Integrated MS(R)-PhD Program in Physics (Space Physics)

About course:

The Integrated MS(R)-PhD Program in Physics (Space Physics) combines a Master of Science (MS) and a Doctor of Philosophy (PhD) degree into a single, continuous program, allowing students to earn both degrees. These programs are particularly appealing to students interested in research and offer a pathway to a PhD while providing the option to exit with an MS degree. It offers students a unique opportunity to explore the fundamental processes governing space, planetary, and astrophysical environments. This interdisciplinary program combines advanced knowledge of physics, mathematics, space science and geomagnetism, preparing students for careers in research, space technology, and related industries. With growing global interest in space exploration and satellite technology, graduates of this program are well-positioned for opportunities in both academic and applied space sectors. Indian Institute of Geomagnetism (IIG) offering this course since 2026. The degree will be awarded from Jawaharlal Nehru University, New Delhi.

About Institute:

Indian Institute of Geomagnetism is a premier research institute of national and international importance, actively engaged in basic and applied research in Space Science and Geomagnetism that covers several phenomena from surface of the Sun to the interior of the Earth. It started out as a successor to the Colaba Magnetic Observatory and its legacy dates back to 1841. In 1971, IIG became an autonomous organization and is currently functioning under the Department of Science & Technology, Govt. of India. It operates four regional labs namely, Dr. K.S. Krishnan Geomagnetic Research Laboratory (KSKGRL), Prayagraj; Equatorial Geophysical Research Laboratory (EGRL), Tirunelveli; North-East Geophysical Research Laboratory (NEGRL) and Colaba Geomagnetic Research Laboratory (CGRL), Mumbai with fourteen magnetic observatories nationwide to monitor the geomagnetic field. It holds several experiments to monitor micro and macro level processes near Earth that has direct implications to our space assets. The vision of IIG is to promote, guide, and conduct research in all branches of Geomagnetism and allied subjects. It is a premier national-level institute that brings together experienced researchers and scientists to offer a high-quality Integrated MS(R)-PhD Program in Physics (Space Physics) to start with.

Scope of the Integrated MS(R)-PhD Program in Physics (Space Physics)

The MS(R)-PhD program in Physics (Space Physics) equips students with a deep understanding of space environments, plasma physics, atmospheric sciences and related disciplines. The program offers vast opportunities for both academic and industry careers, including, (i) Research and Development, (ii) Space Industry and Technology, (iii) Further Academic Pursuits like PhD in Space Science or related fields, both in India and abroad, (iv) Emerging Private Space Sector opportunity as skilled professionals, etc.

Key features of program

- Exclusive, dedicated Research-Focused Integrated MS(R)-PhD Program with exit option at MS level with emphasis on Computational and Programming Training
- Program integrates basic and advanced courses with hands-on research experience.
- Core lectures by leading experts in the field of Space Science and technology. In addition, Guest lectures through regular seminar series and invited talks from other renowned institutions like PRL, IIA, IISc, IITs, etc.

Eligibility and Admission Process

Candidates must hold a BS degree in Physics (Regular, 3-year or 4-year) with a minimum of 60% marks or an equivalent CGPA with Mathematics as one of the subjects studied during their BS program. Students who are in the final year of their Bachelor's degree and awaiting results are also eligible to apply. A relaxation of 5% marks or equivalent CGPA will be granted to candidates belonging to SC/ST/OBC (Non-Creamy Layer)/PWBD/Economically Weaker Sections (EWS), upon submission of a valid certificate. Reservation policy of Government of India will be followed. Candidate holding either a 4-year Bachelor of Science (BS) degree or a 3-year BS degree, in Physics are typically eligible to apply for Integrated MS(R)-PhD Program. In addition, candidates are required to submit their scorecard from CUET, JAM, or JEST national-level examinations. There are two entry levels as shown below.

Duration of Program:

Entry Level	Eligibility	Duration [MS+PhD#]	Exit Option
Entry Level 1	BS (3-year degree)	2+5	Exit after 1-year lead to MS(R) Diploma in Physics (Space Physics) [UGC Level 6] Exit after 2-year lead to MS(R) degree in Physics (Space Physics) [UGC Level 6.5]
Entry Level 2	BS (4-year degree)	1+5	Exit after 1-year lead to MS(R) degree in Physics (Space Physics) [UGC Level 6.5]

 # Entry from MS(R) to PhD program will be based on (i) academic performance, (ii) entrance exam and (iii) interview. Only students with a minimum of 60% or equivalent CGPA marks at MS(R) degree will be eligible to enter the PhD Program. A relaxation of 5% marks or equivalent CGPA will be granted to candidates belonging to SC/ST/OBC (Non-Creamy Layer)/PWBD/Economically Weaker Sections (EWS). In addition, candidates will have to qualify either GATE/NET or IIG's PhD entrance test. Minimum qualifying marks for the IIG entrance exam will be 50%. On production of valid certificate issued by competent authority a relaxation of 5% marks or its equivalent grade will be allowed to those belonging to SC/ST/OBC (non-creamy layer)/PWBD/Economically Weaker Section (EWS) as per the notification issued by UGC from time to time. Reservation policy of Government of India is followed. During selection process, 70% weightage will be given for exam and 30% for the interview. Entrance exam will consist of 50% subject specific questions and 50% general questions including basic research methodology relevant to the research areas carried out IIG.

Maximum Age:
25 years as on 1st July, year of admission.

Selection Criteria
The selection process will be carried out in three stages:
1. Shortlisting based on the academic qualifications as specified in eligibility criteria.
2. Screening of candidates holding a valid CUET, JAM, or JEST scorecard.

3. Personal interview.
Weightage on academic performance, entrance exam score, and interview will be 40%, 30% and 30%, respectively

How to apply:
The Integrated MS(R)-PhD Program will be announced annually, typically around February to March. Interested candidates can apply by filling up the application form and paying a non-refundable application fee as given below. Applicants are required to upload scanned copies of all relevant documents during the application process. Upon successful submission, an email confirmation will be sent to the candidate. The merit list of selected candidates will be published on IIG website by July. Selected candidates will receive an official offer letter via email. To secure admission, candidates must accept the offer and complete the fee payment (as applicable) before the commencement of the course within the time provided.

General Category	Application Fee Rs. 2000/-
SC/ST/OBC (Non-Creamy Layer)/PWBD/Economically Weaker Sections (EWS)	Application Fee Rs. 1500/-

Admission Schedule (tentative)	
Announcement of Program	February-March
Application	March-April
Interview	May-June
Final Selection	July
Fees Payment	July
Start of Course	2nd week of August

Cancellation and Refund Policy:
If a cancellation and refund request is submitted within 30 days after the last date of admission, a refund will be processed (see table below). To request a cancellation, students must send an email to iig.msphd@iigm.res.in.

Before last date of admission	100% refund
Up to 15 days after last date	80% refund
15-30 days after last date	50% refund
Beyond 30 days after last date	No refund

Total seats: 20 (Twenty)

Course location: Indian Institute of Geomagnetism, KSKGRL, Prayagraj, Uttar Pradesh

More Details: https://iigm.res.in/careers/

Contact: +91-22-27484164

Fee Structure:

Integrated MS(R)-PhD Program

Entry Level 1:	**Tuition fees**	**Semester I**	**Semester II**	**Semester III**	**Semester IV**
		30000	30000	30000	30000

Total course fee is 125000/-	Admission fees (one time, non-refundable)	5000			

Entry Level 2: Total course fee is 125000/-	**Tuition fees**	**Semester I**	**Semester II**	**Semester III**	**Semester IV**
		60000	60000	NA	NA
	Admission fees (one time, non-refundable)	5000			

For students admitted to subsequent PhD program the Fees and Fellowship will be as per IIG norms. Admission fees is inclusive of all taxes (if any) as applicable.

