



SRI BHARATHI

ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)
Kaikkurichi, Pudukkottai -622 303

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NAAC DOCUMENTS



Quality Indicator Frame Work

Criterion – 1

CURRICULAR ASPECTS

Submitted by

IQAC

Internal Quality Assurance Cell

Sri Bharathi Engineering College for Women



SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)

Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

| | | |
|--------------------|---------------------------|------------|
| Criterion 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 Contents

| S.No | Description |
|------|--|
| 1 | Preface of the Course File |
| 2 | Review of Course File |
| 3 | Work Load |
| 4 | Course Plan |
| 5 | Content Beyond Syllabus |
| 6 | Assignment Answer Sheet Rubrics Based Evaluation |
| 7 | Tutorial Answer Sheet Rubrics Based Evaluation |
| 8 | Academic Audit Form |
| 9 | Student Feed Back on Faculty |
| 10 | Internal Assessment Schedule |
| 11 | Question Paper |
| 12 | Answer Key |
| 13 | Sample Answer Sheet |
| 14 | Co Based Mark Entry |
| 15 | Root Cause Analysis |
| 16 | Retest Schedule |
| 17 | Retest Sample Question Paper |
| 18 | Attendance Sheet |
| 19 | Retest Co Based Mark Entry |
| 20 | Internal Mark Sheet- Anna University Portal |
| 21 | AU Grade Sheet |
| 22 | CO- PO Attainment |

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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India
DEPARTMENT OF ELECTRONICS COMMUNICATION ENGINEERING

PREFACE OF THE COURSE FILE

Batch : 2017-2021

Academic Year : 2019-2020/ ODD


Program : ELECTRONICS AND COMMUNICATION ENGINEERING


Year & Semester : 3rd Year/ 5th Semester


Course Code : EC8553 NBA Code: C302

Name of the Course : Discrete time signal processing

Faculty Incharge : **Mr S.Udhayanan AP / ECE**


Signature of the Faculty Incharge


Dr. S.THILAGAVATHI M.E., Ph.D.
PRINCIPAL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
Kaikkurichi - 622 303, Pudukkottai Dt.


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SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
KAIKKURICHI,
PUDUKKOTTAI - 622 303.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

REVIEW OF COURSE FILE

(to be pasted on the inner side of the file-backside).(#-State Yes/No.)

| S.N | Details <div style="text-align: right; margin-right: 10px;">Date:</div> | R-I-* | R-II-*& | R-III- *& | R-IV- *&\$ | R-V- *&\$@ |
|-----|--|-------|---------|--------------|---------------|---------------|
| 1. | Preface of the course file | Yes | | | | |
| 2. | Vision, Mission, PEOs, POs, PSOs, Blooms taxonomy | Yes | | | | |
| 3. | Subject handlers of yesteryears | | | | | |
| 4. | Timetable/Workload of the staff – Distribution of teaching load – Roles and Responsibilities | Yes | | | | |
| 5. | Syllabus signed by staff & HoD | Yes | | | | |
| 6. | Lecture Schedule signed by staff & HoD | Yes | | | | |
| 7. | Course Committee meeting circular and minutes | | | | | |
| 8. | Identification of Curricular gap and Content Beyond the syllabus | Yes | | | | |
| 9. | Self-study topics | Yes | | | | |
| 10. | Previous AU Question papers | Yes | | | | |
| 11. | Unit wise Q&A and Objective type questions | Yes | | | | |
| 12. | Unit wise course material | Yes | | | | |
| 13. | Assignment question paper with sample answer sheets and mark entry | | Yes | | | |
| 14. | Tutorial question paper with key and mark entry | | Yes | | | |
| 15. | Class test/IA test Q Paper with Key, sample answer papers and mark entry | | Yes | | | |
| 16. | IA Test- result analysis-CAP-evidence-root cause analysis. | | Yes | | | |
| 17. | Retest –Q paper-Attendance-marks | | | | | |
| 18. | AU Web portal entry sheet | | Yes | | | |
| 19. | Very poor performance in first two tests-action taken.-communication to parents-evidence | | | | | |
| 20. | Absence for two tests-action taken-communication to parents-evidence. | | | | | |
| 21. | Indiscipline of student reported, if any | | | | | |
| 22. | Special class/coaching class/remedial class/attendance-CAP | | | | | |
| 23. | Conduct of Seminar, Quizzes - proof | | | | | |
| 24. | Content beyond the syllabus - proof | | | | Yes | |
| 25. | Student feedback on faculty | | | | Yes | |
| 26. | Course end survey | | | | | |
| 27. | Internal Assessment sheet | | | | Yes | |
| 28. | AU question paper with students feedback | | | | | |
| 29. | Discrepancy of the question paper and correspondence, if any | | | | | |
| 30. | AU result analysis-Details of arrear students. | | | | | |
| 31. | AU grade sheet | | | | | Yes |
| 32. | CO – PO & PSO attainment sheet | | | | | Yes |
| | Signature of Course handling faculty | | | | | |
| | Signature of HoD | | | | | |

Dr. S. THILAGAVATHI M.E., Ph.D.,

PRINCIPAL

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

INDIVIDUAL STAFF WORKLOAD FOR ODD SEMESTER (2019-2020)

| S.NO | STAFF NAME | SUB.CODE & SUB.NAME | DEPT | YEAR / SEM | HOURS ALLOCATED | TOTAL PERIODS |
|------|----------------------|---|----------|------------|-----------------|---------------|
| 1 | Mr.S.UDAYANAN | EC6701 - RF & Microwave Engineering | ECE | IV/VII | 05 | 14 |
| | | EC6712 - Optical & Microwave Laboratory | ECE | IV/VII | 03 | |
| | | EC8553-Discrete Time Signal Processing | ECE | III/V | 06 | |
| 2 | Mrs .R.YOGESHWARI | EC6702 - Optical Communication & Networks | ECE | III/VII | 05 | 8 |
| | | EC8361-Analog and Digital Circuits Laboratory | ECE | II/III | 03 | |
| 3 | Mrs.T.K.MOHANA PRIYA | EC6016 - Opto Electronic Devices | ECE | IV/VII | 05 | 16 |
| | | EC8501 - Digital Communication | ECE | III/V | 05 | |
| | | EE8591- Digital Signal Processing | EEE | III/V | 06 | |
| 4 | Mrs.G.VIDYA | OMD551-Basics of Biomedical Instrumentation | CSE & IT | III/V | 05 | 13 |
| | | EE6008-Mcontroller Based system design | EEE | IV/VII | 05 | |
| | | EC8561-Communication Systems lab | ECE | III/V | 03 | |
| 5. | Ms. M.SUGANYA | EC6703 - Embedded & Real Time Systems | ECE | IV/VII | 05 | 14 |
| | | CS8351-Digital Principle and System Design | CSE | II/III | 06 | |
| | | EC6711 - Embedded Laboratory | ECE | IV/VII | 03 | |
| 6 | Ms.T.SUGANTHI | EC6004 - Satellite Communication | ECE | IV/VII | 05 | 14 |
| | | EC8352 - Signals and Systems | ECE | II/III | 06 | |


Dr. S.THILAGAVATHI M.E.,Ph.D.,

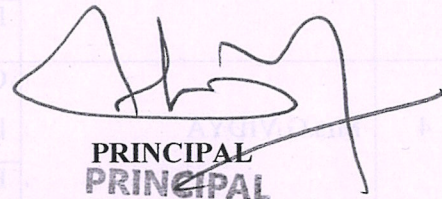
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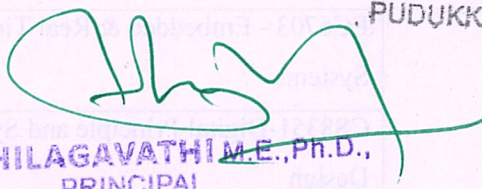
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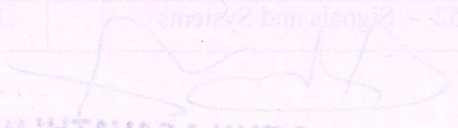
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| | | | | | | |
|----|------------------------|---|-------------|--------|----|----|
| | | CS8382-Digital Systems Lab | CSE & IT | II/III | 03 | |
| 7 | Ms. SATHYA .M | EC8691-Microprocessor And Microcontroller | CSE & IT | III/V | 05 | 13 |
| | | EC8392-Digital Electronics | ECE | II/III | 05 | |
| | | EC8681- Microprocessor and Microcontroller Laboratory | CSE & IT | III/V | 03 | |
| 8 | Mrs .NITHYA POORANI .V | EC6011 - Electro Magnetic Interference &Compatibility | ECE | IV/VII | 05 | 15 |
| | | EE 8551- Microprocessor and Microcontroller | EEE | III/V | 05 | |
| | | GE 8077-Toatal quality Management | ECE | III/V | 05 | |
| 9 | Mr .PALANIAPPAN.C | EC8351 - Electronic Circuits- I | ECE | II/III | 05 | 11 |
| | | EC8562 - Digital Signal Processing Laboratory | ECE | III/V | 03 | |
| | | EC 8311 Electronics lab | EEE | II/III | 03 | |
| 10 | Mrs.V.SAGAYAMARY | EC8395 -Communication Engineering | CSE | II/III | 05 | 11 |
| | | EC8562 - Digital Signal Processing Laboratory(skilled) | ECE | III/V | 03 | |
| | | EC8361-Analog and Digital Circuits Laboratory(skilled) | ECE | II/III | 03 | |


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TAMIL NADU - 622 303.


