



MASTER OF SURGERY (NEUROSURGERY)

*Department of Neuroscience
School Of Medical Sciences
Universiti Sains Malaysia
Health Campus
16150 Kubang Kerian
Kelantan*

TRAINING CURRICULUM FOR TRAINEES AND SUPERVISORS
UNIVERSITI SAINS MALAYSIA

**MASTER OF SURGERY (NEUROSURGERY) BY USM
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A) GENERAL CURRICULUM AND OBJECTIVES

INTRODUCTION

This is a 2 + 4 years programme.

The initial 2 years are the prerequisite years and subsequent 4 years are the actual training in neurosurgery years.

Successful candidate would be awarded a degree in Master of Surgery (Neurosurgery) by the Universiti Sains Malaysia (USM), UM, UKM (Doctorate in Neurosurgery).

TWO PREREQUISITE YEARS AND BASIC SURGICAL

Objective:

To gain knowledge and understanding in principles of surgery and neurosurgery.

The trainee must have completed the housemanship years.

The trainee must have completed these two prerequisite years by having:-

- a) 12 months experience in neurosurgery
- b) 6 months experience in general surgery and
- c) 6 months experience in any surgical-intensive care speciality (including general surgery and/or neurosurgery again and/or anaesthesia-intensive care)

Those attachments must be done in hospitals or institutions recognized by the University/Ministry of Health.

FOUR YEARS OF NEUROSURGICAL TRAINING

These are divided into 2 training parts with 3 phases.

- a) Part 1 in neurosurgery (phase 1 – year 1)
- b) Part 2 in neurosurgery (phase 2 – year 2 and 3; and phase 3 – year 4)

Objective:

The aim of this program is to provide the best medical training in Neurosurgery for Malaysia's needs. The candidates would therefore be capable of carrying out responsibility as a Neurosurgeon in providing the best medical care for the patients.

Specific objectives:

1. To ensure a sound knowledge and understanding in basic medical science (physiology, pathophysiology, pharmacology) especially in the field related to Neurosurgery.
2. To ensure a sound knowledge and understanding in General Surgery, Neurology, Neurophysiology, Neuroanatomy, Neuropathology, Neuroradiology, Intensive care and Operative Neurosurgery.
3. Competence in performing neurosurgical procedures.

4. Capable of accurately diagnosing neurosurgical problems.
5. Be able to offer an appropriate and effective management to the neurology patients.
6. Possesses an outstanding leadership qualities and a profound interest in promoting neurosurgical and neurological knowledge.
7. To promote and enhance the understanding of medical ethics. The exposure would emphasize on the understanding of the disease, holistic medical approach and providing the best medical care in accordance with International standard.
8. Thorough understanding of neurological diseases that require an effective care and commendable epidemiological knowledge relating to the disease.
9. To effectively manage all emergency neurosurgical and neurological cases.
10. To master the knowledge of neurosciences and thus keep abreast with current development in neurosurgery and neurology.
11. Acquire the ability of conducting research in neurosurgery.
12. To be a neurosurgeon that is highly competent in providing the necessary emergency care which comprises a prehospital care, in patient management including the rehabilitation aspect.

Assessment in general:

The program would be conducted in 3 major assessment components:

- a) Continuous assessment
- b) Thesis or Publication by research
- c) Theory examination
- d) Clinical examination

B) ENTRANCE CRITERIA

a) *Basic Qualification*

1. The candidate should possess a medical degree (MD, MBBS, MBBCh or equivalent) and registered/recognised with/by Malaysian Medical Council (MMC)
2. The candidate must fulfil the 2 prerequisite years' criteria.
3. Bahasa Malaysia (BM) with Credit in SPM (for Malaysian citizen) – it applies to USM candidate: If did not obtain credit in BM, the candidate must re-sit BM papers prior to graduation
4. Foreign candidates are required to submit result of TOEFL (minimum score of 550) or IELTS (minimum score of 6) with their applications. Foreign candidates are required to attach to the respective university neurosurgical department/unit for 3 to 6 months and have to pass the attachment evaluation before being accepted as master of neurosurgery trainee. Besides, foreign candidates must also have:
 - a) Passed the MedEx with band 4 or above
 - b) temporary registration certificate (TPC) or annual practice certificate (APC)
 - c) those with unrecognised undergraduate degree in Medicine must undergo Malaysia Quality Examination (MQE) before proceeding to year 2 in the actual neurosurgery programme.
5. The candidate must pass with Grade 1 for Sijil Pelajaran Malaysia (SPM) or grade 1/4A (old system) or CGPA of 4 (new system) for Sijil Tinggi Pelajaran Malaysia (STPM) or Good Grade for Matriculation Examination. The foreign candidates must have good grade/score for the equivalent examinations in their own countries
6. Good physical and mental state

b) *MedEx (Medical Specialist Pre-Entrance Examination) and Entrance-VIVA*

1. The candidate must sit for MedEx MCQ examination. About the MCQ Examination: - The candidate should answer all 50 questions in total time of 60 mins (1 hour). There are two formats: single-best or one-true answer (SBA/OTA) format (25 Questions); and True-False (TF) format for another 25 Questions. Minus marking is not applied to this examination.
2. The candidate must attend entrance interview/viva (s)

