

Emona Lab Products

EMONA × **KSH**®
PRODUCTS

通訊實驗理論 & 教學模式

學校教學

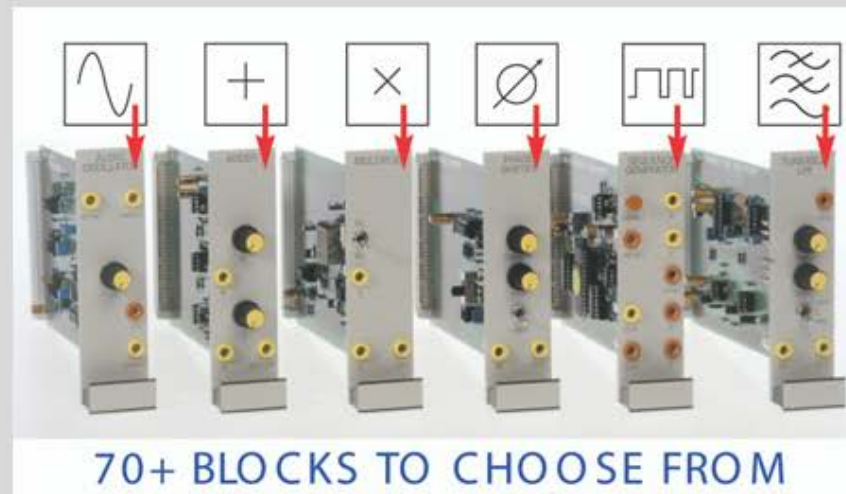
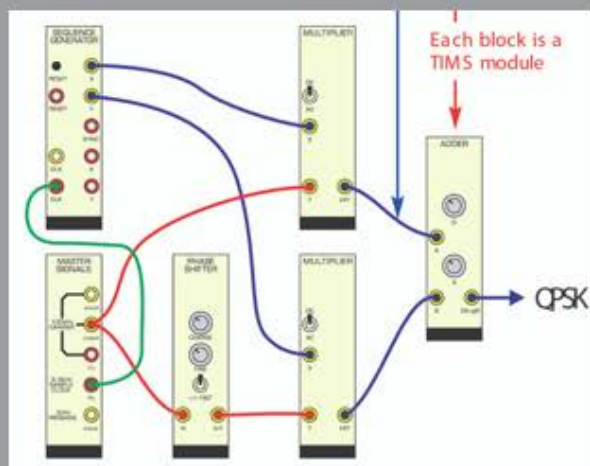
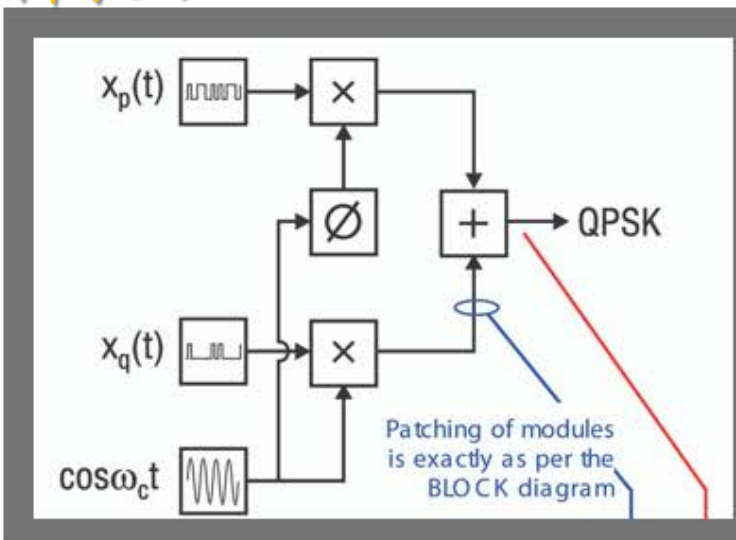
$$x_p(t) \cdot \cos \omega_c t + x_q(t) \cdot \sin \omega_c t = \text{QPSK}$$

where $x_p(t)$ and $x_q(t)$ are elements of a digital sequence.

