



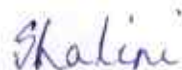
**RAMAIAH
UNIVERSITY**
OF APPLIED SCIENCES

M.S. Ramaiah University of Applied Sciences
Programme Structure and Course Details
Of
M.CH Neuro Surgery 2022 onwards

M.S. Ramaiah University of Applied Sciences
Ramaiah Medical College


Registrar
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Bangalore - 560 054





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**RAMAIAH
UNIVERSITY**
OF APPLIED SCIENCES

M.S. Ramaiah University of Applied Sciences

Programme Specifications

M.CH Neuro Surgery Programme 2022

onwards

Programme Code: MD157

M.S. Ramaiah University of Applied Sciences

Ramaiah Medical College

Shalini

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University's Vision, Mission and Objectives

The M. S. Ramaiah University of Applied Sciences (MSRUAS) will focus on student-centric professional education and motivates its staff and students to contribute significantly to the growth of technology, science, economy and society through their imaginative, creative and innovative pursuits. Hence, the University has articulated the following vision and objectives.

Vision

MSRUAS aspires to be the premier university of choice in Asia for student centric professional education and services with a strong focus on applied research whilst maintaining the highest academic and ethical standards in a creative and innovative environment

Mission

Our purpose is the creation and dissemination of knowledge. We are committed to creativity, innovation and excellence in our teaching and research. We value integrity, quality and teamwork in all our endeavors. We inspire critical thinking, personal development and a passion for lifelong learning. We serve the technical, scientific and economic needs of our Society.

Objectives

1. To disseminate knowledge and skills through instructions, teaching, training, seminars, workshops and symposia in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences to equip students and scholars to meet the needs of industries, business and society
2. To generate knowledge through research in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences to meet the challenges that arise in industry, business and society
3. To promote health, human well-being and provide holistic healthcare
4. To provide technical and scientific solutions to real life problems posed by industry, business and society in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences
5. To instill the spirit of entrepreneurship in our youth to help create more career opportunities in the society by incubating and nurturing technology product ideas and supporting technology backed business
6. To identify and nurture leadership skills in students and help in the development of our future leaders to enrich the society we live in
7. To develop partnership with universities, industries, businesses, research establishments, NGOs, international organizations, governmental organizations in India and abroad to enrich the experiences of faculties and students through research and developmental programme

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Programme Specifications: M.Ch Neurosurgery

Faculty	Ramaiah medical College
Department	Neurosurgery
Programme	M.Ch Neurosurgery
Programme Code	MCH157
Dean of Faculty	Dr. Shalini C. Nooyi
Head of Department	Dr. Sunil V. Furtado

1. **Title of the Award:** M.Ch Neurosurgery
2. **Mode of Study:** Full-Time
3. **Awarding Institution /Body:** M. S. Ramaiah University of Applied Sciences, Bengaluru
4. **Joint Award:** Not Applicable
5. **Teaching Institution:** Ramaiah Medical College
6. **Date of Programme Specifications:** September 2022
7. **Date of Programme approval by the academic Council of MSRUAS :** 27th September 2022
8. **Programme Approving Regulating Body and Date of Approval:** National Medical Council of India
9. **Rationale for the Programme**

Neurosurgery as a medical discipline and surgical specialty provides care for adult and pediatric patients in the treatment of pain or pathological processes that may modify the function or activity of the central nervous system (e.g. brain, hypophysis, and spinal cord), the peripheral nervous system (e.g. cranial, spinal and peripheral nerves), the autonomic nervous system, the supporting structures of these systems (e.g. meninges, skull & skull base, and vertebral column), and their vascular supply (e.g. intracranial, extracranial, and spinal vasculature).

Treatment encompasses both non-operative management (e.g. prevention, diagnosis – including image interpretation – and treatments such as, but not limited to, neuro critical intensive care and rehabilitation) and operative management with its associated image use and interpretation (e.g. endovascular surgery, functional and restorative surgery, stereotactic radiosurgery, and spinal fusion – including its instrumentation).

The broad aim of the training is to encourage the study, improve the practice, elevate the standards, and advance the science of neurological surgery, and thereby to serve the cause of public health.

Residency is an essential dimension of the transformation of the medical student to the independent practitioner along with continuum of medical education. It is physically, emotionally and intellectually demanding, and requires longitudinally- concentrated effort on the part of the resident.

