

पाटन स्वास्थ्य विज्ञान प्रतिष्ठान सेवाआयोग

प्राज्ञिक सेवा, शल्यचिकित्सा समूह, **Neuro-Surgery** उपसमूह, सहायक प्राध्यापक पद, नवौं (९ ख) तहको खुला र आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :- लिखित परीक्षा (Written Examination)

पूर्णाङ्क :- २००

द्वितीय चरण :- अन्तर्वार्ता (Interview)

पूर्णाङ्क :- ३०

प्रथम चरण (First Phase) : लिखित परीक्षा योजना (Written Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage		Time Allowed
I	General Subject	Part I: Management, General Health Issues, Academic Research and Teaching-Learning Practices	50	100	40	10 × 5 = 50 (Subjective)	1.30 hrs	2.15 hrs
		Part II: Technical Subject (Relevant Subject)	50			50 × 1 = 50 (Objective Multiple Choice)	45 min	
II	Technical Subject (Relevant Subject)			100	40	7 × 10 = 70 (Long answer) 2 × 15 = 30 (Critical Analysis)		3.00 hrs
द्वितीय चरण (Second Phase)								
	Interview			30		Oral		

द्रष्टव्य :

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।
- प्रतिष्ठानको प्राज्ञिक सेवा अन्तर्गत समान तहका सबै समूह/सबै उपसमूहहरूको लागि प्रथमपत्रको Part I पाठ्यक्रमको विषयवस्तु एउटै हुनेछ र एकै पटक परीक्षा संचालन हुनेछ ।
- प्रथम पत्रको Part II र द्वितीयपत्रको पाठ्यक्रम समूह/उपसमूह अनुरूप फरक फरक हुनेछ ।
- प्रथम पत्रको Part II र द्वितीय पत्रको विषयवस्तु एउटै समूह/उपसमूहहरूको हकमा समान हुनेछ ।
- प्रथम पत्रको Part II र द्वितीय पत्रको परीक्षा संचालन एकै दिन फरक समयमा हुनेछ ।
- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
- वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A,B,C,D मा लेख्नुपर्नेछ । सानो अक्षर (Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए उक्त उत्तर रद्द हुनेछ ।
- बहुवैकल्पिक प्रश्नहरू हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
- विषयगत प्रश्नहरूको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरू (Short notes) सोध्न सकिने छ ।
- विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरू हुनेछन् । परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरूको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- प्रथम चरणको परीक्षाबाट उर्तिण भई छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
- पाठ्यक्रम लागु मिति : २०८१/१२/०४

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Paper I: General Subject

Part I:

(Management, General Health Issues, Academic Research and Teaching - Learning Practices)

Section (A) - 20 Marks

1. Management

- 1.1. Health care management system in Nepal and other parts of the world
- 1.2. Fundamental principles of healthcare institution and hospital management.
- 1.3. Effective hospital management principles
- 1.4. Purpose of medical and non-medical data and records
- 1.5. Ethics and responsibility of management
- 1.6. Concept of management and its application in health care including hospital
- 1.7. Management: Concept, principles, functions, scope and role, level and skills of manager
- 1.8. Planning: Concept, principles, nature, types, instruments and steps
- 1.9. Leadership: Concept, function, leadership styles, leadership and management
- 1.10. Coordination: Concept, types, techniques of effective coordination
- 1.11. Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
- 1.12. Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
- 1.13. Participative management: Concept, advantage and disadvantage, techniques of participation
- 1.14. Time management: Concept, essential factors and strategies for effective time management
- 1.15. Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
- 1.16. Stress management: Concept, causes and sources of stress, techniques of stress management
- 1.17. Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
- 1.18. Appreciative inquiry: Concept, basic principle and management
- 1.19. Human resource management: Concept, functions and different aspects
- 1.20. Health manpower recruitment and development
- 1.21. Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