Hostel and Mess charges

Limited hostel sharing accommodations are available on payment basis during MS course

Hostel charges	120000/- (Entire course duration i.e., 4 semesters)
Mess charges	As applicable

 # For each semester, fee need to be deposited well before commencement of respective semester.

During PhD course students will be provided hostel accommodation (if available) as per IIG norms.

Offer & Acceptance

If a candidate is selected for the program, he/she will receive an offer letter. To confirm admission, the student must submit a duly filled admission form along with attested copies of the required documents, including a medical fitness certificate, anti-ragging undertaking, and hostel undertaking (if applicable). The student is also required to pay the prescribed fees within the stipulated deadline after the seat is confirmed.

Contact us

More about Indian Institute of Geomagnetism is available at https://www.iigm.res.in. For any queries write to iig.msphd@iigm.res.in. Phone: +91-22-27484164

Address: Indian Institute of Geomagnetism, Autonomous Institute under Department of Science and Technology, Plot 5 Sector 18, New Panvel (w), 410206.

How to reach: https://maps.app.goo.gl/cWUc2waQ51Kt8nuFA

Academic Curriculum

Semester wise credits (Entry Level 1): Total 80 credit points

Semester I	Semester II	Semester III	Semester IV
20	20	20	20

Semester I (6 papers)

Subject code	Subject title	L	T	P	C	Semester I
SP001	Mathematical Methods	3	0	0	3	
SP002	Electrodynamics	3	0	0	3	
SP003	Geomagnetism	3	0	0	3	
SP004	Plasma Physics	3	0	0	3	
SP005	Computational Physics	3	0	1	3	
SP006	Introductory Classical Mechanics	3	0	0	3	
SP007	Computer Programming, Data Handling & Analysis (Lab Session)	0	0	6	2	
	Total	18	0	7	20	

Semester II (6 papers)

Subject code	Subject title	L	T	P	C	Semester II
SP008	Quantum Mechanics	3	0	0	3	
SP009	Atmospheric Physics	3	0	0	3	
SP010	Ionospheric Physics	3	0	0	3	
SP011	Solar Physics & Space Weather	3	0	0	3	
SP012	Magnetospheric Physics	3	0	0	3	
SP013	Elective Environmental Magnetism Applied Geophysics	3	0	0	3	
SP014	Magnetic observatory and Instrumentation	0	0	6	2	

	Total	15	0	6	20	

Semester III (thesis, seminar)

Subject code	Subject title	L	T	P	C	Semester III
SP015	Seminar	0	0	0	2	
SP016	Thesis Phase I	0	0	0	18	
	Total	0	0	0	20	

Semester IV (thesis, seminar)

Subject code	Subject title	L	T	P	C	Semester IV
SP017	Thesis Phase II	0	0	0	18	
SP018	Thesis Seminar-Viva	0	0	0	2	
	Total	0	0	0	20	

L – Lectures (hours per week), T – Tutorials (hours per week), P – Practicals (hours per week), C – Credits for the Curriculum

Semester wise credits (Entry Level 2):

Total 40 credit points

Semester I	Semester II	Semester III	Semester IV
20	20	NA	NA

Semester I (6 papers)

Subject code	Subject title	L	T	P	C	Semester I
SP001	Mathematical Methods	3	0	0	3	
SP002	Electrodynamics	3	0	0	3	
SP003	Geomagnetism	3	0	0	3	
SP004	Plasma Physics	3	0	0	3	

SP005	Computational Physics	3	0	1	3	
SP006	Introductory Classical Mechanics	3	0	0	3	
SP007	Computer Programming, Data Handling & Analysis (Lab Session)	0	0	6	2	
	Total	18	0	6	20	

Semester II (thesis, seminar)

Subject code	Subject title	L	T	P	C	Semester II
SP019	Thesis	0	0	0	18	
SP020	Thesis Seminar-Viva	0	0	0	2	
	Total	0	0	0	20	

L – Lectures (hours per week), T – Tutorials (hours per week), P – Practicals (hours per week), C – Credits for the Curriculum

Syllabus

SEMESTER I

SP001	Mathematical Methods	3credit/45h

Unit 1: Complex Analysis, Complex Variables, Limits, Continuity, Derivatives, Cauchy-Riemann Equations, Analytic functions, Harmonic functions, Elementary functions: Exponential and Trigonometric, Taylor and Laurent series, Residues, Residue theorem, Principal part of the functions, Residues at poles, zeroes and poles of order m, Contour Integrals, Evaluation of improper real integrals, improper integrals involving Sines and Cosines, Definite integrals involving sine and cosine functions.

Unit 2: Matrices and Tensors, Matrices, Eigenvalues and Eigenvectors, orthogonal, unitary and hermitian matrices, Diagonalization of Matrices, Applications to Physics problems. Introduction to Tensor Analysis, Addition and Subtraction of Tensors, summation convention,

Unit 3: Differential Equations and Integral Transforms, General treatment of second order linear differential equations with non-constant coefficients, Power series solutions, Frobenius method, Legendre, Hermite and Laguerre polynomials, Bessel equations, Nonhomogeneous equation – Green's function, Integral transforms: three dimensional Fourier transforms and its applications to PDEs (Green function of Poisson's PDE), convolution theorem, Parseval's relation, Laplace transforms, Laplace transform of derivatives, Inverse Laplace transform and Convolution theorem, Laplace's transform for solving differential equations.

Text / Reference Books:

S. D. Joglekar, Mathematical Methods: The Basics, Universities Press 2005

S. D. Joglekar, Mathematical Methods: Advanced Topics, CRC Press 2007

M.L. Boas, Mathematical methods in the Physical Sciences, Wiley India 2006

G. Arfken and H. J. Weber: Mathematical Methods for Physicists, Academic Press

2005

J. Mathews and R.L. Walker, Mathematical Methods of Physics

A.K. Ghatak, I.C. Goyal and S.J. Chua, Mathematical Methods, McMillan

R. V. Churchill and J.W. Brown, Complex variables and applications, V Ed. Mc Graw. Hill

SEMESTER I

SP002	Electrodynamics	3credit/45h

Unit 1: Electrostatic and Magnetostatics, Coulomb's law, electric field, Gauss's law, (Integral and differential form), scalar potential, potential energy of charge in the electrostatic field, Surface distribution of charges and dipoles, Poisson and Laplace equations, Dirichlet and Neumann boundary conditions, multipole expansion of the potential and multipole moments, Electric field at a point due to an electric dipole, Concept of magnetostatics from continuity equation, Biot-Savart law, Ampere's law, magnetic fields of a localized current distribution, magnetic moments, Faraday laws of induction.

Unit 2: Maxwell's equations, The Poynting vector, The Maxwellian stress tensor, Lorentz Transformations, Electromagnetic waves in vacuum, Polarization of plane waves. Electromagnetic waves in matter, frequency dependence of conductivity, frequency dependence of polarizability, frequency dependence of refractive index. Wave guides, boundary conditions, classification of fields in wave guides, phase velocity and group velocity, resonant cavities.

Unit 3: Moving charges in vacuum, gauge transformation, The time dependent Green function, The Lienard- Wiechert potentials, Leinard- Wiechert fields, application to fields-radiation from a charged particle, Antennas, Radiation by multipole moments, Electric dipole radiation, Complete fields of a time dependent electric dipole, Magnetic dipole radiation

Text / Reference Books:

W.Greiner, Classical Electrodynamics (Springer- Verlag, 2000) (WG).

