TIMS IMPLEMENTS ALL OF THIS AND MORE

Select your curriculum from the experiment list below.

TIMS DOCUMENTED EXPERIMENTS:

- ❒ Adaptive Delta Modulation
- ❒ AM - Amplitude Modulation
- ❒ Amplifier Overload
- ❒ Armstrong's Phase Modulator
- ❒ ASK - Modulation & Demodulation
- ❒ Baseline Wander and Line Coding
- ❒ BER Instrumentation & measurement
- ❒ Bit Clock Regeneration
- ❒ Block Coding and Decoding
- ❒ Block Coding Gain
- ❒ Block Coding - error correcting
- ❒ BPSK - Introduction
- ❒ BPSK and BER
- ❒ Broadcasting - AM and FM
- ❒ Carrier Acquisition - PLL
- ❒ CDMA - 2 Channel
- ❒ CDMA - Introduction
- ❒ CDMA - Multichannel
- ❒ CDMA - Processing Gain
- ❒ CDMA at Carrier Frequencies
- ❒ Complex Analog Messages
- ❒ Convolutional Coding
- ❒ Costas Loop
- ❒ Delta Demodulation
- ❒ Delta Modulation
- ❒ Delta-sigma Modulation
- ❒ Digital Signal Recovery with the Decision Maker
- ❒ Digital Noise in Baseband & Block Coded Channels
- ❒ DPSK and BER
- ❒ DPSK and Carrier Acquisition
- ❒ DSBSC - Generation & Demodulation
- ❒ DSSS - Spread Spectrum
- ❒ Envelopes and Envelope Detection
- ❒ Equalization for ISI
- ❒ Eye Patterns & BER
- ❒ Fading, Multi-path Channel
- ❒ FDM - Frequency Division Multiplex
- ❒ FHSS: Fast & Slow Hopping
- ❒ FHSS and Bit Error Rate Performance
- ❒ FHSS: Hybrid DSSS/FHSS System
- ❒ Fiber Optic Transmission, Splitting and Combining
- ❒ Fiber Optic - Bidirectional Transmission
- ❒ Fiber Optic - WDM Transmission
- ❒ FM - Demodulation by PLL
- ❒ FM - Demodulation by Zero Crossing Counting
- ❒ FM - Deviation Multiplication
- ❒ FM, Wideband - Generation by VCO
- ❒ FM - Synchronous Demodulation
- ❒ FM and Bessel Zeros
- ❒ Frequency Synthesis with the PLL
- ❒ FSK - Generation & Envelope Demodulation
- NEW ❒ BFSK - coherent signalling & BER
- NEW ❒ BFSK - non-coherent signalling & BER
- ❒ Introduction to DSP
- ❒ GFSK - Gaussian FSK
- ❒ ISB - Independent Sideband
- ❒ ISI: PAM & ASK in band-limited channel
- ❒ Line-Coding & Decoding
- ❒ Matched Filter Detection
- ❒ MSK, OQPSK, π/4-QPSK,π/4-DQPSK
- ❒ Modeling Equations
- ❒ Modem: Binary Data via Voiceband
- ❒ Modem: Multi-Level Data via Voiceband
- ❒ Modem: Data Rates & Voiceband Modems
- ❒ Multi-channel Digital Fiber Link
- ❒ Multi-level QAM & PSK
- NEW ❒ Multi-path - Time-invariant fading channel characteristics
- NEW ❒ Multi-path - ISI rejection in DS SS
- ❒ Noisy Channel
- ❒ Noise Generation - Binary Sequences
- ❒ OFDM Principles - Introduction
- NEW ❒ OFDM, Cyclic Prefix & PAPR
- NEW ❒ OFDM & Channel Equalisation with BER Measurement
- NEW ❒ OFDM in band limited, multipath, time-invariant channel with BER measurements
- NEW ❒ OFDM - IDFT, Complex Exponent & Complex Quad Signals
- ❒ PAM & TDM
- ❒ Parseval's Theorem: Harmonic & Non-harmonic Signals
- ❒ PCM & Bit Clock Regeneration
- ❒ PCM Encoding &Decoding
- ❒ PCM TDM
- ❒ PCM-TDM 'T1' Implementation
- ❒ PDM - Phase Division Multiplex
- ❒ PLL - Phase Lock Loop
- ❒ Power Measurements
- ❒ PPM - Pulse Position Modulation
- ❒ PRBS Messages & Sequence Synchronization
- ❒ Product Demodulation
- ❒ Pulse Shaping - Introduction
- ❒ Pulse shaping for band-limited channels
- ❒ PWM - Pulse Width Modulation
- ❒ Random Variables & AWGN
- NEW ❒ Radar signals:
  - Constant-frequency pulse
  - Linear-frequency modulated pulse
  - Coherent train of LFM pulses
  - Phase-coded pulse
  - Coherent train of identical Unmodulated pulses
  - Stepped-frequency pulse
- ❒ QAM - Generation &Demodulation
- ❒ QAM and 4-PSK
- ❒ QASK - Modulation & Demodulation
- ❒ QPSK - Modulation & Demodulation
- NEW ❒ QPSK - BER of Coherent QPSK in distortionless channel
- ❒ Sampling & Reconstruction
- ❒ Sampling with Sample-&-Hold
- ❒ Signal Analysis: relationship between time and frequency domains
- ❒ Signal Constellations 4/8/16QAM and 4/8/16PSK
- ❒ SNR in AM Demodulated Signals
- ❒ SNR performance of SSB and DSBSC
- ❒ SONET - TDM and Byte Interleave Mux
- ❒ SONET Data Frame
- ❒ SONET transmission via an optical link
- ❒ Spread Spectrum Principles
- ❒ Spread Spectrum: Direct Sequence, Frequency Hop, Time Hop Hybrid FH-DS, FH-CDMA,
- ❒ Speech in Telecommunications
- ❒ SSB Generation and Demodulation
- ❒ SSB Linear Amplifier Measurements
- ❒ Superheterodyne
- ❒ System fault finding
- ❒ TCM - Coding Gain
- ❒ TCM - Trellis Coding
- ❒ TDM
- ❒ Timing jitter in Band Limited Channels
- ❒ UWB - Pulse Shapes & Spectra
- ❒ UWB - with BER
- ❒ UWB - Multiband Modulation
- ❒ UWB - Multiple Access Orthogonal Pulse Modulation with MHP
- ❒ UWB - OOK, PPM, BPM & OPM
- ❒ Wave Analyzer - Spectrum Analysis
- ❒ Weaver's SSB Mod and Demodulator

