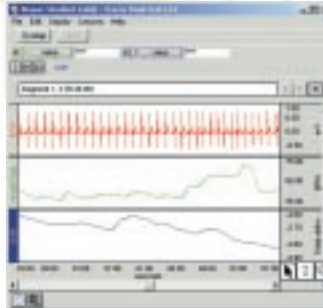


psychophysiology & neurophysiology

Present a wide array of psychophysiology experimental techniques with the BSL System. Lessons guide students through recording and analysis modalities to provide building blocks that empower students to perform increasingly advanced studies. Acquire signals for ECG, EDA (GSR), EEG, EMG, EOG and EGG. Combine physiological data with trigger information time-synced with advanced stimulus presentation paradigms. Record noninvasive cardiac output and blood pressure while students perform tasks or respond to a presentation.

Autonomic Nervous System

Use the BSL system to record changes in the parasympathetic and sympathetic nervous system activity. Acquire a wide variety of ANS-related signals such as EDA (GSR), skin temperature, ECG, pulse, respiration, airflow, nerve conduction, continuous blood pressure, and continuous noninvasive cardiac output (bioimpedance method). Simultaneous graphing shows heart rate, electrodermal activity (GSR) and respiration rates. After the experiment, evaluate the data using the powerful and user-friendly analysis functions.



Electrodermal activity (GSR) from Lesson 14

Event Related Potentials

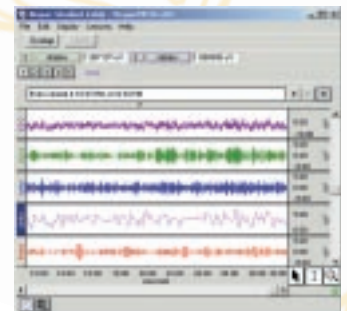
Combine the BSL with a visual presentation system such as SuperLab to explore a wide variety of experiments like Stroop, Oddball, Habituation, and Startle Response. SuperLab is user-friendly and greatly simplifies development of a range of visual and auditory presentations. As each stimulus is presented, SuperLab sends a digital pulse to the BSL System to mark the onset of the stimulus. The stimuli are classified into different groups with each group assigned a unique digital channel. The BSL software will identify the digital pulse and automatically measure the associated response, and provide the average or perform measurements on each response in the stimulus classification.



Facial EMG electrodes

Evoked Response

Lessons guide students through evoked response recordings. Use the system to trigger a stimulus and derive the average response. Use with headphones, stroboscope, or electrical or mechanical stimulation for auditory, visual or somatosensory response.



EEG filtered from Lesson 3

features

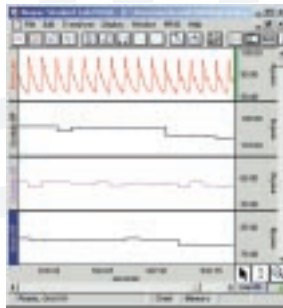
- 28 lessons targeted for Psychophys. & Neurophys.
- ECG, EEG, EMG, EOG & EGG
- Autonomic Nervous System
- Auditory & Visual Evoked Response
- Event Related Potential
- Startle Eye Blink Experiments
- Nerve Conduction
- Habituation
- Stroop
- Sensory Motor Learning
- Electrodermal Activity (GSR)
- Heart Rate Variability
- Visual Presentation System (SuperLab & E-Prime)
- Cardiac Output (via bioimpedance)
- Pre-ejection Period (PEP)
- Automatic Continuous Noninvasive Blood Pressure

Suitable for inquiry-based, active learning in 2-yr. & 4-yr. programs, medical schools, and nursing programs.

Powerful set-up and analysis tools make the BSL ideal for graduate level studies and personal research.

EEG

Introductory lessons allow students to record EEG and look at the differences between Alpha, Beta, Delta and Theta activity levels. Students can record EEG from both hemispheres while listening to music, reading and performing mental tasks. The software guides them through the recording and then shows them how to analyze the frequency components of the signal. The Fast Fourier Transformation is used to show the frequency levels of the activity on each hemisphere.



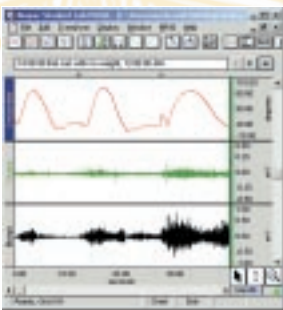
Noninvasive blood pressure data

Cardiovascular

Students can record the changes in pre-ejection period and cardiac output relative to a variety of different stimuli. The new noninvasive Cardiac Output Sensor greatly simplifies previously complex procedures to allow students to record stroke volume and cardiac output. Combine these signals with ECG and blood pressure to demonstrate cardiovascular regulation by the Autonomic Nervous System. The system can also perform detailed Heart Rate Variability tests and Averaged ECG recordings.