2. General Health Issues

- 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
- 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
- 2.3. Professional council and related regulations
- 2.4. National Health Policy
- 2.5. Health Service Act and Regulation
- 2.6. Second Long term health plan
- 2.7. Health Management Information System, forms, indicators, annual reports
- 2.8. Human Development Indices, Sustainable Development Goals
- 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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- 2.10. Local governance and community participation in health service delivery
- 2.11. Health Insurance and financing in health care
- 2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
- 2.13. Indigenous and traditional faith health and health practices
- 2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
- 2.15. Supervision, types and its usage in health sector
- 2.16. Monitoring and evaluation system in health sector
- 2.17. National Health Training Centre
- 2.18. National and International Disaster Plan, Coordination
- 2.19. Patan Academy of Health Sciences Act, Mission, Goals, Organogram
- 2.20. Scope and function of Patan Academy of Health Sciences executive bodies (senate, executive committee, academic council, faculty board, hospital management committee, subject committee), various other committees

Section (B) - 30 Marks

3. Academic Research

- 3.1 Ethics, Bio-ethics and Professionalism
- 3.2 Human dignity and Human Right
- 3.3 Benefit and Harm
- 3.4 Autonomy and Individual responsibility
- 3.5 Consent and capacity to consent
- 3.6 Privacy and confidentiality
- 3.7 Respect for humans and personal integrity
- 3.8 Non-discrimination and non-stigmatization
- 3.9 Respect for cultural diversity and pluralism
- 3.10 National Health Research Council (NHRC) and its guidelines
- 3.11 Research process: ethical research proposal development, research principles, methods and materials, conclusion/recommendation/lesson learnt, commonly used referencing styles
- 3.12 IRB/IRC forms, types, use, importance; getting IRB/IRC clearance
- 3.13 Ethics on research methodology: sample selection, sample size calculation, ensuring reliability and validity of the instruments as well as methods proposed for health research
- 3.14 Quantitative and Qualitative studies
- 3.15 Data analysis (data visualization, descriptive statistics, inferential statistics with statistical hypotheses and appropriate tools/methods for quantitative studies; theme and code generation, thematic analysis, content analysis, grounded theory for qualitative and triangulation for mixed method studies)
- 3.16 Research ethics on vulnerable and non-vulnerable population
- 3.17 Research proposal/protocol/publication:
- 3.18 Publication ethics, plagiarism including self-plagiarism

4. Teaching - Learning, Assessment and Evaluation

- 4.1 Lancet Commission Report on Education of Health Professionals

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- 4.2 Adult learning: Theories, principles, use, importance and outcomes, Andragogy vs. Pedagogy
- 4.3 Conventional teaching - learning: Didactic lectures, Teacher centred approaches, use and importance
- 4.4 Surface learning, deep learning and metacognition
- 4.5 Integrated teaching: Genesis, use, importance and outcomes
- 4.6 Problem-based learning: Genesis, use, importance and outcomes
- 4.7 SPICES model its use, importance and outcomes
- 4.8 Socialization, self-directed learning, mentoring, role model
- 4.9 Community orientation/community posting, re-orientation of medical education camp, community based learning and community engaged teaching-learning methods/models, use, importance and outcomes
- 4.10 Outcome Based Education (Competency-based Medical/Health Professions Education): Genesis, use, importance and outcomes
- 4.11 Experiential learning, Reflective practice, Feedback and feed-forward, Situated learning, Co-operative learning, Communities of practice
- 4.12 Assessment of students
 - 4.12.1 Blueprinting (Table and specification) : use, importance and outcomes
 - 4.12.2 Bloom's taxonomy of cognitive, psychomotor and affective domains, use and importance
 - 4.12.3 Diagnostic, Formative, Summative and Professional exams
- 4.13 Assessment of knowledge: Selection methods like Multiple Choice Questions, Extended Matching Items and supply methods like Short Answer Question, Problem Based Question, Long Answer Question with or without model answers and marking schemes, unstructured, semi-structured and structured viva-voce examination, advantages and limitations, use and importance, outcomes and its use in quality control
- 4.14 Assessment of performance (in-vitro): Direct observation of skills in the simulated setting, lab, ward etc. with or without checklist, Objective Structured Practical Examination, Objective Structured Clinical Examination, Standardized patients, use and importance, analysis, quality assurance, outcomes and its use in quality control
- 4.15 Assessment of performance (in-vivo): Mini-Clinical Evaluation Exercise (Mini-CEX), Direct Observation of Procedural Skills (DOPS), Case-Based Discussion (CbD), OSATS/ PBA, Multi-Source feedback (360 degree evaluation) use and importance for competency based health professions education, analysis, quality assurance, outcomes and its use in quality control
- 4.16 Assessment of observable behaviours in small groups e.g. Problem Based Learning sessions, Community Based Learning and Education sessions, Clinical clerkship rotations
- 4.17 Evaluation: Difference between assessment and evaluation, theory of change and its use in health professions education, process and outcome evaluation, qualitative, quantitative and mixed methods used in evaluation of health professions education