M.A. Heald and J.B. Marion, Classical Electromagnetic Radiation,

3rd edition (Saunders, 1983)

J.D. Jackson, Classical Electrodynamics, 4Th edition, (John Wiley & sons) 2005 (JDJ)

W.K.H. Panofsky and M. Phillips, Classical Electricity and Magnetism, 2nd edition, (

Addison - Wesley) 1962.

D.J. Griffiths, Introduction to Electrodynamics,2nd EdPrentice Hall, India,1989.

J.R. Reitz ,E.J. Milford and R.W. Christy, Foundation of Electromagnetic Theory, 4th

ed., Addison -Wesley, 1993

SEMESTER I

SP003	Geomagnetism	3credit/45h

Unit 1: Fundamentals of geomagnetism, Earth as giant magnet, source of magnetism, Geodynamo, dipole structure, secular variations, derivation of magnetic scalar potential using Poisson's equation, Gauss coefficient, Magnetic field reversals, small- and large-scale variations in magnetic field, Spherical harmonic analysis of geomagnetic data, IGRF model, global geomagnetic field, planetary magnetic field environments, formation of magnetosphere.

Unit 2: What is magnetic observatory, Magnetic observations, History of magnetic observations national and global perspective, Magnetic observatory network, world data centre. Application of geomagnetic field data in space science and geophysics.

Unit 3: Establishment of magnetic observatory, field survey, data quality and resolution, Magnetic field measurements from ground and space. Principal, Design and Functioning of different magnetic instruments (PPM, ICM, Fluxgate)

Text / Reference Books:

W.H. Campbell, Introduction to Geomagnetic Fields. Cambridge University Press, 1997

G. Rajaram and P.R. Pisharoty, The Earth's Magnetic Field, Oxford & IBH Publishing Company Pvt. Ltd., New Delhi, 1998

W.D. Parkinson, Introduction to Geomagnetism. Scottish Academic Press, 1983

R.T.Merrill, M. W. McElhinny and P. L. McFadden, The Magnetic Field of the Earth. Academic Press, 1996

J.A. Jacobs, Geomagnetism Volume 4. Academic Press, 1991

J.A. Jacobs, Geomagnetism Volumes 1, 2 and 3. Academic Press, 1987

SEMESTER I

SP004	Plasma Physics	3credit/45h

Unit 1: The fourth state of matter, Saha's equation, comparison of plasmas, laboratory, space, astrophysical, and industrial applications, Density, temperature, Debye length, plasma frequency, and quasi-neutrality, criteria for plasma existence, Introduction to concept of plasma frequency and gyro-frequency, difference between collisional and collisionless plasmas.

Unit 2: Motion of charged particles in uniform electric and magnetic fields, guiding center motion, gyro-frequency, and gyro-radius (Larmor radius), drifts in non-uniform fields, E×B drift, gradient drift, curvature drift, Vlasov equation and distribution functions, Moments of the distribution function (density, velocity, pressure), fluid equations for plasmas (continuity, momentum, and energy equations), applications to space plasmas.

Unit 3: Electrostatic waves in unmagnetized plasma (Langmuir waves, ion acoustic waves), Electromagnetic waves in plasmas, plasma waves in magnetized plasma (Alfven waves, magnetosonic waves), dispersion relations and phase/group velocities.

Text / Reference Books:

Introduction to Plasma Physics and Controlled Fusion – Francis F. Chen

Basic Space Plasma Physics by Baumjohann and Treumann

Fundamentals of Plasma Physics – J.A. Bittencourt

Plasma Physics for Astrophysics– Russell M. Kulsrud

The Earth's Ionosphere: Plasma Physics and Electrodynamics – Michael C. Kelley

Principles of Plasma Physics for Engineers and Scientists – Umran S. Inan & Marek Golkowski

SEMESTER I

SP005	Computational Physics	3credit/45h

Unit 1: Role of computation in modern Physics research, errors in numerical computations (truncation and round-off errors), Root-finding methods (Bisection, Newton-Raphson, Secant method), Numerical differentiation and integration (Trapezoidal, Simpson's rule), Systems of linear equations (Gaussian elimination, LU decomposition)

Unit 2: Ordinary Differential Equations (ODEs): Euler's method, Runge-Kutta methods, Applications-Projectile motion, harmonic oscillator, damped and driven systems, Partial Differential Equations -Finite difference methods, Heat equation, wave equation, Poisson's equation, Eigenvalue problems

Unit 3: Monte Carlo Methods, Random number generation, Monte Carlo integration, applications in statistical Physics, particle transport, and simulation of random processes,

basics of Markov Chains and Metropolis algorithm, Introduction to Fourier Techniques and Signal Analysis, discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), signal filtering and spectral analysis, its applications in data processing, test particle simulations

Practical Session

Introduction to MatLab & Python programming languages.

Solving ordinary differential equations (ODEs) using Euler's and Runge-Kutta methods and their comparison.

Development of a computer code to predict charged particle trajectory in a mutually perpendicular EM field with constant electric and magnetic fields.

Text / Reference Books:

Computational Physics by Nicholas J. Giordano and Hisao Nakanishi

Plasma Physics via Computer Simulation by C.K. Birdsall and A.B. Langdon

Computer Space Plasma Physics: Simulation Techniques and Software, edited by:
H. Matsumoto & Y. Omura (Radio Atmospheric Science Center, Kyoto University, japan)

Numerical Recipes: The Art of Scientific Computing by William H. Press et al.

An Introduction to Computational Physics by T.P. Pang

Computational Physics by J.M. Thijssen

A First Course in Computational Physics by Paul L. DeVries & Javier E. Hasbun

Computational Physics: Problem Solving with Python by Rubin H. Landau et al.

SP006	**Introductory Classical Mechanics**	3credit/45h

Unit 1: Lagrangian and Hamiltonian mechanics: Constraints and generalized coordinates. Calculus of variation, Euler-Lagrange equations. Hamilton's principle of least action, Lagrange's equations of motion. Cyclic coordinates, symmetries and conservation laws, Noether’s theorem. Hamilton's equations of motion, canonical variables. Canonical transformations, generating functions. Poisson brackets.

Two-body central force problem: Equation of motion and first integrals. Kepler problem. Classification of orbits. Satellites and inter-planetary orbits. Scattering in central force field.

Unit 2: Small oscillations: Linearization of equations of motion. Normal coordinates. Damped and forced oscillations. Anharmonic terms, perturbation theory.

Rigid body dynamics: Rotational motion, moments of inertia, principal axes, torque. Euler’s theorem, Euler angles. Symmetric top.

Unit 3: Special theory of relativity: Motivation. Postulates of special theory of relativity. Lorentz transformation. Space- time diagram. Time dilation and length contraction. Equivalence of mass and energy. Addition of velocities. Doppler effect. Paradoxes. Four-vectors, contra- and covariant vectors.

Coordinate, velocity and momentum four-vectors. Tensors.

Hamiltonian-Jacobi theory, integrability and chaotic dynamics

Hamilton-Jacobi theory, action-angle variables, integrable system. Phase plots, fixed points and their stabilities. Introduction to chaotic dynamics.

