

# Psychometric Structured Course

## **Beginner's Course (3 Days)**

### **1. Day 1 - Item Development**

Topics included:

- **Determining the Test Plan**  
A clearly defined purpose is key to a successful testing program. This session will examine methodologies used in the development of a test plan which puts into operation the testing purpose.
- **Assessing Cognitive Ability**  
This session examines the different types of cognitive ability that are assessed in a knowledge-based test. Practical applications of Bloom's Cognitive Taxonomy will be introduced.
- **Constructing Multiple-Choice Items**  
The multiple-choice item has been described as the 'workhorse' of testing. This session will discuss guidelines for the effective and efficient use of this item type and provide practical hands-on exercises for writing items.

### **2. Day 2 - Measurement Theory & Practical Applications of Measurement**

Topics included:

- **Validity**  
This session will discuss what validity is and how to evaluate it.
- **Classical Test Theory**  
Attendees will be introduced to the basic concepts of classical test theory and the types of analysis used to assess test and item performance.
- **Reliability**  
This session discusses the concept of reliability, how it's estimated and what it means to your testing program. A discussion of the different types of testing error will be included.
- **Classical Item Analysis**  
Continuing on from the previous sessions, the concepts of item difficulty and item discrimination will be discussed in more detail. A hands-on exercise in how to use item statistics in the evaluation of item performance will be included.
- **Trialling**  
This session will discuss the importance of trialling items and options for how the trialling can be performed.
- **Test Scaling & Equating**  
Building equivalent test forms (or papers) is essential to ensuring fairness to candidates. This session will discuss the concepts of test scaling and equating which are fundamental to providing a fair testing experience to all candidates.
- **Standard Setting**  
The goal of certification and licensure examinations is to discriminate between competent and incompetent candidates. The setting of a passing standard is key to the achievement of this goal. This session discusses 'best-practice' techniques for establishing a passing standard.

### **3. Day 3 - Implementing a Computer-Based Testing Programme**

Topics included:

- **The Impact of Technology on Testing Standards**  
This session provides an introduction to how computerisation has influenced and enhanced test development and delivery.
- **Converting from Paper- to Computer-Based Tests**

The keys to a successful conversion from pencil-and-paper to computer-based testing will be presented. Case studies will be used to engage attendees in determining solutions to common issues faced by testing programs during the conversion process.

- **Practical Considerations in Computer-Based Testing**  
This session discusses practical issues that need to be considered prior to and during the conversion including determining appropriate testing windows for the testing program and issues related to item exposure.
- **Item Banking**  
The use of computerised item banking tools will be discussed including the design of the item database to ensure it meets the needs of the testing programme.
- **Adaptive Testing**  
Computer-adaptive testing is a form of testing that adapts to the test-taker's ability level. This session provides an introduction to the concept of adaptive testing and discusses factors to consider when determining whether it's appropriate.

## **Advanced Course (3 Days)**

### **1. Day 1 - Item Development - Advanced**

Topics included:

- **Developing Item Sets**  
Item sets are case studies with a series of related items. This session will discuss the use of item sets and provide practical guidelines for developing item sets. Attendees will have the opportunity to practice writing item sets.
- **Innovative Item Types**  
How does a testing program determine if multiple-choice items will not meet its need? And if not, what other options are there? The focus of this session is alternatives to multiple-choice testing and factors to consider in using innovative item types. A demonstration of item types developed for computer-based delivery will be included.
- **Item Development Guidelines for Non Multiple-Choice Selected Response Items**  
Multiple-choice is not the only option for selected-response items. This session will focus on development, scoring and delivery considerations for the use of other types of selected-response items.
- **Item Development Guidelines for Constructed Response Items**  
Constructed response items are those which require test-takers to generate their own answers. This session will focus on development, scoring and delivery considerations for the use of these types of items. A hands-on experience in constructing and evaluating constructed response items will be included.

### **2. Day 2 - Measurement Theory - Advanced**

Topics included:

- **Measurement models: Classical vs Item Response Theory (IRT)**  
Building on the concepts of Classical Test Theory from the Beginner's Course, this session will introduce Item Response Theory and contrast it with Classical Test Theory. Advantages and disadvantages in the applications of both theories will be presented.
- **IRT - Rasch model**  
There are three models that are used to perform IRT-based data analysis: one parameter (Rasch), two parameter (2-PL) and three parameter (3-PL), based upon the number of item parameters used in the analysis. This

session will discuss the Rasch model. It will provide practical information for non-statisticians on application of this model in a testing program.

- IRT - 2- and 3-PL models  
This session is a continuation of the previous session focussing on the two- and three-parameter models.

### **3. Day 3 - Implementing a Testing Programme – Additional Considerations**

Topics included:

- Test Design Options - Linear, LOTF, Adaptive  
In a computer-based testing environment, there are three options for test design and delivery: Linear (forms-based), LOTF (Linear-on-the-fly using an item pool), and adaptive. This session will build upon the concepts discussed in previous sessions (measurement theory, adaptive testing) and provide practice advice on optimal test design for testing programs.
- Test Fairness: Item Bias & DIF  
Assuring that the test does not gratuitously advantages specific categories of test-takers is important to administering a fair test. This session will discuss statistical analyses used to assess item bias and differential item functioning in a practical, hands-on manner.