



Mind, Science & My Health (MSMH) is a private enterprise established by Michelle Aniftos *BCN QEEGD* to advance the scientific study and professional practice of EEG-guided assessment and intervention in mental health, with accountability to relevant authorities and the field of applied neuroscience.



MSMH Q/EEG DIDACTIC by Distance + Practicum

[IQCB](#) accredited course



The Course Presenter, Michelle Aniftos is a Clinical Psychologist, Certified in Neurofeedback (BCIA) and a Diplomate of the QEEG Board International (IQCB). She is the founder, Director and Senior Clinician of Mylne Street Mental Health in Toowoomba, Queensland. Michelle is accredited by the Australian Health Practitioner Regulation Agency as a Supervisor of Provisional, Registered and Clinical Psychologists and is an approved trainer and mentor for Neurofeedback and QEEG certification candidates. Michelle is past Convener of the Australian Neurofeedback & Psychology Interest Group; past President and Fellow of the Applied Neuroscience Society of Australasia; and past Chair of the Biofeedback Certification International Alliance - Australia. *Mind, Science and My Health* (MSMH) is the education and training arm of Michelle's private practice.

Mind, Science & My Health (MSMH) has developed flexible training options toward completion of Quantitative Electroencephalography (QEEG) Didactic Training which is required for those seek preparation toward IQCB Certification in QEEG. This didactic program includes core modules (below) to be studied independently in advance of a **practicum** which is required to complete the didactic training certificate. Each module is accessible via Dropbox and will include self-guided reading, assessment items and online webinars and tutorial sessions with a QEEG-Diplomate and Mentor.

This course aims to provide the knowledge and skills training to enable delegates to independently record QEEG and ERP data to send for analysis (with access to appropriate technology being the responsibility of the course participant). It is expected that successful candidates will learn to complete foundation-level QEEG analyses under supervision of a QEEG-mentor.

Core Modules:

Ethics & Professional Conduct	Basic Neurophysiology & Neuroanatomy
Recording & Editing raw EEG and artifacts	Clinical and Cognitive Aspects
Drug Effects	Montages, Spectral & Topographic Aspects of EEG
Database Analysis	Record EEG & ERPs, artifact, view & display the data
QEEG Analysis & Neurofeedback Application	

Each online module will contain:

- a curriculum document to guide your reading and reflection
- a range of materials for reading and viewing (included recorded webinar for each module)
- a *Compulsory Review Task* to ensure your engagement with the course content
- questions which may be helpful for content review and exam preparation.

NB: To attain the *MSMH Course Certificate*, participants must complete *QEEG practical skills training* and demonstrate competency through completion of Modules 8 & 9, via onsite workshops **or** live-webinar sessions booked with an approved QEEG-D Mentor.

About the International QEEG Certification Board Certification

The **International QEEG Certification Board (IQCB)** was established to certify the competence of individuals in obtaining and interpreting a Quantitative Electro-encephalograph (QEEG). Certification candidates must:

- A. complete a 36-hour IQCB-accredited, didactic training program including practical skills training for EEG recording, artifacting, quantitative analysis and interpretation. The course must adhere to the following *Blueprint (IQCB, 2020)*:
 - I. Recording & Editing raw EEG and artifact detection (2 hours)
 - II. Basic Neurophysiology & Neuroanatomy; (4 hours)
 - III. Medication/Drug effects (2 hours)
 - IV. Database Analysis (4.5 hours)
 - V. Clinical and Cognitive Aspects (6.5 hours)
 - VI. Montages & Spectral and Topographic Aspects of the EEG (3 hours)
 - VII. QEEG Analysis & Neurofeedback Application; (6 hours)
 - VIII. Ethical & Professional Conduct (2 hours)
 - IX. Practicum, including artifact detection (6 hours)
- B. complete a minimum 10 hours with a QEEG-Mentor to establish practical competencies including the review of 5 completed QEEG case studies; and
- C. complete and pass an IQCB examination with a score of 70% or higher, addressing the following areas (*percent of questions, to be examined from each module, is indicated in brackets.*)
 1. Editing raw EEG and artifact detection (21%)
 - a. Physiologic
 - b. Extra-physiologic
 - c. Movements in the environment
 2. Drug Effects (14%)
 - Understand the effects of various drugs on the EEG/QEEG data.
 3. Database Analysis (19%)
 - a. Know the best subject inclusion and exclusion criteria for building a database
 - b. Understand fundamental statistical consideration within databases
 - c. Have knowledge about t-tests, alpha and P levels, correlational relationships, z-scores
 4. Clinical and Cognitive Aspects (27%)
 - a. Understand developmental changes in the EEG
 - b. Understand the origins of the EEG
 - c. Know what EEG signatures should be referred out to other professionals
 - d. Be knowledgeable about Brodmann area functions and network connections
 - e. Have an understanding of LORETA interpretation and training
 - f. Be knowledgeable about general cognitive and clinical changes that take effect after neurofeedback training based upon publications.
 - g. Understand how clinical presentation may affect the EEG.
 5. Montages and Spectral and Topographic Aspects of the EEG (17%)
 - a. Have a working knowledge of the montages, transforms and power displays along with the specific perspectives they can provide a reader of QEEG output.
 - b. Understand what defines the various montages and the circumstances of their use.
 - c. Understand sources in the brain from which various frequency bands normally emanate.
 - d. Understand phase and coherence, how they relate and what they can mean in the interpretation of the QEEG.
 6. Applications of QEEG in Neurofeedback and Connectivity questions (2%)