References:

H. Goldstein, C.P. Poole and J.F. Safko, Classical Mechanics, Addison- Wesley

N.C. Rana and P.S. Joag, Classical Mechanics, Tata McGraw-Hill

J.V. Jose and E.J. Saletan, Classical Dynamics: A Contemporary Approach, Cambridge University Press

L.D. Landau and E.M. Lifshitz, Mechanics, Butterworth-Heinemann

I.C. Percival and D. Richards, Introduction to Dynamics, Cambridge University Press

R.D. Gregory, Classical Mechanics, Cambridge University Press

A.P. French, Special Relativity, W.W. Norton

E.F. Taylor and J.A. Wheeler, Spacetime Physics: Introduction to Special Relativity, W.H. Freeman

SEMESTER I

SP007	Computer Programming, Data Handling and Analysis (Lab Sessions)	2 credit/60h

1. Overview of scientific programming languages (Python and MATLAB), Basics of algorithm development, flowcharts, and code structure, introduction to Linux environment, compilers, and debugging tools. Self-study programming courses (free) from https://swayam.gov.in/ [Rajendra Rawat & Rohit Jha]
2. International reference ionosphere (IRI) model data analysis and interpretations [Dr. Gopi]
3. Ionospheric data from satellites (CHAMP, SWARM, GOLD etc.) and its analysis [Dr.Gopi]
4. Solar irradiance and Sunspot data analysis: Extracting and inferencing solar cycle variability from sunspot number (SSN) and F10.7 solar flux data. [Dr. Gopi]
5. Data analysis of space whether related datasets (DST, SYM-H, AE, AL, interplanetary data etc.) [Dr. Gopi]
6. Data generation through IGRF model and its plotting [Dr. Ayushi Srivastava]
7. Fourier transform: Generation of synthetic time series signals and obtain their Fourier transformations. [Dr. Gopi]
8. Solving differential equations using different numerical methods and their error analysis. [Dr. Devanandhan]
9. Development of a computer code to understand and quantify current-loop driven magnetic field. [Dr. Ayushi Srivastava]

SEMESTER II

SP008	Quantum Mechanics	3credit/45h

Unit 1: Introduction and formalism: Review of empirical basis, wave-particle duality, electron diffraction. Postulates of quantum mechanics: state vector, Dirac (bra-ket) notation, probability interpretation, physical observables and linear operators, eigenvalues and measurement.

Operators as matrices: Heisenberg-Born-Jordan description. Commutation relations. Uncertainty principle. Correspondence principle, Ehrenfest theorem.

Unit 2: Quantum dynamics: Time-dependent Schrödinger equation. Stationary states and their significance. Time- independent Schrödinger equation. Two-state quantum systems. Density matrix. Schrödinger equation for one-dimensional systems

Free-particle, periodic boundary condition. Wave packets. Square well potential. Transmission through a potential barrier. Gamow theory of alpha-decay. Field induced ionization, Schottky barrier.

Unit 3: Simple harmonic oscillator: solution by wave equation and operator method. Coherent states. Charged particle in a uniform magnetic field. Landau levels.

Spherically symmetric potentials: Separation of variables in spherical polar coordinates. Orbital angular momentum, parity. Spherical harmonics. Free particle in spherical polar coordinates. Spherical well. Hydrogen atom.

Identical particles: Indistinguishability, symmetric and anti-symmetric wave functions, incorporation of spin, Slater determinants, Pauli exclusion principle. Spin-statistics relation.

References:

L.I. Schiff, Quantum Mechanics, McGraw-Hill

R. Shankar, Principles of Quantum Mechanics, Springer

D.J. Griffiths, Introduction to Quantum Mechanics, Cambridge University Press

N. Zettili, Quantum Mechanics: Concepts and Applications, Wiley

J.S. Townsend, A Modern Approach to Quantum Mechanics, Viva Books

E. Merzbacher, Quantum Mechanics, John Wiley and Sons

F. Schwabl, Advanced Quantum Mechanics, Springer

A. Das, Lectures on Quantum Mechanics, Hindustan Book Agency

M. Le Bellac, Quantum Physics, Cambridge University Press

J. J. Sakurai, Modern Quantum Mechanics, Pearson

S. Flügge, Practical Quantum Mechanics, Springer

K. Gottfried and T.-M. Yan, Quantum Mechanics: Fundamentals, Springer

R.P. Feynman, Feynman Lectures on Physics (Vol. III), Addison-Wesley

C. Cohen-Tannoudji, B. Diu and F. Laloe, Quantum Mechanics (Vols. I and II),Wiley

A. Messiah, Quantum Mechanics (Vols. I and II), Dover

SEMESTER II

SP009	Atmospheric Physics	3credit/45h

Unit 1: Basics of the atmospheric structure, electromagnetic radiation, absorption and emission. The radiation balance and the greenhouse gases, energy balance at the Earth's surface. Water balance. Hydrological cycle, water movements in ground and soil, transport of pollution in water and air, Systems of motions in atmosphere, hydrosphere and lithosphere on different scales.

Unit 2: Structure and Composition of the Lower Atmosphere, atmospheric layers(troposphere, tropopause, stratosphere, mesosphere), features of different layers, formation of ozone hole, pressure and density profiles, hydrostatic and hypsometric equations, vertical temperature profiles and lapse rates, lower-upper atmosphere coupling, gravity waves and planetary waves.

Unit 3: Ideal gas law, first and second laws of thermodynamics, potential temperature, Moist-air processes, saturation, dew/frost points, parcel theory, Cloud microphysics: nucleation, growth, precipitation mechanisms, Cloud formation dynamics; warm and cold microphysics, droplet/coalescence, ice-phase processes, electrification, artificial precipitation methods. Introduction to climate models.

Text / Reference Books:

Fundamentals of Atmospheric Physics by Murry L. Salby

An Introduction to Atmospheric Physics by David G. Andrews

Atmospheric Science: An Introductory Survey by Wallace and Hobbs

Physics of the Atmosphere and Climate (2nd ed.) by Murry L. Salby

SEMESTER II

SP010	Ionospheric Physics	3credit/45h

Unit 1: Neutral upper atmosphere and its interaction with solar radiation, introduction to Earth's ionosphere, structure of ionosphere (different layers), density and temperature variations, Chapman's theory of photoionization, Loss and transport mechanisms, Influence of geomagnetic field on ionosphere, electrical conductivity.

Unit 2: Variability of ionosphere (different spatio-temporal variation), local and global distribution of plasma, ionospheric refractive index through Appleton-Hartree equation, propagation of radio wave through ionosphere, ionospheric scintillation, airglow, ionosonde experiment (principal and functioning), GPS/GNSS/ NavIC

Unit 3: Equatorial ionospheric electrodynamics, E region dynamo theory, Daytime equatorial electrojet, Equatorial ionization anomaly, F region dynamo, spread F, Pre-reversal enhancement, ionospheric F-region irregularities, plasma bubbles

Text / Reference Books:

Introduction to Ionospheric Physics, by Henry Rishbeth & Owen K. Garriott

The Earth's Ionosphere: Plasma Physics and Electrodynamics, by Michael C. Kelley

Ionospheric Radio, by Kenneth Davies

Physics of the Space Environment, By Tamas I. Gombosi

SEMESTER II

SP011	Solar Physics & Space Weather	3credit/45h

Unit 1: Overview of the Sun as a star, Structure and composition of the Sun, Energy generation (Nuclear fusion in the solar core), Solar irradiance, Standard solar model, probing solar interior through helioseismology, Solar atmosphere, photosphere, chromosphere, corona, temperature and density variations

Unit 2: Solar dynamo model, Magnetohydrodynamics (MHD) basics relevant to Solar Physics, Solar features, solar flares, Sunspot, coronal holes, coronal mass ejection, solar cycle, solar cycle variability, different periodicities, Significance of L1 point solar observations

Unit 3: Introduction to space weather, Interplanetary magnetic field (IMF), Sun-Earth connection, geomagnetic storm, Geomagnetic activity indices, Historical examples of space weather events (e.g. Carrington event, Halloween storm 2003). Space weather impacts on lower atmosphere, ionosphere, magnetosphere. Technological effects on satellites (GNSS/GPS), radio communications, transportation, electric grid, etc and socio-economic impacts. Effects on human health, Space weather and economy. Global efforts for space weather forecasting models

Text / Reference Books:

The Sun: An Introduction by Michael Stix

Astrophysics of the Sun by Harold Zirin

Physics of the Solar Interior and Atmosphere Edited by A.N. Cox, W.C. Livingston, and M.S. Matthews

The Sun: A Laboratory for Astrophysics, by J.T. Schmelz & J.C. Brown

The Solar Activity Cycle, by Andrei A. Pevtsov et al.

