Indra Ganesan
COLLEGE OF ENGINEERING

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
Accredited by NAAC with 'B+' Grade, 2(f) & 12B Status Institution by UGC
IG Valley, Madurai Main Road, Manikandam, Tiruchirappalli - 620012

NAAC DOCUMENTS

QUALITY INDICATOR FRAME WORK

CRITERION – 1

CURRICULAR ASPECTS

SUBMITTED BY

IQAC

INTERNAL QUALITY ASSURANCE CELL

INDRA GANESAN COLLEGE OF ENGINEERING

Criteria 1	Curricular Aspects	100

1.1 Curricular Planning and Implementation (20)

1.1.1 The Institution ensures effective curriculum planning and delivery through a well-planned and documented process including Academic calendar and conduct of continuous internal Assessment

Table of Content

INDRA GANESAN COLLEGE OF ENGINEERING

IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu – 620 012, India (Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PREFACE OF THE COURSE FILE

Batch	: **2021-2025**
Academic Year	: **2022-2023/ODD**
Program	: **ELECTRONICSANDCOMMUNICATIONENGINEERING**
Year& Semester	: **2nd Year/ 3rdSemester**
Course Code	: **EC3354**
Name of the Course	: **Signals and systems**
Faculty in-charge	: **Mrs.B.Saraswathi, AP/ECE**

Signature of the Faculty in-charge

HoD/ ECE

Dr. G. Balakrishnan, M.E., Ph.D.,
Principal
Indra Ganesan College of Engineering
IG Valley, Madurai Main Road
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INDRA GANESAN COLLEGE OF ENGINEERING

IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu – 620 012, India
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Faculty Time Table

Mrs.B.SARASWATHI, AP / ECE								
Day Order	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
I				EC3354			EC3354	
II								
III		EC3354						
IV				EC3354				
V	EC3354						EC3354	

S.Code	**Title**	**Year / Branch**	**Hours**
EC3354	SIGNALS AND SYSTEMS	II / ECE	6

TOTAL - 6 hours

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EC3354-SIGNALS AND SYSTEMS

LTPC
3104

COURSE OBJECTIVES:

- To understand the basic properties of signals & systems
- To know the methods of characterization of LTI systems in time domain
- To analyze continuous time signals and system in the Fourier and Laplace domain
- To analyze discrete time signals and system in the Fourier and Z transform domain

UNIT I CLASSIFICATION OF SIGNALS AND SYSTEMS **6+6**

Standard signals- Step, Ramp, Pulse, Impulse, Real and complex exponentials and Sinusoids_ Classification of signals – Continuous time (CT) and Discrete Time (DT) signals, Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals -Classification of systems- CT systems and DT systems- – Linear & Nonlinear, Time-variant& Time-invariant, Causal& Non-causal, Stable & Unstable.

UNIT II ANALYSIS OF CONTINUOUS TIME SIGNALS **6+6**

Fourier series for periodic signals- Fourier Transform– properties-Laplace Transforms and Properties

UNIT III LINEAR TIME INVARIANT CONTINUOUS TIME SYSTEMS **6+6**

Impulse response- convolution integrals- Differential Equation-Fourier and Laplace transforms in Analysis of CT systems - Systems connected in series / parallel.

UNIT IV ANALYSIS OF DISCRETE TIME SIGNALS **6+6**

Base band signal Sampling–Fourier Transform of discrete time signals (DTFT)–Properties of DTFT - Z Transform & Properties

UNITV LINEAR TIME INVARIANT- DISCRETE TIME SYSTEMS **6+6**

Impulse response–Difference equations-Convolution sum- Discrete Fourier Transform and Z Transform Analysis of Recursive & Non-Recursive systems-DT systems connected in series and parallel.

TOTAL: 30+30PERIODS

COURSE OUTCOMES:

At the end of the course, the student will be able to:

CO1: determine if a given system is linear/causal/stable
CO2: determine the frequency components present in a deterministic signal
CO3:characterize continuous LTI systems in the time domain and frequency domain
CO4:characterize discrete LTI systems in the time domain and frequency domain
CO5:compute the output of an LTI system in the time and frequency domains

TEXTBOOKS:

1. Oppenheim, Willsky and Hamid, "Signals and Systems",2nd Edition, Pearson Education, New Delhi, 2015.(Units I - V)
2. Simon Haykin, BarryVanVeen,"SignalsandSystems",2ndEdition,Wiley,2002

REFERENCES:

1. B.P.Lathi, "Principles of Linear Systems andSignals",2nd Edition, Oxford,2009.
2. M.J.Roberts, "Signals and Systems Analysis using Transform methods and MATLAB", McGraw- Hill Education, 2018.
3. John Alan Stuller, "An Introduction to Signals and Systems", Thomson,2007.

