**Government College of Technology, Coimbatore Department of Electronics and Instrumentation Engineering**

**List of course modules**

Name: Dr. A.S. Wincy Pon ANNAL

Designation: Associate Professor

|  |  |  |
| --- | --- | --- |
| S.No: | Topic | Video Link |
| Subject: Power Plant Instrumentation |
| 1 | Boiler introduction | https://youtu.be/5SpwjuU53Bs |
| 2 | Boiler mountings | https://youtu.be/4srTtnh7fTQ |
| 3 | Types of boilers- fire and water tube boilers | https://youtu.be/HAsH-rYbWAE |
| 4 | Thermal power plant fuel circuitry | https://youtu.be/JESRBZRCDME |
| 5 | Thermal power plant water circuitry | https://youtu.be/cdK8hYvEIc0 |
| 6 | Hydro power plant | https://youtu.be/hDXZncP5w9A |
| 7 | Cochran boiler | https://youtu.be/xSd1oTWy5Ys |
| 8 | Babcock and wilcox boiler | https://youtu.be/G9j8\_ySMjQ8 |
| 9 | Lamont boiler | https://youtu.be/tC85N-VQI5g |
| 10 | Benson Boiler | https://youtu.be/dSrbrrzuOjU |
| 11 | Cogeneration introduction | https://youtu.be/OO0S6\_R7C9A |
| 12 | Cogeneration types | https://youtu.be/xAcORPSw874 |
| 13 | Types of Cogeneration - part 2 | <https://youtu.be/VeXLmFyng9U> |
| 14 | Importance of instrumentation inpower plants | https://youtu.be/SNmhO-YVYo0 |
| 15 | Wind Power Generation | https://youtu.be/eLuk\_GyzqK0 |
| 16 | Solar Power generation | https://youtu.be/yhlm8NBUkjU |
| 17 | Geothermal Power generation | https://youtu.be/c7UgP333SyM |
| Subject: Electronic Devices and Circuits |
| 1 | Atomic structure | https://youtu.be/JlvRDlw0z9E |
| 2 | Quantum numbers | https://youtu.be/MD4C2usvv6o |
| 3 | Energy bands | https://youtu.be/GkTlQ6u5Amk |
| 4 | Chemical bonds in semiconductors | https://youtu.be/tim7UfwoTdg |
| 5 | Hole current | https://youtu.be/aPcTfGF7zjo |
| Subject: Electronic Devices and Circuits lab |
| 1 | Characteristics of PN junction diode | https://youtu.be/PzntUJWz46c |
| 2 | Zener diode as a voltage regulator | https://youtu.be/Sj0czHok6Wc |
| 3 | Characteristics of transistor in CB mode | https://youtu.be/Dn9N2vNDm5Y |
| 4 | Characteristics of transistor in CE mode | https://youtu.be/0YwChhU1JSI |
| 5 | Half wave rectifier | https://youtu.be/R50sg7u5o4E |
| 6 | Full wave rectifier | https://youtu.be/5ZCxGSGq740 |
| 7 | Transistor as a switch | https://youtu.be/8hPmNOvzZ7Y |
| 8 | Frequency response of CE amplifier | https://youtu.be/pxZzokNnGrA |
| 9 | Astable multivibrator | https://youtu.be/t3natL9tgQk |
| 10 | RC phase shift oscillator |  https://youtu.be/Rvz61rsAjGM |
| 11 | UJT |  https://youtu.be/W6fnOxZI1bw |
|  | Subject: Digital Electronics | https://www.youtube.com/watch?v=QvhEroQmm6w&list=PLtLG5dD\_u94U8LLrUF8BhN5RxtnBHxFQe&pp=iAQB |