Physics of the Space Environment, by Tamas I. Gombosi

Introduction to Space Physics by Margaret G. Kivelson & Christopher T. Russell

Space Weather: Physics and Effects, by Volker Bothmer & I. Daglis

Storms from the Sun: The Emerging Science of Space Weather by Michael Carlowicz and Ramon Lopez, National Academies Press

Space Weather Effects and Applications edited by Anthea J. Coster, Philip J. Erickson, Louis J. Lanzerotti, Yongliang Zhang, Larry J. Paxton, American Geophysical Union

An Introduction to Space Weather by Mark Moldwin

SP012	Magnetospheric Physics	3credit/45h

Unit I: Introduction to the Magnetosphere: Formation: Magnetopause and Bow Shock, Pressure balance. Structure and Regions, plasmasphere, radiation belts, magnetotail, cusps. Sources of plasma: ionosphere, solar wind. Overview of planetary magnetospheres

Unit 2: Solar Wind and IMF (Interplanetary Magnetic Field), Parker solar wind model, IMF orientation and its significance, Magnetosonic and Alfvenic waves in solar wind, Shape and

dynamics of the bow shock and magnetopause, Reconnection at the dayside magnetopause, Reconnection at nightside, Role in substorms and energy transfer

Unit 3: Magnetospheric Current Systems: Chapman-Ferraro currents, Ring current and its decay, Field-aligned currents (Birkeland currents), Magnetotail currents. Radiation Belts and Particle Dynamics: Van Allen belts: formation, structure, and dynamics, Wave-particle interactions, Geomagnetic storms, geomagnetic activity indices, Observational Techniques and Space Missions like THEMIS, Cluster, MMS, Van Allen Probes. Modeling and Simulation in Magnetospheric Physics, Global MHD models, Test particle simulations, Empirical models (e.g., IGRF, WMM, T96, Tsyganenko models)

Text / Reference Books:

Baumjohann & Treumann – Basic Space Plasma Physics

Kivelson & Russell – Introduction to Space Physics

Schindler – Physics of Space Plasma Activity

Roederer & Zhang – Dynamics of Magnetically Trapped Particles

Koskinen – Physics of Space Storms

SEMESTER II

SP013	Elective: Environmental Magnetism	3credit/45h

Unit 1: Introduction to Environmental Magnetism, Principles and applications of magnetism in environmental science, Magnetic Properties of Rocks and Minerals, types of magnetic behaviour, Magnetic Domains, Magnetic minerals in the environment, Igneous rocks, sedimentary materials and soils, Rock-magnetism, Induced and Remanent Magnetism, Magnetic susceptibility, types of magnetic remanence

Unit 2: Environmental sample collection, Laboratory experiments, data collection through instruments, sampling types, sampling protocols, sample preservation and transport, geological and geophysical samples preparation, measurement and instrumentation

Unit 3: Relative Paleointensity (RPI) determination from sediments-Psuedo-thellier approach, Anisotropy of magnetic Susceptibility (AMS), Depositional signals in continental and marine records, environmental magnetism and its application to Indian depositional settings, Magnetic susceptibility and depositional environments, magnetic mineralogical S-ratio and paleoclimate in sediments, application of environmental magnetic methods for paleoclimate, Tracking pollution sources and pathways using magnetic signatures

Text / Reference Books:

Introduction to Magnetism and Magnetic Materials – David Jiles

Environmental Magnetism – Thompson, R., and F. Oldfield, Allen and Unwin: Springer

Environmental Magnetism: a practical guide – J. Walden, F. Oldfield, J. and Smith

Geomagnetism: Solid Earth and Upper Atmosphere Perspectives – N. Basavaiah, Springer

Magnetism and Magnetic Materials – J.M.D. Coey

Research articles on modern magnetic materials and applications

SEMESTER II

SP013	Elective: Applied Geophysics	3credit/45h

Unit 1: Overview of Geophysics, key physical principles (gravity, magnetism, waves, heat), Interrelationship between geology and geophysics. Physical properties of minerals and rocks. Different types of surveys, grid and route surveys, profiling and sounding techniques. Scales of survey, Presentation of geophysical data. Geophysical Data Processing and Interpretation: Introduction to data processing techniques (e.g., inversion, modeling). Gravity and Magnetic Methods: Earth's gravitational and magnetic field. Gravity and magnetic surveys, instruments, anomalies, interpretation, and their applications.

Unit 2: Electrical & Electromagnetic Methods: Electric conductivity of rocks and unconsolidated sediments. Dielectric constants of rocks and unconsolidated sediments. Instrumentation, field procedure and interpretation using electrical methods. Electrical profiling and sounding using Wenner and Schlumberger configurations. Case studies. Electromagnetic fields, Basic principles of transient electromagnetic methods, depth of penetration, electromagnetic techniques (e.g., Magnetotellurics, Ground-Penetrating Radar etc). Applications in groundwater studies, mineral exploration etc

Unit 3: Seismic Methods: Wave propagation, seismic wave types (P-waves, S-waves, surface waves), and their relationship to Earth's structure.
Seismic Exploration: Seismic reflection and refraction techniques, field equipment, data acquisition, and processing. Application in oil and gas exploration
Heat Flow and Geothermal Gradients: Measurement of heat flow within the Earth's crust, geothermal gradients, and their use in understanding Earth's internal processes and geothermal energy exploration.

Text/Reference Books

Burger, Sheehan and Jones. Introduction to Applied Geophysics: Exploring the Shallow Subsurface. Cambridge university press.

Dobrin, M.B. An introduction to Geophysical Prospecting. McGraw-Hill, New Delhi. 1984
Fowler, C.M.R.; The Solid Earth: An introduction to Global Geophysics, Cambridge University Press
Gadallah M.R., Fisher R. and Fisher R.L. Exploration Geophysics. Springer, ISBN-978-3-540-85159-2
Kearey and Brooks An Introduction to Exploration Geophysics, Blackwell scientific Publication.
Lowrie, W. Fundamentals of geophysics. Cambridge University Press.
Ramachandra Rao, M.B. Outlines of Geophysical Prospecting - A Manual for Geologists, Prasaranga, University of Mysore, Mysore.
Robinson E.S.: Basic Exploration Geophysics. John Wiley & Sons.
Sharma PV. Geophysical methods in geology by. Elsevier.
Telford, W. M., Geldart, L. P., & Sheriff, R. E. Applied geophysics (Vol. 1). Cambridge university press.