3. The academic syllabus would cover 'Principles and General Sciences in Neurosurgery' and 'Principles and General Surgery Sciences' for both MedEx MCQ examination and interview/viva (see the syllabus at the [appendix 1](#))
4. MedEx MCQ examination is compulsory to all candidates (KKM, university and foreign candidates).
5. Ranking and/or band 4 or above of MedEx, Entrance-VIVAs and other parameters will finally determine the entry into the programme
6. Those failed to enter the programme in that particular year and/or obtained less than band 4 for the MedEx examination results, suggested to re-sit the examination for the subsequent application year. The intention is to have higher chance of getting into the programme with obvious improvement in the results. Noteworthy: application process follows like before.
7. Those passed the MedEx with band 4 or above, but failed to enter the programme. Candidate must reapply via a standard application process like before, and be likely asked to come for the entrance VIVAs again for the next admission year [unless other factors judged by neurosurgery viva committee prohibiting/delaying him or her to be called for viva (s) again]. Noteworthy, he or she may also re-sit the MCQ examination with intention to improve the results
8. Majlis Peperiksaan Malaysia (MPM) will announce where and when the virtual or non-virtual MedEx MCQ examination will be conducted
9. Vivas for entry into the programme will normally be done twice for MOH (KKM) candidates, and once for the University candidates (i.e. a final viva). For foreign candidate, it is case-by-case basis for entrance interview. Viva one is for general screening to look for some factors (mainly conducted by the KKM). Viva two is a "final Viva" in which some questions in principles of neurosurgery and surgery are going to be asked again to the candidates

Note: Other use of MedEx examination.

- a) Results of MedEx examination obtained by medical officers currently working at non-neurosurgical centre, may be used to support his or her application to be posted in neurosurgical centre throughout Malaysia.
- b) Do take notes that the certificate is valid for 3 years, thus further application for interview to enter the actual neurosurgery programme must be done within that 3 years (i.e. 3 years counting as time after gaining the MedEx-certificate).
- c) Neurosurgery experience for 1 year, 6 months' experience in general surgery and another 6 months in surgical specialty as pre-requisite postings for neurosurgery seems appropriate with that 3 years validity of the MedEx examination certificate.
- d) If needed, he or she can indeed take another MedEx exam prior to entrance interview to obtain better results or band.

- e) Once he or she obtained reasonable good results in MedEx examination, he or she should start soon applying for neurosurgical posting as medical officer in any neurosurgical centre in Malaysia (don't forget to attach the entrance examination results together with change-in-posting application form). This statement meant for those being posted in non-neurosurgical centre, clinic or district hospital but interested to be a neurosurgeon.
- f) Details on MEDEX or Medical Specialist Pre-Entrance Examination should easily be available at web: <https://www.mpm.edu.my/en/medex/background-of-medex>
- g) Syllabus provided here (at the end of the book) and in the website stated above

C) CURRICULUM STRUCTURE

These are divided into 2 training parts with 3 phases ([appendix 6](#) is the syllabus and guideline).

- a) Part 1 in neurosurgery (phase 1)
- b) Part 2 in neurosurgery (phase 2 and 3)

a) Part 1 in Neurosurgery (Phase 1)

Objective:

1. To gain further knowledge and understanding in basic and related neurosurgical sciences or fields.
2. To gain knowledge in neuro-localisation of the pathology
3. To gain capability in accurately diagnosing neuro-related emergency or non-emergency problems.

In order to achieve the objectives, Phase 1 covers the following subjects:

1. Neuroanatomy
2. Neurophysiology
3. Neuropathology
4. Neuropharmacology
5. Neuroradiology
6. Basic Neurosurgery
7. Basic in Neurology
8. Neuro intensive care

Thus, the trainee must have attachment at the following specialty:

1. Neurology for 3 months
2. Neurointensive care for 3 months
3. Neuroradiology and Neuropathology for 2 months (1 month each)
4. Neurosurgery for 4 months

b) Part 2 in Neurosurgery (Phase 2 and 3)

Objective:

1. To gain capability in diagnosing and managing neurosurgical problems.
2. To gain competence in performing neurosurgical procedures.
3. To keep abreast with current development in neurosurgery
4. To promote and enhance the understanding of medical ethics
5. To possess an outstanding leadership qualities and a profound interest in promoting neurosurgical knowledge
6. To gain knowledge in medical-statistics, good-clinical-practice (GCP), ethics and, neurosurgical research and publication