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CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	-	3	-	3	2	-	-	-	-	-	3	-	-	1
2	3	-	3	-	-	2	-	-	-	-	-	3	-	3	-
3	3	3	-	-	3	2	-	-	-	-	-	3	2	-	-
4	3	3	-	-	3	2	-	-	-	-	-	3	-	3	1
5	3	3	-	3	3	2	-	-	-	-	-	3	-	3	1
CO	3	3	3	3	3	2	-	-	-	-	-	3	2	3	1

1 - low, 2 - medium, 3 - high, '-' - no correlation

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Lecture Schedule

Degree/Program: **B.E / ECE**
Duration: **Aug 2022 - Dec 2022**

Course code & Name: **EC3354–SIGNALS AND SYSTEMS**
Semester: **III** Section: **A** Faculty: **Mrs.B.Saraswathi**

AIM:

To teach the students about the analysis of various types of signals and systems.

OBJECTIVES:

To impart knowledge on

(i) To learn the basic properties of signal & systems
(ii) To know the methods of characterization of LTI systems in time domain
(iii) To analyze continuous time signals and system in the Fourier and Laplace domain
(iv) To analyze discrete time signals and system in the Fourier and Z transform domain

PREREQUISITES:

COURSE OUTCOMES:

After the course, the student should be able to:

CO	Course Outcomes	POs	PSOs
C203.1	Determine if a given system is linear/causal/stable	1,3,5,6,12	3
C203.2	Determine the frequency components present in a deterministic signal	1,3,6,12	2
C203.3	Characterize continuous LTI systems in the time domain and frequency domain	1,2,5,6,12	1
C203.4	Characterize discrete LTI systems in the time domain and frequency domain	1,2,5,6,12	2,3
C203.5	Compute the output of an LTI system in the time and frequency domains	1,2,4,5,6,12	2,3
C203.6	Demonstrate about the concepts of Random signals and systems and spectral density	1,3,5,6	1,2

S.No	Date	Period	Topics to be Covered	Book & Page. No.
UNIT-I-CLASSIFICATION OF SIGNALS AND SYSTEMS				**Targetperiods:12**
1	22/08/22	4	Standard signals-Step, Ramp, Pulse, Impulse	T1
2	22/08/22	7	Real and complex exponentials and Sinusoids	T1
3	25/08/22	4	Classification of signals: CT and DT signals	T1
4	26/08/22	1	Periodic & A periodic signals	T1
5	26/08/22	7	Deterministic & Random signals	T1
6	29/08/22	4	Energy & Power signals	T1
7	29/08/22	7	Classification of systems: CT systems and DT systems	R1
8	01/09/22	4	Linear & Nonlinear, Time-variant & Time-invariant	R1
9	02/09/22	1	Causal & Non-causal, Stable & Unstable.	R1
10	02/09/22	7	Tutorial_1	Material
11	05/09/22	4	Tutorial_2	Material
12	05/09/22	7	Tutorial_3	Material