由 **數學** 或 **理論** 開始學習

因為所有的通訊基礎都是
透過方程式及理論證明的

創新教學



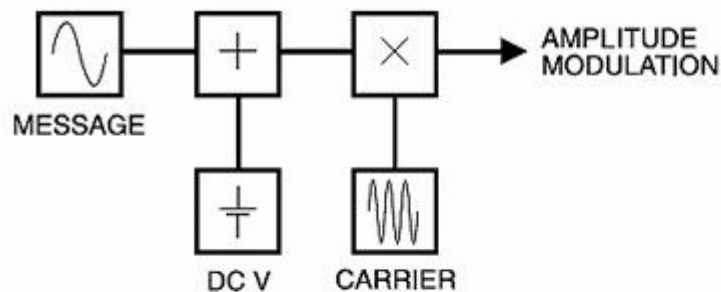
1. 先用〈圖框〉來表示數學

2. 再用〈連接線〉完成連線

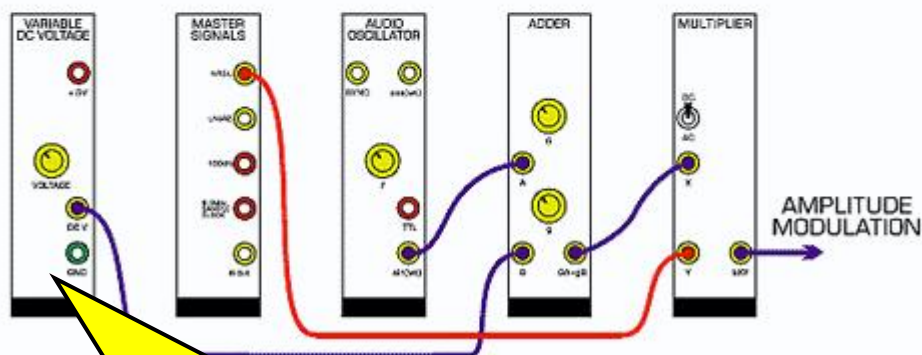
3. 最後驗證理論

超過70片的實驗模組可以使用