In order to achieve the objectives, Phase 2 and 3 cover the following subjects:

1. Neurosurgery
2. Medical statistics, GCP, ethics and Neurosurgical research and publication

Thus, the trainee should have or completed the following:

1. Neurosurgery postings
2. Adequate training course in the following as compulsory: a) Basic life support; b) Ethics and statistics; c) High speed drilling course
3. Adequate training course in the following as preferable: a) Good Clinical Practice (GCP); b) advance trauma life support (ATLS); c) paediatric life support (PLS); d) spine e) microsurgical anastomosis; and f) stereotactic, radiosurgery, image guided or functional course
4. Neurosurgery up-to-date (Journal club or equal up-to-date teachings)

c) The summary of phases:

- I. Phase I (year 1): Neurology, Neurointensive care, Neuroradiology-Neuropathology, and Neurosurgery postings to cover basic and fundamental knowledge in Neurosurgery
- II. Phase II (year 2 & 3): Neurosurgery and related fields (Ethics, GCP, Statistics, Research)
- III. Phase III (year 4/Registrar level): Neurosurgery

D) ATTACHMENT, LEARNING METHOD AND LEARNING-ASSESSMENT

Phase 1 (Year 1) in Neurosurgery

1. The candidate is required to rotate 3 months in neurology, 2 months in neuroradiology and neuropathology, 3 months in Intensive care-anaesthesia, and 4 months in Neurosurgery alongside the lecturers in carrying out daily works in the respective department as thus acquired an understanding and skills
2. Facilitate learning process. The university or department would provide all the necessary materials such as audio-visual, reference books, magazines journals etc.
3. The knowledge in basic science would be provided through lectures, tutorials, and demonstrations and from the involvement in daily work in the ward/department. The environment of self-learning as discussions would be created

4. Supervisions by the department is conducted through supervisor's report and logbook. ([appendix 4 phase 1](#))
5. One case write up must be submitted to the supervisor and/or head of the programme at each centre for each posting
6. Year 1 examination would be held at the end of Phase 1

The summary:

Phase	Year	Attachment	Assessment
1	1	Neurology Neurointensive care Neuropathology and Neuroradiology Neurosurgery	Continuous assessment Year 1 logbook One case report for each posting (Total 4) Year 1 examination

Phase 2 (Year 2 and 3) in Neurosurgery

1. Phase II would emphasize on operative neurosurgery. The candidate will do the attachment at our various recognised training centre ([Appendix 2](#))
2. The trainee would be expected to continuously embrace and enhance the knowledge and be an expert in providing treatments in neurosurgical fields. In the years, the knowledge would also be provided through lectures, tutorials, demonstration, clinical conferences and hands-on experience whilst performing surgical procedures. Group discussions and journal club would also be organized. Candidates would be actively involved in seminars and post-graduate intensive/teaching courses organized by the university, other centres or society. The candidate would assume the 'on-call' responsibility with the specialists
3. The knowledge in biostatistics, good clinical practice (GCP) and medical ethics would facilitate in producing neurosurgeons that are responsive and sensitive towards their environment. This would help in providing optimum medical care
4. The candidates are also required to carry out research thesis or publication by research on interesting topics in order to achieve a better understanding regarding the disease processes
5. The university or training centre would provide lecture notes, articles and journals, reference books and audio-visual materials in related fields. The candidates and supervisors would prepare the materials ([appendix 8](#)).
6. The candidates are also encouraged to be actively involved in the program organized by the university or society
7. Candidates must successfully attend the compulsory courses and strongly advocated to attend the preferable courses
8. Year 3 syllabus would emphasize on continuous self-learning in the aspect of operative neurosurgery. Candidates should also be able to examine, decide on further management and performing procedures under specialist's supervision. They would also assume 'on-call' responsibility with the specialist.
9. Candidates would assume certain responsibilities allocated by the Supervisor.
10. Supervision by the department is conducted through supervisor's report ([appendix 3](#)) and log book ([appendix 4 phase 2 and 3](#)).

11. Specialised case write up or case report in neurosurgery for every 4 months during only year 2 and 3 should be submitted to the supervisor and shown during the progress interview (total of 3 in a year; or total of 6 for the phase 2 – year 2 and 3)
12. Specialised case report is defined as interesting or advance case report in which its content seems as publishable in the journal
13. There will be a 6 monthly progress-interview ([appendix 7](#)) to monitor the trainees.