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SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
KAIKKURICHI - 622 303.
PUDUKKOTTAI DISTRICT


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PRINCIPAL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
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Department of ECE

COURSE PLAN

| | | | |
|------------|-----------------------------------|-----------------|------------------|
| Sub.Code | : EC8553 | Branch/Year/Sem | : ECE/ III/ V |
| Sub.Name | : DISCRETE TIME SIGNAL PROCESSING | Batch | : 2017-2021 |
| Staff Name | : Mr.S.Udhayan | Academic Year | : 2019-2020(ODD) |

COURSE OBJECTIVE

1. To learn discrete Fourier transforms, properties of DFT and its application to linear filtering.
2. 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
3. To understand the effects of finite precision representation on digital filters
4. To understand the fundamental concepts of multi rate signal processing and its applications
5. To introduce the concepts of adaptive filters and its application to communication engineering

TEXT BOOKS:

1. John G. Proakis & Dimitris G.Manolakis, -Digital Signal Processing – Principles, Algorithms & Applications, Fourth Edition, Pearson Education / Prentice Hall, 2007.(UNIT I-V)

REFERENCES:

1. Emmanuel C. Ifeachor & Barrie. W. Jervis, -Digital Signal Processing, Second Edition, Pears Education / Prentice Hall, 2002.
2. A. V. Oppenheim, R.W. Schafer and J.R. Buck, -Discrete-Time Signal Processing, 8th Indian Reprint, Pearson, 2004.

TEACHINGMETHODOLOGIES:

BB -BLACKBOARD
PPT-POWERPOINTPRESENTATION

RELATED WEBSITES URL:

W1: <http://www.IIR filters./wikipages//html>

W2: http://www.nptel.ac.in.courses/117107094/lecture/lecture_18/lecture_18/_page2.html


Dr. S. THILAGAVATHI M.E., Ph.D.,
PRINCIPAL
SRI BHARATHI ENGINEERING
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EC8553

DISCRETE-TIME SIGNAL PROCESSING

L T P C
4 0 0 4

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 digital signal processors & its applications

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 PROCESSOR

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

TOTAL:60PERIODS


Course Faculty


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| S. No | Topic Name | Books for Reference | Page No | Teaching Methodology | No. of Periods required | Cumulative no. of Periods |
|---|---|---------------------|-----------|----------------------|-------------------------|---------------------------|
| UNIT – I DISCRETE FOURIER TRANSFORM | | | | | | |
| 1. | Review of signals and systems | R5 | 1.3-1.11 | BB | 1 | 1 |
| 2. | Concept of frequency in discrete-time signals | R5 | 1.15 | BB | 2 | 3 |
| 3. | Summary of analysis & synthesis equations for FT & DTFT | R5 | 1.100 | BB | 1 | 4 |
| 4. | Discrete Fourier transform (DFT) | R5 | 471-449 | BB | 1 | 5 |
| 5. | Linear filtering using DFT. Filtering long data sequences | R5 | 1.52-1.56 | BB | 1 | 6 |
| 6. | Overlap save and Overlap add method | R5 | 3.52 | BB | 1 | 7 |
| 7. | Radix-2 Decimation-in-time (DIT) | R5 | 4.11 | BB | 1 | 8 |
| 8. | Fast Fourier transform (FFT), Decimation-in-frequency | R5 | 4.21 | BB | 2 | 10 |
| 9. | Fast computation of DFT | T1 | 512-513 | BB | 1 | 11 |
| 10. | Linear filtering using FFT. | R5 | 3.52-3.67 | BB | 1 | 12 |
| 11. | Revision | - | - | BB | 1 | 13 |
| LEARNING OUTCOME | | | | | | |
| At the end of unit, Students should be able to | | | | | | |
| <ul style="list-style-type: none"> • Understand about DIT & DIF • Learn about FFT. • Understand about Linear & Circular convolution. | | | | | | |
| UNIT –II INFINITE IMPULSE RESPONSE FILTERS | | | | | | |
| 12. | Characteristics of practical frequency selective filters | R5 | 5.1 | BB | 1 | 14 |
| 13. | Characteristics of commonly used analog filters | R5 | 5.3 | BB | 1 | 15 |
| 14. | Butterworth filters, Chebyshev filters | R5 | 5.14-5.23 | BB | 2 | 17 |
| 15. | Design of IIR filters from analog filters | R5 | 5.33 | BB | 1 | 18 |
| 16. | Approximation of derivatives, | R5 | 5.34-5.35 | BB | 1 | 19 |
| 17. | Impulse invariance method Bilinear transformation | R5 | 5.44 | BB | 2 | 21 |
| 18. | Frequency transformation in the | R5 | 5.29-5.31 | BB | 1 | 22 |

TEXT BOOKS:

1. John G. Proakis & Dimitris G.Manolakis, -Digital Signal Processing – Principles, Algorithms & Applications, Fourth Edition, Pearson Education / Prentice Hall, 2007.(UNIT I-V)

REFERENCES:

1. Emmanuel C. Ifeachor & Barrie. W. Jervis, -Digital Signal Processing, Second Edition, Pearson Education / Prentice Hall, 2002.
2. A. V. Oppenheim, R.W. Schafer and J.R. Buck, -Discrete-Time Signal Processing, 8th Indian Reprint, Pearson, 2004.



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| | | | | | | |
|-----|---|----|-------------|----|---|----|
| | analog domain | | | | | |
| 19. | Structure of IIR filter - direct form I, | R5 | 6.103-6.105 | BB | 2 | 24 |
| 20. | Direct form II, Cascade, parallel realizations. | R5 | 5.58 | BB | 1 | 25 |
| 21. | Revision | - | - | BB | 1 | 26 |

LEARNING OUTCOME

At the end of unit, Students should be able to

- To learn about IIR filters
- To understand about the realization of filters
- To learn about Frequency transformation in the analog domain

UNIT –III FINITE IMPULSE RESPONSE FILTERS

| | | | | | | |
|----|--|----|-----------|----|---|----|
| 20 | Design of FIR filters | T1 | 6.1-6.6 | BB | 1 | 27 |
| 21 | Symmetric and Anti-symmetric FIR filters | R5 | 6.7-6.10 | BB | 2 | 29 |
| 22 | Design of linear phase | R5 | 6.13 | BB | 1 | 30 |
| 23 | FIR filters using Fourier series method | R5 | 6.16 | BB | 1 | 31 |
| 24 | FIR filter design using windows (Rectangular | R5 | 6.32 | BB | 2 | 33 |
| 25 | Hamming and Hanning window), | R5 | 6.39-6.40 | BB | 2 | 35 |
| 26 | Frequency sampling method | R5 | 6.80 | BB | 1 | 36 |
| 27 | FIR filter structures | R5 | 6.82 | BB | 1 | 37 |
| 28 | linear phase structure, direct form realizations | R5 | 6.102 | BB | 1 | 38 |

LEARNING OUTCOME

At the end of unit, Students should be able to

- To learn about FIR filters
- To understand the concept of windowing method
- To learn about design structure of FIR filters

UNIT IV FINITE WORD LENGTH EFFECTS

| | | | | | | |
|----|--|----|---------|----|---|----|
| 35 | Fixed point and floating point number representation | R5 | 7.3-7.9 | BB | 2 | 40 |
| 36 | ADC - quantization | R5 | 7.9 | BB | 1 | 41 |
| 37 | Truncation and rounding | R5 | 7.10 | BB | 2 | 43 |
| 38 | Quantization noise | R5 | 7.15 | BB | 1 | 44 |
| 39 | Input / output quantization | R5 | 7.16 | BB | 2 | 46 |

| | | | | | | |
|----|---|----|------|-----|---|----|
| 40 | Coefficient quantization error | R5 | 7.29 | BB | 1 | 47 |
| 41 | Product quantization error | R5 | 7.21 | BB | 1 | 48 |
| 42 | Overflow error limit cycle oscillations due to product quantization | R5 | 7.32 | BB | 2 | 50 |
| 43 | Adaptive Filter Equalization | | | PPT | 1 | 51 |

LEARNING OUTCOME

At the end of unit, Students should be able to

- To able to understand Quantization noise
- To learn about quantization error

UNIT – V INTRODUCTION TO DIGITAL SIGNAL PROCESSORS

| | | | | | | |
|----|-----------------------------|----|-------|-----|---|----|
| 44 | DSP functionalities | R1 | 1-5 | PPT | 2 | 53 |
| 45 | Circular buffering | R1 | 5-16 | PPT | 2 | 55 |
| 46 | DSP architecture | R1 | 16-19 | PPT | 2 | 57 |
| 47 | Fixed point Architecture | R1 | 19-42 | PPT | 2 | 59 |
| 48 | Floating point architecture | R1 | 45-53 | PPT | 2 | 61 |
| 48 | Programming | R1 | 45 | PPT | 2 | 63 |
| | | | | | | |

LEARNING OUTCOME

At the end of unit, Students should be able to

- To learn about Addressing formats and Functional modes of DSP Processors.