Name: Prof. G.R. Radhika

Designation: Assistant Professor

|  |  |  |
| --- | --- | --- |
| S.No: | Topic | Video Link |
| Subject: Biomedical Instrumentation |
| 1 | Defibrillators, Principle of Defibrillators, Power of Defibrillators | <http://youtu.be/HlJAYlZG4bA?hd=1> |
| Subject: Sensors and Transducer Lab |
| 1 | Characteristics of load cell | [https://drive.google.com/file/d/1-](https://drive.google.com/file/d/1-XPOgeOrnqOsQOCyhYarH1nBwireojVd/view?usp=sharing) [XPOgeOrnqOsQOCyhYarH1nBwireojVd/view?](https://drive.google.com/file/d/1-XPOgeOrnqOsQOCyhYarH1nBwireojVd/view?usp=sharing) [usp=sharing](https://drive.google.com/file/d/1-XPOgeOrnqOsQOCyhYarH1nBwireojVd/view?usp=sharing) |
| 2 | Characteristics Linear Variable Differential Transducer | https://drive.google.com/file/d/1-VCyXS8jt1- ss2dgnhEI-Tamg9O9tC4S/view?usp=sharing |
| 3 | Measurements of Resistance using Wheatstone Bridge | [https://drive.google.com/file/d/1-](https://drive.google.com/file/d/1-Qv1hpl9d5l11Z2mU2U7PRnato3Zb7HX/view?usp=sharing) [Qv1hpl9d5l11Z2mU2U7PRnato3Zb7HX/view?u](https://drive.google.com/file/d/1-Qv1hpl9d5l11Z2mU2U7PRnato3Zb7HX/view?usp=sharing) [sp=sharing](https://drive.google.com/file/d/1-Qv1hpl9d5l11Z2mU2U7PRnato3Zb7HX/view?usp=sharing) |

Name: Prof.C.Marimuthu

Designation: Assistant Professor

|  |
| --- |
| Subject: Measurements and Instrumentation |
| 1 | Types of instruments, torques in Measuring Instruments | [https://drive.google.com/file/d/1Fp-](https://drive.google.com/file/d/1Fp-5GLlkqr00BHV8bD3ON9rKDA1J_Ksu/view?usp=sharing) [5GLlkqr00BHV8bD3ON9rKDA1J\_K](https://drive.google.com/file/d/1Fp-5GLlkqr00BHV8bD3ON9rKDA1J_Ksu/view?usp=sharing)[su/view?usp=sharing](https://drive.google.com/file/d/1Fp-5GLlkqr00BHV8bD3ON9rKDA1J_Ksu/view?usp=sharing) |
| 2 | Fluid powerTechnology – Industrial Hydraulics and Pneumatics | [https://drive.google.com/file/d/18JGB](https://drive.google.com/file/d/18JGBREiMnUQDpqVehk7NCJVgMsnOS-pG/view?usp=sharing) [REiMnUQDpqVehk7NCJVgMsnOS-](https://drive.google.com/file/d/18JGBREiMnUQDpqVehk7NCJVgMsnOS-pG/view?usp=sharing) [pG/view?usp=sharing](https://drive.google.com/file/d/18JGBREiMnUQDpqVehk7NCJVgMsnOS-pG/view?usp=sharing) |
| 3 | Control valves | [https://drive.google.com/drive/folders/](https://drive.google.com/drive/folders/1T4TIYROJ36KRmxYo_of0ePBXAMJy-0Us) [1T4TIYROJ36KRmxYo\_of0ePBXA](https://drive.google.com/drive/folders/1T4TIYROJ36KRmxYo_of0ePBXAMJy-0Us) [MJy-0Us](https://drive.google.com/drive/folders/1T4TIYROJ36KRmxYo_of0ePBXAMJy-0Us) |
| 4 | Fluid Power symbols | [https://drive.google.com/drive/folders/](https://drive.google.com/drive/folders/1T4TIYROJ36KRmxYo_of0ePBXAMJy-0Us) [1T4TIYROJ36KRmxYo\_of0ePBXA](https://drive.google.com/drive/folders/1T4TIYROJ36KRmxYo_of0ePBXAMJy-0Us) [MJy-0Us](https://drive.google.com/drive/folders/1T4TIYROJ36KRmxYo_of0ePBXAMJy-0Us) |
| 5 | Energy Harvesting | [https://drive.google.com/drive/folders/](https://drive.google.com/drive/folders/1T4TIYROJ36KRmxYo_of0ePBXAMJy-0Us) [1T4TIYROJ36KRmxYo\_of0ePBXA](https://drive.google.com/drive/folders/1T4TIYROJ36KRmxYo_of0ePBXAMJy-0Us) [MJy-0Us](https://drive.google.com/drive/folders/1T4TIYROJ36KRmxYo_of0ePBXAMJy-0Us) |
| 6 | LabVIEW | [https://drive.google.com/drive/folders/](https://drive.google.com/drive/folders/1T4TIYROJ36KRmxYo_of0ePBXAMJy-0Us) [1T4TIYROJ36KRmxYo\_of0ePBXA](https://drive.google.com/drive/folders/1T4TIYROJ36KRmxYo_of0ePBXAMJy-0Us) [MJy-0Us](https://drive.google.com/drive/folders/1T4TIYROJ36KRmxYo_of0ePBXAMJy-0Us) |
| 7 | Energy Meter | [https://drive.google.com/drive/folders/](https://drive.google.com/drive/folders/1T4TIYROJ36KRmxYo_of0ePBXAMJy-0Us) [1T4TIYROJ36KRmxYo\_of0ePBXA](https://drive.google.com/drive/folders/1T4TIYROJ36KRmxYo_of0ePBXAMJy-0Us) [MJy-0Us](https://drive.google.com/drive/folders/1T4TIYROJ36KRmxYo_of0ePBXAMJy-0Us) |