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UNITII-ANALYSIS OF CONTINUOUS TIME SIGNALS				**Targetperiods:12**
13	08/09/22	4	Fourier series for periodic signals	T1
14	09/09/22	1	Properties of Fourier series	T1
15	09/09/22	7	Problems related to Fourier series	T1
16	12/09/22	4	Fourier Transform	T1
17	12/09/22	7	Properties of Fourier Transform	R1
18	15/09/22	4	Problems related to Fourier transform	R1
19	16/09/22	1	Laplace Transforms	R1
20	16/09/22	7	Properties of Laplace Transform	T1
21	19/09/22	4	Problems related to Laplace transform	T1
22	19/09/22	7	Tutorial_1	Material
23	22/09/22	4	Tutorial_2	Material
24	23/09/22	1	Tutorial_3	Material
UNITIII-LINEAR TIME INVARIANT CONTINUOUS TIME SYSTEMS				**TargetPeriods:12**
25	23/09/22	7	Impulse response	T1
26	26/09/22	4	Problems related to Impulse response	T1
27	26/09/22	7	Convolution integrals	T1
28	29/09/22	4	Problems related to convolution integrals	T1
29	30/09/22	1	Differential Equation	T1
30	30/09/22	7	Problems related to Differential Equation	T1
31	03/10/22	4	Fourier transforms in Analysis of CT systems	R1
32	03/10/22	7	Laplace transforms in Analysis of CT systems	R1
33	06/10/22	4	Systems connected in series and parallel	R1
34	07/10/22	1	Tutorial_1	Material
35	07/10/22	7	Tutorial_2	Material
36	10/10/22	4	Tutorial_3	Material
UNITIV-ANALYSISOFDISCRETETIMESIGNALS				**TargetPeriods:12**
37	10/10/22	7	Base band signal Sampling	T1
38	13/10/22	4	Aliasing effect and Reconstruction of signals	T1
39	14/10/22	1	Fourier Transform of discrete time signals (DTFT)	T1
40	14/10/22	7	Problems related to DTFT	T1
41	17/10/22	4	Properties of DTFT	T1
42	17/10/22	7	Z Transform	R1
43	20/10/22	4	Problems related to Z Transform	R1
44	21/10/22	1	Properties of Z Transform	R1
45	21/10/22	7	Problems related to Properties of Z Transform	R1
46	27/10/22	4	Tutorial_1	Material
47	28/10/22	1	Tutorial_2	Material
48	28/10/22	7	Tutorial_3	Material
UNITV-LINEARTIMEINVARIANT-DISCRETETIMESYSTEMS				**TargetPeriods:12**
49	31/10/22	4	Impulse response	T1
50	31/10/22	7	Difference equations	T1
51	03/11/22	4	Convolution sum	T1
52	04/11/22	1	Problems related to Impulse response, Difference equations, Convolution Sum	T1
53	04/11/22	7	Discrete Fourier Transform Analysis of Recursive systems	T1
54	07/11/22	4	Discrete Fourier Transform Analysis of Non-Recursive systems	T1
55	07/11/22	7	Z Transform Analysis of Recursive & Non-Recursive systems	T1
56	10/11/22	4	DT systems connected in series	R1
57	11/11/22	1	DT systems connected in parallel	R1
58	11/11/22	7	Tutorial_1	Material

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59	14/11/22	4	Tutorial_2	Material
60	14/11/22	7	Tutorial_3	Material
Content Beyond the Syllabus				
61	17/11/22	4	Random signals and systems	Material
62	18/11/22	1	Spectral density	Material

Book Reference- Text Books

Sl.	Title of the Book	Author	Publisher	Year
1.	Signals and Systems	Oppenheim, Willskyand Hamid	Pearson Education 2ndEdition	2015.
2.	Signals and Systems	SimonHaykin,Barry VanVeen	Wiley 2ndEdition	2002.

Book Reference-References

Sl	Title of the Book	Author	Publisher	Year
1.	Principles of Linear Systems and Signals	B.P.Lathi	Oxford	2009
2.	Signals and Systems Analysis using Transform methods and MATLAB	M.J.Roberts	Mcgraw-Hill education	2018
3.	An Introduction to Signals and Systems	JohnAlanStuller	Thomson	2007

Website Reference:
http://nptel.iitm.ac.in/courses.php?branch=Electronicswww.freebookspot.com

Signature of the Faculty in-charge

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DEPARTMENTOFELECTRONICSANDCOMMUNICATION ENGINEERING

Identification of Curricular Gap & Content Beyond Syllabus(CBS)

Name of the Faculty: Mrs.B.Saraswathi **Course Code & Name: EC3354-Signals and systems**

Degree & Program: B.E./ECE **Semester & Section: III/A** **AcademicYear:2022-2023/ODD**