The summary

Phase	Year	Syllabus and Attachment	Assessment
2	2 & 3	Clinical work in Neurosurgery. The posting can be in any our recognised institution/hospital (USM, UM, UKM, HKL, HSBULOH, HJB, HKUCHING, HK.KINABALU, HPINANG)	Continuous assessment 6 monthly progress interview on the following: a) Logbook b) Dissertation/Publication by research c) Specialised case reports d) Completing the compulsory courses e) Others (attitude, supervisor report etc.)

Phase 3 (Year 4/Registrar level) in Neurosurgery

1. Phase 3 would also emphasize on operative neurosurgery. The candidate shall do the attachment at our various recognised training centre. University attachment should ideally be at 3 to 6 months prior to final or exit examination.
2. Phase III is to provide a more challenging and detailed exposure to Neurosurgery. Candidate is expected to acquire an in-depth knowledge in order to synthesize an accurate diagnosis and also competent in operative techniques.
3. The university or training centre would provide lecture notes, articles and journals, reference books and audio-visual materials in related fields. The candidates and supervisors would prepare the materials ([appendix 8](#)).
4. Candidates would be assigned as a 'Specialist in training', and be responsible in managing Neurosurgical patients. Candidates are encouraged to decide on the management aspects. However, the specialists are still supervising.
5. Candidates are also required to present papers, research and attending conferences.
6. Candidates must have successfully attended the compulsory listed courses - a) Basic life support; b) Ethics and statistics; c) High speed drilling course organized by the university or any recognized centres.
7. The candidate is preferably had attended the: a) Good clinical practice (GCP); b) advance trauma life support (ATLS); c) paediatric life support (PLS); d) spine e) microsurgical anastomosis; and f) stereotactic, radiosurgery, image guided or functional course
8. Candidates would be expected to be able to resolve departmental issues and current issues arising in order to deliver the best treatment for the neurosurgical patient.
9. Timetable for lecture, tutorial, seminar, clinical teaching and other activities would be circulated from time to time.

10. The candidate should be actively involved in all aspects of patient's care. They would also do 'on-call' with the specialists.
11. Candidates are also expected to attend and actively involved in all teaching activities organized by the university or any centre.
12. Candidates would assume certain responsibilities allocated by the Supervisor.
13. Supervision by the department is conducted through supervisor's report (appendix 3) and log book (appendix 4).
14. No case writes up during year 4 or exit year.
15. There will also be a 6-month progress interview to monitor the trainees in this particular year
16. Final or Exit examination will be conducted at the end of the 4th year in phase 3.

The summary

Phase	Year	Syllabus and Attachment	Assessment
3	4	<p>Clinical work in Neurosurgery as a registrar.</p> <p>The posting can be in any of our recognised institution/hospital (USM, UM, UKM, HKL, HSBULOH, HJB, HKUCHING, HK.KINABALU, HPINANG)</p> <p>The last 3-6 months posting should be done in the respective university to prepare them for the exit examination</p>	<p>Continuous assessment</p> <p>6 monthly progress interview on the following:</p> <ol style="list-style-type: none"> a) Logbook b) Dissertation/Publication by research c) Specialised case reports d) Completed the compulsory courses e) Others (attitude, supervisor report etc.) <p>Final or Exit examination</p>

E) PROGRAMME ASSESSMENT, EXAMINATION, GRADING SYSTEM AND COMPETENCY LEVEL AND SKILL

Assessment, Progress and passing criteria

Program assessment would be divided into 2 parts:

1. Continuous assessment
2. Examination ([appendix 10](#))

Continuous assessment is done continuously and scrutinise at time of progress interview with

1. Satisfactory report by the Supervisors
2. Satisfactory log book
3. Satisfactory case report

4. Satisfactory dissertation/publication by research
 - a) Pre-requisite for phase 1, year 1 Examination
 1. Completed the term rotation satisfactorily
 2. It is monitored by head of the posting supervisor (continuous assessment) and report to the respective head of the neurosurgical programme in each university. This consists of satisfactory report by the supervisors in aspects of attitude and integrity, attendance, clinical skills and theoretical knowledge. End of year 1 examination is the time to discuss on specific problem of the trainee
 3. The candidate must pass the continuous assessment component. Those failed, would not be allowed to sit for year 1 examination
 4. Satisfactory year 1 LogBook
 5. Satisfactory case reports (Total: 4 case reports in year 1)
 - b) Passing Criteria for phase 1, year 1 Examination [see detailed at “Phase I Marking and Assessment Scheme (Year 1)”]
 1. The overall mark must be 50% or above
 2. The candidate must achieve 50% or above in each component:
 - a) Theory
 - b) Clinical
 3. No borderline VIVA
 - c) Criteria to progress from Phase I to Phase II
 1. Pass Year 1 Examination
 2. Approved by the Examination and University Board
 3. Confirmation by the Senate
 - d) Criteria to progress from Phase II to Phase III
 1. Satisfactory report by the Supervisors
 2. Good progress in dissertation/publication by research, logbook and specialised case reports (during 6 monthly progress interview)
 3. Satisfactorily completed the term rotation
 4. Satisfactory in completing the compulsory courses
 - e) Pre-requisite for the Final or Exit Examination
 1. Satisfactory report by the Supervisors
 2. Satisfactory report on thesis or publication by research
 3. Satisfactory log book ([appendix 9](#) – minimal requirement in the log book)
 4. Satisfactorily completed writing in specialised case reports
 5. Satisfactorily completed the compulsory courses
 6. Completed the term rotations
 - f) Phase III Passing Criteria [see detailed at “Phase III Marking and Assessment Scheme (Year 4)”]
 1. A pass in the Final Examination
 2. Approval by the Examination and University Board
 3. Confirmed by the Senate