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The specialty education of physicians to practice independently is experiential, and necessarily occurs within the context of the health care delivery system. Developing the skills, knowledge, and attitudes leading to proficiency in all the domains of clinical competency requires the resident physician to assume personal responsibility for the care of individual patients. For the resident, the essential learning activity is interaction with patients under the guidance and supervision of faculty members who give value, context, and meaning to those interactions. As residents gain experience and demonstrate growth in their ability to care for patients, they assume concept – graded and progressive responsibility – is one of the core principle of graduate medical education. Supervision in the setting of graduate medical education has the goals of assuring the provision of safe and effective care to the individual patient; assuring each resident's development of skills, knowledge, and attitudes required for a foundation for continued professional growth, provide quality health care and carry out professional obligations ethically to fulfill the objectives of National Health Policy.

The major components of the curriculum shall cover theoretical knowledge, practical and clinical skills, treatment protocols, surgical and interventional procedural skills, interpersonal communication skills and training in research methodology. The course study shall be for a period of 3 academic years in the residency pattern with graded responsibilities in the management and treatment of patients entrusted to his / her care.



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Program Objectives (PO) for M.ch Neurosurgery postgraduate students

- PO1.** Acquire adequate knowledge in Neuroanatomy, Neuropathology, Neuro - Pharmacology Neuro-Radiology and clinical Neurosurgery (C)
- PO2.** Know the utility, limitations and interpretation of the result of various investigative modalities commonly used in neurosurgery (C)
- PO3.** Achieve competence in neurological evaluation of the patients which includes history taking skills, detailed neurological examination and clinical analysis to arrive at a provisional diagnosis. (C, P)
- PO4.** Ability to diagnose, triage and surgically manage all neurosurgical elective and emergency cases with competence, compassion and sensitivity towards patient care. (A,C,P)
- PO5.** Independently develop research studies / projects relevant to neurosurgery. (C)

Program Specific Outcome (PSO) For Post Graduate Students

- PSO1.** Develop the knowledge, skills and attitude to be a competent neurosurgeon. (A,C,P)
- PSO2.** Demonstrate a commitment to excellence and continuous professional development with integrity, compassion and sensitivity to patient care and outcomes. (A)
- PSO3.** Develop adequate teaching skills and also acquire the knowledge, and attitude to be a competent and ethical researcher and teacher. (A,C,P)
- PSO4.** Ability to diagnose, triage and surgically manage all neurosurgical elective and emergency cases with competence, compassion and sensitivity towards patient care. (C,P)
- PSO5.** To align the knowledge and competence to fulfil the goal of national and international health programmes. (C)

Note: A- Affective Domain, C- Cognitive Domain & P- Psychomotor Domain



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Course - PO - PSO Mapping

Course Code and name	Program Outcomes POs					Program Specific Outcomes PSOs				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
M.CHC505A Basic sciences relevant to the Neurosurgery	3	3	3	3	3	3	3	3	3	3
M.CHC506A Principles of Neurosurgical disease diagnostic techniques and allied specialties	3	3	3	3	3	3	3	3	3	3
M.CHC507A Management aspects of Neurosurgery	3	3	3	3	3	3	3	3	3	3
M.CHC508A Recent advances in Neurosurgery	3	3	3	3	3	3	3	3	3	3



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10. Regulations:**(A) Attendance, progress and conduct:**

1. A candidate pursuing degree course should work in the concerned department of the institution during the study period as a fulltime student. No candidate is permitted to run a clinic / laboratory / nursing home while studying postgraduate course.
2. Every student shall attend symposia, seminars, conferences, journal review meetings, grand rounds CPC, case presentation, clinics and lectures during each year as prescribed by the department and not absent himself/ herself from work without valid reasons.
3. Every candidate is required to attend a minimum of 80% of the training during the postgraduate course.
4. Any student who fails to complete the course in the manner stated above shall not be permitted to appear for the University Examinations.
5. Attitude and aptitude.
 - Caring attitude
 - Reliability, initiative and organizational abilities
 - Ability to cope with stress and responsibilities
 - Professional relationship and team work.

(B) Monitoring progress of studies

1. Work diary / Log book : Every candidate shall maintain a log book and record of his / her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate. The log book shall be scrutinized and certified by the Head of the Department and Head of the Institution, and presented in the University practical / clinical examinations.
2. Special mention may be made of the presentations by the candidate as well as details of clinical or planning procedures, if any conducted by the candidate. The work diary shall be scrutinized and certified by the Head of the Department and Head of the Institution, and presented in the university practical/clinical examination.
3. Procedure for defaulters: There will be a committee constituted by all teachers to review such situations. The defaulting candidate is counselled by the guide and head of the department. In extreme cases of default, the departmental committee may recommend that defaulting candidate will be withheld from appearing the examination, if she/he fails to fulfil the requirements in spite of being given adequate chances to set himself or herself right.