About the IQCB CERTIFICATION PROCESS

N.B.: Please visit the IQCB website to review the current details of the certification process - <https://qeegcertificationboard.org/certification-process/>

For Board Certification, candidates must:

- 1] meet minimum qualifications
 - degree in an acceptable health care field (required for Diplomate status)
 - be credentialed for practice in a health care field OR work under supervision of a credentialed provider (for Technician status)
- 2] apply for online accounts access:
 - a. for IQCB at <https://qeegcertificationboard.org/account/log-in/> (this is where you will be given access to the latest exam reading list) and;
 - b. a Certemy profile to track your certification progress <https://iqcb.certemy.com/entry/self-enrollments/QEEG-Candidate/595d6334-756e-4d28-9ded-9a0ef477af71> and **make payments**.
 - c. Go to the **[IQCB Examination step and pay for the exam](#)**, and commit to the IQCB **[Professional Standards and Ethical Principles](#)** by endorsement online.

After completing your application and paying the application fee, you will be assigned a credential path (QEEG-Diplomate or QEEG-Technician) based on your application.

If you have completed these steps, you will receive an email from the IQCB Administrator to confirm your readiness to sit the exam.

3] recruit a Diplomate of the IQCB to complete mentoring. Complete 5 QEEGs with a summary report of each, written by the applicant. The diplomate reviews the 5 QEEGs and summaries to determine that they are technically adequate and provides confirmation and referral of the candidate to the QEEG Board.

4] complete an accredited didactic course adhering to the 36-hour course blueprint.

5] **[register for the exam](#)** and pass certification exam with 70% or higher.

*Although it is recommended that candidates complete their didactic training and mentoring program prior to the exam, you may **[register for the exam](#)** and complete it at any stage of your candidature (i.e., must have completed step 2 above prior to registration and payment for exam.)*

QEEG Certification Reading List – updated February 2021

Required Books:

Collura, T.F. *Technical Foundations of Neurofeedback*. Routledge, 2013. Chapters 1-6

Garey, L.J. (1994). *[Brodmann's Localisation in the Cerebral Cortex: The Principles of Comparative Localization in the Cerebral Cortex Based on Cytoarchitectonics](#)*. A translation of the 1909 original. Springer, London.

Rowan AJ. & Tolunsky E. (2003) *Primer of EEG: with a mini-atlas*, Philadelphia; [Oxford]: Butterworth-Heinemann.

Thatcher, R. (2012). *[Handbook of Quantitative Electroencephalography and EEG Biofeedback: Scientific Foundations and Practical Applications](#)*. AniPublishing, Inc. Chapters 1, 2, 4 and 5 (no charge to QEEGCB candidates).

