GURUGRAM UNIVERSITY, GURUGRAM

(A State Govt. University established under Haryana Act 17 of 2017)

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No. GUG/Estt/2026/ET-122 **Dated** 12-02-2026

NOTICE

Subject : **Syllabus for written test for the post of Assistant Professors advertised vide Advt. no. T-01-12/2025.**

In continuation with the above referred advertisement, all applicants are hereby infomed that the syllabus for the written test for the Assistant Professors in various disciplines/ subjects is as follows: -

Subject Disciplines	Syllabus
Pharmaceutical Sciences	As per latest GPAT
Mangement / Law/ Hindi / English/ Economics/ Psychology	As per latest NET
Physics / Mathematics	As per latest CSIR NET
Computer Science & Engg. (CSE)	As per latest GATE
Physiotherapy	Attached at annexure- A
ECE	Attached at annexure- B

Written test will comprise of 50 MCQs. There will be negative marking of 0.25 marks for each incorrect answer. The minimum qualifying marks shall be 50% (47.5% for DSC/OSC/BCA/BCB/PwBD). Eligibility of only written test qualified applicants will be evaluated by the Scrutiny committee.

The schedule of written test will be notified in due course. All applicants are advised to keep visiting university website for updates, if any.

This is for information of all the applicants.

Sd/-
REGISTRAR

Copy to ;

- Director, UCDAC for uploading on university website.
- PS to VC (for information)

ANNEXURE- A

SYLLABUS FOR THE POST OF ASSISTANT PROFESSOR IN PHYSIOTHERAPY

GENERAL PHYSIOTHERAPY

1) **Exercise Therapy**

a. Assessment techniques: Manual Muscle Testing and Goniometry
b. Stretching and Mobilization
c. Re-education and strengthening
d. Balance and Coordination Ex.
e. Gait Analysis and Training (Both Normal and Pathological Gaits)
f. Relaxation and soft Tissue Manipulations
g. Posture
h. PNF and Neuromuscular Coordination
i. Hydrotherapy
j. Joint Mobilization

2) **Electro-Therapy**

a. General Review of Low, Med and high currents and their modifications
b. Laser
c. Ultrasound
d. Cryotherapy
e. UVR and IRR
f. Other thermal modalities like SWD, MWD, HydroCollator, Wax therapy Fluido-therapy.

3) **Fundamental mechanics**

a. Forces; composition and resolution of forces; force systems
b. Force of gravity, LOG and COG
c. Stability
d. Reaction forces
e. Friction
f. Moments
g. Newton's laws
h. Equilibrium: static and dynamic
i. Simple machines: Levers, pulleys and wheel and axle • Segmental dimensions • Poisson's effect • Static and cyclic load behaviors •
j. Load: Load sharing and load transfer
k. Kinematics
   i. Motion: Types, location, magnitude and Direction
   ii. Angular motion and its various parameters
   iii. Linear motion and its various parameters
   iv. Projectile motion
l. Muscle Mechanics
m. Bone Mechanics
n. Joint Mechanics
o. Measurement Instruments: Pressure transducers and Force Plates, Gait Analyzer, Isokinetic device, EMG

ORTHOPEDICS

A. **Orthopedic Assessment:**

i. Patient History, Observation, Examination-Active and Passive Movements, functional Assessment, Special Tests, Reflexes and Cutaneous Distribution, Joint Play Movements Palpation

ii. Regional Examination with Special Emphasis on Special Tests

iii. Orthopedic Diagnosis: Biomechanical measurements –Limbs and Spine, Biopsy, Plain Radiography, Contrast Radiography, Contrast Tomography, Magnetic Resonance Imaging, Arthroscopy, Electromyography, Nerve Conduction Velocity, Strength Duration Curve, Bone Densiometry.

iv. Gait-Definitions, Gait Cycle, Abnormal Gait patterns

v. Posture-Normal and Abnormal

vi. Spinal Deformities

vii. Disability Evaluation

viii. Assessment of Amputees

ix. Examination and Assessment of Geriatric patient.