I. Mapping of Course Outcomes with Pos & PSOs. (before CBS)

Table.1Mappingof COs, C, PSOs with POs- before CBS.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C203.1	3	-	3	-	3	2	-	-	-	-	-	3	-	-	1
C203.2	3	-	3	-	-	2	-	-	-	-	-	3	-	3	-
C203.3	3	3	-	-	3	2	-	-	-	-	-	3	2	-	-
C203.4	3	3	-	-	3	2	-	-	-	-	-	3	-	3	1
C203.5	3	3	-	3	3	2	-	-	-	-	-	3	-	3	1
C203.6	3	-	3	-	3	2	-	-	-	-	-	-	2	3	-
C203	3	3	3	3	3	2	-	-	-	-	-	3	2	3	1

II. Identification of content beyond syllabus.

Table.2Identification of content beyond syllabus

Details of Content Beyond Syllabus(CBS) added	Pos strength ened/ vacant filled	CO/Unit
Random signals and systems, Spectral density	PO2,PO12 vacant filled	C203.6/IV&V

III. Mapping of Course Outcomes with Pos & PSOs. (After CBS)

Table.3 Mapping of COs, C, PSOs with POs- after CBS.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C203.1	3	-	3	-	3	2	-	-	-	-	-	3	-	-	1
C203.2	3	-	3	-	-	2	-	-	-	-	-	3	-	3	-
C203.3	3	3	-	-	3	2	-	-	-	-	-	3	2	-	-
C203.4	3	3	-	-	3	2	-	-	-	-	-	3	-	3	1
C203.5	3	3	-	3	3	2	-	-	-	-	-	3	-	3	1
C203.6	3	*3	-	-	-	-	-	-	-	-	-	*3	-	-	-
C203	3	3	3	3	3	2	-	-	-	-	-	3	2	3	1

Signature of the Faculty

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Proof of Curricular Gap & Content Beyond Syllabus(CBS)

Name of the Faculty: Mrs.B.Saraswathi **Course Code & Name: EC3354-Signals and systems**

Degree & Program: B.E./ECE **Semester & Section: III/ A** **Academic Year: 2022-2023/ODD**

Signature of the Faculty

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HoD/ECE

RANDOMSIGNALSANDPROCESSES:

The theory of signals and systems is applied for the processing of signals like speech signal, RADAR signal, SONAR signal, earth quake signal, ECG and EEG signals. All these signals are naturally occurring signals and hence have some random component. The primary goal of this chapter is to introduce the principles of random signals and processes for in-depth understanding of the processing methods. We will introduce the concept of probability and will discuss different standard distribution functions used for the analysis of random signals. Different operations on the random variables namely expectation, variance and moments will be introduced. We will then discuss central limit theorem. The classification of random processes namely wide sense stationary, ergodic and strict sense stationary processes will be defined.

PROBABILITY:

Consider the experiment of throwing a dice. The result of the throw is random in nature in the sense that we do not know the result i.e., the outcome of the experiment until the outcome is actually available. The randomness in the outcome is lost once the outcome is evident. The result of the experiment is either a 1dot, 2dots, 3dots and so on. The outcome is a discrete random variable. Here, there are only 6 possibilities and so one can easily find the probability of getting 1dot is1/6 evaluated as one of total possible outcomes. If the experiment is performed a large number of times, the ratio of frequency of occurrence of a 1dot and the total number of times the experiment is performed approaches 1/6

We will first define the term event. When any experiment is performed to generate some output, it is called as an event. The output obtained is called as the outcome of the experiment. The possible et of outcomes of the experiment is called as a space or as event space or sample space. Many times, there is the uncertainty or randomness involved in the outcome of the experiment. The term probability is closely related to uncertainty. In case of the experiment of throwing of a die, the uncertainty is involved in the outcome. When a die is thrown, we do not know what will be the outcome. Using the notion we may define a relative frequency of occurrence of some event. Consider the example of a fair coin. Let it be tossed n times. Let $n_H$times Head appear.

DISTRIBUTION FUNCTION:

The distribution function of a random variable X is the probability that it is less than or equal to some value,

As a function of that value. Since the distribution function is a probability it must satisfy the requirements for a probability.