Name: Dr.M.Raghappriya

Designation: Assistant Professor

|  |
| --- |
| Subject: Distributed Control System and Applications |
| 1 | Overview of Automation – PLC architecture – Input and Output modules – Sensors – Output devices | https://www.youtub e.com/playlist?list=P LHYOj31sZjSa- c1MYTGORXJylVniE m19T |
| Subject: Industrial Automation Lab |
| 1 | Implementation of Logic gates–with Hardware implementation | https://www.youtub e.com/watch?v=inY N52prYeE&t=1s&ab\_ channel=Raghappriy aMarimuthusamy |
| 2 | Implementation of PLC timer - with Hardware implementation | https://www.youtub e.com/watch?v=rhpb HdRX4pM&ab\_chann el=RaghappriyaMari muthusamy |
| 3 | Implementation of PLC counter - with Hardware implementation | https://www.youtube. com/watch?v=QFchix3 yg58&ab\_channel=Rag happriyaMarimuthusa my |
| 4 | Implementation of PLC compare functions - with Hardware implementation | https://www.youtube. com/watch?v=6xJ- 61s40EY&ab\_channel= RaghappriyaMarimuth usamy |
| Subject: Electrical circuits and networks |
| 1 | RLC Circuits– Time-Domain Analysis | https://[www.youtube.co](http://www.youtube.co/) m/playlist?list=PLHYOj31sZjSazjUYZcT58umRnykJ0 pCsq |
| 2 | Numerical problems |
| 3 | Sinusoids– ComplexNumbers– Complex,Exponential Representationsof Sinusoids |
| 4 | Impedance and Admittance–Analysis and NetworkTheorems for SinusoidalSteady-State |
| 5 | Frequency Response–Resonance |
| 6 | Power Analysis–Instantaneous and AveragePower– Power Factor andPower Factor Correction–Complex Power. |
| 7 | Series resonant circuits-Qfactor-Bandwidth |
| 8 | Responses to sinusoidal excitation. |
| 9 | Parallel Resonance-Coupledcircuits-Self and Mutualinductance |
| 10 | Inductance in series andparallel- Mutual and leakageflux- Coefficient of coupling |  |
| 11 | Step response of RC,RL andRLC circuits |
| 12 | series and parallel RLC circuitresponses |
| 13 | Introduction– T-to- Π Transformation |
| 14 | Introduction to Three Terminal Networks |
| 15 | Equations of Two-Port Networks– Z and Y Parameters |
| 15 | Hybrid and Transmission Parameters |
| 17 | Relationships Between Two- Port Parameters |
| 18 | Inter-connection of Two-Port Networks– Lattice Networks. |
| Subject: Electrical circuits and networks Laboratory |
|  | Simulation of Two port network – Simulation of RLC circuit | https://www.youtub e.com/playlist?list=P LHYOj31sZjSazjUYZc T58umRnykJ0pCsq |