Phase I Examination - Marking and Requirement Scheme (Year 1)

Year 1 Examination. 100%

Divided into 2 parts: -

A) Theory [50%]

MCQ paper 1

25% (total maximum mark)

MCQ paper 2

25% (total maximum mark)

B) Clinical [50%]

Five (5) cases for clinical examination 50% (total maximum mark)

Requirements:

- a) Candidate must pass separately clinical and theory (50% and above marks from the total in each category).
- b) Those who passed the theory, can only proceed to clinical examination.
- c) Those failed the theory, automatically require to re sit the examination after 6 months of further training.
- d) Those failed the clinical part, (after passing the theory part) are only required to re sit the clinical part after 6 months of further training. This is allowed for only 3 consecutive attempts. For the subsequent 4th attempt (examination of an appealed candidate), the candidate must re sit all components or parts of the examination (theory and clinical again).
- e) Three attempts only allowed for each candidate for the Year 1 examination. Subsequent request is regarded as an appeal candidate and must re sit all components
- f) Those passed both examinations, declared as passing the examination.

Phase III: Final or Exit Examination - marking and requirement scheme (Year 4)

Final examination (end of year 4) 100%

Divided into 2 parts:

A) Theory

I. MCQ

30%

B) Clinical

70%

I. One Modified Long Case

30%

II. Five Short Cases

20%

III. Three sections of Clinical VIVAs

20%

Clinical VIVAs in 3 separate rooms would be on:

- a) Instrumentation and surgical anatomy VIVA (instruments together with anatomical specimens such as skull, plastic brain, spine etc.: 3-4 stations; 2-4 examiners)
- b) Non operative neurosurgical VIVA (may include blood results, neurophysiological studies, neuropathological slides and its adjuvant therapies etc.) (3-4 cases; 2-4 examiners)
- c) Operative case management VIVA (may include neuroradiological images etc.) (3-4 cases; 2-4 examiners)

Requirements: -

- a) Must pass the theory (15% and above from total mark of 30%)
- b) Candidate must pass “separately” the following examinations:
 - i. Long case (15% and above is the passing mark from total mark of 30%)
 - ii. Short cases (10% and above is the passing mark from total mark of 20%)
 - iii. VIVAs (10% and above is the passing mark from total mark of 20%)
- c) Those who passed the theory, can only proceed to clinical examination
- d) Those who failed the theory, automatically require to re sit the examination after 6 months of further training.
- e) Those who failed the clinical part (after passing the theory part) are required to re sit the whole examination after 6 months of further training.
- f) Those passed both examination components (theory and clinical), declared as passing the examination.
- g) No maximum number of attempt stated for the exit/final examination. Its limitation is only the 7 years duration of training in neurosurgery.
- h) Hence, total period of training is allowed up till 7 years.

Supplementary Examination:

Candidates who fail the examination is eligible to sit for the supplementary examination after 6 months as ordered by the Examination Board or University Board and approved by the University Senate.

Grading System

During clinical examinations, a closed marking system 8-12 (CMS) is used.

For USM, the score in the CMS will be converted to mark (and grade later).
The grades for USM are as follow:

Grade Marks		
A	70% or above	- Pass with excellence
B	60 – 69%	- Pass with credit
C	50 – 59%	- Pass
F	Less than 50%	- Fail

Competency level and skills

Phase I – Year 1

The competency level and skills that the candidates should acquire at the end of phase 1 are :

- (i) Good history taking and excellent clinical examination skills
- (ii) Excellent grasp of knowledge in basic Neurology
- (iii) Commendable basic surgical skills especially Neurosurgery
- (iv) Good Intensive care and resuscitation skills

Phase II – Year 2 & 3

The competency level and skills that the candidates should acquire at the end of phase II are:

