Lesson Plan	Teaching Faculty: **Debi Prasad Patnaik, Sr. Lecturer (ETC)**
	Kshirabdhee Tanaya Dora, Guest Lecturer (ETC)
	(AY - 2022-23 (S) - 19.01.2023 to 28.04.2023)
Total Periods: **75**	Subject: **Advanced Communication Engg.**
Periods/Week: **5**	Subject Code: **TH1**
	Branch: **Electronics & Telecommunication Engg.**

1ST	**1. RADAR & NAVIGATION AIDS - 10P**	
	1st	1.1 Basic Radar, advantages & applications
	2nd	1.2 Working principle of Simple Radar system , its types
	3rd	1.3 Radar range equation &Performance factor of radar.
	4th	1.4 Working principle of Pulsed Radar system
	5th	1.5 Function of radar indication and Working principle of moving target indicator.
2ND	**1st**	1.6 Define Doppler effect&Working principle of C.W Radar
	2nd	1.7 Radar aids to Navigation
	3rd	1.8 MTI Radar- working principle
	4th	1.9 Aircraft landing system
	5th	1.10 Navigation Satellite System.(NAVSAT) & GPS System
3RD	**2. SATELLITE COMMUNICATION**	
	1st	2.1 Basic Satellite Transponder & Kepler's Laws
	2nd	2.2 Satellite Orbital patterns and elevation(LEO,MEO & GEO) categories
	3rd	2.3 Concept of Geostationary Satellite, calculate its height, velocity & round trip time delay & their advantage & disadvantage
	4th	2.3 Concept of Geostationary Satellite, calculate its height, velocity & round trip time delay & their advantage & disadvantage
	5th	2.4 Working of the Satellite sub system
4TH	**1st**	2.5 Satellite frequency allocation and frequency bands
	2nd	2.6 General structure of satellite Link system (Uplink, Down link, Transponder, Crosslink)
	3rd	2.7 Working principle of direct broadcast system (DBS)
	4th	2.8 Working principle of VSAT system
	5th	2.9 Define multiple accessing & name various types.
5TH	**1st**	2.10 Time Division Multiple Accessing(TDMA) & Code Division Multiple Accessing (CDMA) – block diagram, its advantages & dis-advantages.
	2nd	2.10 Time Division Multiple Accessing(TDMA) & Code Division Multiple Accessing (CDMA) – block diagram, its advantages & dis-advantages.
	3rd	2.11 Satellite Application- Communication Satellite(MSAT), Digital Satellite Radio.
	4th	2.12 Working principle of GPS Receiver & Transmitter& applications
	5th	2.13 Optical Satellite Link transmitter & Receiver
6TH	**3. OPTICAL FIBER COMMUNICATION - 15P**	
	1st	3.1 Basic principle of Optical communication
	2nd	3.2 Compare the advantage and disadvantage of optical fibres&metallic cables
	3rd	3.3 Electromagnetic Frequency and wave line spectrum
	4th	3.4 Types of optical fibres&principles of propogation in a fibre using Ray Theory
	5th	3.5 Optical fiber construction 3.6 Define terms: Velocity of propagation, Critical angle, Acceptance angle numericalaperture
7TH	**1st**	3.7 Optical fibre communication system- block diagram & working principle
	2nd	3.8 Modes of propagation and index profile of optical fiber
	3rd	3.9 Types optical fiber configuration: Single-mode step index, Multi-mode step index, Multi-mode Graded index
	4th	3.10 Attenuation in optical fibers – Absorption losses, scattering, losses, bending losses, core and cladding losses- Dispersion – material Dispersion, waveguide dispersion, Intermodal dispersion
	5th	3.11 Optical sources(Transmitter) & types – LED- semiconductor laser diodes

8TH	1st	3.12 LASER -its working principles, block diagram using laser feedback control circuit
	2nd	3.13 Optical detectors – PIN and APD diodes &Block diagram using APDConnectors and splices –Optical cables - Couplers
	3rd	3.14 Optical repeater & Single Channel system
	4th	3.15 Applications of optical fibres – civil, Industry and Military application
	5th	3.16 Concept of Wave Length Division Multiplexing (WDM) principles.