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11. Teaching Learning Methods:

The Department of Neurosurgery places great emphasis on providing its residents with hands-on exposure to a wide variety of neurosurgical disorders and interventional/operative procedures in trauma, neuro-oncology, paediatric, functional, epilepsy and spinal neurosurgery to name a few. The students are rotated between the neurosurgical ward and ICUs and also perform duties based on the On-call roster.

Students learn the art of history taking, neurological examination, investigation and management of patients. Acquisition of practical skills occurs in the ward/ICU, the operative theatre and on cadavers in the Ramaiah Advanced Learning Centre (ALC). Students are encouraged to engage in discussions routinely with various sub-specialists in the department to seed an interest in the area as well as build a foundation for the acquisition of knowledge and skills. The residency training programme shall also include formal/didactic lectures in the subject and subspecialties, symposia, clinical discussions, training in diagnostic and therapeutic modalities, research, journal reviews /clinical presentations and teaching rounds.

The students will also be exposed to experts in the field attending guest lectures, workshops and conferences, some of which will be conducted by the department itself. The day-to-day work of the trainees is supervised by the faculty of the department of Neurosurgery. Residents will be provided opportunities to engage in and present original research work that is underway in the department.

The following teaching schedule is prescribed for the course in which all residents participate:

Out Patient Service -	Four times a week (Mon, Wed, Thurs & Fri at RMCH Superspecialty Block)
Ward Rounds	- Every morning and evening
Pre-op Session	- Everyday at 9am in Neuro OT Lounge
Journal Club	- Twice a month (1st and 3rd Mondays , 2- 3pm, Seminar room)
Subject Seminars	- Twice a month (2nd and 4th Tuesdays , 2- 3pm, Seminar room)
Mortality Audit	- Once a month (3rd Wednesday of the month, 2- 3 pm, Seminar room)
Recent Advances	- Once a month (1st Thursday of the month, 2- 3pm, Seminar room)
Neuroradiology	- Once a month (2nd Thursday of the month, 2- 3pm, Seminar room)
Inter departmental meeting / Tumour Board	- Once a month (3rd Thursday of the month, 2- 3pm, Seminar room)
Clinico Pathological conference	- Quarterly (Last Thursday of the month, 2- 3pm, Seminar room)
Friday Clinical Meeting	- Once a week (Friday , 2-3pm, RMH Auditorium) - Clinical
Case Presentation	- Once a week (Saturday 10:30am to 12pm, Seminar Room)

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12. Innovative teaching learning practices

1. Theme based teaching learning activities eg..Current trends in endovascular neurosurgery for a full month.
2. Focused discussion during journal club inculcates culture in the areas of research and publication
3. Faculty Lecture during 4th week: Helps in bridging the gap between what is presented during the month and what is not about particular topic. Also it reinforces learning

13. Assessment:

FORMATIVE ASSESSMENT during the training includes:

Periodic internal assessment

1. Theory and practical examination every 6 months (100 marks written paper and 100 marks clinical examination with 50% as pass percentage)
2. Assessment of log book every 6 months along with appraisal of residents. This includes the discussion and assessment of their academic and research progress.

Attendance, progress and conduct:

- A candidate pursuing degree course should work in the concerned department of the institution during the study period as a fulltime student. No candidate is permitted to run a clinic / laboratory / nursing home while studying postgraduate course.
- Every student shall attend symposia, seminars, conferences, journal review meetings, grand rounds CPC, case presentation, clinics and lectures during each year as prescribed by the department and not absent himself/ herself from work without valid reasons.
- Every candidate is required to attend a minimum of 80% of the training during the postgraduate course.
- Any student who fails to complete the course in the manner stated above shall not be permitted to appear for the University Examinations.
- Attitude and aptitude.
 - Caring attitude
 - Reliability, initiative and organizational abilities
 - Ability to cope with stress and responsibilities
 - Professional relationship and team work.

**Monitoring progress of studies**

- Work diary / Log book :** Every candidate shall maintain a log book and record of his / her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate. The log book shall be scrutinized and certified by the Head of the Department and Head of the Institution, and presented in the University practical / clinical examinations.
- Periodic internal tests:** During the course of three years the concerned departments may conduct 5 tests, two of them are annual tests, one at the end of first and the other in the second year. The tests include written papers (100 marks), practical test (100 marks) and marks obtained in such tests will be maintained by the Head of the Department.

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- c. **Continuous assessments:** This will be based on a report by the department faculty who evaluates the progress of the candidate in cognitive, affective and psychomotor domains.

Research & Publications

- One poster presentation in a National / State conference
- One paper to be read in a National / State conference
- One Research paper should be published / accepted for publication / sent for publication in an indexed journal.

Summative assessment (final assessment at the end of the training)

The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.

The post graduate examination shall be in two parts and will be as per the details given in Postgraduate Regulations, 2000.

