

**शहीद धर्मभक्त राष्ट्रिय प्रत्यारोपण केन्द्र**  
मानव अङ्ग प्रत्यारोपण विकास समिति, प्रविधिक सेवा, रेडियोलोजी समूह, रेडियोडाइग्नोसिस उपसमूह, नबौ तह,  
कन्सल्टेण्ट (रेडियो डायग्नोसिस) पदको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम  
एवं परीक्षा योजना

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको 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	Management	25	100	40	5 × 5 = 25 (Short answer)	3.00 hrs
	General Health Issues & Related Legislations	40			4 × 5 = 20 (Short answer) 2 × 10 = 20 (Long answer)	
	Human Organ Donation & Transplantation	35			3 × 5 = 15 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject (Radiology)		100	40	6 × 10 = 60 (Short answer) 2 × 20 = 40 (Long answer)	3.00 hrs

**द्वितीय चरण (Second Phase) : अन्तर्वार्ता (Interview)**

Subject	Full Marks	Examination
Interview	30	Oral

**द्रष्टव्य :**

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।
- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- लिखित परीक्षामा सोधिने प्रश्नसंख्या र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा दिईए अनुसार हुनेछ ।
- विषयगत प्रश्नमा एउटा लामो प्रश्न वा 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 सकिनेछ ।
- प्रथम र द्वितीय पत्रमा प्रत्येक खण्ड (Section) को लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरू हुनेछन् । उम्मेदवारले प्रत्येक खण्ड (Section) को प्रश्नको उत्तर छुट्टाछुट्टै उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जुन सुकै कुरा लेखिएको भए तापनि 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 छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
- पाठ्यक्रम स्वीकृत मिति :- २०८१/०८/०४

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**Paper I: General Subject**  
**(Management, Human Organ Donation & Transplantation, General Health Issues & Related Legislations)**

**Section (A)**

Short Questions	5 Question × 5 Marks = 25 Marks	<b>25 Marks</b>
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**1. Management**

- 1.1 Management: concept, principles, functions, scope, role, level and skills of managers
- 1.2 Participative management: concept, advantages and disadvantages, techniques of participation
- 1.3 Time management: concept, advantages, and disadvantages
- 1.4 Conflict management: concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
- 1.5 Stress management: concept, causes and sources of stress, techniques of stress management
- 1.6 Planning: concept, principles, nature, types, instrument and steps
- 1.7 Motivation: concept, theories of motivation, reason for low productivity, techniques of employee motivation
- 1.8 Leadership: concept, functions, leadership styles, leadership and management effectiveness
- 1.9 Coordination: concept, need, types, techniques & approaches of effective coordination
- 1.10 Communication: concept, communication process and barrier to effective communication, techniques for improving communication
- 1.11 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
- 1.12 Fundamental principles of healthcare institution and hospital management

**Section (B)**

Short Question	4 Question × 5 Marks = 20 Marks	<b>40 Marks</b>
Long Question	2 Question × 10 Marks = 20 Marks	

**2. General Health Issues (25 Marks)**

- 2.1 Present Constitution of Nepal (health and welfare issues)
- 2.2 International health agencies: role and responsibilities of WHO, UNICEF, UNFPA and interagency relationships
- 2.3 Medical ethics
- 2.4 Indigenous and traditional faith healing and health practices
- 2.5 Supervision, types and its usage in health sector
- 2.6 Monitoring and evaluation system in health Sector
- 2.7 Health management information system
- 2.8 Health insurance and financing in health care
- 2.9 Effects of environment in public health: air pollution, domestic pollution, noise pollution
- 2.10 Importance of water, sanitation and hygiene in public health

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- 2.11 Effects of disaster in public health: deforestation, landslide, flood, earthquake & fire
- 2.12 Health volunteers' involvement in health service delivery
- 2.13 Counseling: concept, type, importance and its application in health service delivery

### 3. Related Legislations (Policy, Act and Regulations) (15 Marks)

- 3.1 National Health Policy, 2076
- 3.2 Human Organ Transplantation (Regulation and Prohibition) Act, 2055 with amendment
- 3.3 Human Organ Transplantation Regulations, 2073
- 3.4 Guidelines on medical treatment of deprived citizens program, 2080
- 3.5 Human Organ Transplant Development Committee Personnel Administration Rules, 2069 (मानव अंग प्रत्यारोपण विकास समिति कर्मचारी प्रशासन नियमवाली, २०६९)
- 3.6 Human Organ Transplant Development Committee Formation Order, 2068 (मानव अंग प्रत्यारोपण विकास समिति गठन आदेश, २०६८)
- 3.7 Health Workers and Health Institutions Security Act, 2066 & Health Workers and Health Institutions Security Regulation, 2069
- 3.8 Health Insurance Act, 2074
- 3.9 Health Service Act, 2053
- 3.10 Public Health Service Act, 2075