B. **General Orthopedics:**

i. Infection Disorders of the Bones and Joints

ii. Metabolic Disorders of the bones and joints

iii. Congenital Disorders of the bones and joints

iv. Inflammation of the bones and joints

v. Degeneration of the bones and joints

vi. Developmental of the bones and joints

vii. Connective tissue Disorders

viii. Neuromuscular disorders

ix. Tumors of bones

x. Complex Regional Pain Syndrome

xi. Myopathies

xii. Burns

NEUROLOGY

1. **Neuroanatomy (Applied)-**
   i. Organization of the nervous system (CNS, PNS, ANS);
   ii. Functional anatomy of (a) Cerebral cortex (motor, sensory, association areas),(b) Basal ganglia (c) Cerebellum (d) Brainstem nuclei and pathways & (e) Spinal cord tracts;
   iii. Blood supply of brain and spinal cord;
   iv. Ventricular system and CSF circulation;
   v. Cranial nerves (functional correlations);
   vi. Neuroplasticity and cortical reorganization

2. **Neurophysiology:**
   i. Neuron structure and function,
   ii. Synaptic transmission,
   iii. Action potential and nerve conduction,
   iv. Motor control and motor learning,
   v. Muscle tone regulation,
   vi. Reflex mechanisms,

vii. Ascending and Descending motor pathways,
viii. Postural control and balance mechanisms

3. Clinical Neurology

i. **Central Nervous System Disorders:** Stroke (ischemic, haemorrhagic), Traumatic brain injury (TBI), Spinal cord injury (complete & incomplete), Brain tumours, Hydrocephalus, Cerebral palsy, Multiple sclerosis, Motor neuron disease, Parkinson's disease, Huntington's disease, Ataxias, Dementia

ii. **Peripheral Nervous System Disorders:** Peripheral neuropathies, Guillain–Barré syndrome, Myopathies, Neuromuscular junction disorders (e.g., Myasthenia Gravis), Nerve injuries (classification and recovery)

iii. **Paediatric Neurological Conditions**

4. Neurological Assessment In Physiotherapy

i. **Clinical Neurological Examination-**Higher mental functions; Cranial nerve examination; Motor system examination; Sensory system examination; Reflexes; Coordination and balance tests; Gait analysis

ii. **Functional & Outcome Measures-** Muscle tone assessment; Motor function scales; Balance scales; Gait assessment tools; Upper limb functional tests; Quality of life measures; ICF framework in neurorehabilitation

5. Neurological Physiotherapy Techniques

i. Bobath / Neurodevelopmental Treatment (NDT)
ii. Brannstrom approach
iii. Rood's approach
iv. Proprioceptive Neuromuscular Facilitation (PNF)
v. Motor relearning program
vi. Task-Oriented & Contemporary Approaches-Task-specific training; Constraint-Induced Movement Therapy (CIMT); Mirror therapy; Mental imagery; Dual-task training; Community-based rehabilitation; Goal-oriented therapy; Virtual reality in neurorehabilitation; Robotics and exoskeletons; Functional Electrical Stimulation (FES); Biofeedback
vii. Condition-Specific Physiotherapy Management

CARDIO THORACIC & PULMONARY CONDITIONS

1. Cardio-Pulmonary assessment
   i) History taking ii) Observation iii) Palpation iv) Auscultation v) Percussion vi) Functional ability
2. Relevant diagnosis tests:
   i) Hematology ii) ABG analysis iii) Spirometry iv) Invasive and Non-invasive techniques v) ECG vi) Echocardiography vii) Imaging • Plain X-ray • Computed Tomography • Magnetic resonance imaging viii) Cardiac catheterization ix) Radio nuclide Scanning x) Stress testing xi) Lung Function Testing xii) Biofeedback xiii) Humidification and Aerosol Therapy.