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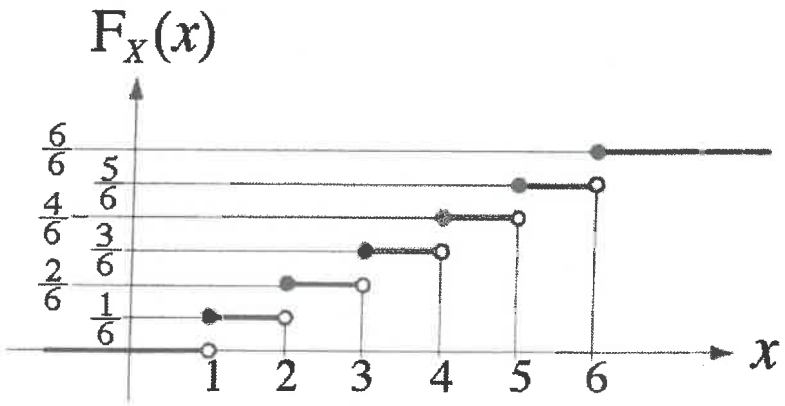
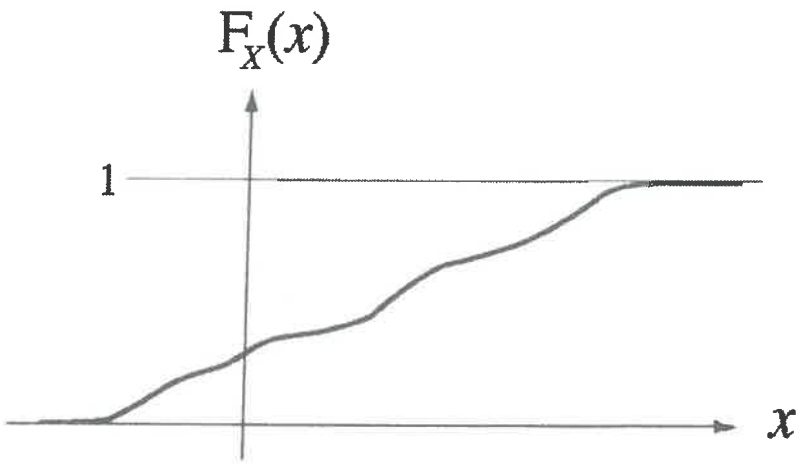
In $F_x(x) - x$ is a monotonic function and its derivative is never negative.



Possible distribution function for a continuous random variable



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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Assignment Question Paper

Assignment–01			Date of Issue:	04.09.2022	Marks	10
Course code	EC3354	Course Title	Signals and Systems			
Year	II	Semester/Section	III/A	Date of Submission:	08.09.2022	

Q.No	Questions	CO
1.	Determine whether the following system is causal, stable, linear and time invariant $y(t) = d/dt(e^{-x(t)})$	C203.1
2.	Determine whether the signal $x(t)=tu(t)$ is an energy signal or power signal.	C203.1
3.	Find the even and odd components of the signal $x(n)=\{1,0,-1,2,3\}$.	C203.1
4.	Check the system $y(n)=\log_{10}\|x(n)\|$ is linear, time invariant, causal and static.	C203.1
5.	Find the fundamental period of the signal $x(t)=e^{j7\pi t/3}$	C203.1

B S S

Name and signature of the faculty In-charge

(B. SARASWATHI)

HOD/ECE

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Assignment Answer Sheet

Name of the Student: S.Deepalakshmi

AU Register Number: 811221106005

Assignment–01			Date of Issue:	04.09.2022	Marks	10
Course code	EC3354	Course Title	Signals and Systems			
Year	II	Semester/Section	III/A	Date of Submission:	08.09.2022	

Q.No	Questions	CO
1.	Determine whether the following system is causal, stable, linear and time invariant $y(t) = d/dt(e^{-x(t)})$	C203.1
2.	Determine whether the signal $x(t)=tu(t)$ is an energy signal or power signal.	C203.1
3.	Find the even and odd components of the signal $x(n)=\{1,0,-1,2,3\}$.	C203.1
4.	Check the system $y(n)=\log_{10}\|x(n)\|$ is linear, time invariant, causal and static.	C203.1
5.	Find the fundamental period of the signal $x(t)=e^{j7\pi t/3}$	C203.1

Mark Allocation

Rubrics	Marks Allocated	Marks obtained
Content Quality	6	4
Presentation Quality	2	2
Timely submission	2	2
Total marks	10	8