使用「圖框」的方法來建立及完成實驗



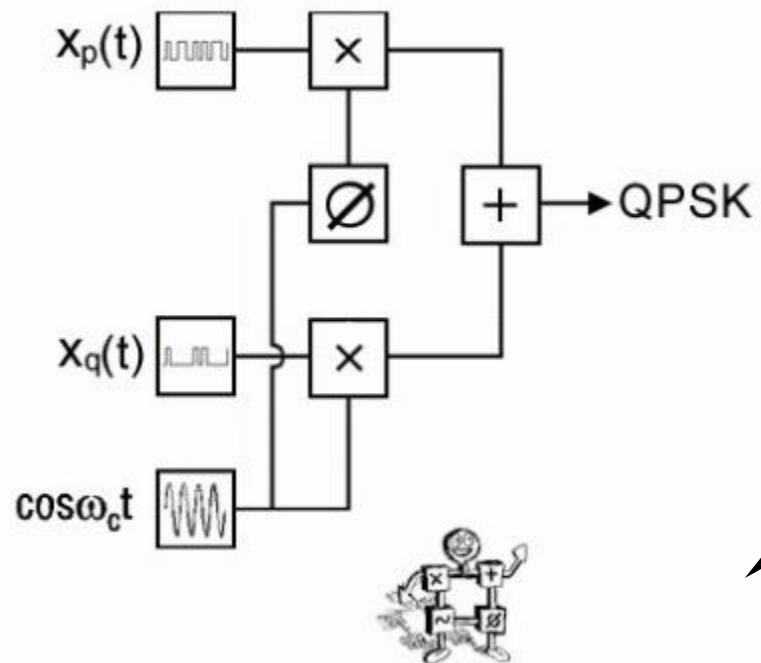
先用〈圖框〉
1 來 表示數學



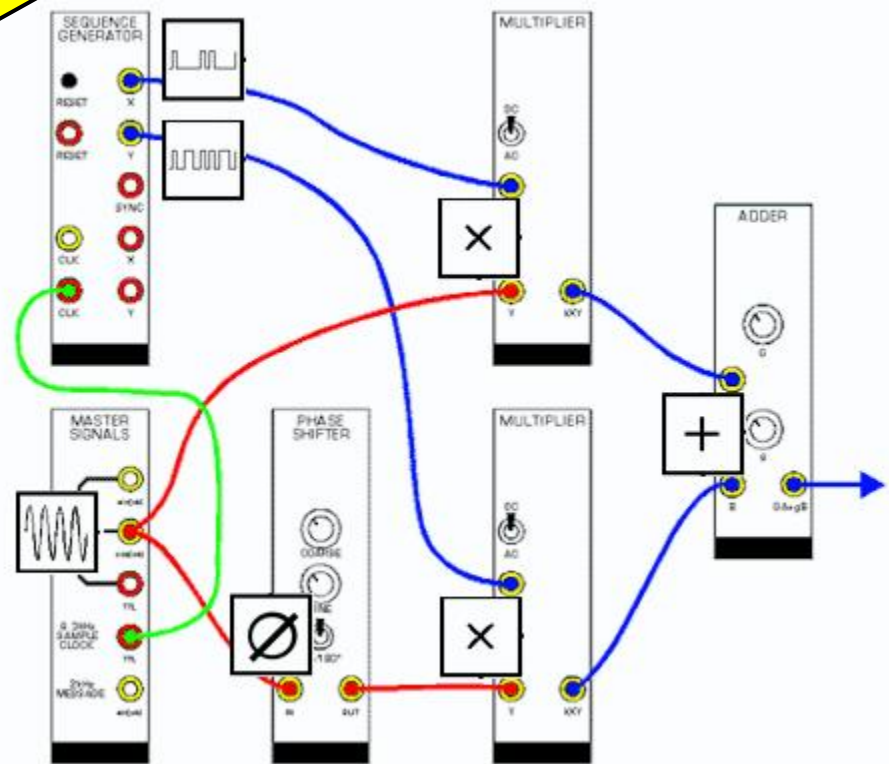
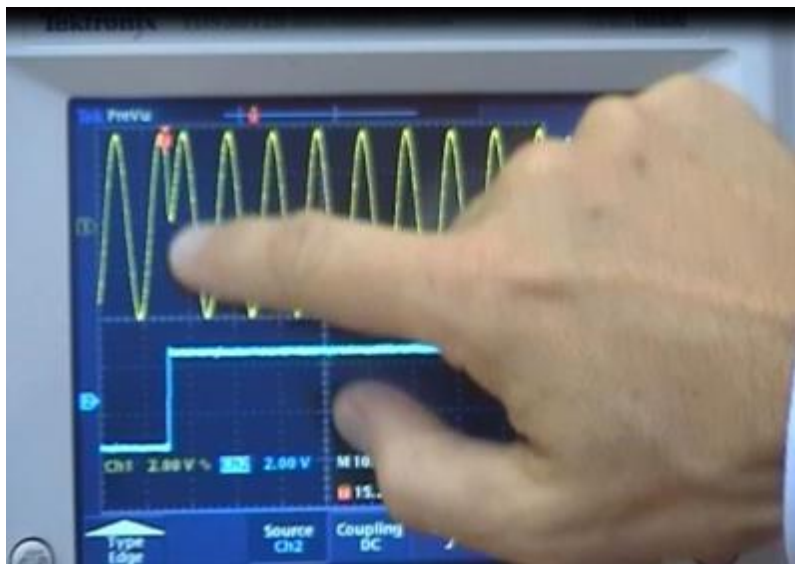
每個〈圖框〉
2 表達 一個等效電路(模組)