#### Section (C)

Short Question	3 Question × 5 Marks = 15 Marks	<b>35 Marks</b>
Long Question	2 Question × 10 Marks = 20 Marks	

### 4. General Concept of Solid Organ Donation and Transplantation

- 4.1 Basic Concept of Transplant Science
  - 4.1.1 Transplant immunology
  - 4.1.2 Basic terminology : autologous graft, syngeneic graft, allogeneic graft, xenogeneic graft, alloantigen, alloreactive, immune rejection
  - 4.1.3 Types of graft rejection : hyper acute rejection, acute cellular rejection, acute antibody mediated rejection, chronic rejection
  - 4.1.4 Immunosuppressant drugs used in organ transplantation
  - 4.1.5 Evaluation of donor and recipient and management
  - 4.1.6 Organ preservation and procurement
  - 4.1.7 Role of immunological test in transplantation : Human leucocyte antigen (HLA), Donor specific antibodies (DSA), Panel reactive antibodies (PRA), Complement dependent cytotoxicity (CDC) cross match, flow cross match
  - 4.1.8 Complications among organ transplant recipients and management
- 4.2 Concepts of Organ Donation and Transplantation Process
  - 4.2.1 Demand vs. supply gap in transplantation
  - 4.2.2 Health promotion and prevention of organ failure
  - 4.2.3 Organ failure, organ donation, transplant etc
  - 4.2.4 Organ recovery process
  - 4.2.5 Organ donation process
  - 4.2.6 Brain death donation: definition, declaration & management

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- 4.2.7 Contraindication of transplantation in brain death donation
- 4.2.8 Hurdles in brain death donation program
- 4.2.9 Brain death, criteria for certifying brain death and tests to confirm diagnosis
- 4.2.10 Concept of circulatory death : donation after circulatory death (DCD), types, different from brain death donation
- 4.2.11 Allocation of Kidneys, Liver, Heart and Lungs in Deceased donor transplantation
- 4.2.12 Preservation and transportation of retrieved organs
- 4.3 History of organ transplantation in Nepal
- 4.4 Role, scope and importance of Shahid Dharmabhakta National Transplant Center in organ transplantation
- 4.5 Religion and culture in organ donation and transplantation

## **5. Ethical Issues in Organ Donation and Transplantation**

- 5.1 Patient confidentiality and privacy legislation
- 5.2 Patient autonomy
- 5.3 Principles of informed consent and decision making
- 5.4 Next of kin designation
- 5.5 End of life decision making
- 5.6 Organ procurement for transplantation
- 5.7 Management and review of adverse events
- 5.8 Communication with families in crisis

**Paper II: Technical Subject  
(Radiology)**

**Section A (Transplant Radiology)**

Short Question	3 Question × 10 Marks = 30 Marks	<b>50 Marks</b>
Long Question	1 Question × 20 Marks = 20 Marks	

**1. Renal Transplantation (20 marks)**

- 1.1 Pre op evaluation of the Donor- Role of imaging
- 1.2 Post renal transplant complications
- 1.3 Post renal transplant complications diagnosis and management- Radiologists role
- 1.4 Intra operative Doppler- Approach and role of imaging in identification of early complications
  - 1.4.1 Renal Doppler
  - 1.4.2 Fistula Doppler
  - 1.4.3 Venous mapping for AV fistula creation
  - 1.4.4 CT/USG scan pre-op evaluation of the donor.
  - 1.4.5 CT Renal angiography Donor and Transplant criteria's for right Donor Selection
  - 1.4.6 Post renal Transplant Complication Role of Computed tomography (CT) / Ultra sonography (USG) / Magnetic resonance imaging (MRI)/ Diethylenetriamine pentaacetic acid (DTPA) renal scan
  - 1.4.7 Renal biopsy- Indications, contraindications and complications