Muscular

Students can measure EMG and Integrated EMG, including force and angle of limb movement. They can listen to the sound of the electrical activity coming from the muscle as they squeeze a hand dynamometer and equate changes in sound form and intensity with changes in force. Add the BSL Stimulator and human-safe stimulation electrode for a variety of muscle stimulation experiments. Use the Tri-Axial Accelerometer to examine movement of limbs, head and torso in three-dimensional space. Couple the resultant acceleration, velocity and distance data with EMG recordings to obtain a comprehensive picture of skeletal muscle performance.



EMG data: Goniometer, Triceps, Biceps

EOG

Students can record horizontal and vertical eye movements while observing fixation and tracking. The XY display mode will plot horizontal vs. vertical eye movement to track eye position relative to an image or object. By using the zoom and measurement tools, students can measure duration of saccades and fixation. A simple light fixture becomes an excellent tool for measuring angular displacement.



EDA mirror test (Lesson H11)

Nerve Conduction

Combine the human-safe stimulating electrode with the stimulator to record nerve conduction experiments. Stimulate the ulnar nerve at three different points and record nerve conduction time. Measure the distance between the stimulation and recording points and then calculate the velocity of signal propagation along the nerve (motor response). Use the Finger Twitch transducer coupled with nerve stimulation to examine the relationship between applied (external) nerve stimulation and associated motor recruitment.

The following hardware suggestions will enable you to perform a wide variety of applications targeted for **psychophysiology & neurophysiology**. Use BIOPAC lessons or easily create your own experiments with the BSL *PRO* software included with each system. Order the core package or select items à la carte.

See **BSL Hardware** (page 23) for all available transducers, electrodes and accessories.

Psychophysiology Core

BSLPSY-W (Win) or BSLPSY-M (Mac)

Basic BSL System	BSLBSC, p. 8
BP Cuff Transducer	SS19L, p. 27
Colored Paper (for BSL9)	PAPER1
EDA (GSR) Lead	SS57L, p. 26
EDA (Isotonic) Electrodes (100/pk)	EL507, p. 37
Electronic Stethoscope Transducer	SS30L, p. 28
Hand Switch	SS10L, p. 26
Headphones	OUT1, p. 26
Pulse Transducer	SS4LA, p. 26
Respiratory Effort Transducer	SS5LB, p. 26

Perform 28 or more lessons with this core package:

Muscular

BSL1	Standard & Integrated EMG
H07	EMG Contractions - Active Learning
H27	Facial EMG
H34	EGG Electrogastrogram
H36	Muscular Biofeedback

Cardiovascular

BSL5	Components of the ECG (Lead II)
BSL6	Leads I, II, III & Einthoven's Law
BSL7	ECG & Pulse
BSL16	Blood Pressure & Korotkoff Sounds
BSL17	Heart Sounds & Cardiac Events
H08	Dive Reflex - Active Learning
H23	Signal Averaged ECG
H32	Heart Rate Variability

Neurophysiology

BSL3	EEG Relaxation & Brain Rhythms
BSL4	Alpha Rhythms in the Occipital Lobe
BSL9	GSR and Polygraph
BSL10	EOG Eye Movement, Saccades & Fixation
BSL11	Reaction Time
BSL14	Biofeedback: Relaxation & Arousal
H10	EEG & Hemispheric Asymmetry
H11	Mirror Test—EDA Sensory motor learning
H12	EOG Saccades & Displacement
H13	EOG Visual Tracking vs. Imagination
H14	Ocular Fixation while reading
H15	Ocular Fixation while viewing an image
H16	Reflexes & Reaction Time - Active Learning
H24	Habituation

Biomedical Engineering

H02	Compartmental Modeling
H20	BME Filtering
H33	FFT Fast Fourier Transform

See page 43-45 for a description of all available lessons.

Increase your lab options with...

Cardiac Output Sensor	SS31L, p. 29
Noninvasive Blood Pressure Monitor	NIBP100A, p. 32
Psych. Variable Assessment Trans.	SS43L, p. 30
Stimulator	BSLSTM, p. 25
SuperLab Package	STP35, p. 32
Finger Twitch Transducer	SS61L, p. 30
Stim. Electrode for Humans	HSTM01, p. 32
Transducer Accessory Pack	BSLPSY-TA, p. 42