9TH		**4.TELECOMMUNICATION SYSTEM -10P**
	1st	4.1 Working of Electronic Telephone System. (Telephone Set)
	2nd	4.2 Function of switching system.& Call procedures
	3rd	4.2 Function of switching system.& Call procedures
	4th	4.3 Space and time switching.
	5th	4.4 Numbering plan of telephone networks (National Schemes & International Numbering)
10TH	1st	4.5 Working principle of a PBX & Digital EPABX
	2nd	4.5 Working principle of a PBX & Digital EPABX
	3rd	4.6 Units of Power Measurement.
	4th	4.7 Working principle of Internet Protocol Telephone
	5th	4.8 Working principle of Internet Telephone
11TH		**5.Data Communication - 10P**
	1st	5.1 Basic concept of Data Communication
	2nd	5.2 Architecture, Protocols and Standards
	3rd	5.2 Architecture, Protocols and Standards
	4th	5.3 Data Communication Circuits
	5th	5.4 Types of Transmission & Transmission Modes
12TH	1st	5.5 Data Communication codes
	2nd	5.5 Data Communication codes
	3rd	5.6 Basic idea of Error control & Error Detection
	4th	5.6 Basic idea of Error control & Error Detection
	5th	5.7 MODEM & its basic block diagram& common features Voice Band Modem
13TH		**6.WIRELESS COMMUNICATION - 15P**
	1st	6.1 Basic concept of Cell Phone,frequency reuse channel assignment strategic handoff co-channel Interference and system capacity of a Cellular Radio systems.
	2nd	6.1 Basic concept of Cell Phone,frequency reuse channel assignment strategic handoff co-channel Interference and system capacity of a Cellular Radio systems.
	3rd	6.2 Concept of improving coverage and capacity in cellular system (Cell Splitting, Sectoring)
	4th	6.3 Wireless Systems and its Standards.
	5th	6.4 Discuss the GSM (Global System for Mobile) service and features.
14TH	1st	6.5 Architecture of GSM system & GSM mobile station &channel types of GSM system.
	2nd	6.5 Architecture of GSM system & GSM mobile station &channel types of GSM system.
	3rd	6.6 working of forward and reveres CDMA channel,the frequency and channel specifications
	4th	6.7 Architecture and features of GPRS.
	5th	6.8 Discuss the mobile TCP, IP protocol.
15TH	1st	6.8 Discuss the mobile TCP, IP protocol.
	2nd	6.8 Discuss the mobile TCP, IP protocol.
	3rd	6.9 Working of Wireless Application Protocol (WAP).
	4th	6.10 Features of SMS, MMS, 1G,2G, 3G, 4G& 5G Wireless network.
	5th	6.11 Smart Phone and discuss its features indicate through Block diagram.

Lesson Plan AY – 2022-23(S) (19.01.2023 – 28.04.2023)	Teaching Faculty: 1. **Deepika Panda, Lecturer (Electronics)** 2. **Kshirabdhee Tanaya Dora (Guest Lecturer, Electronics)**
Total Periods: **60** Periods/Week: **4**	Subject: **Control System & Component** Subject Code: **TH2** Branch: **Electronics & Telecommunication Engineering**

Week	No of Periods Allotted (60)	Syllabus To be Covered
1ST	**1.Fundamental of Control System - 5P**	
	1st	1.1 Classification of Control system
	2nd	1.2 Open loop system & Closed loop system and its comparison
	3rd	1.3 Effects of Feed back
	4th	1.4 Standard test Signals (Step, Ramp, Parabolic, Impulse Functions)
2ND	1st	1.5 Servomechanism
	2. Transfer Functions - 8P	
	2nd	2.1 Transfer Function of a system & Impulse response,
	3rd	2.2 Properties, Advantages & Disadvantages of Transfer Function
	4th	2.3 Poles & Zeroes of transfer Function
3RD	1st	2.4 Poles & Zeroes of transfer Function
	2nd	2.5 Representation of poles & Zero on the s-plane
	3rd	2.6 Simple problems of transfer function of network
	4th	2.6 Simple problems of transfer function of network
4TH	1st	2.6 Simple problems of transfer function of network
	3. Control system Components & mathematical modelling of physical System - 5P	
	2nd	3.1 Components of Control System