Scheme of Examination:

A. Theory (Written papers) Marks 400

The examinations shall be organized on the basis of 'Grading' or 'Marking system' to evaluate and to certify postgraduate student's level of knowledge, skill and competence at the end of the training.

There will be four theory papers each of 100 marks as below:

Name of the course	Course Code	Topics	Marks
Basic sciences relevant to the discipline of Neurosurgery	MCHC505A	Neuroanatomy, Neurophysiology, Neuropharmacology, Neuroradiology & Clinical Neurological examination	100
Principles of Neurosurgical disease diagnostic techniques and allied specialties	MCHC506A	Head Injury & Spinal cord injuries, Brain tumors, Spinal cord tumors, Brain infections, Vascular Malformations, Aneurysms, Spinal dysraphism, Hydrocephalus, Craniosynostosis, Epilepsy, Movement disorders, Intervertebral Disc, Kyphoscoliosis, Psychotherapy, Skull base tumors	100
Management aspects of Neurosurgery	MCHC507A	Head injury & spinal injury, Intracerebral, Subdural, Extradural hematoma, Diffuse	100



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		axonal injury, Brain tumors, Skull base tumors, Spinal tumors, Brain infections, Vascular Malformations, Aneurysms, Spinal dysraphism, Hydrocephalus, Craniosynostosis, Epilepsy, Movement disorders, Intervertebral Disc, Kyphoscoliosis, Spinal fusion surgery, Psychotherapy,	
Recent advances in Neurosurgery	MCHC508A	Neuro navigation, DTI, Functional MRI, MRS, Stereotactic based surgery, Functional surgery	100

2. Clinical / Practical and Oral/viva voce Examination:

Oral examination shall be comprehensive enough to test the student's overall knowledge of the subject. The clinical/practical examination shall be held as per norms and as per the prevailing rules of the training institute/ University rules. A broader outline is suggested below:

- One long case - 100 marks
- Two short cases – 50 marks each
- Structured viva voce:
- Neuro-radiology
- Recent advances and history
- Operative neurosurgery viva
- Instruments and neuropathology specimen

100 marks

Practical / clinical examination:

- The clinical examination should aim at examining clinical skills and competence of candidates for undertaking independent work as a specialist. Each candidate will be evaluated based on the examination of one long case and two short cases.
- The practical examination should be aimed at assessing competence, skills of technique and procedures as well as testing student's ability to make relevant and valid observations, interpretations and neurosurgical/operative management of the patient
(The maximum marks for the practical and clinical examination will be 200)

Viva voce examination:

- Will be conducted after the clinical case presentation and will be directed to the evaluation of the breadth and depth of the candidate's knowledge of neurosurgery and pertinent allied specialties. Practical examination shall consist of interpretation of
 - Gross Pathological specimens
 - Neuroradiology
 - Operative session (discussion only) with operative instruments

The maximum marks for the viva voce examination is 100.

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Number of candidates per day: The maximum number of candidates for practical / clinical and viva - voce examination shall be maximum of 3 per day (subject to revision by the University / NMC)

Passing: The candidate will be considered to have passed the examination provided he / she obtains 50% marks overall in all the spheres i.e theory (≥ 200 marks , clinical + practical and viva voce (≥ 150 marks) examinations (subject to revision by the University / NMC)

A. Total Marks Distribution:

Maximum marks for MCh degree course	Theory	Practical	Viva	Grand Total
	400	200	100	700

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Annexures

- Annexure 1_ Competency List
- Annexure 2_Overall course plan year-wise
- Annexure 3_Sample of monthly schedules
- Annexure 4_PG outside posting policy
- Annexure 5_Logbook entry
- Annexure 6_Students appraisal form



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Annexure 1Competency List

- Following is the table where you will find the details
- Idea is to teach, assess in an on-going manner and document.
- K/S/A refers to Knowledge/skill/affective domain and what is mentioned is the predominant domain to gain that particular competency

Topics	Competency	Sub competency	K/S/A predominant and must know (M), Nice to know (DS)	Teaching method	Assessment	Remarks	Doctors Signature
Neurosurgical case history taking and examination	Coming to a diagnosis	Detailed history taking, analyzing the history, Head to toe examination, eliciting specific neurological signs	K/M	DOAP	OMP		
Investigation	Ability to decide the required investigation modalities	Interpretation of CT, MRI, Nerve conduction study, EEG	K/M	Small group discussion			
Neurosurgery – Basic Technique	Ability to decide surgical procedure Positioning of patient	Patient positioning, ability of fix head on four pin and to decide surgical incision Able to perform the required craniotomy. Able to perform ventricular diversion	S/M	Small group discussion			