再用連接線
3 完成 數學公式





**4 進行實驗訊號
測量 & 驗證**

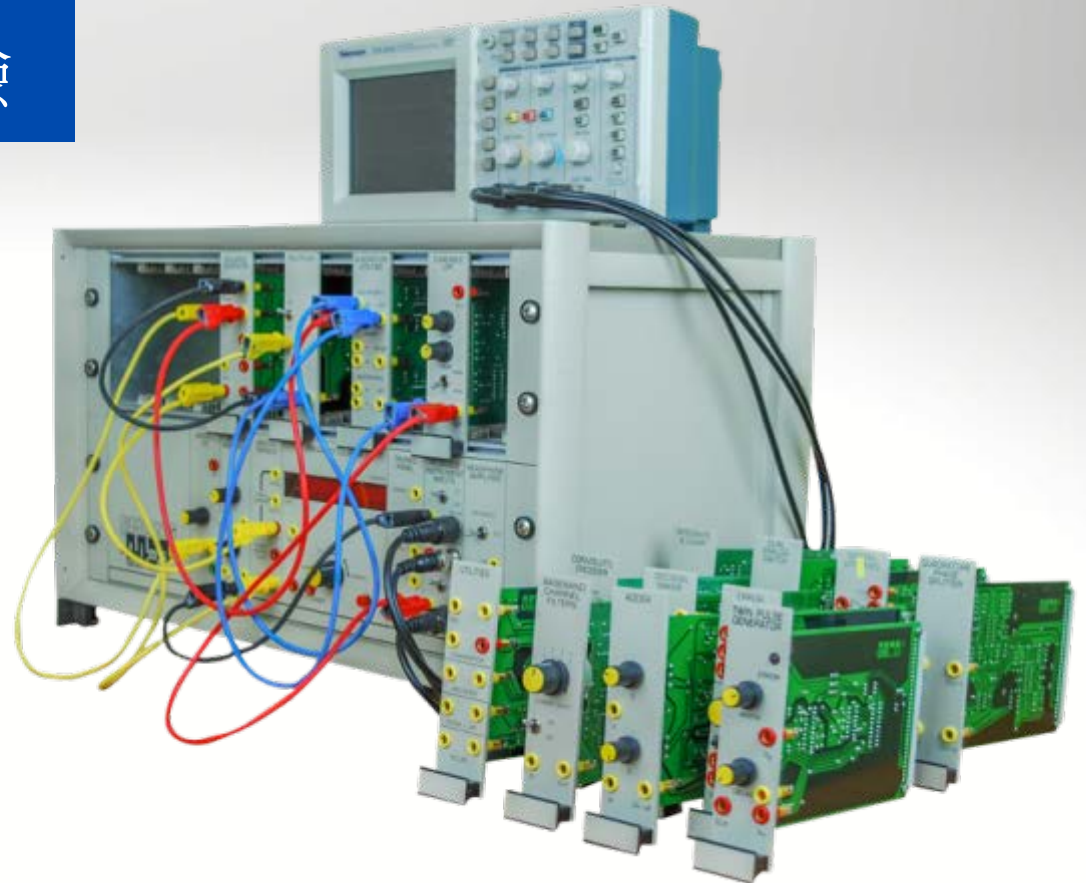


TIMS-300 SERIES

先進通訊系統實驗器

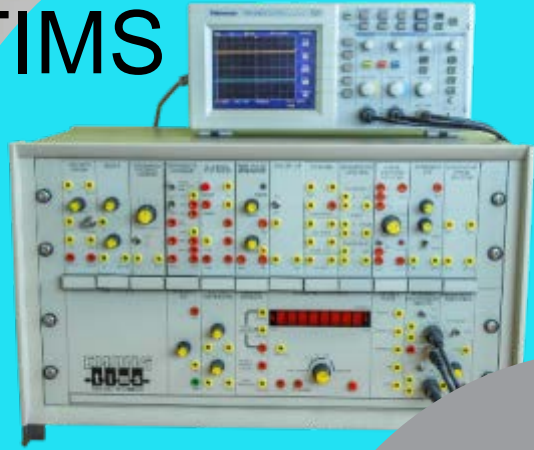
透過主機操作許多通訊實驗

- 使用模組化學習
- 無限增加模組實驗
- 學習最新技術
- 學生動手做實驗
- 實踐 & 學習

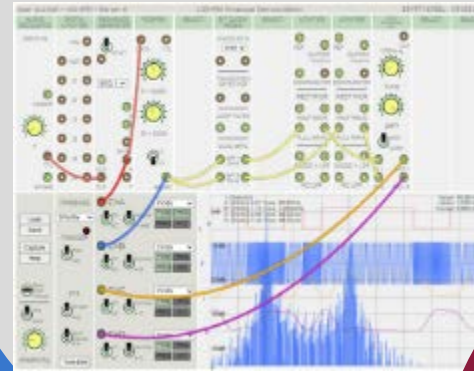


通訊產品系列

TIMS