Required Journal Articles:

- Arns, M, deRidder, S., Strehl, U., Breteler, M & Coenen, A. (2009). [Efficacy of Neurofeedback treatment in ADHD: the effects on inattention, impulsivity and hyperactivity: A meta-analysis](#). *Clinical EEG and Neuroscience*:40(3). 180-189.
- Bao-Juan Li, Karl Friston, Maria Mody, Hua-Ning Wang, Hong-Bing Lu, De-Wen Hu (2018). [A brain network model for depression: From symptom understanding to disease intervention](#). Doi:10.1111/cns.12998
- Coben, R., Ilean Padolsky, PhD (2007). [Assessment-guided neurofeedback for autistic spectrum disorder](#). In Coben, R. & Evans, J. (2011). *Neurofeedback and Neuromodulation Techniques and Applications*. Academic Press of Elsevier, San Diego, CA.
- Delorme, A, Palmer, J, Onton, J, Oosterveld, R, Makeig, S. (2012) [Independent EEG Sources Are Dipolar](#). *PLoSOne 7(2)*: 30135. Doi: 10.1371/journal.pone.0030135
- Dhar, M., Been, P.H., Minderaa, R.B., Althaus, M. (2010). [Reduced interhemispheric coherence in dyslexic adults](#). *Cortex*, 46(6): 794-8
- Duffy, F. H., Shankardass, A., McAnulty, G. B., & Als, H. (2013). [The relationship of Asperger's syndrome to autism: a preliminary EEG coherence study](#). *BMC Medicine*, 11(1), 175. doi: 10.1186/1741-7015-11-175
- Enoch M-A, Shen P-H, Ducci F, Yuan Q, Liu J, White KV, et al. (2008) Common Genetic Origins for EEG, Alcoholism and Anxiety: The Role of *CRH-BP*. *PLoS ONE* 3(10): e3620. <https://doi.org/10.1371/journal.pone.0003620>
- Frank H Duffy and Heidelise Als, [A stable pattern of EEG spectral coherence distinguishes children with autism from neuro-typical controls - a large case control study](#) (2012); 10: 64. doi: 10.1186/1741-7015-10-64 PMID: PMC3391175 PMID: 22730909
- Gunkelman, J., (2012). [Drug exposure and EEG/qEEG findings: A technical guide](#). Brain Science International. Pleasanton, CA.
- Herrmann, CS., & Demiralp, T. (2005). [Human EEG gamma oscillations in neuropsychiatric disorders](#). *Clinical Neurophysiology*:116. 2719–2733.
- Koenig, T., L. Prichep, T. Dierks, D. Hubl, LO. Wahlund, ER., Jelic, JV. (2005). [Decreased EEG synchronization in Alzheimer's disease and mild cognitive impairment](#). *Neurobiology of Aging*:26. 165–171.
- Lutz, A., Greischar, L. L., Rawlings, N. B., Ricard, M., & Davidson, R. J. (2004). [Long-term meditators self-induce high-amplitude gamma synchrony during mental practice](#). *Proceedings of the National Academy of Sciences of the United States of America*, 101(46), 16369-16373. doi: 10.1073/pnas.0407401101
- Machado, C., Estévez, M., Leisman, G., Melillo, R., Rodríguez, R., DeFina, P., . . . Beltrán, C. (2015). [QEEG Spectral and Coherence Assessment of Autistic Children in Three Different Experimental Conditions](#). *Journal of Autism and Developmental Disorders*, 45(2), 406-424. doi: 10.1007/s10803-013-1909-5
- Makeig, S. and Onton, J. (2009) [ERP Features and EEG Dynamics: AN ICA Perspective](#) (An Invited Chapter) Swartz Center for Computational Neuroscience, Institute for Neural Computation, University of California San Diego.
- Matsumoto, H. & Hikosaka, O. (2007). [Lateral habenula as a source of negative reward signals in dopamine neurons](#). *Nature (London)*, 447(7148), 1111–1115. London: Springer Science and Business Media LLC.
- Nuwer, M., (1997) [Assessment of digital EEG, qEEG and EEG brain mapping](#). *Neurology*:49. 277-292
- R.W. Thatcher ✖, D.M. North, C.J. Biver [EEG and NeuroImaging Laboratory, Intelligence and EEG phase reset: A two compartmental model of phase shift and lock](#) Applied Neuroscience Research Institute, St. Petersburg, FL, USA
- Ratcliff-Baird, B. (2002). [ADHD and Stuttering: Similar EEG Profiles Suggest Neurotherapy as an Adjunct to Traditional Speech Therapies](#). *Journal of Neurotherapy*, 5(4), 5-22. doi: 10.1300/J184v05n04_02