BSS

Name and Signature of the Faculty In charge

(B.SARASWATHI)

M.Bhuvaneshwari

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Tutorial Question Paper

Tutorial–02			Date of Issue:	23.09.2022	Marks	10
Course code	EC3354	Course Title	Signals and Systems			
Year	II	Semester/Section	III/A	Date of Submission:	30.09.2022	

Q.No	Questions	CO
1.	Find the trigonometric Fourier series for $x(t) = t^2$, overtheinterval(-1,1)	C203.2
2.	Find the Fourier transform of $x(t)=A \cos(2\pi ft).u(t)$	C203.2
3.	Find Fourier Transform of $x(t)= e^{-at}.u(t)$.	C203.2
4.	Obtain inverse Laplace transform of the function $X(s)=1/s^2+3s+2$ ROC;-$2<Re(s)<-1$	C203.2
5.	(i)State and prove any 3 properties of Laplace Transform. (ii)Find the Laplace transform of the signal $x(t) = e^{-2t}.u(t)+e^{-4t}.u(t)$ and specify its ROC	C203.2

Name and signature of the faculty In-charge

HOD/ECE

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Tutorial Answer Sheet

Name of the Student: S.Vellaisamy

AU Register Number: 811221106036

Tutorial–02			Date of Issue:	23.09.2022	Marks	10
Course code	EC3354	Course Title	Signals and Systems			
Year	II	Semester/Section	III/A	Date of Submission:	30.09.2022	

Q.No	Questions	CO
1.	Find the trigonometric Fourier series for $x(t) = t^2$, overtheinterval(-1,1)	C203.2
2.	Find the Fourier transform of $x(t)=A \cos(2\pi ft).u(t)$	C203.2
3.	Find Fourier Transform of $x(t)= e^{-at}.u(t)$.	C203.2
4.	Obtain inverse Laplace transform of the function $X(s)=1/s^2+3s+2$ ROC;- $2<Re(s)<-1$	C203.2
5.	(i)State and prove any 3 properties of Laplace Transform. (ii)Find the Laplace transform of the signal $x(t) = e^{-2t}.u(t)+e^{-4t}.u(t)$ and specify its ROC	C203.2

Mark Allocation

Rubrics	Marks Allocated	Marks obtained
Problem solving approach	6	5
Correctness of Answer	2	2
Timely submission	2	2
Total marks	10	9

B S S
Name and signature of the faculty In-charge
(B.SARASWATHI)

M. Bhuvaneswari
HOD/ECE

Dr. G. Balakrishnan, M.E., Ph.D.,
Principal
Indra Ganesan College of Engineering
IG Valley, Madurai Main Road
Manikandam, Trichy-620 012.

Register Number:

INDRAGANESANCOLLEGEOFENGINEERING

IG Valley, Manikandam, Tiruchirappalli,TamilNadu–620012, India

(Approved by AICTE, New Delhi and affiliated to Anna University, Chennai)

Internal Assessment Exam-I			Date/Session	14.10.22/FN	Marks	60
Course code	EC3354	Course Title	Signals and Systems			
Regulation	2021	Duration	90 minutes	Academic Year	2022-2023	
Year	II	Semester	III	Department	ECE	

COURSEOUTCOMES

CO1:	Determine if a given system is linear/causal/stable
CO2:	Determine the frequency components present in a deterministic signal
CO3:	Characterize continuous LTI systems in the time domain and frequency domain
CO4:	Characterize discrete LTI systems in the time domain and frequency domain
CO5:	Compute the output of an LTI system in the time and frequency domains
CO6:	Demonstrate about the concepts of Random signals and systems and spectral density