- (i) Ability to diagnose patient's problems and capable carrying out relevant research and operation
- (ii) Ability to provide the appropriate treatment for Neurosurgical patients effectively and independently with minimal supervision
- (iii) Commendable skill in Neuroradiology
- (iv) Ability to perform non invasive Neurosurgery effectively
- (v) Ability to anticipate the brain trauma and appropriately providing the necessary care with the aid of Neurophysiology techniques
- (vi) Good interpersonal skills

Phase III – Year 4 (see appendix 9 and 10)

The competency level and skills that the candidates should acquire at the end of phase III are:

- (i) Competent in providing care for emergency Neurosurgical and Stroke cases as an individual or as a group
- (ii) Competent in managing Neurosurgical emergencies in a scope of prehospital care, inpatient and rehabilitation
- (iii) Capable of initiating and presenting Neurosurgical topics or cases efficiently
- (iv) Competent in caring out responsibility as an individual or as a group. Ability to critically appraise his/her limitations and immediately seek the required assistance from other 'sub-specialty' in the patient's best interest
- (v) Competent to work proficiently and effectively
- (vi) Well versed in medical ethics especially in the field related to Neurosurgery
- (vii) Ability to act as a mentor in sharing and expending the Neurosurgical knowledge with junior candidates

F) EXAMINER AND ASSESSOR

Examiners or assessors are divided into 6 categories for this programme:

- a) Entrance assessor – Entrance examination and VIVA/interview assessor
- b) Continuous assessment assessor – On logbook, thesis or dissertation. Normally, they are clinical posting supervisor
- c) Marking the non-examination paper assessor such as case reports
- d) Assessor who mark or running the oral defence for the dissertation/publication by research
- e) Progress interview assessor (6 monthly)
- f) Examiner or Examination assessor

Details:

- a) Entrance assessor

They carry out the selection process for new candidates. They are representatives of: a) University; b) Ministry of Health and/or

- b) Continuous assessment assessor

They are the ones who supervise the trainees in many aspects: clinical, log book and thesis. Here it may have two different persons – clinical supervisor (the head, consultant, or person in charge for the programme in a particular hospital) and thesis supervisor (with experience of at least 5 years in KKM and 3 years in university).

- c) Marking the non-examination paper assessor

They are responsible to mark the (specialised) case reports made by the trainees for every posting (year 1) or 4 monthly (year 2 and 3).

- d) Assessors who mark the dissertation

Thesis or dissertation is marked only by the internal local-university (with at least 2 years' experience after graduation) or those appointed by the head of the programme or department.

- e) 6 monthly progress assessor

They consist of neurosurgeons from: a) University; b) Ministry of Health; and/or c) Neurosurgical Association of Malaysia (NAM)

- f) Examination assessors or examiners – Year 1 and Exit Examination

They are divided further into 2 categories:

- I. External examiner and
- II. Internal examiners

External examiner is a person who was passed by the senate and other required levels to be our examiner. External examiner is a person outside of our training programme or university. The CVs are required in the recruitment process and agreed by all involved in the examination.

Internal examiners for clinical examinations are those selected by the head of the programme and passed by the university council (at school level). The CVs are required in the recruitment process. In general, they are selected if: a) more than 5 years holding the consultant post in neurosurgery; b) Good CVs; c) Appointed or recommended by previous group of (senior) examiners – mainly based on clinical outcomes and good inputs from colleagues. Currently, they are:

- a) Head of the programme
 - b) Representatives from University
 - c) Head or those from Ministry of Health Neurosurgery programme
 - d) Representatives from Neurosurgical Association of Malaysia (NAM)
- (See [appendix 5](#) for the current list of internal examiners)

G) DISSERTATION GUIDELINE, CASE WRITE-UP/REPORT AND PUBLICATION, AND THE LOG BOOK

Dissertation (USM):

1. Candidates are required to involve in research activities whereby they would be exposed to the research methodology and data analysis in preparing a dissertation
2. Candidates would propose the topic for the dissertation, 3-6 months before they sit for the Phase I examination. The topic must be submitted within the time provided and the Department must authorize it.
3. Approval from the ethical and research committees must be obtained separately from the Ministry of Health and/or university
4. A supervisor will be appointed to monitor the progress. The supervisor would prepare a progress report submitted or verbally report it at time of 6 monthly progress interview to the Head of the programme
5. The completed dissertation must be submitted 6 months before the end of Phase III for assessment by the two-three internal examiners.
6. Satisfactory dissertation report by the two-three internal examiners is a pre-requisite for the candidate to be able to sit for the final examination.

Preparation of the dissertation:

Can either be in Journal style (preferred) or dissertation style. For journal style, the trainee must mention which journal he or she is following.

Guidelines for the thesis are the following;

1. The title or topic must be specific.
2. It should be between 10,000 –20,000 words (excluding diagram, table and references).
3. Discussion aspect must comprise 30-40% of the content.