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		procedures Able to perform spinal laminectomy.					
Counselling of patient's attenders	To develop compassion, empathy and responsibility towards patient care.	To explain patient attenders about the patient condition and ability to take a detailed informed written consent	A	Small group discussi on			



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Annexure 2

Overall course plan year-wise

Course plan

1. FIRST YEAR

1. Out patient service - OPD (supervised) - three days in a week per student.
2. In-patient care (supervised) - daily (Wards and ICU)
3. Ward rounds - daily
4. Emergency - on call according to the duty roster
5. Teaching schedule: To attend all the above seminar room/ward teaching programmes and in addition **to present:**
 - Subject seminars – (once a month per student)
 - Neuroanatomy
 - Clinical Neurological Examination
 - Neuro-radiology
 - Clinical seminars – Attend case discussion (once a month per student)
 - Journal review- (once a month per student)
 1. Procedures – External ventricular drains, lumbar punctures, shunt taps- at least 6 independently by the end of the 1st year.
 2. Log books
 3. Internal assessment

2. SECOND YEAR

1. Out patient service - OPD (supervised) – three days in a week
2. In-patient care (supervised) – daily (wards and ICU)
3. Ward rounds – daily
4. Emergency – on call according to the duty roster
5. Teaching schedule: To attend all the above teaching programmes and in addition **to present:**
 - Subject seminar –
 - Neuro-oncology
 - Vascular Neurosurgery
 - Pediatric Neurosurgery
 - Functional Neurosurgery & Epilepsy
 - Spinal Disorders
 - Neuro-trauma
 - Clinico-pathologic case discussions/ inter-departmental meetings
 - Mortality meet
 - Procedures – Skull traction (5 nos) chronic subdural drainage (3 nos)



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- External Postings: Neuro-radiology – NIMHANS (1 month)
Neurology – Dept of Neurology, RMCH (1 month)
- Scientific paper presentation (State/national conference)-Poster and oral (one each)
- Log books – to be duly maintained and certified by the allotted guides on a quarterly basis.
- Internal assessment

3. THIRD YEAR

- Out-patient service – OPD (independent decision making under guidance allowed) three days in a week per student
- In-patient care (independent) - daily (wards and ICU) (Independent decision making allowed under guidance)
- Ward rounds – daily
- Emergency - on call according to the duty roster
- Teaching schedule: To attend all the above teaching programmes and in addition **to present:**
 - Clinical seminars – case discussion
 - Recent advances
- Research publications –One original article to be published.
- Procedures - Emergent neurosurgical procedures [extradural, subdural hematomas (3 nos each), decompression craniectomy (3 nos), contusion evacuation (2 nos).
Elective procedure: Standard approach craniotomy (3 nos) Spine exposure, laminectomy (3nos) and discectomy (3nos)
- Completion of log books
- External Posting: Neuropathology-NIMHANS (15 days)
- Internal assessment (one assessment after 6 months)
- University examination



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Annexure 3MONTH WISE TEACHING SCHEDULE FOR POST GRADUATES DEPARTMENT OF NEUROSURGERY

MONTH	SITE	Teacher
January	Aneurysm	Moderator
February	Head injury	Moderator
March	Minimal invasive spine surgeries	Moderator
April	Skull base tumors	Moderator
May	CVJ Malformations	Moderator
June	Epilepsy surgeries	Moderator
July	Pediatric Neurosurgery	Moderator
August	Endovascular procedures	Moderator
September	Endoscopic spine surgeries	Moderator
October	Spinal cord trauma	Moderator
November	Low grade gliomas	Moderator
December	Spinal cord malformations	Moderator

Note:

1. The respective faculty will be in charge of the entire process...planning, implementation and assessment.
2. It is preferable to put the time table latest by 20th of previous month.
3. PGs are expected to keep in touch with the respective teachers well ahead of the class.



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Annexure 3APRIL TEACHING SCHEDULE FOR POST GRADUATESTHEME: CURRENT TRENDS IN ENDOVASCULAR NEUROSURGERY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 Chart rounds	2 Chart rounds	3 Case presentation Grand rounds
4 Sunday	5 Journal club	6 Chart rounds	7 Chart rounds	8 Neuro Radiology	9 Chart rounds	10 Case presentation Grand rounds
11 Sunday	12 Chart rounds	13 Holiday	14 Chart rounds	15 Recent Advances Tumor Board	16 Chart rounds	17 Case presentation Grand rounds
18 Sunday	19 Journal club	20 Chart rounds	21 Mortality Audit	22 Chart rounds	23 Chart rounds	24 Case presentation Grand rounds
25 Sunday	26 Chart rounds	27 Subject Seminar	28 Chart rounds	29 Chart rounds	30 Chart rounds	

