CET Date: 02 JULY 2026 (Thursday)

M.Sc. Medical Physics

Common Entrance Test (CET) Regulations

M.Sc. Medical Physics program at The Gujarat Cancer & Research Institute, Ahmedabad is affiliated by Gujarat University and recognized by Atomic Energy Regulatory Board (AERB), Mumbai. As per the requirement of National Commission for Allied & Healthcare Professions (NCAHP), GCRI is conducting a Common Entrance Test (CET) as a partial fulfillment of eligibility requirements.

Student Intake Per Year: Ten students

Pattern of the program: The program adopts semester system.

Background of the program:

This program has been specially designed to meet the ever increasing demand for well trained personnel with advanced & appropriate skills and knowledge of Medical Physics.

Duration of the Program:

Duration of this program will be three years including two academic years (4 semesters) plus one-year mandatory paid residency.

Medium of instructions: English

Eligibility Criteria:

First class B.Sc. Physics with Mathematics as an ancillary subject

Or

B.Sc. with Physics as a major (≥ 60% or ≥ 6.5 CGPA) and Mathematics as an ancillary subject

Additionally, candidates must be medically fit and are required to appear for the Common Entrance Test (CET) conducted by The Gujarat Cancer & Research Institute. Admission is based on CET performance and fulfillment of all eligibility criteria.

Fee Structure:

M.Sc. Course			
Course Type	Course	Fees (in Rs)	
		Male	Female
HPP	Medical Physics	40,000/- per semester	40,000/- per semester

Note: During Residency of one year a stipend of Rs. 10,000 per month will be given to each student.

Syllabus for M.Sc. Medical Physics CET:

1. **Mechanics:**

Newton's law of Gravitation, various forces in nature, central and non-central forces, inverse square force, centre of mass, equivalent one body problem, reduced mass, angular momentum in central force field, equation of motion under a force law, equation of orbit and turning points, relationship between eccentricity and energy, Kepler's laws, rotational motion, angular velocity, angular momentum, torque, conservation of angular momentum, elastic and inelastic collisions, coefficient of restitution, elastic collisions in laboratory and centre of mass systems, velocities, angle and energies in elastic collisions in laboratory and centre of mass system, cross- section for elastic scattering, Rutherford scattering.

Special theory of relativity, concept of stationary universal frame of reference, Michelson- Morley experiment, postulates of special theory of relativity, Lorentz transformations, observers in relativity, relativity of simultaneity, length contraction, time dilation, relativistic addition of velocities, relativistic Doppler effect, variation of mass with velocity and mass energy equivalence, increase of mass in an inelastic collision, relativistic momentum and energies, transformations of momentum and energy, Minkowsky space.

2. **Electricity and Magnetism:**

Electrostatic force, electrostatic field, electric flux, Gauss' theorem of electrostatics, electric field due to a point charge, infinite line of charge, uniformly charged spherical shell and solid sphere, plane charged sheet, charged conductor, electrostatic potential, electrostatic potential energy, electric potential due to a dipole and quadrupole, electric potential energy, electric field as a gradient of a scalar potential, calculation of electric field due to a point charge and a dipole from potential, Poisson and Laplace equations, electric current and current density, continuity equation, Ohm's law.

Ampere's circuital law and its applications, Hall effect, divergence and curl of magnetic field, behavior of various substances in magnetic field, magnetic permeability and susceptibility and their interrelation, orbital motion of electrons and diamagnetism, electron spin and paramagnetism, ferromagnetism, domain theory of ferromagnetism, magnetization curve, hysterics loss.

Dielectrics, parallel plate capacitor with a dielectric, dielectric constant, polarization and polarization vector, displacement vector, Claussius – Mossotti equation, polarization of matter, atomic and molecular dipoles, induced dipole moment and atomic polarizability, electric susceptibility and polarization vector, Gauss' law, displacement vector, energy stored in a dielectric medium.

3. Thermodynamics:

Kinetic theory of gases: Introduction –Deduction of Maxwell's law of distribution of molecular speeds, experimental verification. Transport phenomena – Mean free path - Viscosity of gases-thermal conductivity-diffusion of gases.

Thermodynamics: Introduction- Isothermal and adiabatic process- Reversible and irreversible processes- Carnnot's engine and its efficiency-Carnot's theorem-Second law of thermodynamics. Kelvin's and Claussius statements-Entropy, physical significance –Change in entropy in reversible and irreversible processes-Entropy and disorder-Entropy of Universe–Temperature-Entropy (T-S) diagram and its uses - Change of entropy of a perfect gas- change of entropy when ice changes into steam.

4. Optics:

Diffraction of Light (Fresnel class): Frensnel‟s half period zones, zone plate, difference between interference & diffraction,

Fraunhofer class: Fraunhofer diffraction at two slits, diffraction at N slits, Plane diffraction grating, Dispersive power of grating, Grating at oblique incidence.