SEMESTER II

SP014	Magnetic observatory and Instrumentation (Lab Sessions)	2credit/60h

1. Realtime measurement of geomagnetic field. Measurement of short-term variations in Earth's magnetic field using digital fluxgate magnetometer (DFM).
2. Hands on sessions: Geomagnetic data from IIG's magnetic observatory network, world data centre, Intra magnet network
3. Measurement of declination and inclination of Earth's magnetic field using DIM (Declination Inclination Magnetometer) and calculation of different components of Earth's magnetic field.
4. Deriving the Dst-index from magnetometer observations from the four stations used internationally (Hermanus, Kakioka, Honolulu and San Juan).
5. Extraction of EEJ (Equatorial Electrojet) signatures from ground-based magnetometer data and their diurnal variations.
6. Hands on session on VLF experiment
7. Magnetic Susceptibility for Environmental Material Characterization
8. Electrical Resistivity Imaging of the Subsurface
9. Hands on Session on Airglow imager
10. Hands on Session on ionosonde experiment and its data analysis. Calculation of different ionospheric parameters (foF2, h'F, hmF2, etc.) using ionosonde
11. Installation of GPS and position marking during field survey

SEMESTER III [Start]

SP015	Seminar	2 credit

Topic related to their thesis research

SEMESTER III [End]

SP016	Thesis Phase I	18 credit

Based on topic thesis work will be compiled with respective thesis guides/supervisors

SEMESTER IV [Start]

SP017	Thesis Phase II	18 credit

Based on topic thesis work will be compiled with respective thesis guides/supervisors

SEMESTER IV [End]

SP018	Thesis Seminar-Viva	2 credit

Based on Thesis topic

Semester wise credits (Entry Level 2):

SEMESTER II [Start]

SP019	Thesis	18 credit

Based on topic thesis work will be compiled with respective thesis guides/supervisors

SEMESTER II [End]

SP020	Thesis Seminar-Viva	2 credit

Based on Thesis topic

Evaluation/Review Pattern:

Entry Level 1

Semester	Papers/Seminar	Marks
I	Six papers Seminar	80 Marks each = 480 20 Marks [Total 500]
II	Six papers Seminar	80 Marks each = 480 20 Marks [Total 500]
III	Seminar Thesis Phase I	100 Marks 400 Marks [Total 500]
IV	Thesis submission Thesis Seminar + Viva	400 Marks 100 Marks [Total 500]

Entry Level 2

Semester	Papers/Seminar	Marks
I	Six papers Seminar	80 Marks each = 480 20 Marks [Total 500]
II	Thesis submission Thesis Seminar + Viva	400 Marks 100 Marks [Total 500]

Distribution of marks

Entry level 1

Semester	Subject code	Subject title	Marks Theory Papers	Marks Internal Papers	Marks Total	credit
I	SP001	Mathematical Methods	70	10	80	3
	SP002	Electrodynamics	70	10	80	3
	SP003	Geomagnetism	70	10	80	3
	SP004	Plasma Physics	70	10	80	3
	SP005	Computational Physics	70	10	80	3
	SP006	Introductory Classical Mechanics	70	10	80	3
	SP007	Computer Programming, Data Handling & Analysis (Lab Session)	Lab Sessions			2
II	SP008	Quantum Mechanics	70	10	80	3
	SP009	Atmospheric Physics	70	10	80	3
	SP010	Ionospheric Physics	70	10	80	3
	SP011	Solar Physics & Space Weather	70	10	80	3
	SP012	Magnetospheric Physics	70	10	80	3
	SP013	Elective Environmental Magnetism Applied Geophysics	70	10	80	3

	SP014	Magnetic observatory and Instrumentation	Lab Sessions			2
III	SP016	Seminar	--	100	100	2
	SP017	Thesis Phase I	--	800	800	18
IV	SP018	Thesis Phase II				18
	SP019	Thesis Seminar-Viva	--	100	100	2

Entry level 2

Semester	Subject code	Subject title	Marks Theory Papers	Marks Internal Papers	Marks Total	credit
I	SP001	Mathematical Methods	70	10	80	3
	SP002	Electrodynamics	70	10	80	3
	SP003	Geomagnetism	70	10	80	3
	SP004	Plasma Physics	70	10	80	3
	SP005	Computational Physics	70	10	80	3
	SP006	Introductory Classical Mechanics	70	10	80	3
	SP007	Computer Programming, Data Handling & Analysis (Lab Session)	Lab Sessions			2
II	SP019	Thesis		400	400	18
	SP020	Thesis Seminar-Viva	--	100	100	2

Grading System:

Student has to obtain a minimum of 45% marks (equivalent CGPA of 4) in aggregate in the examination to pass. Minimum 75% attendance is mandatory during the course. Students shall be graded, in each course, on a ten-point scale, which is as follows.

Grade	**A+**	**A**	**A-**	**B+**	**B**	**B-**	**C+**	**C**	**C-**	**F**
Grade Point	9	8	7	6	5	4	3	2	1	0

Conversion factor

The percentage of 55% is equivalent to CGPA of 5 and percentage of 35% is equivalent to CGPA of 3.

CGPA	**Conversion**	**Percentage**
8 to 9	5+CGPA × 10	85%-95.99%
7 to 7.99	5+CGPA × 10	75%-84.99%
6 to 6.99	5+CGPA × 10	65%-74.99%
5 to 5.99	5+CGPA × 10	55%-64.99%
4 to 4.99	5+CGPA × 10	45%-54.99%
3 to 3.99	5+CGPA × 10	35%-44.99%
2 to 2.99	5+CGPA × 10	25%-34.99%
1 to 1.99	5+CGPA × 10	15%-24.99%
0 to 0.99	5+CGPA × 10	0%-14.99%

Course code and Teaching Faculties:

Semester I (6 papers)

Subject code	Subject title	L	T	P	C	Faculty
SP001	Mathematical Methods	3	0	0	3	1. Dr. S. Sathishkumar (coordinator) 2. Dr. Sreeraj
SP002	Electrodynamics	3	0	0	3	1. Dr. Jayashree Bulusu (coordinator) 2. Dr. Anjana
SP003	Geomagnetism	3	0	0	3	1. Dr. Geeta Vichare (coordinator) 2. Dr. S.P. Anand
SP004	Plasma Physics	3	0	0	3	1. Dr. Remya Bhanu (coordinator) 2. Dr. Ramsingh (New Recruit)
SP005	Computational physics	3	0	1	3	1. Dr. Devanandhan (coordinate) 2. Ayushi Srivastava
SP006	Introductory Classical Mechanics	3	0	0	3	1.Dr. Naveen Parihar (Coordinator)
SP007	Computer Programming, Data Handling and Analysis (Lab Session)	0	0	6	2	1. Dr. Gopi Seemala (coordinator) 2. Dr. Devanandhan 3. Ayushi Srivastava For computer programming part

						4. Rajendra Rawat (coordinator), 5. Rohit Jha
	Total	18	0	6	20	

Semester II (5 papers, Seminar, Viva)

Subject code	Subject title	L	T	P	C	Faculty
SP008	Quantum Mechanics	3	0	0	3	1. Dr. Chinmay Nayak (coordinator)
SP009	Atmospheric physics	3	0	0	3	1. Dr. Rajesh Singh (coordinator) 2. Dr. S. Sau,
SP010	Ionospheric Physics	3	0	0	3	1. Dr. S. Sripathi (coordinator) 2. Dr. Srinivas Nayak
SP011	Solar physics & Space Weather	3	0	0	3	1. Dr. Tulasiram (coordinator) 2. Dr. Mala Bagiya
SP012	Magnetospheric Physics	3	0	0	3	1. Dr. Amar Kakad (coordinator) 2. Dr. Bharati Kakad
SP013	Elective Environmental Magnetism Applied Geophysics	3	0	0	3	1. Dr. Deendayalan (coordinator) 2. Lakshmi 3. Dr. Priyeshu 1. Dr. Shantanu Pandey (coordinator)

						2. Dr. Anand SP 3. Dr. Ajish Saji
SP014	Magnetic observatory and Instrumentation	0	0	6	2	1. Dr. Sujit Kumar Pradhan (coordinator) 2. Atul Kulkarni 3. Varun Dongre 4. Dr. Anil Iype
	Total	18	0	6	20	

Semester III (Seminar, Thesis)

Subject code	Subject title	L	T	P	C	Faculty
SP015	Seminar	0	0	0	2	Open
SP016	Thesis Phase I	0	0	0	18	Assigned Faculty
	Total	0	0	0	20	

Semester IV (Thesis, Seminar)

Subject code	Subject title	L	T	P	C	Faculty
SP017	Thesis Phase II	0	0	0	18	Assigned Faculty
SP018	Thesis Seminar-Viva	0	0	0	2	Open
	Total	0	0	0	20	

Guest lectures

Guest 1	August 2027
Guest 2	September 2027

Guest 3	October 2027
Guest 4	November 2027
Guest 5	February 2027
Guest 6	March 2027
Guest 7	April 2027
Guest 8	May 2027

Forms: Admission Form, Medical certificate form, Antiaging Policy & Undertaking and Conduct Rules follows

The MS(R)-PhD Program is recognized by Jawaharlal Nehru University (JNU). The curriculum, syllabus, grading, evaluation, and other academic matters shall be governed by the rules and policies of the IIG and may be revised from time to time in accordance with the recommendations of JNU relating to the conduct of the Program.