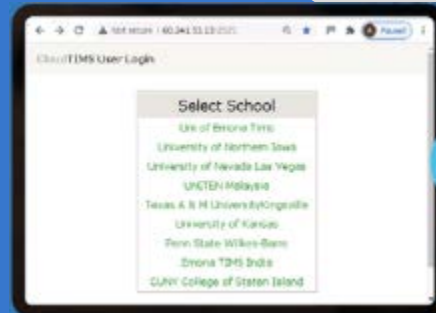
TUTORTIMS
CLOUD



ETT-101C



NETCIRCUITLABS



CLOUD
TIMS

遠距
實驗室



NETTIMS-FREEWIRE

What is TIMS –

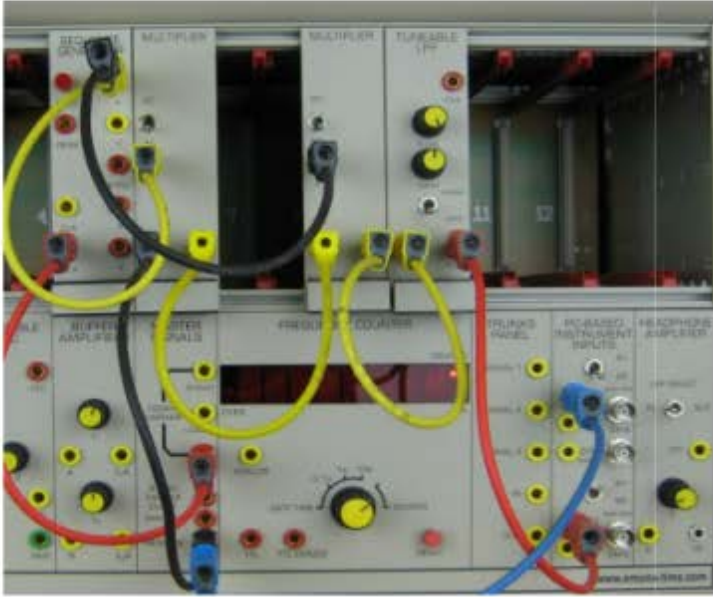
鼓勵學生動手做實驗的教學設備
用於通訊系統實驗:

- + 訊號與系統
- + 傳輸理論、調變、編碼與 SDR
- + 4G、5G 和無線調變
- + 學生設計模組 (專題實驗)