COURSE OUTCOME

CO1: To learn discrete Fourier transforms, properties of DFT and its application to linear filtering

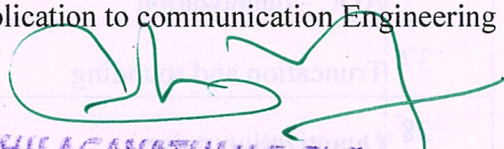
CO2: To analyze the characteristics of digital filters, design digital IIR and FIR filters and apply these filters to filter undesirable signals in various frequency bands.

CO3: To describe the effects of finite precision representation on digital filters.

CO4: To evaluate the fundamental concepts of finite word length effects and its applications

CO5: Explain the functionalities and architecture of DSP processors.

CO6: To introduce the concepts of adaptive filters and its application to communication Engineering


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INTERNAL ASSESSMENT DETAILS

| ASSIGNMENT | I | II | III |
|------------|--|--|------------------------|
| Syllabus | (1 st Unit)(2 nd Unit) | (3 rd Unit)(4 th Unit) | (5 th Unit) |


| ASSIGNMENT NUMBER | I | II | III | IV | V |
|-------------------|----------|----------|----------|----------|----------|
| Dead line | 15.07.19 | 29.07.19 | 19.08.19 | 24.08.19 | 16.10.19 |

| ASSIGNMENT NUMBER | UNIT | DESCRIPTIVE QUESTIONS/TOPIC (Minimum of 8 Pages) |
|-------------------|------|--|
| 1 | I | DIT Algorithm Problems |
| 2 | II | Cascade and parallel realization |
| 3 | III | Direct form realization |
| 4 | IV | Fixed and floating point representation |
| 5 | V | DSP architecture |

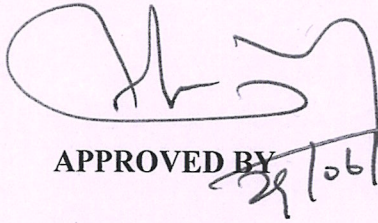
PREPARED BY


S.UDHAYANAN
AP/ECE

VERIFIED BY


HoD/ECE
HOD / ECE
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
KAIKKURICHI,
PUDUKKOTTAI - 622 303

APPROVED BY


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COLLEGE FOR WOMEN
KAIKKURICHI - 622 303.
PUDUKKOTTAI DISTRICT


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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Identification of Curricular Gap & Content Beyond Syllabus(CBS)

Name of the Faculty :Mr.S.Udhayanan

Course Code & Name:EC8553&DTSP

Degree & Program: B.E. /ECE

Semester/Year : V/III

Academic Year: 2019 -2020 /ODD

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

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

| Course Outcomes | ProgramOutcomes | | | | | | | | | | | | | | |
|-----------------|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| C302.1 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302.2 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302.3 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302.4 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302.5 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302.6 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |

II. Identification of content beyond syllabus.

Table.2 Identification of content beyond syllabus

| Details of Content Beyond Syllabus(CBS) added | POs strengthened/ vacant filled | CO/Unit |
|---|------------------------------------|----------------------------|
| Adaptive Filter Equalization | PO6(2) Vacant filled | C302.4 & C302.5/ IV & V |

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

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

| Course Outcomes | ProgramOutcomes | | | | | | | | | | | | PSO1 | PSO2 | PSO3 |
|-----------------|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | | | |
| C302.1 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302.2 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302.3 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302.4 | 3 | 3 | 2 | 1 | 1 | 2* | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302.5 | 3 | 3 | 2 | 1 | 1 | 2* | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302.6 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |

Signature of the Faculty


Dr. S.THILAGAVATHI M.E.,Ph.D.,
 PRINCIPAL
 SRI BHARATHI ENGINEERING
 COLLEGE FOR WOMEN
 Kaikkurichi - 622 303, Pudukkottai Dt.


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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Assignment Answer Sheet

Name of the Student: C. Kavya

AU Register Number: 912617106011

| | | | | | | |
|-----------------|--------|------------------|---------------------------------|---------------------|----------|----|
| Assignment – 01 | | | Date of Issue: | 11.07.19 | Marks | 10 |
| Course code | EC8553 | Course Title | Discrete time signal Processing | | | |
| Year | III | Semester/Section | v | Date of Submission: | 15.07.19 | |

| Q.No | Questions | CO |
|------|---|--------|
| 1 | Find the DFT of the sequence $X(n) = \{1 \quad 0 \leq n \leq 7 \quad \text{using DIT Algorithm}$ 0 Otherwise plot And plot $ x(k) $ and angle of $x(k)$ | C302.1 |
| 2 | Compute IDFT of the sequence $X(k) = \{10, -2+j2, -2, -2-j2\}$ using DIT and DFT Algorithm | C302.1 |

Mark Allocation

| Rubrics | Marks Allocated | Marks obtained |
|----------------------|-----------------|----------------|
| Content Quality | 6 | 5 |
| Presentation Quality | 2 | 2 |
| Timely submission | 2 | 2 |
| Total marks | 10 | 9 |

[S. UDHAYANAN, AP/ECE]

Name and Signature of the Faculty Incharge

Dr. S. THILAGAVATHI M.E., Ph.D.,

PRINCIPAL

SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN

Kaikkurichi - 622 303, Pudukkottai Dt.

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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Tutorial Answer sheet

Name of the Student: S. Abishka

AU Register Number: 912617106002

| | | | | | |
|---------------|--------|--------------|---------------------------------|---------------------|----------|
| Tutorial – 01 | | | Date of Issue: 04.11.19 | Marks | 10 |
| Course code | EC8553 | Course Title | Discrete time signal processing | | |
| Year | III | Semester | v | Date of Submission: | 12.11.19 |

| Q.No | Questions | CO |
|------|---|--------|
| 1 | Find DFT for the eight point sequence [1,2,3,4,1,2,3,4] | C302.1 |
| 2 | Compute IDFT of the sequence $X(k) = \{7, -0.707, -j0.707, -j, 0.707 - j0.707, 1, 0.707 + j0.707, j, -0.707 + j0.707\}$ using DIF and DIT algorithm | C302.1 |
| 3 | Compute 8-point DFT of the following sequence using radix-2 DIF algorithm. $x(n) = \{0, 1, 2, 3, 4, 5, 6, 7\}$ | C302.1 |

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 |

[S. UDHAYANAN, A/PL/EC]

Name and Signature of the Faculty Incharge

Dr. S. THILAGAVATHI M.E., Ph.D.,

HoD/ECE

PRINCIPAL

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IQAC Academic Audit Form

ACADEMIC YEAR: 2019-2020 ODD SEMESTER

| | | | | | |
|----------------------|-----|--------------|--------|------------------------------|----|
| Name of Department : | ECE | Year / Sem : | III/ V | No. of Students Registered : | 18 |
|----------------------|-----|--------------|--------|------------------------------|----|

| | |
|--------------------------|---|
| Details of Examination : | Cycle Test -1 / Cycle Test -2 / Cycle Test -3 |
|--------------------------|---|

| S.No. | Course Code | List of Reg.No Verified | Course Log Book Verified (Y/N) | Course File Verified (Y/N) | No of students Passed | No of Absentees | No of Failures | Pass % | Remarks |
|-------|-------------|-------------------------|--------------------------------|----------------------------|-----------------------|-----------------|----------------|--------|---------|
| 1. | EC8501 | 912617106001 | Y | Y | 14 | - | 04 | 78% | - |
| 2. | EC8553 | 912617106003 | Y | Y | 12 | - | 06 | 67% | - |
| 3. | EC8552 | 912617106004 | Y | Y | 14 | - | 04 | 78% | - |
| 4. | EC8551 | 912617106002 | Y | Y | 10 | - | 08 | 83% | - |
| 5. | GE8077 | 912617106005 | Y | Y | 17 | - | 01 | 94% | - |
| 6. | OMD551 | 912617106011 | Y | Y | 16 | - | 02 | 89% | - |