Name: Dr. N. Arulmozhi

Designation: Assistant Professor

|  |
| --- |
| Subject: Control system design |
| 1 | Unit-I - Control System -Introduction; Classification; Effect of Feedback |  |
| 2 | Mathematical Model of a process or system; Transfer function; Standard test Inputs; Laplace Transform |
| 3 | Transfer function of Mechanical Translational Systems |
| 4 | Transfer function of Mechanical Translational Systems- Problems |
| 5 | Transfer function of Mechanical Translational Systems- Case study#2- Problems |
| 6 | Transfer function of Mechanical Rotational Systems- Problems |
| 7 | Transfer function of Electrical systems -Problems; Electrical Analogous - Introduction |
| 8 | Electrical Analogous for Mechanical Translational System-Problems |
| 9 | Electrical Analogous for Mechanical Rotational System-Problems |
| 10 | Thermal Systems and Electromechanical systems-Transfer function of DC and AC Motor |
| 11 | Block Diagram reduction (BDR) |
| 12 | Block Diagram reduction (BDR)-Problems |
| 13 | Signal Flow Graphs \_ Introduction |
| 14 | Signal Flow Graphs \_Problems |
| 15 | Conversion of BDR to SFG |
| 16 | Unit-II - Transient and Steady state Analysis ; Test signals; Type and Order of the system |
| 17 | Time response of First Order system and SecondOrder system - Undamped, Critically damped, Underdamped and over damped |
| 18 | Time Domain Specifications |
| 19 | Time Domain Specifications-Problems |
| 20 | Static Error Constants- Problems |
| 21 | Generalised Error Constants - Problems |
| 22 | Unit-III -Stability-Routh Hurwitz criterion |
| 23 | Routh Hurwitz criterion-Problems |
| 24 | Root Locus -Introduction |
| 25 | Root Locus - Problem |
| 26 | Frequency domain Specifications-Introduction |
| 27 | Bode plot |
| 28 | Bode plot-Problem |
| 29 | Polar plot -Introduction |
| 30 | polar plot-problem with 4 case studies |
| 31 | Constant M & N Circles; Unit-IV -Compensators- Lag Compensator-Introduction |
| 32 | Lag compensator-Problem |
| 33 | Lead Compensator |
| 34 | Lead Compensator-problem |
| 35 | Lag-Lead Compensator+problem |
| 36 | Lag-Lead Compensator+problem |
| 37 | Unit-V - Stepper motors |
| 38 | Servo motors-Error detectors; PID controllers;Nyquist Stability criterion |
| 39 | State Space Model-Introduction |
| 40 | Matrices; solution of state space equations; statetransition matrices |
| 41 | cayley hamilton theorem; Diagonalisation andLaplace transform method |
| 42 | computation of state transition matrices by twomethods; |
| 43 | Solution of state equations - Homogenousequations |
| 44 | Solution of state equations - Non-Homogenousequations; Computation of state transition matrix - Derivation of methods Method 1: Matrix Exponential; Method 2: Laplace transform; |
| 45 | Computation of state transition matrix -Derivation of methods Method 3: Canonical Transformation ; Method 4: Cayley-Hamilton Theroem |
| 46 | Problems on Computation of state transitionmatrix - Method 1: Matrix Exponential; Method 2: Laplace transform; Method 3: Canonical Transformation ; Method 4: Cayley-Hamilton Theroem |
| 47 | Derivation of - State space Transformation usingPhysical variables; State space Transformation using Phase variables; State space Transformation using Canonical variables; |
| 48 | Problems on - State space Transformation usingPhysical variables; State space Transformation using Phase variables; State space Transformation using Canonical variables; |