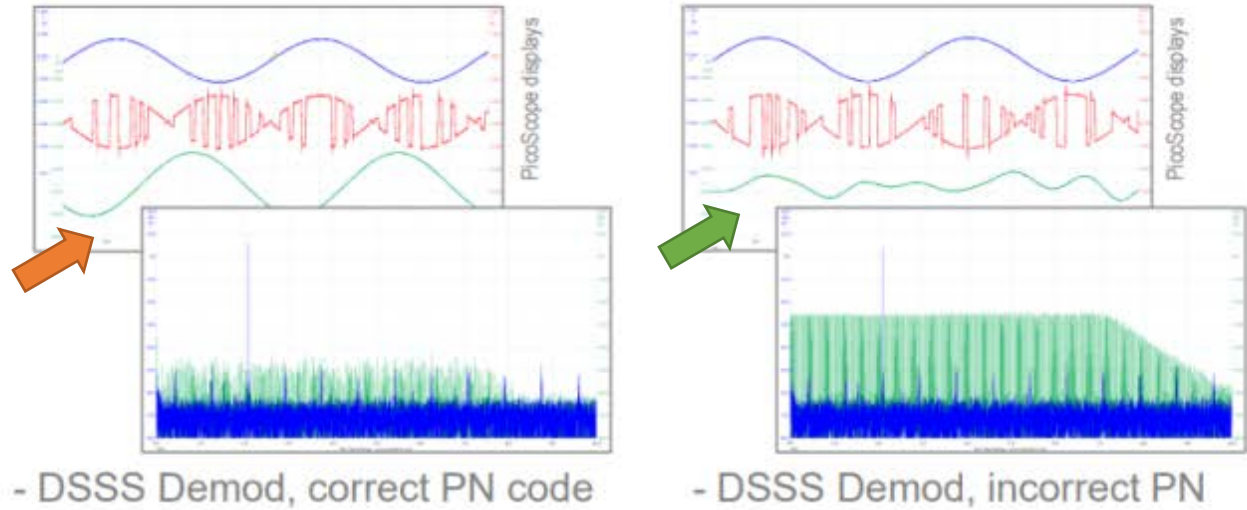
What it does –

是一個即時的工程建模系統，就像通訊理論的樂高
可以讓學生看到:

- + 真實訊號
- + 真實頻譜
- + 眼圖、星座圖、編碼增益、SNR、BER
- + 還有更多



e.g. Direct Sequence Spread Spectrum:



TIMS 提供可使用的實驗手冊

4,000 + 頁 及 15 + 冊的實驗記錄 (陸續增加)

LabSheet Experiments

- + 簡潔、單頁實驗
- + 快速入門，展示如何使用 TIMS 進行操作

主題式實驗

Student Text Experiments

- + 14 冊詳細的實驗
- + 可供教授編輯和定制

學生上課實驗

Explorative Experiments

- + 專為學生研究理論設計

探索式實驗

TIMS 實驗項目

超過 200 多個實驗項目

SIGNALS & SYSTEMS

- 13 Labs covering topics such as
- + Signal characteristics & linearity
 - + Convolution and Fourier
 - + Laplace domain structures
 - + FIR / IIR filter structures

ANALOG MODULATION

- Tens of labs covering topics incl.:
- + AM / FM / PM / SSB / ISB
 - + Product and Envelope demod.
 - + PLL and more

DIGITAL MODULATION

- + **Tens** of labs covering almost **any Digital modulation** scheme.
eg. from BPSK to MSK to UWB and more
- + Multiple labs covering block, convolutional, TCM, turbo coding.
- + PCM, Line Codes, Eye Diagrams
- + SNR, BER, Coding Gain

4G / 5G and WIRELESS

- + Spread Spectrum **NEW**
DSSS/CDMA/FHSS/THSS/Hybrid
- + Basic OFDM principles (no DSP)
- + OFDM with DSP and sub-carrier
Visualiser Software Vector
Display and BER

FIBER OPTICS

- + Transmit analog & digital signals
- + Splitting, mixing, WDM, full-duplex

STUDENT PROJECTS

- + Build electronic circuits, or FPGA
or DSP, wire-wrap, or breadboard

SDR (software defined radio)

- + A complete SDR **NEW**
environment for education
- + No downloads or installations:
fast, Plug-and-Play solution
- + Full LINUX and GNURadio
- + Insightful and engaging expt's

經濟型 高效率 緊湊型

一台主機可以完成 70+ 實驗項目



透過 ETT-101 可以完成哪些實驗？

- 基礎的類比通訊實驗

AM, FM, DSB, SSB, PM, PAM, TDM, PDM, PWM, Superheterodyne, Speech in Comm's, PLL, QAM, SNR Concepts and more

- 數位通訊實驗

Sampling, PCM, PCM-TDM, ASK, BPSK, FSK, GFSK, Eye Patterns, QPSK, Delta Modulation, Delta-Sigma Modulation, Spread Spectrum, Line Coding, Noise Generation, SNR Concepts and more