Verified by

| | |
|-------------------------------------|----------------------|
| External Member Name and Signature: | R. Sath [R. SARATHA] |
|-------------------------------------|----------------------|

| | |
|-------------------------------------|------------------------------|
| Internal Member Name and Signature: | Rh ~ [C. PALANIAPPAN AP/ECE] |
|-------------------------------------|------------------------------|

Overall Remarks:
Improve the pass percentage for Subject Code EC8553

R. Sath
HoD/ECE

Rh ~
IQAC Coordinator

S. Thilagavathi
19/08/19
S. THILAGAVATHI M.E., Ph.D. Principal
15/08/19



SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Course code & Name: EC8553 & Discrete time signal processing

Year & Sem : III/V

STUDENT FEEDBACK ON FACULTY

| S.NO. | DESCRIPTION | SCORED OUT OF 4 | SCORED OUT OF 100 |
|----------------------|--|-----------------|-------------------|
| 1. | Syllabus coverage as prescribed by university | 3.7 | 92.5 |
| 2. | Technical Knowledge of the teacher | 3.6 | 90 |
| 3. | Teacher Communication Skill | 3.7 | 92.5 |
| 4. | Regularity in taking classes | 3.5 | 87.5 |
| 5. | Helping the students in conducting the experiment through set of instructions And Demonstrations | 3.6 | 90 |
| 6. | Tendency of inviting opinion and questions on subject matter from students | 3.6 | 90 |
| 7. | Knowledge of the teacher in latest Development of field | 3.6 | 90 |
| 8. | Perfectness of Valuation | 3.7 | 92.5 |
| OVERALL SCORE | | 3.62 | 90.62 |


Dr. S. THILAGAVATHI M.E., Ph.D.,

PRINCIPAL


SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN

Kaikkurichi - 622 303, Pudukkottai Dt.

REPORT SHEET

| S.NO | REG.NO | NAME | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 |
|-------------------|--------------|--------------------|-------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1. | 912617106001 | ABIRAMI S | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 4 |
| 2. | 912617106002 | ABISHEKA S | 4 | 3 | 4 | 3 | 4 | 4 | 3 | 4 |
| 3. | 912617106003 | ATSHAYA R | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 3 |
| 4. | 912617106004 | BAVADHARANI A | 3 | 3 | 4 | 4 | 3 | 4 | 3 | 4 |
| 5. | 912617106005 | BHUVANESHWARI B | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 6. | 912617106006 | DHIVYA L | 4 | 3 | 4 | 3 | 3 | 3 | 3 | 3 |
| 7. | 912617106007 | GOWSALYA D | 3 | 4 | 4 | 4 | 4 | 3 | 4 | 4 |
| 8. | 912617106009 | INDHUMATHI S | 4 | 3 | 4 | 4 | 3 | 3 | 4 | 4 |
| 9. | 912617106010 | KANIMOZHI D | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 |
| 10. | 912617106011 | KAVYA C | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 |
| 11. | 912617106012 | KEERTHANA G | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 4 |
| 12. | 912617106013 | MAHESHWARI G | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 4 |
| 13. | 912617106014 | MANOHARI M | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 3 |
| 14. | 912617106015 | MARAGATHALAKSHMI S | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 4 |
| 15. | 912617106016 | RAMYA P | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 16. | 912617106017 | SAFRIN NISHA S | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 |
| 17. | 912617106018 | SUBASHINI M | 4 | 3 | 3 | 4 | 4 | 4 | 3 | 3 |
| 18. | 912617106019 | SUBASHINI T | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 |
| 19. | 912617106020 | VINTHIYA R | 4 | 4 | 3 | 3 | 4 | 3 | 3 | 3 |
| AVERAGE | | | 3.7 | 3.6 | 3.7 | 3.5 | 3.6 | 3.6 | 3.6 | 3.7 |
| PERCENTAGE | | | 94.7 | 92.10 | 93.4 | 89.4 | 90.7 | 92.1 | 90.7 | 93.4 |


| EXCELLENT | VERY GOOD | GOOD | AVERAGE | POOR |
|-----------|-----------|------|---------|------|
| 4 | 3 | 2 | 1 | 0 |


 Course Faculty
 (Name /Sign)

[S. UDHANAN, A/PIECE]


Dr. S. THILAGAVATHI M.E., Ph.D.,
 PRINCIPAL

SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
 Kaikkurichi - 622 303, Pudukkottai Dt.


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SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN
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Circular

Date: 12-07-2019

The first cycle test will be conducted from 22.07.2019 to 27.07.2019 for the III, V & VII semester (II, III & IV year) students.

The following instructions are to be followed by the faculty members.

- Total marks for which the question paper to be set will be for 60 marks.
- Question Pattern – Part A – 10 X 2 = 20 Marks, Part B – 2 X 13 = 26 Marks & Part C = 1 X 14 = 14 Marks
- It is the responsibility of the question paper setter to take the Xerox copies of the required number of question papers with the help of Ms. Anusha. G & Ms. Keerthana. P and it should be handed over to the Exam Coordinator Mr. J. Sathyaraj A.P/ EEE on or before 19.07.2019.
- The Exam Coordinators (exam cell) are requested to make necessary arrangements (hall arrangements, invigilation duty etc.,) for conducting the test.
- Faculty members are requested to handover the valued answer scripts to the students on or before 29.07.2019 and the class in-charges are requested to send the consolidated mark sheet along with the attendance percentage to the parents on or before 30-07-2019.

Cc:

- All faculty
- Exam cell
- Office file


PRINCIPAL (12/27)
Dr. S. THILAGAVATHI M.E., Ph.D.,
PRINCIPAL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
Kaikkurichi - 622 303, Pudukkottai Dt.



**SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN
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Circular

Date: 12-07-2019

The first cycle test will be conducted from 22.07.2019 to 27.07.2019 for the V semester (III year) B.E/ B.Tech students for 60 marks as per the timetable given below. Students are directed to prepare well and score good marks.

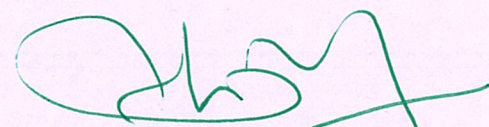
| Date | 9.30 am -11.30 am (FN) |
|------------|--|
| 22.07.2019 | CE8591 Foundation Engineering (Civil) MA8551 Algebra and Number Theory (CSE & IT) EE8501 Power System Analysis (EEE) EC8501 Digital Communication (ECE) |
| 23.07.2019 | CE8501 Design of Reinforced Cement Concrete Elements(Civil) CS8591 Computer Networks (CSE & IT) EE8551 Microprocessors and Microcontrollers (EEE) EC8552 Computer Architecture and Organization (ECE) |
| 24.07.2019 | EN8491 Water Supply Engineering (Civil) EC8691 Microprocessors and Microcontrollers (CSE & IT) EE8552 Power Electronics (EEE) EC8553 Discrete-Time Signal Processing (ECE) |
| 25.07.2019 | CE8502 Structural Analysis I (Civil) CS8592 Object Oriented Analysis and Design (CSE) CS8494 Software Engineering (IT) EE8591 Digital Signal Processing (EEE) EC8551 Communication Networks (ECE) |
| 26.07.2019 | ORO551 Renewable Energy Resources (Civil) OMD551 Basics of Biomedical Instrumentation (CSE & IT) CS8392 Object Oriented Programming (EEE) GE8077 Total Quality Management (ECE) |
| | 2.15 pm - 4.15 pm (AN) |
| 27.07.2019 | GE8071 Disaster Management (Civil) CS8501 Theory of Computation (CSE) IT8501 Web Technology (IT) OMD551 – Basics of Biomedical Instrumentation (EEE, ECE) |

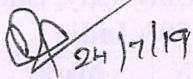
Cc:

- ✓ All III year B.E / B.Tech Classes
- All faculty
- Exam cell
- Notice Board
- Office file

PRINCIPAL

12/7/19

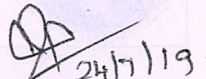

Dr. S.THILAGAVATHI M.E., Ph.D.,
PRINCIPAL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
Kaikkurchi - 622 303, Pudukkottai Dt.