Instructions: -

- All classes will be based on discussion
- PPTS to be used only to show images /staging /RT planning details
- Both students should discuss with each other prior to the class and present
- The team shall discuss with the teacher atleast 3-5days before the date of the class.
- The week's doubts clarifications to be discussed with the faculty on Saturdays.
- All the best



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ANNEXURE – 4POLICY FOR OUTSIDE PG POSTINGSYear wise PG Posting

The student will spend majority of training period of three years learning in the department of neurosurgery. Additionally he/she will spend short durations learning other facets of the field in external postings at various other departments as follows:

Neurology (RMCH) (II year)	- 1 month
Neuroradiology (NIMHANS) (II year)	- 1 month
Neuropathology (NIMHANS) (III year)	- 15 days



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Annexure 5Logbook entry

Date	
Setting/method	
Presented/attended	
Summary in brief	
Reflection	
Teachers comments	

Student's signature

Guide's Signature

HOD's Signature



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ANNEXURE-6

Postgraduate Students Appraisal Form Name of the PG Student _____ Period of Training
Duration:.....to.....

Sl. No	Particulars	Not satisfactory (1,2,3)	Satisfactory (4,5,6)	More than Satisfactory (7,8,9,10)	Remarks
1.	Journal based learning				
2.	Patient care and rounds				
3.	Bedside teaching, Clinical seminars				
4.	Communication skills				
5.	Log book				
6.	Thesis work				
7.	CME/Outreach programmes/Conference presentations				
8.	Self-directed learning				
9.	Under-graduate teaching				
10.	Research/Publication				

Sign of the student

Sign of the assessor



Sign of Head of the Department

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Course Specification

M.Ch Neuro Surgery 2022 onwards

Course Code: M.CHC505A



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Course Specifications

Course Title	Basic sciences relevant to the Neurosurgery
Course Code	MCHC505A
Department	Neurosurgery
Faculty	Ramaiah Medical College

Course summary:

The course is designed to train neurosurgery residents with respect to clinical history taking, examination and coming to right diagnosis and to formulate a treatment plan and also be able to perform basic neurosurgical procedures.

Course Outcomes:

CO1: Demonstrate comprehensive knowledge of Neuro anatomy, Neurophysiology, Neuro pharmacology, Neuro radiology

CO2: Demonstrate competence in neurosurgical history taking and diagnosis

CO3: Develop basic neurosurgical operative skills sets.

Course Content:

Neurosurgery basics

1. Neuroanatomy

1. Cerebrum (Supratentorium)
2. Cerebellum (Infratentorium)
3. Brain stem
4. Cranial nerves
5. White matter tracts
6. Lobar functions
7. Spinal cord
8. CVJ
9. Neuroembriology

2. Neurophysiology

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1. Physiological changes in head injury
2. Physiological changes in raised ICP
3. Neuroradiology
 - CT, MRI, X-Ray
 - Clinical Neurology
 - Detailed neurological case history taking
 - Neurological signs and symptoms
 - Cranial nerve examination, fundus examination
 - Differential diagnosis

Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Outcomes	Program Outcomes				Program Specific Outcomes				
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5
MCHC505A Basic sciences relevant to the Neurosurgery	CO 1	3	3	3	3	3	3	3	3	3
	CO 2	3	3	3	3	3	3	3	3	3
	CO 3	3	3	3	3	3	3	3	3	3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution										



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Course Specification

M.Ch Neuro Surgery 2022 onwards

Course Code: M.CHC506A



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Course Specifications

Course Title	Principles of Neurosurgical disease diagnostic techniques and allied specialities
Course Code	MCHC506A
Department	Neurosurgery
Faculty	Ramaiah Medical College

Course Summary:

To train neurosurgical post graduates the ability to accurately diagnose neurosurgical disease with relevant investigative modality

Course Outcomes:

CO1: Prescribe relevant investigative modality based on clinical presentation and examination.

CO2: To accurately interpret the investigative modality to come to the correct diagnosis

CO3: To make a management plan, conservative / surgical based on the investigations.

Course Content:

-Neuroradiology

X-ray of skull, CVJ, cervical, lumbar, Thoracic spine

CT scan of brain & spine

MRI of brain & spine

MR & CT cisternorraphy

CT & MR Angiogram of brain

DSA of brain

PET, SPECT, FMRI, DTI

TCD, EEG & NCS



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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Outcomes	Program Outcomes				Program Specific Outcomes				
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5
MCHC506A Principles of Neurosurgical disease diagnostic techniques and allied specialities	CO1	3	3	3	3	2	2	2		
	CO 2	3	3	3	3	3	3	3		
	CO 3	3	3	3	3	3	3	3		
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution										



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Course Specification

M.Ch Neuro Surgery 2022 onwards

Course Code: M.CHC507A



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Course Specifications

Course Title	Management aspects of Neurosurgery
Course Code	MCHC507A
Department	Neurosurgery
Faculty	Ramaiah Medical College

Course Summary:

To train neurosurgical residents in basic neurosurgical operative procedures

Course Outcomes:

CO1: To decide the required surgical procedure based on clinical and radiological presentation.