	3rd	3.2 Potentiometer, Synchro, Diode modulator & demodulator
	4th	3.2 Potentiometer, Synchro, Diode modulator & demodulator
5TH	1st	3.3 DC motors, AC Servomotors
	2nd	3.4 Modelling of Electrical Systems (R, L, C, Analogous systems)
	4. Block Diagram & Signal Flow Graphs (SFG) - 8P	
	3rd	4.1 Definition of Basic Elements of a Block Diagram
	4th	4.2 Canonical Form of Closed loop Systems
6TH	1st	4.3 Rules for Block diagram Reduction 4.4 Procedure for of Reduction of Block Diagram
	2nd	4.5 Simple Problem for equivalent transfer function
	3rd	4.6 Basic Definition in SFG & properties
	4th	4.7 Mason's Gain formula
7TH	1st	4.8 Steps foe solving Signal flow Graph
	2nd	4.9 Simple problems in Signal flow graph for network
	5. Time Domain Analysis of Control Systems - 8P	
	3rd	5.1 Definition of Time, Stability, steady-state response, accuracy, transient accuracy, In-sensitivity and robustness.
	4th	5.2 System Time Response
8TH	1st	5.3 Analysis of Steady State Error

		2nd	5.4 Types of Input & Steady state Error (Step, Ramp, Parabolic)
		3rd	5.5 Parameters of first order system & second-order systems
		4th	5.6 Derivation of time response Specification (Delay time, Rise time, Peak time, Setting time, Peak over shoot)
9TH		1st	5.6 Derivation of time response Specification (Delay time, Rise time, Peak time, Setting time, Peak over shoot)
		2nd	5.6 Derivation of time response Specification (Delay time, Rise time, Peak time, Setting time, Peak over shoot)
	6. Feedback Characteristics of Control Systems - 6P		
		3rd	6.1 Effect of parameter variation in Open loop System & Closed loop Systems
		4th	6.2 Introduction to Basic control Action& Basic modes of feedback control: proportional, integral and derivative
10TH		1st	6.3 Effect of feedback on overall gain, Stability
		2nd	6.3Effect of feedback on overall gain, Stability
		3rd	6.4 Realisation of Controllers (P, PI, PD, PID) with OPAMP
		4th	6.4 Realisation of Controllers (P, PI, PD, PID) with OPAMP
11TH	**7. Stability concept& Root locus Method - 8P**		
		1st	7.1 Effect of location of poles on stability
		2nd	7.2 Routh Hurwitz stability criterion.
		3rd	7.3 Routh Hurwitz stability criterion.
		4th	7.3 Routh Hurwitz stability criterion.
12TH		1st	7.4 Steps for Root locus method
		2nd	7.5 Root locus method of design (Simple problem)
		3rd	7.5 Root locus method of design (Simple problem)
		4th	7.5 Root locus method of design (Simple problem)
13TH	**8. Frequency-response analysis & Bode Plot -7P**		
		1st	8.1 Frequency response, Relationship between time & frequency response
		2nd	8.2 Methods of Frequency response
		3rd	8.3 Polar plots & steps for polar plot
		4th	8.4 Bodes plot & steps for Bode plots
14TH		1st	8.5 Stability in frequency domain, Gain Margin& Phase margin
		2nd	8.6 Nyquist plots. Nyquist stability criterion.
		3rd	8.7 Simple problems as above
	9. State variable Analysis - 5P		
		4th	9.1 Concepts of state, state variable, state model,
15TH		1st	9.1 Concepts of state, state variable, state model,
		2nd	9.2 state models for linear continuous time functions (Simple)
		3rd	9.2 state models for linear continuous time functions (Simple)
		4th	9.2 state models for linear continuous time functions (Simple)

Lesson Plan			Teaching Faculty: **Gopal Chandra Behera, Lecturer (Electronics)** **AY – 2022-23** (19.01.2023 – 28.04.2023)
Total Periods: 60 **Periods/Week: 4**			Subject: **DIGITAL SIGNAL PROCESSING** Subject Code: **TH3** Branch: **Electronics & Telecommunication Engineering**
WEEK	**SN**	**CLASS DAY**	**THEORY TOPICS**
1ˢᵗ	**1.**		**INTRODUCTION**
	1.	1ˢᵗ	**1.1** Discuss Signals, Systems & Signal processing.