**2. Liver Transplant (30 marks)**

- 2.1 Pre op evaluation of the Donor- Role of imaging
- 2.2 Pre op evaluation of the Donor, Liver Volumetric study
- 2.3 Liver attenuation index (LAI)
- 2.4 Intra op Liver Doppler
- 2.5 Role of Radiologist and interventional Radiologist in post Liver transplant complication management
- 2.6 Post-operative Liver Doppler
- 2.7 Trans jugular liver biopsy Indications Procedure Complications
- 2.8 Trans jugular intrahepatic portosystemic shunt (Indications, Procedure steps, contraindications and complications)
- 2.9 Role of transarterial chemoembolization (TACE) and combined TACE and microwave ablation (MWA) for liver cancer
- 2.10 MWA/radio frequency ablation (RFA) for focal liver mass
- 2.11 TARE for hepato cellular carcinoma (HCC)
- 2.12 Targeted and non-targeted liver biopsy (Indication procedure and complications)
- 2.13 T-tube cholangiography
- 2.14 ERCP, percutaneous cholangiogram (PTC) and percutaneous biliary drainage (PTBD)
  - 2.14.1 Interventional procedures

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- 2.14.2 (Ascites and pleural tapping) diagnostic and therapeutic
  - 2.14.3 Role of pigtail- Checklist, approach and procedure steps
  - 2.14.4 Fine needle aspiration cytology (FNAC)/ USG guided biopsy of the neck, thyroid, breast, soft tissue mass and chest wall lesions - Biopsy approach and complications
  - 2.14.5 CT guided drainage of intra-abdominal collection Approach, plan, procedure steps and management of complications
  - 2.14.6 CT guided biopsy of lung, liver, kidney, bones, pancreas, and retroperitoneal lesions of the abdomen Approach, Procedure steps- and complications
  - 2.14.7 Embolization Materials (Classifications)
  - 2.14.8 Various uses of embolization Complications of embolization
  - 2.14.9 PTBD- (Percutaneous transhepatic biliary drainage, indications, procedure steps, approach and complications
  - 2.14.10 Transarterial chemoembolization (TACE) and Microwave ablation for HCC
  - 2.14.11 Interventional radiologists Role and complications of TACE and other intervention
3. Role of Radiology in Heart & Lung Transplantation
    - 3.1 Pre & Post of Imaging in Heart and Lungs Transplant recipient
    - 3.2 Post operative complication of Heart and Lungs Transplant recipient

### Section B

Short Question	3 Question × 10 Marks = 30 Marks	<b>50 Marks</b>
Long Question	1 Question × 20 Marks = 20 Marks	

#### 1. Basic Science (10 marks)

##### 1.1 Anatomy

- 1.1.1 Respiratory system- Lung Segments
- 1.1.2 Hepatobiliary System- Liver Couinauds classification
- 1.1.3 Genitourinary system- Renal vascular anatomy
- 1.1.4 Cardio Vascular System - Heart & Vascular trees
- 1.1.5 Gastrointestinal System- Anatomy

#### 2. Radiation Physics (20 marks)

- 2.1 Electromagnetic radiation & its properties
- 2.2 Production and properties of X-ray
- 2.3 Interaction of Radiation with matter
- 2.4 Properties of X-ray film, film processing
- 2.5 X-ray absorption on the radiographic image
- 2.6 Grid & filter
- 2.7 Principle of Diagnostic ultrasound
- 2.8 Principle of CT
- 2.9 Principle of MRI

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- 2.10 Principle of Nuclear Medicine and Imaging
- 2.11 Radiation Hazards and its effects Central Nervous System
- 2.12 Cerebrovascular accident (Stoke, CT Protocol ) MRI in stoke imaging
- 2.13 Congenital diseases of brain
- 2.14 Brain and spinal tumor
- 2.15 Endocrine and metabolic diseases
- 2.16 Ultrasound imaging of the whole body
- 2.17 CT Imaging of the whole body
- 2.18 MRI Imaging of the whole body

### **3. Urogenital Tracts (20 marks)**

- 3.1 Congenital lesions
- 3.2 Cystic diseases of the kidney Bosniak grade
- 3.3 Tumors of the kidney and ureter
- 3.4 Renal calculi and Nephrocalcinosis
- 3.5 Renal parenchymal disease - Ultrasound
- 3.6 Renal trauma-American Association for Surgery of Trauma (AAST) classification
- 3.7 Renal Vascular diseases
- 3.8 Diseases of Bladder and prostate
- 3.9 Renal Doppler Iliac Doppler of the recipient
- 3.10 Venous mapping for AV fistula creation
- 3.11 CT scan pre- evaluation of the donor-Checklist
- 3.12 Role of imaging and Radiologist in the evaluation of the renal transplant recipient
- 3.13 CT Renal angiography Donor