24/7/19

Course Faculty

(Name / Sign / Date)

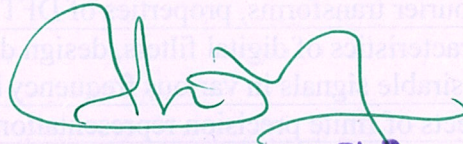
[S. UDHAYANAN, AP/ECE]


24/7/19

HoD

(Name / Sign / Date)

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COLLEGE FOR WOMEN
KAIKKURICHI,
PUDUKKOTTAI - 622 303



Dr. S. THILAGAVATHI M.E., Ph.D.,
PRINCIPAL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
Kaikkurichi - 622 303, Pudukkottai Dt.

| Q.No | CO | BTS |
|--------|--------|-----|
| PART A | | |
| 1 | C302.1 | K1 |
| 2 | C302.1 | K1 |
| 3 | C302.1 | K3 |
| 4 | C302.1 | K1 |
| 5 | C302.2 | K3 |
| 6 | C302.2 | K1 |
| 7 | C302.2 | K1 |
| 8 | C302.2 | K1 |
| 9 | C302.2 | K1 |
| 10 | C302.2 | K3 |
| PART B | | |
| 11a | C302.1 | K1 |
| 11b | C302.1 | K3 |
| 11c | C302.1 | K3 |
| 12 | C302.1 | K1 |
| PART C | | |
| 13a | C302.2 | K3 |
| 13b | C302.2 | K3 |

Dr. S. THILAGAVATHI M.E., Ph.D.,
PRINCIPAL
SRI BHARATHI ENGINEERING
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EC8553 - Discrete Time signal processing.

1) Decimation in frequency algorithm:-

→ DIF N point DFT is splitted into $N/2$ points.
 $x(k)$ is splitted k (even) & k odd.

2) Advantages:-

FFT $\rightarrow N \log_2 N$ DFT $\rightarrow N^2$
FFT \rightarrow Audio signal processing. DFT has less speed.

3) Periodicity properties:-

→ Discrete sequence $x(n)$ is periodic with a period N .

→ N point DFT of the sequence $x(k)$, where $k = 0, 1, 2, \dots, N-1$.

4. Multiply with factor of $1/N$ and replace the twiddle factors.

→ conjugate DIF algorithms.

5. Bilinear transform equation.

6. Butter worth filter, Chebyshev filter.

→ Normalized magnitude response value $1/\sqrt{2}$.

→ poles lies in s-plane.

Normalized magnitude response $1/\sqrt{1+\epsilon^2}$.

poles lies in ellipse in s-plane

7. Different methods:-

→ Low pass filter, High pass filter,

→ Bandpass filter, Bandstop filter.

8. Advantage & disadvantages:-

i) Digital filter → Linear phase response

Disadvantages:-

→ Speed limitation, Finite wordlength effect.

9. Denominator polynomials:-

i) $1+s$ ii) $1+1.414s+s^2$ iii) $(1+s)(1+s+s^2)$

~~(1+0.765s+s^2) (1+1.848s+s^2)~~

P. S. THILAGAVATHI M.E., Ph.D.

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$$y(n) = \{8, -2, -1, -4, -1\}$$

11) b) Find DFT sequence $x(k)$ for $0 \leq n \leq 2-1$

otherwise $N=4$

$$N=4 \quad x(k) = \sum_{n=0}^{N-1} x(n) e^{-j\frac{2\pi}{4}kn} \quad ; 0 \leq k \leq N-1$$

$$x(k) = \sum_{n=0}^3 x(n) e^{-j\frac{2\pi}{4}kn} \quad 0 \leq k \leq 3$$

$k=0$

$$x(n) = 1 + [1 \times 1] + [1 \times 1] + [0 \times 1]$$

$$x(0) = 3$$

$$\text{Magnitude: } |x(k)| = \{3, 1, 1, 1\}$$

$$\text{phase: } \angle x(k) = \left\{ 0, -\frac{\pi}{2}, 0, \frac{\pi}{2} \right\}$$

12) a) $x(n) = \{3, -1, 0, 1, 3, 2, 0, 1, 2, 1\}$

using Overlap save method & overlap add method.

The length of $h(n) = M = 3$

Dr. S. THILAGAVATHI M.E., Ph.D.,
PRINCIPAL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
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ii) Overlap save Method:-

$$x_1(n) = \{0, 0, 3, -1, 0\}$$

$$x_2(n) = \{-1, 0, 1, 3, 2\}$$

$$x_3(n) = \{3, 2, 0, 1, 2\}$$

$$x_4(n) = \{1, 2, 1, 0, 0\}$$

9) Analog Filter

→ Construct active and passive components of electronic components

→ Differential Equation

Digital Filter

→ Adder, Multiplier, and delay unit.

Difference equation

10) Steps for impulse invariance method:-

$$H(z) = \sum_{n=0}^{\infty} h(n) z^{-n}$$

$$H(s) = \sum_{k=1}^N \frac{C_k}{s - p_k}$$

i) Find $H(s)$ transfer function ii) select the sampling rate -

part - B.

11) a) $x_1(n) = \{1, -1, -2, -3, -1\}$

$x_2(n) = \{1, 2, 3\}$

$x_1(n)$ = counter clockwise direction

$x_2(n)$ = clockwise direction

$x_2(n) = \{1, 2, 3, 0, 0\}$

$y(n) = x_2(n) \otimes x_1(n)$

$$= \begin{bmatrix} 1 & 0 & 0 & 3 & 2 \\ 2 & 1 & 0 & 0 & 3 \end{bmatrix} \begin{bmatrix} 1 \\ -1 \\ -2 \\ -3 \\ -1 \end{bmatrix}$$

Dr. S. THILAGAVATHI M.E., Ph.D.,
PRINCIPAL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
Kaikkurehi - 622 303, Pudukkottai Dt.

$$y_1(n) = x_1(n) \otimes h(n)$$

$$y(n) = \{3, 2, 2, 0, 4, 6, 5, 3, 3, 4, 3, 1\}$$

ii) Overlap add method:-

$$x(n) = \{3, -1, 0, 1, 3, 2, 0, 1, 2, 1\}$$

$$h(n) = \{1, 1, 1, 0, 0, 0\}$$

$$y_1(n) = x_1(n) \otimes h(n)$$

$$y(n) = \{3, 2, 2, 0, 4, 6, 5, 3, 3, 4, 3, 1\}$$

part-c

13 i) Design steps of analog Butterworth filter.

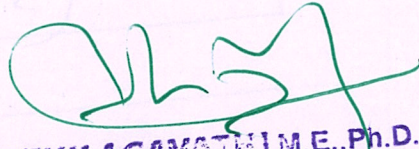
$$N = \frac{\log \sqrt{\frac{10^{0.1 \times \omega_s}}{1} - 1}}{\log \frac{\omega_s}{\omega_p}}$$

$$N \geq \frac{\log \frac{1}{\epsilon}}{\log \frac{\omega_s}{\omega_p}}$$

$$N \geq \frac{\log A}{\log \frac{\omega_s}{\omega_p}}$$

$$H(s) = \frac{1}{(s+1)(s^2+s+1)}$$

$$H(s) = \frac{1}{\left(\frac{s}{\omega_c} + 1\right) \left(\frac{s}{\omega_c}\right)^2 + \left(\frac{s}{\omega_c}\right) + 1}$$


Dr. S. THILAGAMATHI M.E., Ph.D.,
 PRINCIPAL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
 Kakkurchi - 622 303, Pudukkottai Dt.

Design steps of Chebyshev filter.

$$N \geq \frac{\log \sqrt{\frac{10^{0.1\alpha_s}}{10^{0.1\alpha_p} - 1}}}{\log \frac{\omega_s}{\omega_p}}$$

$$N \geq \frac{\log A}{\log K}$$

$$M = \epsilon^{-1} + \sqrt{\epsilon^{-2} + 1} \quad \epsilon = \sqrt{\frac{10^{0.1\alpha_p}}{10^{0.1\alpha_s} - 1}}$$

$$\phi_k = \frac{\pi}{2} + \left(\frac{2k-1}{2N} \right) \pi$$

ii) Given:-

$$\alpha_p = -2 \text{ dB} \quad \alpha_s = -10 \text{ dB} \quad \omega_p = 20 \text{ rad/s}$$

$$\omega_s = 30 \text{ rad/s}$$

$$N = \frac{\log \sqrt{\frac{10^{0.1\alpha_s}}{10^{0.1\alpha_p} - 1}}}{\log \frac{\omega_s}{\omega_p}}$$

$$N \geq 3.37$$

$$\boxed{N = 4}$$

$$\omega_c = 21.386$$

$$H(s) = 0.20921 \times 10^4$$

$$\frac{1}{(s^2 + 16.821s + 457.39)(s^2 + 39.516s + 457.39)}$$

Staff Incharge

Dr. S. THILAGAVATHI M.E., Ph.D.,
PRINCIPAL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
Kaikkurchi - 622 303, Pudukkottai Dt.