訓練核心技能

- 思考技能

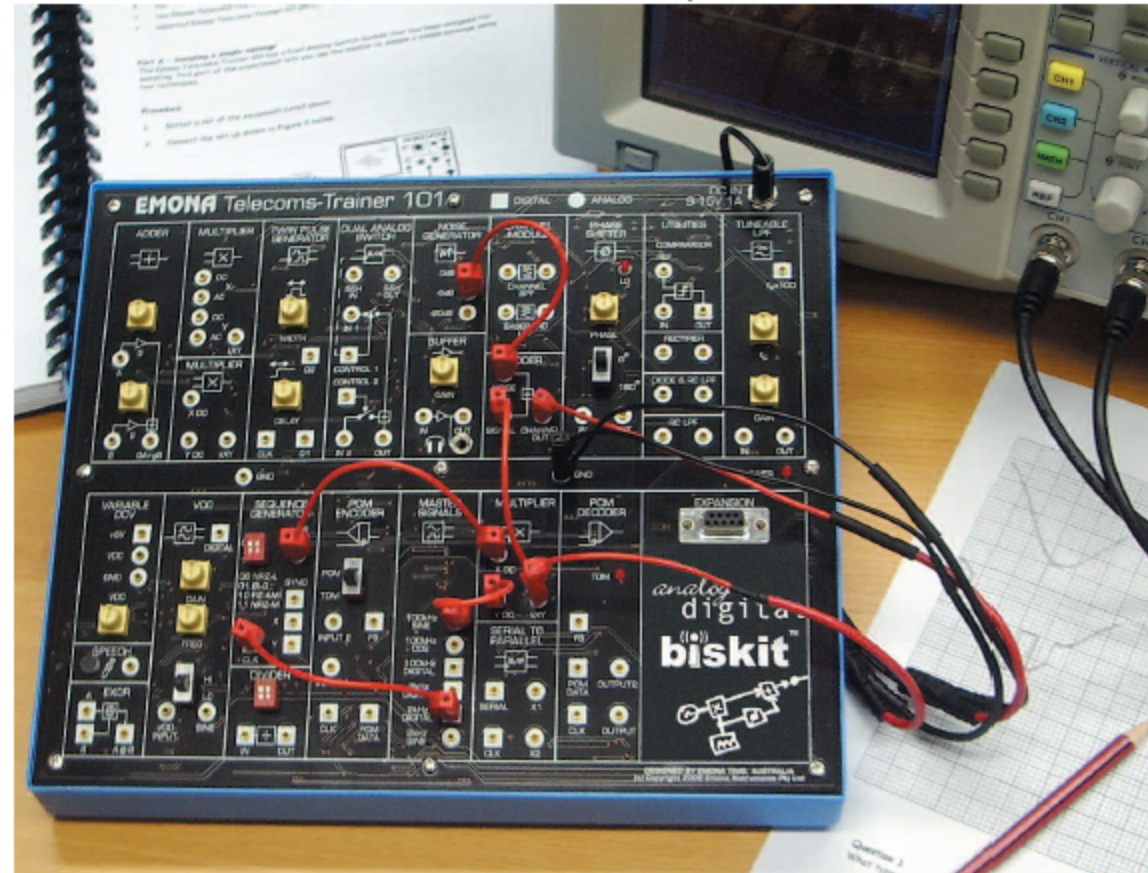
Problem solving activities, evaluating evidence, interpreting instructions, analysing evidence and drawing conclusions.

- 科學技能

Measurement, experimental procedure, system building, electricity and waveforms.

- 數學技能

Mathematical operators, equations, trigonometric functions, continuous and sampled functions, charts and graphs, positive and negative values.