	2.	2ⁿᵈ	**1.1.1** Explain basic element of a digital signal processing system.
	3.	3ʳᵈ	**1.1.2** Compare the advantages of digital signal processing over analog signal processing. **1.2** Classify signals. **1.2.1** Multi channel & multi-dimensional signals.
	4.	4ᵗʰ	**1.2.2** Continuous time verses Discrete -times Signal.
2ⁿᵈ	5.	1ˢᵗ	**1.2.3** Continuous valued verses Discrete -valued signals.
	6.	2ⁿᵈ	**1.3** Discuss the concept of frequency in continuous time & discrete time signals.
	7.	3ʳᵈ	**1.3.1** Continuous-time sinusoidal signals. **1.3.2** Discrete-time sinusoidal signals.
	8.	4ᵗʰ	**1.3.3** Harmonically related complex exponential.
3ʳᵈ	9.	1ˢᵗ	**1.4** Discuss Analog to Digital & Digital to Analog conversion & explain the following. **1.4.1** Sampling of Analog signal, **1.4.2** The sampling theorem.
	10.	2ⁿᵈ	**1.4.3** Quantization of continuous amplitude signals, **1.4.4** Coding of quantized sample. **1.4.5** Digital to analog conversion.
	11.	3ʳᵈ	**1.4.5** Analysis of digital systems signals vs. discrete time signals systems.
	2.		**DISCRETE TIME SIGNALS & SYSTEMS**
	12.	4ᵗʰ	**2.1** State and explain discrete time signals.
4th	13.	1ˢᵗ	**2.1.1** Discuss some elementary discrete time signals.
	14.	2ⁿᵈ	**2.1.2** Classify discrete time signal.
	15.	3ʳᵈ	**2.1.2** Classify discrete time signal. **2.1.3** Discuss simple manipulation of DTS.
	16.	4ᵗʰ	**2.2** Discuss discrete time system.
5ᵗʰ	17.	1ˢᵗ	**2.2** Discuss discrete time system.
	18.	2ⁿᵈ	**2.2.1** Describe input-output of system. **2.2.2** Draw block diagram of DTS
	19.	3ʳᵈ	**2.2.3** Classify discrete time system. **2.2.4** Discuss inter connection of DTS
	20.	4ᵗʰ	**2.3** Discuss discrete time time-invariant system.
6ᵗʰ	21.	1st	**2.3.1** Discuss different technique for the analysis of linear system. **2.3.2** Discuss the resolution of a discrete time signal in to impulse.
	22.	2ⁿᵈ	**2.3.3** Discuss the response of LTI system to arbitrary I/Ps using convolution theorem.
	23.	3ʳᵈ	**2.3.4** Explain the properties of Convolution & interconnection of LTI system.
	24.	4ᵗʰ	**2.3.5** Study systems with finite duration and infinite duration impulse response.
7ᵗʰ	25.	1st	**2.4.1** Explain recursive & non-recursive discrete time system.
	26.	2ⁿᵈ	**2.4.2** Determine the impulse response of linear time invariant recursive system.

			3. The Z-Transform & Its Application to analysis of LTI System
	27.	3rd	**3.1** Discuss Z-transform & its application to LTI system.
	28.	4th	**3.1.1** State & explain Direct Z-transform.
8th	29.	1st	**3.1.1** State & explain Direct Z-transform.
	30.	2nd	**3.1.2** State & explain inverse Z-transform.
	31.	3rd	**3.2** Discuss various Properties of Z-transform.
	32.	4th	**3.2** Discuss various Properties of Z-transform.
9th	33.	1st	**3.3** Discuss rational Z-transform. Explain Poles & Zeros.