CARDIOLOGY:

i) Assessment of system of heart disease.
ii) Disorders of cardiac rate rhythm and conduction.
iii) Cardiac Arrest Course

iv) Shock
v) Rheumatic fever
vi) Congenital Heart Values
vii) Disease of Heart Values
viii) Infective endocarditis
ix) Ischemic heart disease
x) Hypertension
xi) Ortho static hypertension
xii) C.P.R
xiii) Pericarditis
xiv) Heart disease in pregnancy
xv) Inflammatory arterial disease
xvi) Raynaud's Disease
xvii) Venous Thrombosis
xviii) Peripheral Vascular Disease
xix) Cardiomyopathy
xx) Disease of the pericardium

PULMONOLOGY:

i) Obstructive Pulmonary Disease
ii) Infections of the respiratory System
iii) Interstitial and Infiltrative Pulmonary Diseases.
iv) Pulmonary Disease due to Exposure to Organic and Inorganic Pollutants
v) Pulmonary Disorders due to Systemic Inflammatory disease
vi) Pulmonary Vascular disease
vii) Disease of the Pleura
viii) Respiratory Failure
ix) Supplementary Oxygen and Oxygen Delivery in chronic Respiratory disease
x) Neuromuscular Atrophic, Poliomyelitis, Motor Neuron Disease, Kyphoscoliosis Pectus carinatum, Pectus Excavatum
xi) Pathophysiology of Paralytic-Restrictive Pulmonary Syndromes
xii) Conventional Approaches to Managing Neuromuscular Ventilatory Failure
xiii) Mechanical Ventilation: Concepts, Physiological effects and Complications

CARDIOTHORACIC SURGERIES:

1. Closed versus open Heart Surgeries
2. Incisions
3. Preoperative Assessment of Patients
4. Pre and Post-Operative Blood Exchange
5. Hemodynamics Performance of Patient
6. Emergencies in CTVS
7. AV Shunts
8. Heart Transplant
9. Left Ventricular Assistive Devises
10. Procedure on Sternum, Chest wall Diaphragm, Mediastinum and Esophagus
10. Cardiopulmonary Bypass
11. Maintaining and Removing Artificial always
12. All Pulmonary Surgeries like Lobectomy, Pneumonectomy Pleurectomy, Thoracotomy etc.

SPORTS PHYSIOTHERAPY

i. Emergency sports evaluation
ii. Biomechanics of running and jumping,
iii. medical problems of athletes, female athletic tried,
iv. emergency care athletes first aid and cardiopulmonary resuscitation,
v. sports specific injury pattern -cricket, tennis, football, sports injuries to lower Limb, spine, internal and external bleeding,
vi. role of physical exercise in high blood pressure & diabetic athlete,
vii. bio-mechanic and injury to cricket, Judo, tennis badminton, swimming,
viii. Cyriax mobilization technique for peripheral joints and spine, capsular stretching,
ix. principle of Pilates,
x. structural and functional adaptations to resistance training,
xi. environmental stress on exercise performance- medium and high altitude,
xii. thermal stress, energy expenditure during walking running and swimming.

ANNEXURE- B

SYLLABUS FOR THE POST OF ASSISTANT PROFESSOR IN E.C.E

Device Physics: Semiconductor basics and crystal structure, Energy bands in crystalline solids, intrinsic and extrinsic semiconductors, equilibrium carrier concentration, direct and indirect band- gap semiconductors. Carrier transport: diffusion current, drift current, mobility and resistivity, generation and recombination of carriers, Poisson and continuity equations, Device modelling. Properties of Silicon, SiO_2, Silicon nitrides, polysilicon, metal/oxide semiconductors interfaces, interconnect, insulators, isolators. P-N junctions, hetro junctions, Metal Semiconductor Contacts, Breakdown diodes, BJTs, MOS CAPs, MOSFETs, non-conventional FETs, LEDs, photodiodes and solar cells.

