Black Board (BB)

### Teaching Methods \*

1. Lecture (L)
2. Group Discussion (GD)
3. Seminar (S)
4. Quiz (Q)
5. Team Teaching (TT)
6. Guest Lecture (GL)
7. Demonstration (D)
8. Drill and Practice (DP)
9. Industrial Visit (IV)
10. Games (G) / Role Play (RP)
11. Activity Based Learning (ABL)
12. Project Based Learning (PBL)

\* The abbreviated forms may be used in the Unit Plans

## INTERNAL ASSESSMENT TEST(IAT) OF STUDENT LEARNING

The continuous internal assessment system for the students of any semester shall comprise Cycle Tests, Model Examination and other Activities.

The IAT marks will be for 20 marks and end semester examination for 80 marks.

### ESSENTIAL FEATURES OF THE IAT SYSTEM

1. There will be 3 IAT tests for 1½ hour of 50 mark and one 3-hour model exam for 100-mark per course for all the programmes.
2. Questions for the tests will assess student achievement of the Course Outcomes (COs) related to the units concerned.
3. The questions shall be in conformity with the level of Bloom's Taxonomy that the COs indicates. (The COs shall relate to a minimum of four levels of Bloom Levels).
4. One test cycle represents six subject tests, one each for six theory course, in a semester for all UG programmes.
5. Remedial Classe shall be organised for students who have failed in the regular tests.
6. Students who have been absent for the regular test will not be permitted to take the related retest unless for a valid reason.
7. The faculty is to enter the marks of the IAT tests into the Management Information Software (MIS) and Anna University COE Web portal on or before the stipulated dates.
8. The Final (Model) Examinations will be organised based on the University Practical Examination Schedule.
9. Faculty is to ensure assessment of at least 60 percent of the COs through the IAT tests and examinations and maintain proper evidence in support of it.

## DEPARTMENT

### Vision

- To be globally recognized for providing value based engineering education and research in the field of Electronics and Communication Engineering.

### MISSION

- To provide a congenial learning environment which fosters creativity and innovation among students
- To conduct value based courses for improving technical competency
- To encourage faculty to attend workshops, seminars, faculty development programs and engage them in continuous learning and to use innovative teaching methodologies
- To impart moral values and inculcate moral and ethical behavior
- To establish Centre of Excellence in emerging areas in the field of Communication Engineering
- To undertake collaborative work with industry and institutes and provide solutions for societal challenge

### PROGRAM EDUCATIONAL OBJECTIVES (PEO'S)

- The graduates of the program would have a successful professional career and engage in lifetime learning
  - The graduates will be able to work as a team or a team leader and exhibit professional and ethical behavior
  - The graduates will be able to understand, analyze the technical problems and provide suitable solutions
- 

### PROGRAM OUTCOMES

- Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 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.
- 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.
- Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 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.
- 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.
- Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 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, and give and receive clear instructions.
- 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.
- 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.

### PROGRAM SPECIFIC OUTCOME (PSO'S)

- Ability of the students to design and develop embedded solution for engineering applications.
- Ability of the students to design and implement communication sub systems.

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### MAPPING OF COURSE OUTCOMES TO POs & PSO's

S. No.	Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
1.	Analyse the signals & sm using DFT	3	3												
2.	Design IIR Filters based on requirements			3	3	1									
3.	Design FIR Filters based on requirements			3	3	1									
4.	Characterize Finite word length effects on quantization	3	1	1	1										
5.	Able to explain the Spl features of DSP Architecture	3	2	1	1										
6.	Able to describe the addressing forms in DSP processors	3		2	1	1									

### MAPPING OF COURSE TO POs & PSO's

S. No.	Course	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
1	EC 8553 - Discrete Time Signal Processing	3	3	3	2	1	1								

*W. Umamaheswari*  
19/6/19  
Course Coordinator

*W. Umamaheswari*  
19/6/19  
Module Coordinator

*W. Umamaheswari*  
Program Co-ordinator

# 1. Photos of Lab Manual



## DHIRAJLAL GANDHI COLLEGE OF TECHNOLOGY

Approved AICTE, New Delhi & Affiliated to Anna University, Chennai

Accredited by NAAC

DEPARTMENT OF  
MECHANICAL ENGINEERING



LABORATORY RECORD

### ME6712 - Mechatronics Laboratory

NAME : N. KANDHAVAL  
REG. NO. : 610516114036  
BRANCH : MECH SEM & SECTION : VII - A



Academic Year 2019 - 20 (ODD Sem)





**DHIRAJLAL GANDHI COLLEGE OF TECHNOLOGY**  
(Approved by AICTE and Affiliated to Anna University)

**Department of Mechanical Engineering**

**ME 6712 - MECHATRONICS LABORATORY**

**Course Objectives (CObs)**

- |   |  |
|---|--|
| 1 | To know the method of programming the microprocessor   |
| 2 | To know the method of design, modeling & analysis of basic electrical, hydraulic & pneumatic Systems |
| 3 | To enable the students to understand the concept of mechatronics.                                    |

**Course Outcomes(COs)**

- |     |  |
|-----|--|
| CO1 | Achieve a good knowledge in microprocessor programming   |
| CO2 | Expert in using pneumatic equipments   |
| CO3 | Learn basics of using an hydraulic system  |
| CO4 | Learn basics of image processing concept   |
| CO5 | Apply basic knowledge of Microcontroller programming to control stepper motor and traffic signal |
| CO6 | Apply the knowledge of transducers and PLC to automate the conventional machines used            |

CO & PO/PSO MAPPING

S.No	Course Outcomes (COs)	a	b	c	d	e	f	g	h	i	j	k	l	p	q	r
1	Achieve a good knowledge in microprocessor programming	3			2	1	2		3			2		2		3
2	Expert in using pneumatic equipments			1		2		3			3			1	2	
3	Learn basics of using an hydraulic system				3	1						3		1	2	
4	Learn basics of image processing concept	3			1	2	1		2							1
5	Apply basic knowledge of Microcontroller programming to control stepper motor and traffic signal	2		2		3		2		3				3	3	2
6	Apply the knowledge of transducers and PLC to automate the conventional machines used	1		2			3	1			2		2		3	1

MAPPING GRADE: 1-strong, 2-average, 3-some

ME6712

MECHATRONICS LABORATORY

L T P C 0 0 3 2

**OBJECTIVES:**

To know the method of programming the microprocessor and also the design, modeling & analysis of basic electrical, hydraulic & pneumatic Systems which enable the students to understand the concept of mechatronics.

**LIST OF EXPERIMENTS**

1. Assembly language programming of 8085 - Addition - Subtraction - Multiplication - Division - Sorting - Code Conversion. *Acendy - decendy, secendy - trady*
2. Stepper motor interface. *CH. CCH*
3. Traffic light interface.
4. Speed control of DC motor.
5. Study of various types of transducers.
6. Study of hydraulic, pneumatic and electro-pneumatic circuits.
7. Modeling and analysis of basic hydraulic, pneumatic and electrical circuits using Software.
8. Study of PLC and its applications.
9. Study of image processing technique.

**Total Hours: 45 Hrs**