CO2: To attain knowledge of the surgical neuro anatomy and steps of neurosurgical procedure and possible complications to be anticipated.

CO3: To use high end neurosurgical equipment (Microscope navigation drills)

Course Content:

- Neurosurgical procedures
 - Different types of Craniotomy's
 - Laminectomy
 - Endoscopic skull base & trans ventricular procedures
 - Ventricular diversion procedures
 - Spinal fusion techniques
 - Stereotactic frame based procedures



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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Outcomes	Program Outcomes				Program Specific Outcomes				
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5
MCHC507A Management aspects of Neurosurgery	CO 1	3	3	3	3	3	3	3	3	
	CO 2	3	3	3	3	3	3	3	3	
	CO3	3	3	3	3	3	3	3	3	
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution										



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Course Specification

M.Ch Neuro Surgery 2022 onwards

Course Code: M.CHC508A



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Course Specifications

Course Title	Recent advances in Neurosurgery
Course Code	MCHC508A
Department	Neurosurgery
Faculty	Ramaiah medical College

Course Summary:

To train neurosurgical postgraduates with respect to utilization modalities like high power microscope, neuronavigation, high speed drills, intraoperative neuro monitoring and intraoperative ultrasound.

Course Outcomes:

CO1: Skill training in the use of high speed drills to perform craniotomy and laminectomy

CO2: Ability to use high power microscope in the excision of brain and spinal cord tumors evacuation of deep seated hematoma.

CO3: To understand the indications and the ability to use Neuronavigation, Intraoperative Neuro monitoring, Intra operative ultrasound.

Course Content:

- Use of high speed drills
 - Craniotomy, Craniectomy
 - Laminectomies
- Neuro Navigation
 - Indication
 - Setup
 - Radiological specifications
- Neuro monitoring
 - Indication
 - Setup
 - intrepretation



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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Outcomes	Program Outcomes				Program Specific Outcomes				
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5
MCHC508A Recent advances in Neurosurgery	CO 1	3	3	3	3	3	3	3	3	
	CO 2	3	3	3	3	3	3	3	3	
	CO 3	3	3	3	3	3	3	3	3	
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution										



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Course Materials:**RECOMMENDED BOOKS AND JOURNALS**Comprehensive Neurosurgery textbooks:

1. Neurosurgery vols. I-III by Wilkins & Rengachari.
2. Youmans Neurological Surgery vols I-IV .
3. Handbook of Neurosurgery by Greenberg.
4. Textbook of Neurosurgery by Ravi Rammurthi and PN Tandon 2011, Churchill Livingstone
5. Practical handbook of Neurosurgery. Marc Sindou. Elsevier 2010
6. Textbook of Neurological Surgery: Principles and practices. Hunt Batjer and Christopher Loftus ,2003. Lipinkott Wilkins and Williams

Operative Neurosurgery:

1. Operative neurosurgery by Andrew Kaye, Peter Black. ChurchillLivingstone 1999
2. Brain Surgery by Apuzzo vols I & II Complication avoidance and management. Microneurosurgery vols I, II, IIIA, IIIB, IVA & IVB by Prof. Yasargil.
3. Atlas of Neurosurgical techniques. Shekar and Fessler. Second Edition. Thieme
4. Schmidek and Sweet: Operative Neurosurgical Techniques: Indications, Methods and Results Book by Alfredo Quiñones-Hinojosa
5. Textbooks of Operative Neurosurgery (2 Vol.) Textbook by Ramamurti
6. Spine Surgery vols I & II by Benzel techniques

PEDIATRIC NEUROSURGERY:

1. Albright, A. Leland, Ian F. Pollack, P. David Adelson, (Eds). Principles and Practice of Pediatric Neurosurgery. Thieme, New York, 1999.
2. Cheek, William R. (Ed). Pediatric Neurosurgery. Third Edition, W.B. Saunders Company, Philadelphia, 1994.