Q.No.	Question	CO	BTS
	PARTA **(Answer all the Questions 9x2=18Marks)**		
1	Define signal. Give some examples	CO1	K1
2	Differentiate energy and Power signals	CO1	K4
3	What is Discrete time system? Give the classifications of DT system	CO1	K2
4	Draw the signal $x(n)=u(n)-u(n-3)$	CO1	K1
5	What are standard signals? Give expression for each.	CO1	K2
6	Determine whether the given signal is periodic or not. $x(t)=3\cos(4t)+\sin(\pi t)$	CO1	K2
7	If $x(n)=\{0,0,0,3,2,1,-1,-7,6\}$ then find and Draw $y(n)=x(2n-3)$	CO2	K3
8	State and Prove Parseval's Power Theorem.	CO2	K1
9	Find Fourier Transform of $x(t)=e^{-at}.u(t)$.	CO2	K3
	PARTB **(Answer all the Questions 2 x14=28Marks)**		
11a	Find whether the following system is Linear, Shift invariant, Causal, Static and Stable. $y(n)=x(n).\cos(\omega n)$	CO1	K3
	OR		
11b	(i)Find whether the signal $x(t) = 2\cos(10t+1) - \sin(4t-1)$ is Periodic or not. (ii) $x(t) = \begin{cases} 5 & -4\le t\le 5 \\ 1 & -4\le t\le 4 \\ t+5 & -5\le t\le -4 \end{cases}$ .Determine Total Energy of x(t)	CO1	K3
12a	Find whether the following system is Linear, Shift invariant, Causal, Static and Stable. $y(n)=x(n^2)$	CO1	K3
	OR		
12b	Sketch $x(n)=a^n$. Where $-2\le n\le 2$ for the two cases (i)$a=-1/4$ (ii)$a=-4$	CO1	K3
	PARTC **(Answer all the Questions 1 x14=14Marks)**		
13a	Find the trigonometric Fourier series for $x(t)=t^2$, over the interval (-1,1)	CO2	K3
	OR		
13b	Find the Fourier transform of $x(t) = A\cos(2\pi ft).u(t)$	CO2	K3

B.S.G

Course Faculty

(Name/Sign/Date)

(B. SARASWATHI)

Dr. G. Balakrishnan, M.E., Ph.D.,
Principal
Indra Ganesan College of Engineering
IG Valley, Madurai Main Road
Manikandam, Trichy-620 012.

HoD

(Name/Sign/Date)

INDRA GANESAN COLLEGE OF ENGINEERING

IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu – 622 012, India
(Approved by AICTE, New Delhi and affiliated to Anna University, Chennai)

Internal Assessment Test Answer Book

Name	S. Aathi			**Year/ Semester/Section**	II / III
Batch No.	8111221106001	**Date/Session**	14/10/22 FN	**Department**	ECE
Course code		**Course Title**	Signals and systems		
Internal Assessment Test	**IAT 1** ☐	**IAT 2** ☐	**IAT 3** ☐	**Model** ☐	
Name and Signature of the Invigilator with date	P. Santhana Selvi 14/10/22				

Instruction to the Student: Put tick mark to the question attended in the column against question.

Part A			Part B / Part C					Total Marks
Q. No.	✓	Marks	Q. NO.	✓	a Marks	✓	b Marks	
1		2	11		11		—	11
2		2	12		6		—	6
3		1½	13		13		—	13
4		1	14					
5		2	15					
6		1½	16					
7		1					Total	30
8		2	FOUR FOUR				B. SARASWATHI	
9		1	44/60				15/10/22	
10		—	Grand Total				Name and Signature of the Examiner with date	
Total		14						

To be filled by the examiner							
Course Outcomes	1	2	3	4	5	6	Total
Marks allotted	40	20					60
Marks Obtained	32	12					44

IQAC Audit - Remarks

—

Name and Signature of the IQAC member

Dr. G. Balakrishnan, M.E., Ph.D.,
Principal
Indra Ganesan College of Engineering
IG Valley, Madurai Main Road
Manikandam, Trichy-620 012.

INDRAGANESANCOLLEGEOFENGINEERING

IGVALLEY,MANIDANDAM,TIRUCHIRAPPALLI–620012

RTMENTOFELECTRONICSANDCOMMUNICATIONENGINEERING ACADEMIC YEAR 2022 – 2023 (ODD SEMESTER)