Application for Admission for
Integrated MS(R)-PhD Physics (Space Physics)
INDIAN INSTITUTE OF GEOMAGNETISM
An Autonomous Institute under Department of Science and Technology, Government of India
Recognized Research Centre of Jawaharlal Nehru University, Delhi

Registration Number :

(for Office Use only)

Passport - size recent colour Photograph

1. Name in Full (Block letter) :
2. Date of Birth (dd/mm/yy) :
3. Gender(M/F) :
4. Community :
   [SC/ST/OBC (non-creamy layer)/PWBD/ Economically Weaker Section (EWS)]
   (Enclose photo copy)
5. Id Proof (Enclose photo copy) :
6. Marital Status :
7. Contact details

Mobile No.	**Email ID** **(Official and Personal)**
Primary:	Off : @iigm.res.in
Secondary:	Per:

a) Address for Communication

b) Permanent Address

8. Details of Academic Qualifications (enclose copy)
   (enclose attested copy of certificate/marksheet)

Category	**Degree**	**Discipline**	**University / College**	**Month andYear of passing**	**% of Marks / CGPA**	**Class**
SSC						
HSC						
UG [Semester wise]						
other						

9. Professional Experience (Teaching / Research / Industrial)
   (Note: Enclose separate sheet if needed)

Sr. No	**Name of Organization**	**Designation**	**Period**		**Regular / Temporary/ Contract**
			From	**To**	

10. CUET-PG/JAM/JEST Entrance exam

(enclose attested copy of certificate/marksheet)

Sr. no.	**Exam**	**Score**

DECLARATION

I hereby declare that the particulars given above are true, correct and complete to the best of my knowledge and belief. I am aware and agree that in case of wrong / misleading information may lead to cancellation of my registration at any time and I may be subjected to disciplinary / legal action as required. I also declare that I have read and accept the entire PhD Regulations/guidelines of IIG which may be revised from time to time and I shall abide by the same.

Signature of Candidate

Place **:**

Date **:**

Anti-Ragging

UNDERTAKING BY THE STUDENT [MS(R)-PhD Physics]

I, _____ (full name), son/daughter of _____,
resident of _____,
having been admitted to _____ (name of university/institute)
for the Integrated MS(R)-PhD program in _____ (department), do hereby solemnly affirm and declare as follows:

1. That I have read and fully understood the provisions of the regulations on curbing the menace of ragging in higher educational institutions as per the guidelines of the University Grants Commission (UGC), 2009.
2. That I have also gone through the rules/instructions issued by the institution regarding anti-ragging.
3. That I understand that ragging in any form is strictly prohibited and is a punishable offence.
4. That I will not indulge in ragging in any form whatsoever, whether directly or indirectly.
5. That I will not participate in or support any act of ragging.
6. That I will report any incident of ragging that comes to my notice to the appropriate authorities.
7. That I understand that if found guilty of ragging, I am liable for punishment as per UGC regulations and the rules of the institution, including suspension, expulsion, or legal action.

Declared on this ____ day of _____**, 20**
Place: _____

Signature of the Student: _____
Name: _____
Enrollment No.: _____

Anti-Ragging

UNDERTAKING BY PARENT/GUARDIAN

I, _____ (full name), parent/guardian of
_____ (student name),
resident of _____,
do hereby solemnly affirm and declare as follows:

1. That I am aware of the admission of my ward to _____ (name of institution) for the Integrated MS(R)-PhD program.
2. That I have read and understood the regulations of the University Grants Commission (UGC), 2009 on ragging.
3. That I assure you that my ward will not indulge in ragging in any form.
4. That I agree that if my ward is found guilty of ragging, appropriate disciplinary action may be taken against him/her.
5. That I undertake to cooperate with the authorities in maintaining a ragging-free campus.

Declared on this ____ day of _____**, 20**
Place: _____

Signature of Parent/Guardian: _____
Name: _____
Contact Number: _____

MEDICAL FITNESS CERTIFICATE

This is to certify that I have carefully examined Mr./Ms. _____
Son/Daughter of _____

Date of Birth: _____

Based on clinical examination, I find that he/she is:

- In **good physical and mental health**
- Free from any **communicable disease**
- Fit to pursue a **full-time Integrated MS(R)-Ph.D course**

Details (if any):

- Height: _____
- Weight: _____
- Blood Pressure: _____
- Any past illness: _____

Conclusion:
He/She is **medically fit / not fit** to pursue higher studies.

Doctor's Details:
Name: _____
Qualification: _____
Registration No.: _____
Hospital/Clinic Name: _____

Signature: _____
Date: _____
Seal: _____

HOSTEL RULES AND REGULATIONS

All students should read all the points herein, before check-in to h*ostel accommodation. In* case *of any doubt, get them clarified from the Wardens.*

1) BEHAVIOUR AND DISCIPLINE:

a) Hostel Residents are expected to display acceptable form of behaviour and maintain discipline and decorum everywhere in general and in and around the hostel.

b) Ragging is a punishable offence. Students should abstain from committing such offences as no leniency will be shown to any student if found guilty of the offence.

c) Smoking is banned anywhere in the Hostel and Campus premises. Possession, distribution or consumption of alcoholic beverages, prohibited drugs, any form of narcotics, chewable tobacco is a serious offence and not permitted in the RS Hostel complex at any time. Non-compliance shall lead to strict disciplinary action and legal authorities shall be informed of violations.

d) Decent dress code to be maintained in the hostel and campus.

e) Walking in the areas where plantation is done shall be carefully maintained and the flowers should not be plucked off. Students are not allowed to enter into prohibited or restricted areas of the campus.

f) Trespassers from Boys hostel Room to Girls hostel rooms and vice versa is strictly prohibited. Disciplinary action will be taken for the violation of the rule.

g) Visitors are not allowed in hostel. Any student found violating this rule will be liable for disciplinary action.

h) Waste and dust should not be thrown in the corridors, Cupboards and other common places.

i) Care should be taken to maintain the hostel neat and clean. The students should not use pens, pencils, sketches, water colours or any other materials to draw images on the walls / floors. If any student is found guilty, penalty will be imposed.

j) Students of the allotted room is responsible for the maintenance and upkeep of the room and furniture.

k) Adherence to Campus entry/exit timings:

   i. students are not permitted to leave before 06.00 AM in the morning and are not permitted to enter the campus after 10.00 PM. Delayed / Late entry into campus shall attract penalty / punishment as per recommendation of Warden/Program coordinator.

   ii. In cases where the residents anticipate late entry (e.g. Need to go to the city bus stand or railway station or for any other reason beyond their control), they have to take prior consent and written permission of the Warden(s).

l) Students are not allowed to change the allotted rooms. Parties, social gatherings, celebrations, etc., in the hostel complex are not permitted.

m) Staying out of hostel for some period: If student need to stay out of the hostel for any period of time, or need to leave campus for personal reasons, they have to take prior written permission, and get approved from warden(s) and program coordinator. Staying out of the hostel without permission may attract very strict disciplinary action.

n) Noise levels must be kept low to give opportunity for other students to study or sleep in comfort. Television, radio, or other facilities provided in the common room, if any, must be switched off after 10.00 PM.

o) Vandalism is a very serious offence and anyone found guilty of committing or resorting to such acts can be fined and / or expelled from the hostel.

p) In case of any unacceptable behaviour by any room-mate, the other room-mate must report it to the Warden at the earliest.

q) Students are not allowed to stay in hostel during course/working hours without prior permission of the Warden.

r) Misbehaving with security personnel or other students, Families, Staff will be considered as vandalism.