PERIPHERAL NERVE

1. Birch, R. Bonney G. Wynne P. Surgical Disorders of Peripheral Nerves. Churchill-Livingstone, London, 1998.
2. Gelberman R. (Ed). Operative Nerve Repair and Reconstruction. I.P. Lippincott Company, Philadelphia, 1991.
3. Kline D, Hudson A. Nerve Injuries: Operative Results for Major Nerve Injuries, Entrapments, and Tumors. W.B. Saunders Company, Philadelphia, 1995.
4. Lunborg G. Nerve Injury and Repair. Churchill-Livingstone, New York, 1998.
5. MacKinnon S, Dellon A. Surgery of Peripheral Nerves. Thieme, New York, 1988.
6. Sunderland S. Nerve and Nerve Injuries. First and Second Editions, E & S Livingston Stone, London, 1968 and 1978.
7. Terzis J. (Ed). Microreconstruction of Nerve Injuries. W. B. Saunders, Philadelphia, 1987



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SPINE

1. Benzel's Spine Surgery Techniques, Complication Avoidance and Management , 2-Volume Set, 5th Edition Editors : Michael P Steinmetz & Sigurd Berven & Edward C. Benzel
2. Herkowitz Harry N. (Ed). Rothman-Simeone, The Spine. Fourth Edition. W. B. Saunders, Philadelphia, 1994.
3. Menezes, Arnold H., Volker K. Sonntag H. (Eds). Principles of Spinal Surgery. McGraw-Hill, Inc., New York, 1996.

STEREOTACTIC/FUNCTIONAL

Gildenberg Phillip L, Tasker, Ronal R. (Eds). Textbook of Stereotactic and Function Neurosurgery. McGraw-Hill, Inc., New York, 1998.

Lundsford L, Dade. (Ed). Modern Stereotactic Neurosurgery. Nijhoff, Boston, 1988.

TRAUMA/CRITICAL CARE

Andrews, Intensive Care in Neurosurgery, 2003

Valadka, Neurotrauma: Evidence Based Answers to Common Questions, 2004

Neurotrauma and Critical Care of the Brain by Jack Jallo and Christopher M Loftus (May 28, 2009)

NEURO-OPHTHALMOLOGY:

Kline and Bajandas, Neuro-Ophthalmology Reviw Manual, 5th Revised Edition, 2003

Neuroanatomy:

Carpenter's Human Neuroanatomy Book by André Parent

Rhoton's Cranial Anatomy and Surgical Approaches By Albert L. Rhoton, Jr. - 2019

Snell's Clinical Neuroanatomy Edition: 8 Author(s): Ryan Splittgerber Ph.D.

Neuropathology:

1. Central Nervous System Tumours WHO Classification of Tumours, 5th Edition, Volume 6

2. Greenfields Neuropathology. Seth Love, David N Louis, David Ellison (eds).Hodder Arnold

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Neuroradiology:

1. Osborn's Brain 2nd Edition - September 20, 2017 Authors: Anne G. Osborn, Gary Hedlund, Karen L. Salzman
2. Diagnostic Imaging: Spine Jeffrey Ross. Lippincott Williams & Wilkins (2010)
3. Diagnostic Cerebral Angiography Lippincott Williams & Wilkins Anne G. Osborn (1999)

NEUROLOGY:

1. Neurology in Clinical Practice Walter G. Bradley, Robert B. Daroff, Gerald Fenichel, Joseph Jankovic
2. Butterworth-Heinemann, 2008
3. B Adams and Victor's Principles of Neurology, Allan Ropper, Martin Samuels McGraw-Hill Professional, 2010

Clinical Examination:

1. DeJong's The Neurologic Examination Edition: 8 Author(s): William W. Campbell, Richard J. Barohn
2. Neurological Differential Diagnosis Authors: (view affiliations) John Philip Patten
3. Localization in Clinical Neurology Book by Joseph C. Masdeu, José Biller, and Paul W. Brazis
4. The Mental Status Examination in Neurology by Richard L. Strub, F. William Black
5. Plum and Posner's Diagnosis of Stupor and Coma (4 ed.) Jerome B. Posner, Clifford B. Saper, Nicholas Schiff, and Fred Plum



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List of Journals:

1. Journal of Neurosurgery – General / Spine/ Pediatrics
2. Neurosurgery
3. Acta Neurochirurgica
4. World Neurosurgery
5. Spine
6. Neurology India
7. Neurosurgical Focus
8. Neurosurgical Review
9. Brain Injury
10. British Journal of Neurosurgery
11. Clinical Neurology and Neurosurgery
12. European Spine Journal
13. Journal of Neurology, Neurosurgery and Psychiatry
14. Neurology and Neurosurgery
15. Operative Neurosurgery
16. British Journal of Neurosurgery

Library facility: The textbooks and journals are housed in the library of the medical college. The medical college provides online access to journals and textbooks on subscription basis to journal and textbook aggregators online. Besides the main library, the department maintains a library for quick reference of essential topics in prescribed textbooks.

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