Resolving power of optical Instrument: Resolving power, Rayleigh‟s criterion of resolution, resolving power of telescope, relation between magnifying power & the resolving power of telescope, Resolving power of a plane diffraction grating, difference between resolving power & dispersive power of grating, comparison of prism & grating spectra

5. Electronics:

Semiconductros, *p-n* junctions, V-I characteristics, Zener diode, tunnel diode, LED and LCD, solar cell, half wave, full wave and bridge rectifier, filter circuits. Transistors, characteristics of a transistor in CB, CE and CC mode, field effect transistor, depletion and enhancement mode, MOSFET, amplifiers, principle of

operation, emitter follower, feedback in amplifiers, negative feedback and stability.

Oscillators, Braukhausen criteria for oscillations, tuned collector, Hartley and Colpitts oscillators, phase shift oscillators, operational amplifiers, inverting and non-inverting amplifiers, operational amplifier as adder, subtractor, comparator, integrator and differentiator**.**

6. Solid State Physics:

Crystal structure and crystal bonding, lattice translation vectors, lattice with a basis, unit cell, Miller indices, reciprocal lattice, types of lattices, Brillouin zones, diffraction of X-rays by crystals, Bragg's law, Laue equations, atomic and geometrical factor, potential between a pair of atoms, Lennard-Jones potential, ionic, covalent and Vander – Waal's bonding, calculation of cohesive energy for ionic and inert gas system.

Lattice vibrations and phonons, linear monoatomic and diatomic chains, acoustical and optical Phonons, qualitative description of the phonon, spectrum in solids, specific heat, Dulong and Petit's law, Einstein and Debye theories of specific heat of solids.

Free electron theory of metals, Fermi gas, density of states, Fermi energy and Fermi velocity, electronic contribution to specific heat of metals, band theory of metals, Kronig Penny model, electrons in periodic structure, energy bands, energy gaps, effective mass of electron, electron mobility, metals, insulators and semiconductors.

Superconductivity, Meissner effect, Type I and Type II superconductors, London's equation and penetration depth, isotope effect, cooper pairs, BCS theory.

7. Nuclear Physics:

Liquid drop model, semi empirical mass formula and significance of various terms, nuclear stability, two nucleon separation energies, evidence for nuclear shell structure, nuclear magic numbers, nuclear shell model and its applications.

Radioactive decay, laws of radioactive decay, mean life and half life, alpha (α) decay, theory of α-emission, Gamow factor, Geiger-Nuttall law, beta-decay, energy kinematics for beta-decay, positron emission, electron capture, neutrino hypothesis, gamma decay, gamma ray emission and kinematics, internal conversion.

Nuclear reactions, types of reactions, conservation laws, kinematics of reactions, Q-value of reaction, nuclear fission, nuclear fusion, reaction rate, reaction cross

section, compound and direct reactions, resonance reactions, Coulomb scattering.

8. **Mathematical Physics:**

Fourier series**:** Introduction, Simple Harmonic motion & wave motion – Periodic functions, Applications of fourier series, Average value of a function, Fourier co-efficients, Dirchlet conditions, complex form of fourier series, other intervals, Even & odd functions, Parsevel‟s theorem, Applications/Numericals on Fourier series.

Differential equations: Some partial differential equations in physics, the method of Separation of variables, separation of Helmholtz equation in Cartesian coordinates, in spherical polar and cylindrical Coordinates, Laplace's equation in various coordinates, Choice of coordinate system and separability of a partial differential equation, Parabolic coordinates system, Prolate Spheroidal coordinates system, various examples based on the separation of variables.

Application Process: Prospective students are required to complete an online application form available on the official GCRI website (www.gcriindia.org). The application includes payment of a registration fee of Rs. 500.

After submitting the application with educational qualification, age, and government issued identification (Aadhar Card), list of all eligible candidates will be called for test at The Gujarat Cancer & Research Institute, Ahmedabad on **02 July 2026 (Thursday)**.

Merit List and Counseling: The Common Entrance Test (CET) will be conducted at The Gujarat Cancer and Research Institute (GCRI), New Civil Hospital Campus, Asarwa, Ahmedabad – 380 016.

For preparation of the merit list, the following weightage shall be considered:

- 50 % weightage for the CET score; and
- 50 % weightage for the aggregate percentage of all 3 years obtained in B.Sc. examination

Based on CET scores, a merit list will be sent to GCAS. Shortlisted candidates participate in a centralized counseling process (GCAS), where they can select their preferred institutions and specializations, subject to seat availability.

Admission Confirmation: Following counseling, candidates must confirm their admission by paying the required fees and completing any additional formalities specified by the allotted institution/university.

It's important to regularly check the official website of **Gujarat Common Admission Service (GCAS)** portal for the latest updates on admission schedules, application deadlines, and other pertinent information.

Contact us:

Dr. Satish M. Pelagade	9327074766 / 079 2268 8252
Dr. Jyoti Rawat	7983925929 / 079 2268 8252
Mr. Mitul Kakkad	9898512858 / 079 2268 8252
Mr. Deven Patel	9909502840 / 079 2268 8135

Email: medicalphysicsgcri@gmail.com