2) UPKEEP OF THE HOSTEL:

a) Warden reserves the right to carry out spot-checks of the students' hostel's and the rooms anytime.

b) Students are responsible for keeping their rooms' clean and tidy at all times. All fans, lights and electrical appliances must be switched off when not in use.

c) Cooking is not permitted in the hostel rooms. Common room furniture provided to the students should not be moved.

d) Sticking posters, writings, wall chalking, wall painting, writing slogans of any kind or defacing the hostel complex in any form is not permitted. Any disfigurement of the common areas such as visitor's area, bathrooms, staircase, common room, etc., cost of repair / re-paint shall be borne by the occupants of that room or corridor, as per case, decided by the Wardens.

e) Electricians, contractors or any other service personnel may enter the hostel rooms for necessary civil/electrical work. Prior information will be given to students about the same.

f) For any, day to day damage / technical fault observed by students in common areas, toilets, rooms etc., is to be reported by entered in the Feedback cum Grievances' Register.

g) For any major repair work required, in a hostel students are required to approach the Warden(s).

3) PERSONAL BELONGINGS:

a) Students are solely responsible for all their personal and valuable belongings. They are expected to keep their valuables under their own supervision or under lock and key, whenever they move out of their rooms. In case of loss of any such belongings whatsoever, the authorities will not be held responsible and no claim will be entertained in this regard.

b) students are supposed to vacate their rooms for maintenance works, following notices released from time to time. While vacating all personal belongings are to be taken back.

4) CANTEEN RULES:

a) No student is permitted to take the Canteen utensils outside the Dining hall. If anyone is found taking the utensils outside the Canteen or in their rooms, he/ she is liable to be penalized by the concerned authority.

b) Guests and/or visitors of students may avail canteen facility in the dining hall only, of the respective Canteen.

c) Canteen bills should be paid on time in each month.

Note: *Students violating the above said rules may be attracting disciplinary action, which may include expulsion from the hostel.*

Signature

Student Name

Undertaking for Responsible Use of Social Media
by Integrated MS(R)-PhD Students

I, _____, enrolled as a PhD/ Integrated MS(R)-PhD Physics (Space Physics) student in Indian Institute of Geomagnetism, New Panvel at_____laboratory, hereby undertake that:

1. I shall use social media platforms responsibly and maintain the dignity, reputation, and academic integrity of the Institute, its faculty members, staff, students, and research activities.
2. I shall not post, share, publish, or circulate any confidential, sensitive, unpublished, or proprietary information related to research work, laboratory activities, institutional data, or academic matters on any social media platform without prior written permission from the competent authority.
3. I shall refrain from posting any objectionable, defamatory, misleading, offensive, discriminatory, or inappropriate content that may harm the reputation of the Institute or any individual associated with it.
4. I understand that the use of social media during official academic or research activities should not interfere with academic responsibilities, research ethics, or institutional discipline.
5. I agree to comply with all rules, regulations, and guidelines issued by the Institute regarding the use of social media and digital communication platforms. Any violation of these guidelines may lead to disciplinary action as per Institute norms.

Declared on this ____ day of _____**, 20**
Place: _____

Signature of the Student: _____
Name: _____
Enrollment No.: _____

Conduct Rules & Regulations

(a) **Anti-Ragging Policy** - All institutions shall enforce a strict zero-tolerance policy on ragging in accordance with the UGC Regulations on Curbing the Menace of Ragging in Higher Educational Institutions, 2009. Ragging in any form—physical, verbal, psychological, or sexual—is strictly prohibited. Offenders shall be liable for disciplinary action, including expulsion, suspension, or monetary penalties, as well as prosecution under the relevant provisions of the Bharatiya Nyaya Sanhita, 2023 (BNS), including offences relating to hurt, wrongful restraint, criminal intimidation, and outraging modesty, as applicable.

All students and their parents/guardians must submit duly signed affidavits affirming non-involvement in ragging. Institutional premises must prominently display anti-ragging helpline details, including the UGC helpline (1800-180-5522).

(b) **Student Discipline** - Students are required to maintain exemplary standards of conduct, demonstrating respect toward faculty, peers, and institutional regulations. Acts of indiscipline—including examination malpractice, substance abuse, or disruptive behaviour—shall invite appropriate penalties such as warnings, fines, suspension, or rustication in accordance with institutional statutes.

Hostel residents must comply with prescribed rules, including curfew timings. Appeals against disciplinary actions may be submitted to the designated institutional authority or committee.

(c) **Safeguarding of Government Property** - All assets of the Indian Institute of Geomagnetism (IIG), including the Dr. K. S. Krishnan Geomagnetic Regional Laboratory and its facilities across India—such as laboratories, equipment, library resources, hostels, and vehicles—are government-funded and must be used responsibly.

Any damage, misuse, or unauthorized use shall result in recovery of costs from the concerned student(s), along with disciplinary action. Students are required to promptly report defects or damage and shall remain accountable for any loss occurring during their period of use.

(d) **Hostel Accommodation Guidelines**- Hostel accommodation is limited and allotted on the basis of merit and availability, with preference given to outstation students. Residents must adhere to the instructions of the warden, maintain cleanliness, and refrain from accommodating unauthorized guests.

Violation of hostel rules—including cooking inside rooms, misuse of electricity, or causing disturbance through loud noise—may result in disciplinary action, including eviction from the hostel.

(e) **Fee Payment and Refund Policy**- All fees must be paid online within the stipulated deadlines. Delayed payments shall attract applicable late fees. Refunds shall be governed by prevailing UGC norms: a full refund (after deduction of a processing fee) shall be permitted if withdrawal occurs at least 15 days prior to the commencement of the program; 50% refund shall be allowed if withdrawal occurs within 15 days; no refund shall be admissible thereafter. Details regarding scholarships and financial assistance shall be notified separately.

(f) **Reservation and Eligibility Compliance**- Admissions shall be conducted in accordance with Government of India reservation policies: 15% for SC, 7.5% for ST, 27% for OBC (Non-Creamy Layer), and 10% for EWS, along with 5% supernumerary seats for Persons with Disabilities (PwD).

Submission of false information or certificates shall result in immediate cancellation of candidature.

(g**) Attendance and Academic Requirements**- A minimum of 75% attendance is mandatory for eligibility to appear in examinations; failure to meet this requirement shall result in detention.

Students enrolled in MS–PhD programs must complete prescribed coursework, meet research milestones, and submit their thesis within stipulated timelines (typically 5–7 years). Academic progress shall be reviewed at the end of each semester.

(h**) Equal Opportunity and Anti-Discrimination** - The institution is committed to upholding constitutional values and strictly prohibits discrimination on the basis of caste, gender, religion, disability, or any other protected ground. Dedicated grievance redressal mechanisms, including committees for SC/ST, women, and Persons with Benchmark Disabilities (PwBD), are in place to ensure prompt and fair resolution of complaints.

I have read and understood the above rules and regulations. I hereby agree to abide by them throughout my tenure in the MS(R)-PhD Program at the Indian Institute of Geomagnetism

Signature

Student Name