- Saletu, B., Anderer, P., & Saletu-Zyhlarz, G. M. (2006). [EEG Topography and Tomography \(LORETA\) in the Classification and Evaluation of the Pharmacodynamics of Psychotropic Drugs](#). *Clinical EEG and Neuroscience*, 37(2), 66-80. doi: 10.1177/155005940603700205
- Salinsky, M. C., Binder, L. M., Oken, B. S., Storzbach, D., Aron, C. R., & Dodrill, C. B. (2002). [Effects of Gabapentin and Carbamazepine on the EEG and Cognition in Healthy Volunteers](#). *Epilepsia*, 43(5), 482-490. doi: doi:10.1046/j.1528-1157.2002.22501.x
- Sherlin, L., Arns, M., Lubar, J. & Sokhadze, E. (2010). [A position paper on neurofeedback for the treatment of ADHD](#). *Journal of Neurotherapy*:14(2). 66-78.
- Solso, S., Xu, R., Proudfoot, J., Hagler, D. J., Campbell, K., Venkatraman, V., . . . Courchesne, E. (2016). [Diffusion Tensor Imaging Provides Evidence of Possible Axonal Overconnectivity in Frontal Lobes in Autism Spectrum Disorder Toddlers](#). *Biological Psychiatry*, 79(8), 676-684. doi: <https://doi.org/10.1016/j.biopsych.2015.06.029>
- Thatcher, R.W., North, DM., Neubrandner, J., Biver, CJ., Cutler, S., DeFina, P. (2009). [Autism and EEG phase reset: Deficient GABA, Mediated inhibition in thalamo-cortical circuits](#). *Developmental Neuropsychology*:34(6). 780–800.
- Thornton, K. (2014). [A QEEG activation methodology which obtains 100% accuracy in the discrimination traumatic brain injured from normal and does the learning disabled show the brain injury pattern?](#) *Neuroregulation*, 1 (3-4), 209-217.
- Thornton, K., (2002), [Electrophysiology \(QEEG\) of effective reading memory: Towards a generator/activation theory of the mind](#). *J. Neurotherapy*:6(3). 37-66
- Thornton, K., Carmody, D. (2013) [The relationship between memory improvement and QEEG changes in three clinical groups as a result or EEG biofeedback treatment](#). *J. Neurotherapy*:17(2), 116-131
- Travis, F., & Lagrosen, Y. (2014). [Creativity and Brain-Functioning in Product Development Engineers: A Canonical Correlation Analysis](#). *Creativity Research Journal*, 26(2), 239-243. doi: 10.1080/10400419.2014.901096
- Vanneste, S., Song, J. & De Ridder, D. [Thalamocortical dysrhythmia detected by machine learning](#). *Nat Commun* 9, 1103 (2018). <https://doi.org/10.1038/s41467-018-02820-0>
- Yigal Agam, Jennifer L Greenberg, Marlisa Isom, Martha J Falkenstein, Eric Jenike, Sabine Wilhelm, Dara S Manoach, (2014). [Aberrant error processing in relation to symptom severity in obsessive-compulsive disorder: A multimodal neuroimaging study](#). PMID: 25057466, PMCID: PMC4096999, DOI: 10.1016/j.nicl.2014.06.002
- Zarei, M., Johansen-Berg, H., Smith, S., Ciccarelli, O., Thompson, A. J., & Matthews, P. M. (2006). [Functional anatomy of interhemispheric cortical connections in the human brain](#). *Journal of Anatomy*, 209(3), 311-320. doi: doi:10.1111/j.1469-7580.2006.00615.x

Additional Recommended Resources:

- Schomer, D.L., & Lopes da Silva, F.H. (2011). *Niedermeyer's electroencephalography: basic principles, clinical applications, and related fields*, Philadelphia : Wolters Kluwer Health/Lippincott Williams & Wilkins
- Marella, Sudhakar. [EEG artifacts \[PowerPoint slides\]](#). Shared with permission of author
- Reich, Jeffrey. [Guidelines for Writing a QEEG Report](#) [PowerPoint presentation]. Shared with permission of author
- [IQCB Hygiene Document](#)
- [qEEG100 Practice Test Software \(OPTIONAL-subscription required\)](#)
- Additional Recommended Readings available at: <https://qee certificationboard.org//wp-content/uploads/Recommended-Reading-List.pdf>