|  |
| --- |
| Subject: Modern Control Theory |
| 1 | Modern Control Theory -Introduction; State space equations |  |
| 2 | Matrices; solution of state space equations; state transition matrices |
| 3 | Cayley Hamilton theorem; Diagonalisation and Laplace transform method |
| 4 | computation of state transition matrices by two methods; |
| 5 | Solution of state equations - Homogenous equations |
| 6 | Solution of state equations - Non-Homogenous equations; Computation of state transition matrix - Derivation of methods Method 1: Matrix Exponential; Method 2: Laplace transform; |
| 7 | Computation of state transition matrix - Derivation of methods Method 3: Canonical Transformation ; Method 4: Cayley-Hamilton Theroem |
| 8 | Problems on Computation of state transition matrix - Method 1: Matrix Exponential; Method 2: Laplace transform; Method 3: Canonical Transformation ; Method 4: Cayley-Hamilton Theroem |
| 9 | Derivation of - State space Transformation using Physical variables; State space Transformation using Phase variables; State space Transformation using Canonical variables; |
| 10 | Problems on - State space Transformation using Physical variables; State space Transformation using Phase variables; State space Transformation using Canonical variables; |
| 11 | State Space analysis- Discrete systems - State equation and Output equation; State Diagram Solution of State Equations– State Transition Matrix |
| 12 | Solution of Homogenous State Equations &solution using Z-Transform |
| 13 | Discrete Systems ,Derivation Computation ofState Transition Matrix |
| 14 | Method 1: Using Z Transform |
| 15 | Method 2: Canonical Transformation |
| 16 | Method 3: Cayley-Hamilton Theorem |
| 17 | Discrete Systems - Problems Computation of StateTransition Matrix |
| 18 | Method 1: Using Z Transform |
| 19 | Method 2: Canonical Transformation |
| 20 | Method 3: Cayley-Hamilton Theorem |
| 21 | Discrete Systems ,Derivation & Problems on -State space Transformation using Phase variables; State space Transformation using Canonical variables; |
| 22 | Controllability and Observability;Kalmans Testand Gilberts Test for Controllability and Observability |
| 23 | Controllable Phase variable form |
| 24 | Controllable Phase variable form-Problem |
| 25 | Observable Phase variable form + Problem |
| 26 | Observable Phase variable form + Problem |
| 27 | State feedback design using pole placement |
| 28 | State feedback design using pole placement +problem |
| 29 | State Observer |

|  |
| --- |
| Subject: Control System Lab |
| 1 | Control System Lab-virtual version of lab-I Experiment #1 - Experimental Modelling and Validation of DC Motor using Step Response |  |
| 2 | Experiment #2 - Second Order system analysis using DC Motor |
| 3 | MATLAB - Introduction Experiment #3 - Mathematical modelling of physical system |
| 4 | Experiment #4 - Block Diagram Reduction |
| 5 | Experiment #5-Determination of Step, Ramp and Impulse response for Type ‘0’, Type ‘1’ and Type ‘2’ systems |
| 6 | Experiment #6-Performance Analysis of First Order and Second Order Systems |
| 7 | Experiment #7-Analyze the effect of Addition of Zeros and Poles to Closed Loop Transfer function |
| 8 | Experiment #8-Determination of Time Domain and Frequency Domain Specifications |
| 9 | Experiment #9-Stability Analysis using Bode Plot & Root Locus |
| 10 | Experiment #10-Introduction to PID Controllers |

Name: Prof. A. Suguna

Designation: Assistant Professor

|  |
| --- |
| Subject: Electronics for analog signal processing |
| 1 | Multivibrator | <https://youtu.be/sHtIsREDvyM> |
| 2 | 555 Timer | https://youtu.be/Q0mlxkkjHk0,  |
|  |  | https://youtu.be/DWYYs1xetSo |