Format;

- A)** Title page
- B)** Appreciation
- C)** Foreword
- D)** Table of content
- E)** List of tables and diagrams.
- F)** List of symbols, abbreviations or parenthesis.
- G)** Abstract – 250 words.
 1. Introduction (with some literature review and purpose)
 2. Methods
 3. Results

4. Discussion
5. References
6. Bibliography
7. Appendix.

Format according to the mentioned Journal style is also possible.

DISSERTATION STRUCTURE FOR MASTER IN SURGERY (NEUROSURGERY)

PHASE	MONTH	DISSERTATION
Phase I/II	0 – 6 months	Discussion on topics and methodology
	7 – 24 months	Data collection and analysis and preparation
Phase III	Completion and submission of dissertation 6 months before the final examination	

Case write-ups and publications:

- a) Phase 1- There should be one case write-up for each posting (total 4).
- b) Phase 2 and 3 - There should be a total of 6 specialised case write-ups in year 2 and 3. No paragraphs, website or pictures should be plagiarised from books or journal without permission from the respective publisher.
- c) Sending proof for publication of either case write-up or dissertation prior to graduation

LogBook:

1. Each candidate is required to complete a logbook regarding his/her coursework. This would document his/her activities, clinical training and experience obtained.
2. The supervisor must regularly check the logbook. A satisfactory logbook is a prerequisite for the examination. The sample for the Neurosurgical logbook is herewith appended ([appendix 4](#)).
3. The logbook is a property of the University.

H) SUPERVISION AND PERFORMANCE REPORT

General Procedure

- b) The University would appoint a specialist as a supervisor for each candidate.
- c) The specialist from hospitals under the Ministry of Health, Malaysia, other institutions or medical centres may be appointed as a supervisor once the University authorizes him or her.

- d) The recognised 9 local training centres in Neurosurgery are stated below (appendix 2).

Appendix 2. NEUROSURGERY PROGRAMME IN USM-UM-UKM-KKM-MALAYSIA AND ITS NEUROSURGICAL TRAINING CENTRES

Centres	Number of Bed for Neuro cases	Mic ro scope	Endo scope	stereotactic frame	IOM	Intraoperative imaging s ict/iMRI	CT	MRI	DS Ang io	MRI - fMRI/ DTI	Radio surgery	Number of supervisor/ Lecturer	Neuro pathic Pain centre	Spine facilit y	Minima lly invasiv e spine facility	Neuro ICU facility	Nav igation syst em
USM Kubang Kerian	60	2	2	Y e s	Y e s	no	Yes (1)	Yes (1)	Yes	Yes	Yes	5	Yes	Yes	No	11 beds	1
HKL	106	2	2	Yes (1)	No (rental)	No	Yes (1)	Yes (2)	Yes	No	Yes (1)	4	Yes (1)	Yes	Yes	11	1
Hosp Sungai Buloh	84	1	1	Yes (1)	Yes (1)	Yes (1)	Yes (3)	Yes (1)	Yes	No	Yes (1)	3	Yes (1)	Yes	Yes	28	1
Hosp JB	70	2	1	Yes (1)	Yes (1)	Yes (1)	Yes (3)	Yes (1)	Yes	No	No	3	No	Yes	no	10	1
Hosp Kucing	50	2	2	Yes (1)	Yes (1)	Yes (1)	Yes (1)	Yes (1)	Yes	No	No	2	Yes (1)	Yes	Yes	16	1
Hosp Q Elizabeth Sabah	30	2	2	No	Yes (1)	No	Yes (4)	Yes (3)	Yes	No	Yes (1)	2	Yes (1)	Yes	No	8	1
Hosp UM	36	2	2	Y(1)	Yes	Yes - iCT & iMRI	Y (4)	Y (3)	Yes	Yes	Yes	8	Yes	Yes	Yes	9	2
Hosp UKM	40	3	3	Yes (1)	Yes (1)	Yes (1)	Yes (4)	Yes (3)	Yes (3)	Yes	Yes	8	Yes	Yes	Yes	24	3 (build-in / rental)
Hosp Penang	40	1	2	0	1	0	1	1	Yes	1	1	2	Yes	Yes	No	9	1

Log Book

- Each candidate is required to complete a logbook regarding his/her coursework. This would document his/her activities, clinical training and experience obtained.
- The supervisor must regularly check the logbook. A satisfactory logbook is a prerequisite for the examination (appendix 9). The sample for the Neurosurgical logbook is herewith appended (appendix 4).
- The logbook is a property of the University.
- The appointed supervisor is required to prepare a report regarding the candidate's performance after his/her attachment. The report would be forwarded to the Head of department. The annual report (i.e. 2 times in a year, in March and September obtained from clinical progress interview or 'naik-tahun' interview: appendix 3) regarding the performance of each candidate would be forwarded to the University.