STUDENTSMARKSTATEMENT-COBASED

INTERNAL ASSESSMENT-I

SUBJECTCODE&TITLE:EC3354 –SIGNALSANDSYSTEMS

YEAR/SEM:II/III

MONTH&YEAR:OCT2022

S.NO	REGNO	STUDENTNAME	CO1	CO2	TOTAL (60)	TOTAL(100)
1.	811221106001	AarthiS	32	12	44	73
2.	811221106003	ArockiaJeniferM	-	-	AB	AB
3.	811221106005	DeepalakshmiS	32	14	46	77
4.	811221106008	DhineshBabuC	-	-	AB	AB
5.	811221106012	JayaKamaksheradhaSP	24	6	30	50
6.	811221106022	ParkaviS	26	4	30	50
7.	811221106024	PremkumarS	25	6	31	52
8.	811221106033	Thamilarasi C	26	10	36	60
9.	811221106034	ThrishaS	23	14	37	62
10.	811221106035	VeerakumarR	24	10	34	57
11.	811221106036	VellaisamyS	34	14	48	80
12.	811221106037	VictorrajS	-	-	AB	AB
13.	811221106040	VishalV	27	12	39	65
14.	811221106301	OmprakashR	26	8	34	57

MARKSRANGE:

<20	20-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
0	0	0	2	4	2	3	0	0

Dr. G. Balakrishnan, M.E., Ph.D.,
Principal
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Total No. of Candidates Present	**11**
Total No. of Candidates Absent	**3**
Total No. of Students Pass	**11**
Total No. of Students Fail	**0**
Percentage of Pass	**100**

STAFF IN CHARGE **HoD/ECE** **PRINCIPAL**

Dr. G. Balakrishnan, M.E., Ph.D.,
Principal
Indra Ganesan College of Engineering
IG Valley, Madurai Main Road
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ROOT CAUSE ANALYSIS

Name of the Faculty : B.Saraswathi
Degree & Program : B.E(ECE)
IA Test : I
Target : 85%

Course Code & Name: EC3354- Signals and Systems
Semester & Section: III
University Exam / Month & Year: Dec/Jan-2023
Achieved :78%

S.NO	BATCHNO	NAMEOFTHE STUDENT	CAUSESFOR FAILURE	CORRECTIVE ACTIONTAKEN	PREVENTIVE ACTIONTAKEN	FOLLOWUP STATUS
1.	811221106003	AROCKIA JENIFER.M	MOTHER HEALTH ISSUE	RETEST CONDUCTED	ADVISED TO TAKE CARE OF HERMOTHER'S HEALTH	PROGRESS MONITERED
2.	811221106008	DHINESHBABU.C	HEALTH ISSUE	RETEST CONDUCTED	ADVISED TO TAKECAREOF HEALTH	PROGRESS MONITERED
3.	811221106008	VICTORRAJ.S	HEALTH ISSUE	RETEST CONDUCTED	ADVISED TO TAKECAREOF HEALTH	PROGRESS MONITERED

Signature of the Faculty Member

Dr. G. Balakrishnan, M.E., Ph.D.,
Principal
Indra Ganesan College of Engineering
IG Valley, Madurai Main Road
Manikandam, Trichy-620 012.

Signature of the HoD/ ECE

INDRA GANESAN COLLEGE OF ENGINEERING

IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu – 620 012, India
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)

IQAC Academic Audit Form

ACADEMIC YEAR: 2022-2023 / ODD SEMESTER

Name of Department :	ECE	Year / Sem / Sec :	II / III / A	No. of Students Registered :	14
Details of Examination :	IA Test -1 / IA Test -2 / IA Test -3 / Model Test				

S.No.	Course Code	List of Reg.No Verified	Course Log Book Verified (Y / N)	Course File Verified (Y / N)	No of students Attended	No of Absentees	No of Failures	Pass %	Remarks
1.	EC3353	811221106001	Y	Y	11	3	0	100%	—
2.	EC3352	811221106033	Y	Y	11	3	1	91%	Retest
3.	EC3354	811221106012	Y	Y	11	3	1	91%	—
4.	EC3351	811221106034	Y	Y	11	3	3	73%	—
5.	MA3355	811221106040	Y	Y	12	2	2	83%	Retest
6.	CS3352	811221106024	Y	Y	12	2	1	92%	—

Verified by

External Member Name and Signature:	S. Minipriya &
Internal Member Name and Signature:	M. Nandhini &

Overall Remarks:

Instructed to Conduct Retest for failure students.

HoD/ ECE

IQAC Co-ordinator

Principal

Dr. G. Balakrishnan, M.E., Ph.D.,
Principal
Indra Ganesan College of Engineering
IG Valley, Madurai Main Road
Manikandam, Trichy-620 012.