Name: Dr. P. MANGAIYARKARASI

Designation: Associate Professor (CAS)

|  |
| --- |
| Subject: Measurements and Instrumentation |
| 1 | PMMC Instrument | <https://qrgo.page.link/1iGzS> |
| 2 | Moving Iron Instruments | https://qrgo.page.link/wKYzb |
| 3 | Resistance measurement using Wheatstone Bridge | https://qrgo.page.link/N1j9m |
| 4 | Inductance measurement using Maxwell’s Bridge | https://qrgo.page.link/cWrvp |
| 5 | Capacitance measurement using Schering Bridge | <https://qrgo.page.link/Ukjpk> |
| 6 | Turbine classification | https://qrgo.page.link/VrKvk |
| 7 | Cogeneration in power plants | https://qrgo.page.link/P9btu |
| 8 | Turbine governing system | https://qrgo.page.link/ciEYz |
| 9 | Wave analysers | https://qrgo.page.link/QJ5no |
| 10 | Magnetic measurements | https://qrgo.page.link/oMUCG |
| Subject: Microprocessor and Industrial Instrumentation |
| 1 | AVR Processor | <https://qrgo.page.link/H4moJ> |
| 2 | ARM-Advanced Microcontroller | <https://qrgo.page.link/apgYc> |
| 3 | Temperature Measurement- Expansion Type | <https://qrgo.page.link/BqeWk> |
| 4 | Filled in system method of temperature measurement | https://qrgo.page.link/wyZXE |
| 5 | Electrical method of temperature measurement | https://qrgo.page.link/RnvVh |
| 6 | Classification of signals | https://qrgo.page.link/dqDHv |
| 7 | Energy and power signals | https://qrgo.page.link/pWRVn |

Name: Dr. Dr.B.Achiammal

Designation: Assistant Professor

|  |
| --- |
| Subject: Basics of Signals and Systems |
| 1 | Continuous Time Signals and Discrete Time Signals | https://youtu.be/zgoY15qaMy A. |
| Measurements and Instrumentation |
| 1 | Electro-dynamic wattmeter | https://youtu.be/kSp5RI53GP8. |
| 2 | Low power factor watt meter | https://youtu.be/BUXQKnPuLeY |
| 3 | Phantom loading | https://youtu.be/XS4t8QhRfKo |

Name: Dr.S. Anbu

Designation: Assistant Professor

|  |
| --- |
| Subject: Power Plant Instrumentation |
| 1 | Combustion Control | <https://qrgo.page.link/4TgUx> |
| 2 | Combustion Control- Parallel | <https://qrgo.page.link/6oWf9> |
| 3 | Combustion- Ratio Control | <https://qrgo.page.link/mFkkP> |
| 4 | Furnace Draft Control | <https://qrgo.page.link/om8ei> |
| 5 | Boiler\_Shrink and Swell | <https://qrgo.page.link/ri3vn> |
| 6 | Single Element Drum Level Control | <https://qrgo.page.link/7MF5n> |
| 7 | Two Element Drum Level Control | <https://qrgo.page.link/92LoE> |
| 8 | Three Element Drum Level Control | <https://qrgo.page.link/P3Ydi> |
| Subject: Safety Instrumented Systems |
| 1 | What is an SIS? | <https://qrgo.page.link/pyVWd> |
| 2 | Alarm SystemsProcess control as protection layer | <https://qrgo.page.link/dwmXT> <https://qrgo.page.link/MYBHj> |
| 3 | Protection layers and safety requirement specification | <https://qrgo.page.link/g9zSv> |
| 4 | System Evaluation-Metrics | <https://qrgo.page.link/7fCw7> |
| 5 | Reliability Modelling-I | <https://qrgo.page.link/bbjzq> |
| 6 | Reliability Modelling-II | <https://qrgo.page.link/BCW8R> |
| 7 | Case Study | <https://qrgo.page.link/qACgy> |
| Subject: Logic and Distributed Control Systems |
| 1 | PLC programming\_Contacts and Timers | <https://qrgo.page.link/pFSKM> |
| 2 | PLC programming\_Timer Instructions | <https://qrgo.page.link/jrSTE> |
| 3 | PLC programming\_Counter Instructions | <https://qrgo.page.link/C6PNr> |
| 4 | PLC- Program Control Instructions | <https://qrgo.page.link/57xDS> |
| 5 | Evolution of DCS-I | <https://qrgo.page.link/No3yn> |
| 6 | Evolution of DCS-II | <https://qrgo.page.link/TnFfb> |
| 7 | DCS Architecture | <https://qrgo.page.link/TnFfb> |
| 8 | HART | <https://qrgo.page.link/ooEsJ> |