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Paper I

Part II: Technical Subject

Section (C) - 25 Marks

1. Anatomy:

The student should be able to describe the structure (both microscopic and macroscopic) and function of the head, neck and spine.

1.1 Head:

- 1.1.1 Detailed knowledge of the structure of the scalp, cranial and facial bones, skull base, cranial cavities and meninges with emphasis on surgical approaches.
- 1.1.2 Should be able to describe the structure and function of cerebral hemispheres, brainstem, cerebellum and the cranial nerves.
- 1.1.3 Should be able to describe the arterial supply and venous drainage of the brain with special emphasis on microsurgical anatomy of the carotid and vertebral system.
- 1.1.4 Should be able to describe neuroembryology and anomalies resulting from maldevelopment.

1.2 Spine:

- 1.2.1 Should be able to describe the anatomical structure of the cervical thoracic and lumbo sacral spines with structures around them and be able to plan surgical approaches to the spine anteriorly, posteriorly and laterally.
- 1.2.2 Should be able to describe the microsurgical anatomy of the spinal cord and its vascular supply and drainage.

1.3 Peripheral Nerves:

- 1.3.1 Should be able to describe the anatomical basis of surgical exposure of the peripheral nerves.

1.4 Developmental Anatomy:

- 1.4.1 Should be able to describe the development of the nervous system and the embryological basis of various congenital abnormalities of the cranium, spine, brain and spinal cord.

2. Physiology:

- 2.1 Should be able to describe the generation and propagation of impulse in the excitable tissue, synaptic transmission, role of neurotransmitters and physiological basis of EMG and nerve conduction velocity.
- 2.2 Should be able to describe the mechanism of arousal, sleep, electrical activity of the brain and the physiological basis of EEG and Evoked potentials.
- 2.3 Should be able to describe of control of posture and movement and the underlying basis of postural reflexes.
- 2.4 Should be able to describe the function of the pituitary, endocrine abnormality related to the pituitary and the pituitary function tests.
- 2.5 Should be able to describe:
 - 2.5.1 Cerebral metabolism, BBB, ICP, cerebral blood flow, autoregulation, cerebral metabolism and the pathophysiology of ischemic brain damage, blood-brain barrier and physiology of the cerebrospinal fluid, Pulmonary and cardiovascular physiology relating to neurosurgical critical care
 - 2.5.2 Rehabilitation after CNS Lesions

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- 2.5.3 Neurosurgical epidemiology and outcome assessment evaluation of new technologies and evidence based approach to practice.
- 2.5.4 Basic Computer Skill and Tele-medicine
- 3. **Pain:**
 - 3.1 Pain: general historical considerations, approach to the patient with Chronic Pain and medical and surgical management of pain.
- 4. **Radiation Therapy and Radiosurgery:**
 - 4.1 General and historical considerations of radiotherapy and radiosurgery, Radiobiology, Principles of radiotherapy, Fractionated radiation therapy for malignant brain tumours, Radiotherapy for benign skull base tumours, Fractionated radiation therapy for pituitary tumours, Radiotherapy of tumours of the spine, Radiosurgery of tumours, Radiosurgery for arteriovenous malformations, Functional radiosurgery, Interstitial and intracavitary irradiation of brain tumours, Linac radiosurgery, Gamma knife radiosurgery, Proton radiosurgery and Fractionated and stereotactic radiation, Extracranial stereotactic radiation, intensity modulation, and multileaf collimation.
- 5. **Trauma:**
 - 5.1 Modern neurotraumatology: a brief historical review, Cellular basis of injury and recovery from trauma, Clinical pathophysiology of traumatic brain injury, and investigation and management of traumatic brain and spinal injury.