TutorTIMS CLOUD

模擬軟體

專為實驗室教學設計

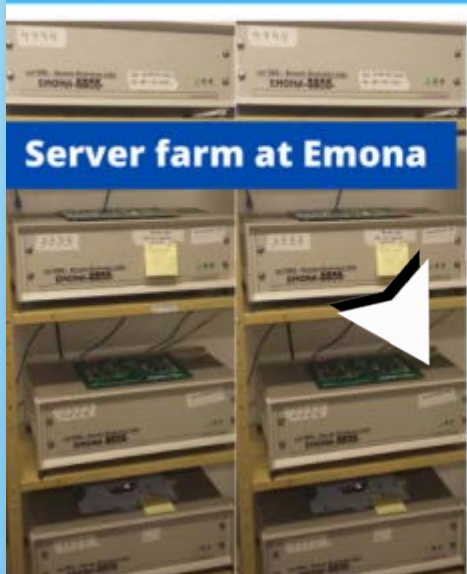
EMONA
REMOTE
LABS

線上學習
是前進的方向

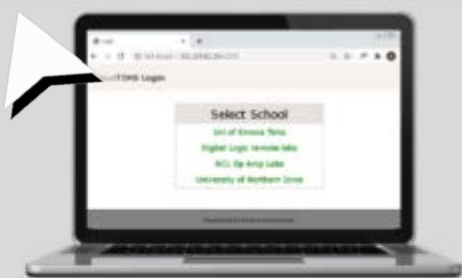




CloudTIMS



Server farm at Emona



Single portal access for professors & students from anywhere remotely



HARDWARE-AS-A-SERVICE

它們是從遠端 **硬體實驗**
控制真實的

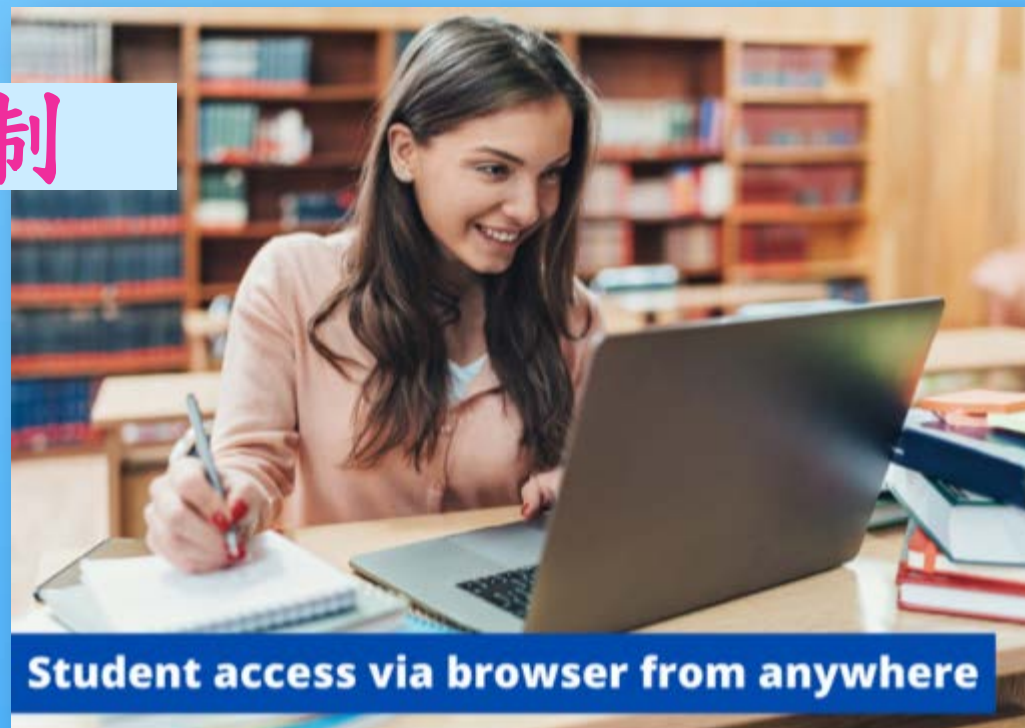
ONE-TO-MANY

訂閱服務制

遠端實驗室提供

替代 和 **增強** 傳統硬體實驗室

NOT SIMULATIONS!



Student access via browser from anywhere

MANY STUDENT PER UNIT AT A DISTANCE

Thank
you



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