HOD Sign.



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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

Cycle Test Answer Book

| | | | | | |
|---|--|-------------------------------|---------------------------------|---------------------------------------|--------------------------|
| Name | R. ATSHAYA | | | Year/ Semester | III/V |
| Reg No. | 912617106003 | Date/Session | 24.7.19/FA | Department | ECE |
| Course code | FC8553 | Course Title | Discrete time signal processing | | |
| Cycle Test (Put a tick mark) | CT 1 <input checked="" type="checkbox"/> | CT 2 <input type="checkbox"/> | CT 3 <input type="checkbox"/> | Model | <input type="checkbox"/> |
| Name and Signature of the Invigilator with date | | | | P. Dhanu P. Dhanu Flora, AP/ECE | |

| 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 | b | |
| | | | | | Marks | Marks | |
| 1 | | 2 | 11 | | | 12 | 12 |
| 2 | | 2 | 12 | | 12 | | 12 |
| 3 | | 1 | 13 | | 13 | | 13 |
| 4 | | 2 | 14 | | | | |
| 5 | | 1 | 15 | | | | |
| 6 | | 2 | 16 | | | | |
| 7 | | 2 | Total | | | | 37 |
| 8 | | 1 | <div style="border: 1px solid black; border-radius: 50%; width: 60px; height: 60px; display: flex; align-items: center; justify-content: center; margin: 0 auto;"> 54 60 </div> | | | | <div style="text-align: right;"> S. UDHAYANAN, AP/ECE 26/7/19 Name and Signature of the Examiner with date </div> |
| 9 | | 2 | | | | | |
| 10 | | 2 | | | | | |
| Total | | 17 | Grand Total | | | | |

| To be filled by the examiner | | | | | | | |
|--|----|----|---|---|---|---|--|
| Course Outcomes | 1 | 2 | 3 | 4 | 5 | 6 | Total |
| Marks allotted | 30 | 30 | | | | | 60 |
| Marks Obtained | 28 | 26 | | | | | 54 |
| IQAC Audit - Remarks | | | | | | | P. SUBHA Name and Signature of the IQAC member |
| L. S. THILACAVATHI M.E., Ph.D. PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurichi - 622 303, Pudukkottai Dt. | | | | | | | |

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)

Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

ACADEMIC YEAR 2019 – 2020 (ODD SEMESTER)

STUDENTS MARK STATEMENT- CO BASED

CYCLE TEST-I

SUBJECT CODE & TITLE: EC8553 –DISCRETE TIME SIGNAL PROCESSING

YEAR/SEM: III YEAR & V SEMESTER

MONTH & YEAR: JULY 2019

| S.NO | REG NO | STUDENT NAME | CO1 (30) | CO2 (30) | (CO1, CO2) (60) | TOTAL (100) |
|------|--------------|--------------------|-------------|-------------|-----------------------|-------------|
| 1. | 912617106001 | ABIRAMI S | 28 | 30 | 58 | 92 |
| 2. | 912617106002 | ABISHEKA S | 26 | 20 | 46 | 74 |
| 3. | 912617106003 | ATSHAYA R | 28 | 26 | 54 | 87 |
| 4. | 912617106004 | BAVADHARANI A | 27 | 29 | 56 | 90 |
| 5. | 912617106005 | BHUVANESHWARI B | 25 | 23 | 48 | 76 |
| 6. | 912617106006 | DHIVYA L | 14 | 15 | 29 | 46 |
| 7. | 912617106007 | GOWSALYA D | 26 | 25 | 51 | 82 |
| 8. | 912617106009 | INDHUMATHI S | 15 | 14 | 29 | 47 |
| 9. | 912617106010 | KANIMOZHI D | 20 | 11 | 31 | 52 |
| 10. | 912617106011 | KAVYA C | 27 | 29 | 56 | 94 |
| 11. | 912617106012 | KEERTHANA G | 10 | 13 | 23 | 39 |
| 12. | 912617106013 | MAHESHWARI G | 19 | 10 | 29 | 48 |
| 13. | 912617106014 | MANOHARI M | 23 | 22 | 45 | 74 |
| 14. | 912617106015 | MARAGATHALAKSHMI S | 25 | 26 | 51 | 84 |
| 15. | 912617106017 | SAFRIN NISHA S | 24 | 28 | 52 | 83 |
| 16. | 912617106018 | SUBASHINI M | 22 | 23 | 45 | 75 |
| 17. | 912617106019 | SUBASHINI T | 15 | 10 | 25 | 42 |
| 18. | 912617106020 | VINTHIYA R | 29 | 28 | 57 | 95 |


Dr. S. THILAGAVATHI M.E., Ph.D.,

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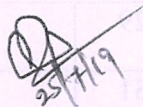
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COLLEGE FOR WOMEN

Kaikkurichi - 622 303, Pudukkottai Dt.

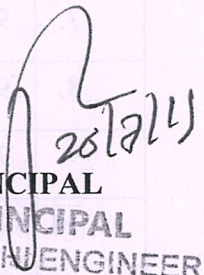
MARKS RANGE:

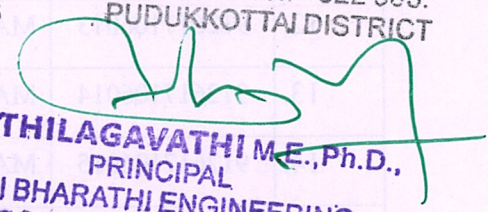
| <20 | 20-30 | 31-40 | 41-50 | 51-60 | 61-70 | 71-80 | 81-90 | 91-100 |
|-----|-------|-------|-------|-------|-------|-------|-------|--------|
| - | - | 01 | 04 | 01 | - | 04 | 05 | 03 |

| | |
|--------------------------------|-----|
| Total No.of Candidates Present | 18 |
| Total No.of Candidates Absent | NIL |
| Total No.of Students Pass | 13 |
| Total No. of Students Fail | 05 |
| Percentage of Pass | 72% |


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PUDUKKOTTAI DISTRICT


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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ROOT CAUSE ANALYSIS

Name of the Faculty : Mr.S.Udhayanan Course Code & Name: EC8553&Discrete Time signal Processing
Degree & Program : B.E & ECE Semester : V
Cycle Test : I/II/III
Target : 100 % Achieved : 72 %

| S.NO | REG NO | NAME OF THE STUDENT | CAUSES FOR FAILURE | CORRECTIVE ACTION TAKEN |
|------|--------------|---------------------|--|---|
| 1. | 912617106006 | Dhivya. I | Difficulty in mathematical concepts | provided extra study materials & practice more problems |
| 2. | 912617106009 | Indhumathi.S | Confused in problems | assist to solve more problems |
| 3. | 912617106010 | Kanimozhi.D | Not well prepared | Advised to study in home daily |
| 4. | 912617106012 | Keerthana.G | poor time management | create a proper study schedule |
| 5. | 912617106013 | Maheswari.G | Due to health issue | Take care of your health & concentration in studies. |
| 6. | 912617106019 | Subashini.T | Difficulty to understand mathematical concepts | To practice more problems & previous years problems |

Signature of the Faculty Member

Signature of the HoD/ECE

Dr. S.THILAGAVATHI M.E., Ph.D.,
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PUDUKKOTTAI - 622 303



19-20-2019-R

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN
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Circular

Date: 29.07.2019


Retest for first cycle test will be conducted from 31.07.2019 to 06.08.2019 for the III, V & VII semester (II, III & IV year) students.


The following instructions are to be followed by the faculty members.

- Total marks for which the question paper to be set will be for 50 marks.
(PART A 5X2=10, PART B 2X13=26 & PART C 1X14=14)
- It is the responsibility of the **question paper** setter to take the Xerox copies of the required number of question papers.
- Concerned Faculty members are requested to conduct the examination as per the scheduled and handover the valued answer scripts to the students on or before 07.08.2019.