MSMH Didactic Course in QEEG: Core Modules

Q1: Ethical & Professional Conduct

(2hrs self-guided plus webinar & review task)

- IQCB Ethical Principles, Standards & the Law
- Clinical Compliance, & OHS
- Scope of Practice (Competence & Responsibility)
- Client rights, feedback & complaints
- Culture & Diversity
- Confidentiality, Communication, Advertising/PR
- Professional relationships & research
- Record keeping & reports

Q2: Basic Neuroanatomy & Neurophysiology

(4hrs plus webinar & review task)

- Neurophysiology of an individual neuron
- Neuronal synapses & neurotransmitters
- Cellular learning and Hebbian plasticity
- Brain anatomy and its functions
- Three axis of brain functions: cortex-subcortex, left-right, anterior-posterior
- Brodman areas
- Graph theory, networks & connections:
 - functional and structural pathways

Q3. Recording & Editing raw EEG and artifacting

(2hrs plus webinar & review task)

- IFCN Guidelines
- Impedance & Electricity
- Artifacts:
 - Physiologic (EMG, EOG, EKG, etc)
 - Environment (AC noise, acquisition gear/gel; temperature; electrical; etc)
 - Transients (state changes, movement, abnormal morphology, normal variants)
 - Correction methods (PCA & ICA)
 - Definition of Filters
- Recording, editing & artifacting methods
- Case Study

Q4. Clinical and Cognitive Aspects

(6.5hrs plus webinar & review task)

- developmental changes in the EEG
- origins of the EEG
- Definition of QEEG
- Examples of several types of QEEG report
- The basic concepts of statistics for QEEG
- Matching exercise of QEEG with raw EEG
- Concepts for research in QEEG: sample size and effect size; sensitivity and specificity
- Measures for QEEG interpretation: amplitude and magnitude, absolute power and relative power, power ratio, coherence and comodulation, phase, power symmetry, LORETA, mean frequency
- Review previous research: ADHD, Epilepsies, TBI, Autism, AoD dependence, Anxiety, Depression, Dementias

Q5. Medications/Drug Effects

(2hrs self-guided plus webinar & review task)

- Half-life and washout
- Classification of medication and drugs: *Anxiolytics, antidepressants, antipsychotics, antimanics, antiepileptic drugs, stimulants, hallucinogens, opioids, recreational drugs, alcohol, thyroid hormone, other medications, heavy metals, insecticides, methanol and solvents*
- EEG changes associated with meds & drugs: background slower, excess beta, epileptiform, triphasic waves, theta and delta, coma patterns

Q6. Montages, Spectral & Topographic Aspects of the EEG

(3hrs self-guided plus webinar & review task)

- understand montages, transforms, and power displays & the perspectives they provide of QEEG output;
- understand what defines various montages and circumstances guiding montage selection;
- understand frequency sources in the brain; &
- view phase and coherence of frequency bands, how they relate and their interpretation of the QEEG.

Q7. Database Analysis

(4.5hrs self-guided plus webinar & review task)

- Database Conception & History
- Database Gold Standards
- Statistical Considerations
- Inclusion/Exclusion Criteria

Q8. QEEG Practicum (*see essential skills next page*)

(6hrs via workshop or online mentoring)

- Client/Patient Orientation
- Intake & Assessment Design
- QEEG Software/hardware Setup & Application
- Recording, Artifacting, Basic Analysis
- Data Management
- Maintenance, Hygiene & Aseptic Techniques

Q9. QEEG Analysis & Neurofeedback Applications

(6hrs via workshop or online mentoring)

- client background and presentation
- recording, artefacting & analysis (raw, Q & LORETA)
- Protocol design for neuromodulation
- Case Presentations, for example
 - Epileptiform
 - Attention & learning Disorders
 - Mood Disorders
 - Cognitive Decline

All modules require delegates to complete Compulsory Review Tasks to demonstrate engagement and learning.

Practical Skills Training (Modules 8 & 9)

Modules 8 & 9 are available via distance education, onsite group workshops when available **or** individually by live-webinar sessions booked with an approved QEEG-D Mentor.