Circuits: BJT and MOSFET amplifiers: biasing, ac coupling. Current mirrors and differential amplifiers. Op-amp circuits: Amplifiers, summers, differentiators, integrators, active filters, Schmitt triggers and oscillators. **Combinational circuits:** Number representations, Boolean algebra, minimization of functions using Boolean identities and Karnaugh map, logic gates, CMOS inverters and their static/dynamic CMOS implementations, arithmetic circuits, code converters, multiplexers, decoders. **Sequential circuits:** latches and flip-flops, counters, shift registers, finite state machines, propagation delay, setup and hold time, critical path delay. Data converters: sample and hold circuits, ADCs and DACs. Semiconductor memories (Volatile and Non-Volatile): ROM, SRAM, DRAM. **Microprocessors (8085-86) and Microcontrollers (8051, Aurdino, ARM)**: Architecture, addressing modes, pipelining, instructions, interrupts, programming and I/O interfacing.

Fabrication Processes & Technology: Clean rooms, Crystal growth, Wafer fabrication. Wafer Cleaning/Dicing/Handling/Characterization, Oxidation, epitaxy, Lithography, Advanced lithography, Masks, Resists, Diffusion, Ion Implantation, Vacuum technology, Thin film depositions, Etching, Metallization, Multi-level metalization, interconnect and vias, bonding, MOSFET & CMOS Process flow, backend technology, and IC packaging. Process models and TCAD for IC fabrication processes. Measurement and characterization methods: Morphological, Electrical, Chemical and Mechanical. **CMOS Technology:** Moores Law**,** MOSFET scaling and technology trends.

Integrated Circuit Design: Introduction to VLSI Design: Top Down and Bottom-up approach, Design flow, Overview/Evolution of VLSI technology/ICs and its applications, Design methodologies, Layout design rules and abstraction levels. **Digital Design:** CMOS Inverters, Combinational and sequential logic design, Arithmetic circuits and data path design, Finite State Machine (FSM) design, Memory design. **Analog Design**: Basic concepts of analog circuits, Analog CMOS circuits, Operational amplifiers and feedback circuits, Analog-to-Digital and Digital-to-Analog converters, Radio-frequency (RF) and mixed-signal integrated circuit design, circuit simulators.

Advanced VLSI Design Techniques: Low power design techniques, Clock and power distribution networks, Digital System Testing and Fault Simulation, Design for testability (DFT) and Built-In Self-Test (BIST), Embedded System Design, System on chip, RF Microelectronics, Digital Signal Processing in VLSI, Hardware description languages (HDLs: VHDL, Verilog, System Verilog) different modelling styles, data types, objects, Dataflow, Behavioral and Structural Modeling, Simulation and synthesis. HDLs constructs and codes for combinational and sequential circuits.

ASIC Design Methodologies: ASIC design flow, RTL design and synthesis, Static Timing Analysis (STA) and timing closure, clock skew, Physical design and layout considerations. **Field- Programmable Gate Arrays (FPGAs)**, FPGA architecture and programming, High-level synthesis (HLS) and FPGA design flow, FPGA-based prototyping and verification.

Emerging Trends in VLSI: Multi-core processors, Advanced CMOS technologies:(FinFETs, PD, FD-SOI, HEMT), Nanoelectronics, III-V/2D semiconductor FETs, High-κ, MEMS, NEMS, Low dimensional semiconductor devices – quantum wells, quantum wires, quantum dots. Three- dimensional integrated circuits (3D ICs), Neuromorphic and quantum computing concepts. IC Packaging, TCAD, ECAD and EDA simulation tools in VLSI, Computational techniques, and VLSI design challenges.

Communications, Networks, Signals and Systems: Analog & Digital communications, Circuit analysis, Continuous-time signals, Discrete-time signals, LTI systems.