Cc:

- All faculty
- Exam cell
- Office file


PRINCIPAL
21/7/19


Dr. S. THILAGAVATHI M.E., Ph.D.,
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Circular

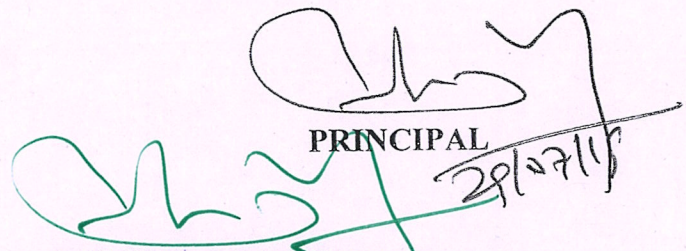
Date: 29.07.2019

Retest for first cycle test will be conducted from 31.07.2019 to 06.08.2019 for the V semester (III year) B.E students for 50 marks as per the time table given below. Students are directed to prepare well and score good marks.

| Date | 04.00 pm -05.30 pm |
|------------|--|
| 31.07.2019 | CE8591-Foundation Engineering(CIVIL) MA8551-Algebra and Number Theory (CSE & IT) EC8552-Computer Architecture and Organization (ECE) EE8551- Microprocessor and Microcontrollers (EEE) |
| 01.08.2019 | ORO551-Renewable Energy Resources(CIVIL) OMD551-Basics of Biomedical Instrumentation (CSE/IT/EEE/ECE) |
| 02.08.2019 | CE8501-Design of Reinforced Cement Concrete Elements (CIVIL) CS8501-Theory of Computation (CSE) EC8553- Discrete Time Signal Processing (ECE) EE8501-Power System Analysis (EEE) CS8494-Software Engineering(IT) |
| 03.08.2019 | EN8491-Water Supply Engineering (CIVIL) CS8592-Object Oriented Analysis and Design(CSE) EC8551-Communication Networks (ECE) EE8552-Power Electronics(EEE) IT8501-Web Technology(IT) |
| 05.08.2019 | GE8071-Disaster Management (CIVIL) EC8691-Microprocessor and Microcontrollers (CSE/IT) CS8392- Object Oriented Programming (EEE) GE8077-Total Quality Management(ECE) |
| 06.08.2019 | CE8502-Structural Analysis I(CIVIL) CS8591-Computer Networks (CSE/IT) EC8501-Digital Communication (ECE) EE8591-Digital Signal Processing(EEE) |

Cc:

- All III year B.E Classes
- All faculty
- Exam cell
- Notice Board
- Office file


PRINCIPAL
29/07/19

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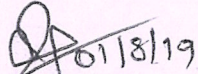
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

| | | | | | | |
|-------------------------------|---|--------------|---------------------------------|---------------|-----------|----|
| Cycle Test – I(RETEST) | | | Date/Session | 02.08.19/AN | Marks | 50 |
| Course code | EC8553 | Course Title | DISCRETE TIME SIGNAL PROCESSING | | | |
| Regulation | 2017 | Duration | 2 HOURS | Academic Year | 2019-2020 | |
| Year | III | Semester | V | Department | ECE | |
| COURSE OUTCOMES | | | | | | |
| C302:1 | To learn discrete Fourier transforms, properties of DFT and its application to linear filtering | | | | | |
| C302:2 | To analyze the characteristics of digital filters, design digital IIR and FIR filters and apply these filters to filter undesirable signals in various frequency bands. | | | | | |
| C302:3 | To describe the effects of finite precision representation on digital filters | | | | | |
| C302:4 | To evaluate the fundamental concepts of finite word length effects and its applications | | | | | |
| C302:5 | Explain the functionalities and architecture of DSP processors. | | | | | |
| C302:6 | To Introduce the concepts of adaptive filters and its application to communication Engineering | | | | | |

| Q.No. | Question | CO | BTS |
|--|--|--------|-----|
| PART A | | | |
| (Answer all the Questions 05 x 2 = 10 Marks) | | | |
| 1 | What is meant by decimation in frequency algorithm | C302.1 | K1 |
| 2 | Identify the advantages of FFT over DFT. | C302.1 | K1 |
| 3 | State and prove periodicity property of DFT | C302.1 | K2 |
| 4 | How can we calculate IDFT using FFT algorithm | C302.1 | K1 |
| 5 | Give the bilinear transform equation between S-plane and Z-plane. | C302.2 | K4 |
| PART B | | | |
| (Answer all the Questions 2 x 13 = 26 Marks) | | | |
| 11a | Compute the DFT of the sequence whose values for one period is given by $x(n) = \{1, 1, -2, -2\}$. | C302.1 | K1 |
| OR | | | |
| 11b | Compute 8-point DFT of the following sequence using radix-2 DIF algorithm. $x(n) = \{0, 1, 2, 3, 4, 5, 6, 7\}$ | C302.1 | K1 |
| 12a | Determine the circular convolution of the sequence $x_1(n) = \{1, 2, 3, 1\}$ and $x_2(n) = \{2, 2, 3, 4\}$ using FFT algorithm (13) | C302.1 | K1 |
| OR | | | |
| 12b | Find the 8-point DFT of the sequence $x(n) = \{2, 2, 2, 2, 1, 1, 1, 1\}$ using DIT FFT algorithm (13) | C302.1 | K1 |
| PART C | | | |
| (Answer all the Questions 1 x 14 = 14 Marks) | | | |
| 13a | Design a third order Butterworth digital filter using impulse invariant technique. Assume sampling period $T=1$ sec. (14) | C302.2 | K2 |
| OR | | | |
| 13b | Design a Butterworth LPF for the following specification using IIT method for given normalized transfer function. $0.7 \leq H(e^{jw}) \leq 1; 0 \leq w \leq 0.2\pi$ $ H(e^{jw}) \leq 0.3; 0.6\pi \leq w \leq \pi$ (14) | C302.2 | K2 |


 Course Faculty
 (Name / Sign / Date)


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 HoD
HOD / ECE
 (Name / Sign / Date)
 SRI BHARATHI ENGINEERING



SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ATTENDANCE SHEET - RETEST FOR CYCLE TEST-I

Name of the Faculty : Mr.S.Udhayanan

Course Code & Name: EC 8553&Discrete time Signal Processing

Academic Year : 2019 -2020/ODD

Degree & Program : B.E/ECE

Year/ Semester: III/V

| S.NO | REG.NO | NAME | SIGNATURE |
|------|--------------|--------------|-----------|
| 1. | 912617106006 | DHIVYA L | |
| 2. | 912617106009 | INDHUMATHI S | |
| 3. | 912617106010 | KANIMOZHI D | |
| 4. | 912617106012 | KEERTHANA G | |
| 5. | 912617106013 | MAHESHWARI G | |
| 6. | 912617106019 | SUBASHINI T | |

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PUDUKKOTTAI DISTRICT

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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

ACADEMIC YEAR 2021 – 2022 (ODD SEMESTER)

STUDENTS MARK STATEMENT- CO BASED

RETEST-I

SUBJECT CODE & TITLE: EC8553 & DISCRETE TIME SIGNAL PROCESSING

YEAR/SEM: III YEAR & V SEMESTER

MONTH & YEAR: AUG-2019

| S.NO | REG NO | STUDENT NAME | CO1 (30) | CO2 (20) | (50) | TOTAL (100) |
|------|--------------|--------------|-------------|-------------|------|-------------|
| 1. | 912617106006 | DHIVYA L | 28 | 18 | 46 | 77 |
| 2. | 912617106009 | INDHUMATHI S | 29 | 13 | 42 | 69 |
| 3. | 912617106010 | KANIMOZHI D | 21 | 18 | 39 | 64 |
| 4. | 912617106012 | KEERTHANA G | 28 | 15 | 43 | 72 |
| 5. | 912617106013 | MAHESHWARI G | 28 | 19 | 47 | 78 |
| 6. | 912617106019 | SUBASHINI T | 25 | 15 | 40 | 67 |

MARKS RANGE:

| <20 | 20-30 | 31-40 | 41-50 | 51-60 | 61-70 | 71-80 | 81-90 | 91-100 |
|-----|-------|-------|-------|-------|-------|-------|-------|--------|
| - | - | - | - | - | 03 | 03 | - | - |

| | |
|--------------------------------|------|
| Total No.of Candidates Present | 06 |
| Total No.of Candidates Absent | NIL |
| Total No.of Students Pass | 06 |
| Total No. of Students Fail | - |
| Percentage of Pass | 100% |

FACULTY INCHARGE

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PRINCIPAL
KAIKKURICHI, PUDUKKOTTAI - 622 303.