SIGNALS & SYSTEMS EXPERIMENTS MANUALS:

- ❒ Special Signals - characteristics and applications
- ❒ Modeling Linear and Non-linear Systems
- ❒ Unraveling Convolution
- NEW ❒ Integration, correlation & matched filters
- NEW ❒ Exploring complex numbers and exponentials
- ❒ Comparing Responses in the Time and Frequency Domains
- ❒ A Fourier Series Analyzer
- ❒ Spectrum Analysis of Various Signal Types
- ❒ Poles and Zeros in the Laplace Domain
- ❒ Sampling and Aliasing
- ❒ Analog-Digital Conversion
- ❒ Discrete-Time Filters - Finite Impulse Response
- ❒ Poles and Zeros in the z plane: Discrete-time Filters
- ❒ Discrete-time Filters - Practical

STUDENT PROJECT CAPABILITIES:

- ❒ Building electronic circuits with the **TIMS-820 Wire-wrapping Project Module**
- ❒ Implementing functions in a CPLD with the **TIMS-830 Programmable Digital Project Module**
- ❒ Solderless breadboarding of electronic circuits with the **TIMS-840 Circuit Experimenter**
- ❒ Programming DSP implementation with the **TIMS-DSP-6713 Module**

NOTE: This list is constantly expanding as new modules are released and new experiments are written.