Section (D) - 25 Marks

- 6. **Introduction to Neurological Surgery**
 - 6.1 History and physical examination, Differential diagnosis of altered states of consciousness, Neuro-ophthalmology, Neuro-otology, Neurourology, Neuropsychological assessment, Brain death, Radiology of the skull, Magnetic resonance imaging of brain, Molecular imaging of the brain with positron emission tomography, Radiology of the spine, Anesthesia : preoperative evaluation, Complication avoidance in neurosurgery, General principles of operative positioning, Surgical positioning and exposures for cranial, procedures, Surgical exposures and positioning for spinal surgery and Peripheral nerves.
- 7. **Oncology**
 - 7.1 Brain tumors : epidemiology, histological classification, Clinical features, investigations and management of primary and secondary brain tumors including basic principles of cranial surgery for brain tumors, basic principles of skull base surgery, surgical complications and their avoidance, surgical navigation for brain tumours as well as principles of chemotherapy and radiotherapy.
- 8. **Vascular**
 - 8.1 Historical considerations, ischemic disease and stroke, Carotid occlusive disease, Traumatic carotid injury, Nonatherosclerotic carotid lesions, Extracranial vertebral artery, Intracranial occlusion disease, Cerebral venous and sinus thrombosis,

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Spontaneous intracerebral hemorrhage, intracranial aneurysms, arteriovascular malformations, spinal cord vascular lesions .

9. **Epilepsy:**

9.1 General and historical considerations of epilepsy surgery, Basic science of post-traumatic epilepsy, Approaches to the diagnosis and classification of epilepsy, Antiepileptic medications : Identification of candidates for epilepsy surgery, Motor, sensory, and language mapping, monitoring for cortical Resections and Monitoring and mapping of vision in the neurosurgical patient, Epilepsy surgery

10. **Functional Neurosurgery:**

10.1 History of functional neurosurgery, Rationale for surgical interventions in movement disorders, Approach to movement disorders, Patient selection in movement disorder surgery and different surgeries for movement disorders.

11. **Paediatric:**

11.1 Neurological surgery in childhood: general and historical considerations, Neurological examination in infancy and childhood, Neuroanesthesia in children, and diagnosis and management of neurosurgical conditions in infancy and childhood including Encephaloceles, Myelomeningocele and myelocystocele, Lipomyelomeningocele, Tethered spinal cord, Occult spinal dysraphism and the tethered spinal cord, Dandy-walker syndrome, Arachnoid cysts, hydrocephalus in children, arteriovenous malformations and intracranial aneurysms in children, and head trauma in children and brain tumors in children.

12. **Peripheral Nerve:**

12.1 General principles in evaluating and treating peripheral nerve injuries, Peripheral neuropathies

13. **Spine:**

13.1 Overview and historical considerations, Biologic strategies for central nervous system repair, Concepts and mechanisms of biomechanics, Intraoperative electrophysiologic monitoring of the spinal cord and nerve roots, Bone metabolism and it relates to spinal disease and treatment, Normal and abnormal embryology of the spinal cord and spine

13.2 Approach to the patient and medical management of spinal disorders, Metabolic and other nondegenerative, Infections of the spine and spinal cord, Treatment of disk and ligamentous diseases of the spine, Benign extradural lesions of the dorsal spine, Treatment of disk disease of the spine, Adult thoracolumbar scoliosis, Acquired abnormalities of the craniocervical junction, Tumours of the craniovertebral junction, Spinal cord tumours in adults, Tumours of the vertebral axis: benign, primary malignant, and metastatic tumours,

13.3 Spine trauma: approaches to the patient and diagnostic evaluation