	34.	2nd	**3.3.1** Determine pole location time domain behaviour for casual signals
	35.	3rd	**3.3.2** Describe the system function of a linear time invariant system.
	36.	4th	**3.4** Discuss Inverse Z-transform.
10th	37.	1st	**3.4.1** Determine inverse Z-transform by partial fraction expansion.
	38.	2nd	**3.4.1** Determine inverse Z-transform by partial fraction expansion.
			4. Discuss Fourier Transform: Its Applications Properties →[12P]
	39.	3rd	**4.1** Discuss discrete Fourier transform.
	40.	4th	**4.2** Determine frequency domain sampling and reconstruction of DTS.
11th	41.	1st	**4.3** State & Explain Discrete Time Fourier transformation (DTFT)
	42.	2nd	**4.3** State & Explain Discrete Time Fourier transformation (DTFT)
	43.	3rd	**4.4** State & explain Discrete Fourier transformation (DFT).
	44.	4th	**4.4** State & explain Discrete Fourier transformation (DFT).
12th	45.	1st	**4.5** Compute DFT as a linear transformation.
	46.	2nd	**4.6** Relate DFT to other Transforms.
	47.	3rd	**4.7** Discuss the Property of the DFT.
	48.	4th	**4.7** Discuss the Property of the DFT.
13th	49.	1st	**4.8** Explain multiplication of two DFT & Circular Convolution
	50.	2nd	**4.8** Explain multiplication of two DFT & Circular Convolution
			5. Fast Fourier Transform algorithm & Digital Filters.
	51.	3rd	**5.1** Compute DFT & FFT algorithm.
	52.	4th	**5.1** Compute DFT & FFT algorithm.
14th	53.	1st	**5.2** Explain direct computation of DFT.
	54.	2nd	**5.3** Discuss the radix-2 algorithm. (Small Problems)
	55.	3rd	**5.3** Discuss the radix-2 algorithm. (Small Problems)
	56.	4th	**5.3** Discuss the radix-2 algorithm. (Small Problems)
15th	57.	1st	**5.3** Discuss the radix-2 algorithm. (Small Problems)
	58.	2nd	**5.4** Introduction to digital filters. (FIR Filters)
	59.	3rd	**5.4** Introduction to digital filters. (FIR Filters)
	60.	4th	**5.5** Introduction to DSP architecture, familiarization of different types of processors.

<table>
<tr><td colspan="5" align="center">Subject: Internet of Things (IoT) - TH4(2)
Name of Teaching Faculty: Er. Poonam Panda
Discipline: Electronics and Telecommunication Engineering
Semester: 6th Semester</td></tr>
<tr><td></td><td>No. of Days/per week class allotted: 4</td><td colspan="3">Semester From Date: 14.02.2023 to Date: 23 .05. 2023
No.of Weeks:15</td></tr>
<tr><td>Week</td><td>Class Day</td><td>Theory Topics</td><td>Remarks</td><td>Chapter</td></tr>
<tr><td rowspan="4">1st</td><td>1</td><td>What is IoT.Architectural Overview,</td><td></td><td rowspan="8">1. Introduction to IoT</td></tr>
<tr><td>2</td><td>Design principles and needed capabilities,</td><td></td></tr>
<tr><td>3</td><td>IoT Applications, Sensing, Actuation,</td><td></td></tr>
<tr><td>4</td><td>Basics of Networking, M2M and IoT Technology</td><td></td></tr>
<tr><td rowspan="4">2nd</td><td>5</td><td>Fundamentals- Devices and gateways,</td><td></td></tr>
<tr><td>6</td><td>Data management, Business processes in IoT</td><td></td></tr>
<tr><td>7</td><td>Everything as a Service(XaaS),</td><td></td></tr>
<tr><td>8</td><td>Role of Cloud in IoT, Security aspects in IoT.</td><td></td></tr>
<tr><td rowspan="4">3rd</td><td>9</td><td>Hardware Components- Computing (Arduino,Raspberry Pi),</td><td></td><td rowspan="10">2.Elements of IoT</td></tr>
<tr><td>10</td><td>Communication, Sensing, Actuation</td><td></td></tr>
