# Certificate of Competence in Environmental Noise Measurement (CCENM):

The course follows the prescribed Institute of Acoustics (IOA) syllabus and it additionally addresses some of the differences in legal and procedural matters which arise between the UK and Irish jurisdictions. The core syllabus and course details are addressed below.

## 1. Basic Concepts and Noise Units

Sound pressure and sound power. Pure tones, frequency, the audible range, broadband noise, octave and third-octave frequency analysis of noise.

Sound pressure level, sound power level and the decibel scale. The range of decibel levels and the significance of level changes (3 dB, 10 dB, 20 dB etc) in terms of energy content and loudness.

The procedure for combining and subtracting decibel levels, including background levels. The variation of hearing sensitivity with frequency and the A-weighting scale. Steady and time-varying noise levels: $L_{Aeq}$, SEL and exceedance levels $L_{A10}$, $L_{A90}$ etc.

The effects of noise on people: hearing damage, annoyance, activity interference and sleep disturbance.

## 2. Instrumentation for Environmental Noise Measurement

Types of sound level meters for measurement of steady noise levels (BS EN 60651:1994).

Integrating averaging sound level meters (BS EN 60804:1994) for the measurement of time-varying noise, and environmental noise analysers for $L_{A10}$ and $L_{A90}$ measurements and frequency analysis.

Time weighting (‘Fast’, ‘Slow’, ‘Impulse’ averaging times) and frequency weighting: A-weighting, C-weighting, Z-weighting, ‘Linear’ and Peak level measurement.

Types of microphone and their directionality. Accuracy of Types 1, 2 and 3 instruments. Field and laboratory calibration of sound level meters, including traceability. Electronic noise floor. Electrical interference.

Recording and presentation of time-varying noise levels.

## 3. Noise Indices and Measurement Methodology for Environmental Noise Measurement

Standard methodology for the measurement of transportation, industrial, recreation and construction site noise and non-specific background noise levels, according to BS 7445.

Noise indices and specific measurement methodology, rating and assessment methods for:

- Industrial noise and BS 4142:1997, Method for Rating industrial noise affecting mixed industrial and residential areas.

- PPG 24, “Planning and Noise” (Scottish Office, PAN 56, “Planning and Noise” - Scotland only) for guidance on noise sensitive developments near existing noise sources, and new noise sources near noise sensitive property.

- Road traffic noise — the measurement method in “Calculation of Road Traffic Noise” and the requirements for compensation under the Noise Insulation Regulations.

An elementary introduction to:

- Construction site noise - BS 5228:1994 guidance on prediction and control of noise
- Aircraft noise and railway noise and appropriate sound insulation schemes
- Control of noise at surface mineral workings, Planning guidance MPG 11 (Pan 50 Annex: A Scotland only)
- Noise from leisure activities and associated codes of practice
- Irish Environmental Protection Agency Guidance for Noise for Scheduled Activities
- ‘Environmental Noise Directive’ and Irish Statutory Instruments.

## 4. Environmental Noise Measurement in Practice

The use of sound level meters in typical practical environmental noise situations. Choice of microphone position. The use of windshields, and the effect of wind and other environmental conditions on measurement accuracy.

The influence of screening and reflecting surfaces. The nature and causes of other uncertainties in measurement. Choice of sampling periods for time-varying signals - averaging of $L_{Aeq}$ and the use of $L_{A10}$, $L_{A90}$ etc.

Limitations on accuracy and tolerance limits associated with sampling.

Data interpretation and report preparation.

Comprehension of noise issues in environmental assessments and consultant’s reports.

## 5. Basic Understanding of Noise Propagation and Control

The effects of distance, reflection, air absorption, ground absorption, wind and temperature gradients (ISO 9613). Attenuation by barriers, earth banks, vegetation. Propagation from point, line and planar noise sources.

Consideration of noise reduction at source and standard noise control techniques (enclosures, barriers, use of absorption, insulation and isolation). The source-path-receiver model.

Planning to control external noise, for dwellings (BRE report BR238 ‘Sound Control for Homes’, and BS 8233 :1999 ‘Sound insulation and noise reduction for buildings — Code of practice.

## 6. Final Revision/Tutorial.

Practical Tutorial on Miscellaneous Topics and, Guidance on Exam Format.

## 7. Written Examination/Practical Test and Report Preparation

The practical test will include an objective measurement of an environmental noise source to demonstrate the use of suitable instrumentation and assessment of the noise using an appropriate measurement methodology. Acquired data will then be presented in a written report of no more than 3 sides. The report must be laid out to include the following: date/time, description of noise source, subjective response, purpose of report, prevailing environmental conditions, instrumentation used and calibration, measurement location and proximity to noise source, measurement procedure, results, interpretation of results and conclusions.

**Certificate of Competence in Environmental Noise Measurement (CCENM) - Draft Timetable.**

| Subject/Topic | Draft Schedule |
|---|---|
| Basic Concepts and Noise Units | Day 1: 09:00 – 13:00. |
| Instrumentation for Environmental Noise Measurement | Day 1: 14:00 – 17:00. |
| Noise Indices and Measurement Methodology for Environmental Noise Measurement | Day 2: 09:00 – 13:00 |

**Draft Timetable (continued):**

| Subject/Topic | Draft Schedule |
|---|---|
| Environmental Noise Measurement in Practice | Day 2: 14:00 – 17:00<br><br>Day 3: 09:00 – 13:00 |
| Environmental Noise Measurement – Practical Test | Day 3: 14:00 – 17:30 |
| Basic Understanding of Noise Propagation and Control | Day 4: 09:00 – 13:00 |
| Tutorial on Miscellaneous Topics and Guidance on Exam Format | Day 4: 14:00 – 17:00 |
| Final Revision and Exam | Day 5 |

## 8. Instrumentation/Administration:

Delegates are encouraged to bring their own instrumentation to the course and guidance will be given on best practice and on standardized assessment methodology. Any delegates who may not have access to their own instrumentation will be provided with a suitable instrument for the practical elements of the course and for the practical test.

The IOA Certificate course requires each delegate to be successful in the following elements:

1) A two part written examination.
2) Producing a competent report following a practical test or case study appraisal.

The written examination papers take 2.5 hours on the designated examination day.

All successful candidates will be issued with a Certificate of Competence in Environmental Noise Measurement (CCENM).

**Contact:**

The administration and presentation of the courses is primarily dictated by the prescribed examination dates set by the IOA. For further information and details on the course please contact Dermot Moloney or Valerie Caulfield – telephone 00 353 21 4374333 or simply email your query and contact details to info@env.ie.