I) ACADEMIC STAFF

NEUROSCIENCE DEPARTMENT

- Lecturers:
 - Professor Dato' Dr. Jafri Malin Abdullah (Neurosurgery)

2. Professor Dr. Zamzuri Idris (Neurosurgery)
3. Professor Dato' Dr. Ab Rahman Izaini Ghani @ Ab.Ghani (Neurosurgery)
4. Dr Muhammad Ihfaz Ismail
5. Dr Ang Song Yee
6. Dr Diana Noma Fitzrol
7. Dr. Sanihah Abdul Halim (Neurology)
8. Dr. Muhammad Hafiz Hanafi (Neurorehabilitation)
9. Associate Professor Dr. Abdul Aziz Mohamed Yusoff (Molecular Neuroscience)
10. Dr. Mohamed Faruque Reza (Neuroscientist)
11. Dr. Tahamina Begum (Neuroscientist)
12. Dr Aini Ismafairus Abd Hamid (Neuroimaging)
13. Dr Zuraida Zainun (Balance rehab)
14. Associate Professor Dr. Muzaimi Mustapha (Neuroscientist)

b) Honorary lecturers:

1. Dr. Regunath a/l Kandasamy (Neurosurgery)
2. Dato Dr. Azmin Kass Rosman (Neurosurgery)
3. Dr. Albert Wong Sii Heing (Neurosurgery and spine)
4. Datuk Dr. Pulivenden a/l Sellamuthu (Neurosurgery)
5. Dr. Azmi Alias (Neurosurgery)
6. Dr. Noor Azman Abd Rahman (Neurosurgery)
7. Dr Saiful Azli Bin Mat Nayan (Neurosurgery)
8. Dato' Dr. Kantha a/l Rasalingam (Neurosurgery and spine)
9. Prof Datuk Dr Mohamed Saufi Awang (Neurosurgery)
10. Dr Mohd Sofan Zenian (Neurosurgery)
11. Dr Mohammad Azman Mohammad Raffiq (Neurosurgery)
12. Dr Donald Liew Ngian San (Neurosurgery)

c) Associate lecturers:

1. Associate Professor Dr. Wan Mohd Nazaruddin Wan Hassan (Neuroanaesthesia)
2. Dr. Laila Abd Mukmin (Neuroanaesthesia)

3. Associate Professor Dr. Zul Izhar Mohd Ismail (Neuroanatomy)
4. Associate Professor Dr. Che Badariah Che Aziz (Neurophysiology)
5. Associate Professor Dr. Mohd Shafie Abdullah (Neuroradiology)
6. Associate Professor Dr. Zahiruddin Othman (Neuropsychiatry)
7. Professor Dr. Wan Hazzabah Wan Hitam (Neuro-ophthalmology)
8. Associate Professor Dr. Raza Mohsen (Neuropharmacology)

J) OTHERS RELATED TO THE PROGRAMME

SUSPENSION

The Senate / University is authorized to suspend any candidates from the course and / or examination with or without penalty.

POSTPONEMENT

The candidate may apply for a postponement of course due to specific reasons upon the discretion of the University / Senate.

TERMINATION

The candidate may choose to withdraw from the course by writing to the Dean, School of Medical Science through the Head of Department. The Senate, after the approval by the University Board may terminate the course of a candidate if

- 12.1 Poor performance by the candidate as concluded by the University.
- 12.2 Involved in disciplinary cases, which are against the University or government.
- 12.3 Found guilty of malpractice or criminal offences by the court or Malaysian Medical Council.
- 12.4 Failure to register without obtaining approval from the University.
- 12.5 Failure to pass the examination after 3 consecutive attempts
- 12.6 Failure to complete the course within maximum time limit allowed (Perhaps because of obtained penalties during phase 2/3 interview)
- 12.7 Cancellation of registration by the Malaysian Medical Council.
- 12.8 The candidate's general physical and mental health does not permit him/her to perform effectively or pose a risk to the patients.

PENALTY

Single penalty is 6 months in duration.

The penalty is given because of

- a. Failure in or to take (without decent reason) Phase 1 or Final examination and/or
- b. Failure in Phase2/3 interview (interview Naik-Tahun) – Examples are, failure to progress because of poor thesis/dissertation preparation, poor log book, poor overall assessment etc.

K) THE APPENDICES

Appendix 1 – syllabus for MedEx and entrance viva

Appendix 2 – recognised training centre

Appendix 3 – continuous assessment

Appendix 4 – log book

Appendix 5 – list of examiners

Appendix 6 – syllabus and the curriculum guidelines

Appendix 7 – progress interview schema

Appendix 8 – teaching schedule

Appendix 9 – minimal requirement guideline

Appendix 10 – example of examination questions