<tr><td>11</td><td>I/O interfaces</td><td></td></tr>
<tr><td>12</td><td>Software Components- Programming API's</td><td></td></tr>
<tr><td rowspan="4">4th</td><td>13</td><td>Software Components- Programming API's</td><td></td></tr>
<tr><td>14</td><td>Protocols-MQTT,</td><td></td></tr>
<tr><td>15</td><td>ZigBee</td><td></td></tr>
<tr><td>16</td><td>Bluetooth,</td><td></td></tr>
<tr><td rowspan="4">5th</td><td>17</td><td>CoAP</td><td></td></tr>
<tr><td>18</td><td>UDP, TCP.</td><td></td></tr>
<tr><td>19</td><td>Implementation of Device integration</td><td></td><td rowspan="14">3. IoT Application Development</td></tr>
<tr><td>20</td><td>Implementation of Device integration</td><td></td></tr>
<tr><td rowspan="4">6th</td><td>21</td><td>Data acquisition and integration</td><td></td></tr>
<tr><td>22</td><td>Data acquisition and integration</td><td></td></tr>
<tr><td>23</td><td>Data acquisition and integration</td><td></td></tr>
<tr><td>24</td><td>Device data storage-</td><td></td></tr>
<tr><td rowspan="4">7th</td><td>25</td><td>Device data storage-</td><td></td></tr>
<tr><td>26</td><td>Device data storage-</td><td></td></tr>
<tr><td>27</td><td>Unstructured data storage on cloud/local server</td><td></td></tr>
<tr><td>28</td><td>Unstructured data storage on cloud/local server</td><td></td></tr>
<tr><td rowspan="4">8th</td><td>29</td><td>Solution framework for IoT applications</td><td></td></tr>
<tr><td>30</td><td>Solution framework for IoT applications</td><td></td></tr>
<tr><td>31</td><td>Authentication, authorization of devices</td><td></td></tr>
<tr><td>32</td><td>Authentication, authorization of devices</td><td></td></tr>
<tr><td rowspan="4">9th</td><td>33</td><td>Understanding the IoT Big Picture</td><td></td><td rowspan="11">4.Smart Technology</td></tr>
<tr><td>34</td><td>Building the Internet of Things</td><td></td></tr>
<tr><td>35</td><td>Building the Internet of Things</td><td></td></tr>
<tr><td>36</td><td>Understanding Smart Devices,Building Blocks</td><td></td></tr>
<tr><td rowspan="4">10th</td><td>37</td><td>Understanding Smart Devices,Building Blocks</td><td></td></tr>
<tr><td>38</td><td>Understanding Network Conections</td><td></td></tr>
<tr><td>39</td><td>Understanding IP Adresses</td><td></td></tr>
<tr><td>40</td><td>Understanding IP Adresses</td><td></td></tr>
<tr><td rowspan="3">11th</td><td>41</td><td>Understanding cellular Network & Mesh Network</td><td></td></tr>
<tr><td>42</td><td>Understanding cellular Network & Mesh Network</td><td></td></tr>
<tr><td>43</td><td>Understanding cellular Network & Mesh Network</td><td></td></tr>
<tr><td rowspan="6">12th</td><td>44</td><td>What is Smart TV & its use</td><td></td><td rowspan="6">smart tv</td></tr>
<tr><td>45</td><td>What is inside Smart TV</td><td></td></tr>
<tr><td>46</td><td>What is inside Smart TV</td><td></td></tr>
<tr><td>47</td><td>What a Smart TV does</td><td></td></tr>
<tr><td>48</td><td>What a Smart TV does</td><td></td></tr>
<tr><td>49</td><td>Smart TV Operating Systems</td><td></td></tr>
</table>

13th	50	Smart TV Operating Systems		**5.**
	51	What is Smart TV Set-TopDevices		
	52	Intergrating Smart TV in to IOT		
14th	53	Intergrating Smart TV in to IOT		**6.IOT case studies**
	54	smart home		
	55	smart car		
	56	smart cities		
15th	57	smart drone		
	58	industrial automation		
	59	industrial automation		
	61	industrial automation		