Q8. Recording Practicum – *Essential Skills* to record EEG & ERPs, artifact, view & display the data (6 hrs)

QEEG Essential Skills:

- Client preparations before the assessment
- Caps/Electrodes & the 10/20 System
- Aseptic Techniques, reducing impedance (prep, gels & pastes)
- Software options: Intro WinEEG
- The EEG Signal & Amplifiers
- Signal Acquisition techniques to reduce artifact
- Recording EEG in various conditions: eyes closed, eyes open, task

Q9. QEEG Analysis & Recommendations – *Essential Skills*

- Observing the raw EEG: Normal EEG, variants, morphology
- Reviewing montages (bipolar and referential)
- Identifying artifacts; procedures for editing & removing artifacts
- Clinically significant raw EEG waveforms (e.g. Mu, spike & wave, SMR, sleep spindles)
- Filtering methods and subjective characteristics of frequency bands
- Spectral analyses: FFT, frequency, amplitude, morphology, power, magnitude
- Source localization (LORETA inverse solution, Laplacian analysis)
- Database Analysis & Reporting QEEG

In addition to didactic training, delegates pursuing IQCB Certification in QEEG must successfully complete the Board Exam and complete a minimum 10 hours of mentoring in [Essential Skills](#) to demonstrate competency to record, clean, interpret and present 5 completed case reports addressing:

1. Client Background
 - a clinical profile of the client including behavioural symptoms
 - referral reason/purpose of assessment
 - what you might expect to find in QEEG.
2. EEG Assessment
 - Professional rapport, reassurance and readiness
 - Procedures and mechanics of conducting assessment
 - observations during assessment (where significant)
 - artifacting & analysis
3. Analysis & Interpretation
 - methods of analysis (include at least two montage views)
 - interpretation of findings relevant to clinical presentation
 - protocol development for neuromodulation (NFB); and
4. Report Preparation with indications for onward referral and/or other intervention.

Preliminary Reading

Arns, M. and E. Gordon (2014). "[Quantitative EEG \(QEEG\) in psychiatry: diagnostic or prognostic use?](#)" Clinical Neurophysiology, **125**(8): 1504-1506.

Hammond, D.C. (2011). "[What is Neurofeedback: An Update.](#)" Journal of Neurotherapy **15**(4): 305-336.

MSMH QEEG DIDACTIC REGISTRATION FORM

1. Personal Details

Surname:	Given names:
Postal address:	
Email:	Mobile:

2. Academic Qualifications

Please indicate your profession and/or demonstrate suitability to participate in this post-graduate professional training in applied neuroscience.

I have completed higher education studies in: _____

I have Professional Registration in the field of: _____

I have attached a copy of my current licence/registration as a healthcare professional.

3. Registration Options

Please register _____ (*First and LAST name*) as a participant in the MSMH QEEG Didactic Course by distance education.

I understand that Modules 1-7 of the course are delivered as an online, self-guided learning materials including readings, recorded tutorials and compulsory review tasks with personalised feedback from a QEEG Mentor.

I understand that to complete Modules 8 & 9, I must access face-to-face online mentoring and/or attend a group workshop when these become available.

I elect to complete the following registration option:

MSMH QEEG Didactic Modules 1-7 Package, \$1400 AUD + GST

OR

Individually Selected Modules as indicated below, AUD ex GST total = \$ _____

1. 3hrs Ethics & Professional Conduct - \$150 [*approved for BCN Recertification Applicants*]
2. Basic Neurophysiology & Neuroanatomy - \$240
3. Editing raw EEG and artifacts - \$150
4. Clinical and Cognitive Aspects - \$380
5. Drug Effects - \$150
6. Montages, Spectral and Topographic Aspects of the EEG - \$190
7. Database Analysis - \$240

Practical Skills Training [choose either ONLINE or WORKSHOP below]

Module 8: Practicum, recording EEG & ERPs, artifacting, montages & displaying the data

Module 9: QEEG Analysis & Neurofeedback Application

Online, individual training with 10 hours supervision, \$1600 AUD + GST

2-day Workshop (when available*), @ \$360/day + GST

**Practical Skills Workshops currently scheduled: please enquire*

Submit your Registration Form to Mind Science and My Health, michelle@msmh.com.au

Your Tax Invoice/Receipt will be dispatched following receipt and approval of your registration.