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PUDUKKOTTAI DISTRICT



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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR 2019 – 2020 (ODD SEMESTER)

FINAL INTERNAL STUDENTS MARK STATEMENT(Out of 20)

SUBJECT CODE & TITLE: EC 8553–DISCRETE TIME SIGNAL PROCESSING

YEAR/SEM : III/V

REGULATION : 2017

| S.NO | REG NO | STUDENT NAME | TOTAL (20) |
|------|--------------|--------------------|------------|
| 1. | 912617106001 | ABIRAMI S | 19 |
| 2. | 912617106002 | ABISHEKA S | 15 |
| 3. | 912617106003 | ATSHAYA R | 15 |
| 4. | 912617106004 | BAVADHARANI A | 17 |
| 5. | 912617106005 | BHUVANESHWARI B | 15 |
| 6. | 912617106006 | DHIVYA L | 17 |
| 7. | 912617106007 | GOWSALYA D | 17 |
| 8. | 912617106009 | INDHUMATHI S | 15 |
| 9. | 912617106010 | KANIMOZHI D | 16 |
| 10. | 912617106011 | KAVYA C | 18 |
| 11. | 912617106012 | KEERTHANA G | 15 |
| 12. | 912617106013 | MAHESHWARI G | 16 |
| 13. | 912617106014 | MANOHARI M | 18 |
| 14. | 912617106015 | MARAGATHALAKSHMI S | 15 |
| 15. | 912617106016 | RAMYA P | 15 |
| 16. | 912617106017 | SAFRIN NISHA S | 16 |
| 17. | 912617106018 | SUBASHINI M | 14 |
| 18. | 912617106019 | SUBASHINI T | 18 |
| 19. | 912617106020 | VINTHIYA R | 18 |

FAULTY INCHARGE

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HOD / ECE

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PUDUKKOTTAI - 622 303

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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING


ACADEMIC YEAR 2019 – 2020 (ODD SEMESTER)

ANNA UNIVERSITY RESULT STATEMENT NOV/DEC-2019


SUBJECT CODE & TITLE: EC 8553-DISCRETE TIME SIGNAL PROCESSING
YEAR/SEM : III/V

| S.NO | REG NO | STUDENT NAME | GRADE |
|------|--------------|--------------------|----------------|
| 1. | 912617106001 | ABIRAMI S | A |
| 2. | 912617106002 | ABISHEKA S | B |
| 3. | 912617106003 | ATSHAYA R | B ⁺ |
| 4. | 912617106004 | BAVADHARANI A | B ⁺ |
| 5. | 912617106005 | BHUVANESHWARI B | U |
| 6. | 912617106006 | DHIVYA L | U |
| 7. | 912617106007 | GOWSALYA D | B |
| 8. | 912617106009 | INDHUMATHI S | U |
| 9. | 912617106010 | KANIMOZHI D | B ⁺ |
| 10. | 912617106011 | KAVYA C | B ⁺ |
| 11. | 912617106012 | KEERTHANA G | U |
| 12. | 912617106013 | MAHESHWARI G | U |
| 13. | 912617106014 | MANOHARI M | B |
| 14. | 912617106015 | MARAGATHALAKSHMI S | B |
| 15. | 912617106016 | RAMYA P | B |
| 16. | 912617106017 | SAFRIN NISHA S | U |
| 17. | 912617106018 | SUBASHINI M | A |
| 18. | 912617106019 | SUBASHINI T | B ⁺ |
| 19. | 912617106020 | VINTHIYA R | B ⁺ |

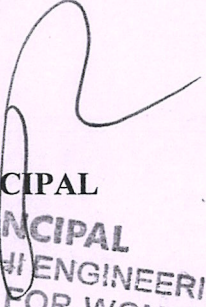
FACULTY INCHARGE


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SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN
DEPARTMENT OF ECE
COURSE OUTCOME ATTAINMENT - UNIVERSITY EXAMINATION
ACADEMIC YEAR : 2019 - 2020(ODD SEM)

YEAR/SEM: III/V


Batch:2017-2021

SUBJECT : EC8553-Discrete Time Signal Processing

CO Attainment Level: 1 - (UPTO 60%) 2- (61%-79%) 3-(80% and Above)

TOTAL STRENGTH : 18

| S.NO | Register No | NAME | Univ. Grade | |
|--------------------------------------|--------------|--------------------|-------------|----|
| 1 | 912617106001 | ABIRAMI S | A | |
| 2 | 912617106002 | ABISHEKA S | B | |
| 3 | 912617106003 | ATSHAYA R | B+ | |
| 4 | 912617106004 | BAVADHARANI A | B+ | |
| 5 | 912617106005 | BHUVANESHWARI B | U | |
| 6 | 912617106006 | DHIVYA L | U | |
| 7 | 912617106007 | GOWSALYA D | B | |
| 8 | 912617106009 | INDHUMATHI S | U | |
| 9 | 912617106010 | KANIMOZHI D | B+ | |
| 10 | 912617106011 | KAVYA C | B+ | |
| 11 | 912617106012 | KEERTHANA G | U | |
| 12 | 912617106013 | MAHESHWARI G | U | |
| 13 | 912617106014 | MANOHARI M | B | |
| 14 | 912617106015 | MARAGATHALAKSHMI S | B | |
| 15 | 912617106017 | SAFRIN NISHA S | B | |
| 16 | 912617106018 | SUBASHINI M | U | |
| 17 | 912617106019 | SUBASHINI T | A | |
| 18 | 912617106020 | VINTHIYA R | B+ | |
| No. of O Grade | | | 0 | 0 |
| No. of A+ Grade | | | 0 | 0 |
| No. of A Grade | | | 2 | 2 |
| No. of B+ Grade | | | 5 | 5 |
| No. of B Grade | | | 0 | 0 |
| No. of U Grade | | | 6 | 6 |
| No. of UA Grade | | | 0 | 0 |
| Target for course outcome Attainment | | | 60 | 10 |
| No of students above the target | | | 7 | |
| CO-Attainment University (%) | | | 38.89 | |


Faculty


Dr. S.THILAGAVATHI M.E.,Ph.D.,
PRINCIPAL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
Kaikkurchi - 622 303, Pudukkottai Dt.


HOD/ECE
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SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
KAIKKURICHI,
PUDUKKOTTAI - 622 303

| CO | CO-Attainment Internal (CO-INT) (Avg. Attainment of All section) (%) | CO-Attainment University (CO-UNI) (Avg. Attainment of All section) (%) | Direct CO Attainment (0.20xCO-INT + 0.80xCO-UNI) (%) | CO Attainment Level |
|--------|---|---|---|---------------------|
| C302.1 | 100.0 | 38.89 | 51.1 | 1 |
| C302.2 | 100.0 | 38.89 | 51.1 | 1 |
| C302.3 | 100.0 | 38.89 | 51.1 | 1 |
| C302.4 | 100.0 | 38.89 | 51.1 | 1 |
| C302.5 | 100.0 | 38.89 | 51.1 | 1 |
| C302.6 | 100.0 | 38.89 | 51.1 | 1 |

Expected CO-PO Level

| Course | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| C302.1 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302.2 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302.3 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302.4 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302.5 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302.6 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| C302 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |


PO Attainment Level

| Course | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-------------|-----|-----|------|------|------|-----|-----|-----|------|------|------|------|------|------|------|
| C302.1 | 1 | 1 | 0.67 | 0.33 | 0.33 | - | - | - | 0.33 | 0.33 | - | 0.33 | 0.67 | 0.33 | - |
| C302.2 | 1 | 1 | 0.67 | 0.33 | 0.33 | - | - | - | 0.33 | 0.33 | - | 0.33 | 0.67 | 0.33 | - |
| C302.3 | 1 | 1 | 0.67 | 0.33 | 0.33 | - | - | - | 0.33 | 0.33 | - | 0.33 | 0.67 | 0.33 | - |
| C302.4 | 1 | 1 | 0.67 | 0.33 | 0.33 | - | - | - | 0.33 | 0.33 | - | 0.33 | 0.67 | 0.33 | - |
| C302.5 | 1 | 1 | 0.67 | 0.33 | 0.33 | - | - | - | 0.33 | 0.33 | - | 0.33 | 0.67 | 0.33 | - |
| C302.6 | 1 | 1 | 0.67 | 0.33 | 0.33 | - | - | - | 0.33 | 0.33 | - | 0.33 | 0.67 | 0.33 | - |
| C302 | 1 | 1 | 0.67 | 0.33 | 0.33 | - | - | - | 0.33 | 0.33 | - | 0.33 | 0.73 | 0.33 | - |

Attainment of POs and PSOs

| Course Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-------------------|-----|-----|------|------|------|-----|-----|-----|------|------|------|------|------|------|------|
| C302 | 3 | 3 | 2 | 1 | 1 | - | - | - | 1 | 1 | - | 1 | 2 | 1 | - |
| Attainment | 1 | 1 | 0.67 | 0.33 | 0.33 | - | - | - | 0.33 | 0.33 | - | 0.33 | 0.73 | 0.33 | - |

| | |
|---------------------------------|----------|
| Comments by Program Coordinator | 1. 2. |
| Remarks by HoD | |

 [S. UDHAYANAND, AP/EECE]

Name and Signature
of the Faculty Member


Dr. S. THILAGAVATHI M.E., Ph.D.,

PRINCIPAL

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KAIKKURICHI,
PUDUKKOTTAI - 622 303