NAAC A+

INFORMATION BROCHURE

Doctor of Philosophy (Ph.D.).
Ph.D. Entrance Examination (PhDEE)
January 2025

For admission into various Ph.D. Programs for Academic Session 2024-25

Fellowship will be provided to selects candidates

srhu.edu.in

AT A GLANCE

Important Dates of Ph.D. Entrance Examination – January 2025		
1.	Schedule for on-line submission of Application forms with requisite fee	3 February 2025 (Monday) – 3 March 2025 (Monday)
2.	Date of downloading Admit-Cards from University website	10 March 2025 (Monday)
3.	Date & Time of Entrance Examination	16 March 2025 (Sunday), 10:00AM
4.	Date of Uploading Answer Keys on University website	20 March 2025 (Thursday)
5.	Declaration of Entrance Examination Result	27 March 2025 (Thursday)
6.	Personal interaction and Interview	1 April 2025 (Tuesday) – 8 April 2025 (Tuesday)
7.	Result	22 April 2025 (Tuesday)
8.	Date of Physical Document Verification and payment of fees	30 April 2025 (Wednesday)

Link to fill online application for Ph.D.E.E. January 2025
https://admissions.srhu.edu.in/
Online Application fee: ₹1500 /- + Transaction Charges as applicable

Important Note

- Be it known to all that there is no management quota in the University or its Constituent Colleges/Schools. The admissions to Ph.D. programs offered by the University are made purely on merit decided by the University (wherever applicable). The public, in general, is informed that Swami Rama Himalayan University or its constituent colleges have never authorized/solicited any person(s) or any agent(s) for admissions in the Ph.D. programs. Therefore, the public is cautioned to be aware of unscrupulous person(s)/agents/advertisements. The Authorities of the University or its constituent colleges shall not be responsible if candidates/wards are cheated on this account.
- No claim shall be entertained for a refund of application fee, paid for Ph.D.E.E.- January 2025.
- After declaration of the result of the written entrance exam, the qualified candidates will be called for personal interaction and interview to discuss research interest/area.
- Ph.D. programme shall be in **Full time Mode and Part Time Mode** for a minimum duration of three years and four years respectively, including course work.
- **For the Part-time mode** of the Ph.D. programme, prior to joining, **any external candidate** who is employed in any Institution/Organization is required to submit a 'No Objection Certificate' from the appropriate authority in the organization where the candidate is employed, clearly stating that:
    a) The candidate is permitted to pursue studies on a part-time basis.
    b) His/her official duties permit him/her to devote sufficient time for research.
    c) If required, he/she will be relieved from the duty to complete the course work and research.
- **SRHU employees** who apply for the Ph.D. programme will be considered as **Part-time scholars**. They also must submit a 'No Objection Certificate' from the appropriate authority in the University stating that:
    a) The candidate is permitted to pursue studies on a part-time basis.
    b) His/her official duties permit him/her to devote sufficient time for research.
    c) If required, he/she will be relieved from the duty to complete the course work and research.
    d) He/she would have to avail his/her own personal leave from the respective departments/ workplace in the university for the purpose of the Ph.D. course work and research.
- **Candidates having their Master's degree from foreign university are required to submit equivalence certificate issued by Association of Indian Universities (AIU) at the time of physical document verification. Foreign nationals are required to follow the norms and procedures as prescribed by the Government of India/University Grants Commission or any other Authorities/Bodies and Guidelines for admission of International Candidates of the Swami Rama Himalayan University, Dehradun.**
- Candidates shall have to produce their original degree and marksheet with the required percentage as per the UGC (Minimum Standards and Procedures for Award of Ph.D. Degree) Regulations, 2022, at
-

- the time of admission/ document verification; failing which their candidature will be cancelled automatically.
- Merely qualifying the Ph.D. Entrance Examination (written examination & personal interaction and interview) will not entitle the candidate secure admission to Ph.D. program unless all other conditions laid down by the University are fulfilled.
- Refund of fees shall be as per the Policy for Refund of Fees of the University circulated through officer order number SRHU/Reg/OO/2022/177 dated 20 October 2022.
- Admission of a candidate shall be cancelled if it is found at a later stage that he/she had secured admission by giving false information/certificate(s) or has concealed some information. The fee deposited shall be forfeited and such a candidate shall also be liable to pay the fee for the remaining duration of the programme. In such a situation, the University reserves the right to take any other action as deemed fit.
- There may be a case where a candidate is provisionally admitted into a programme in-spite of his not having the qualifying examination result. In such an event, the provisional admission order stipulates the date by which he/she is required to submit the qualifying examination result in support of his meeting the eligibility criteria for admission to the programme. In case a candidate fails to submit documentary evidence of his meeting the eligibility criteria for admission by the stipulated date, his/her provisional admission will stand cancelled, and no refund shall be made.
- There may be cases where a candidate leaves the programme mid-stream thus depriving the right of another meritorious candidate who could have taken admission. **In order to avoid such a situation and also to ensure that seat(s) in the programme do not remain vacant, candidates who obtain admission will be required to submit at the time of joining either a bank guarantee for the tuition fee of the entire duration of the programme or post-dated cheques in favour of Swami Rama Himalayan University for the balance unpaid tuition fee of the entire duration of the programme as cash security.** The University shall have the right to encash the bank guarantee/post-dated cheques in case the candidate leaves the programme mid-stream, after the admission.
- The specialization/subjects for which UGC-NET and CSIR-UGC NET examination is conducted, the University will accordingly, admit students based on NET Score and such students shall be called for interview only. The CSIR-NET conducts the exam in Life Sciences that includes the syllabus of Biochemistry, Biotechnology and Microbiology. The admission in the following specializations shall be done through UGC NET/CSIR-NET score only: **Management (Finance, Human Resource, Marketing), Yoga Sciences, Biochemistry, Biotechnology and Microbiology**
- The specializations/subjects like Pharmacy, Nursing and Engineering for which UGC-NET and CSIR-UGC NET examination is not conducted, the University will organize its own entrance examination as being done earlier. The written entrance examination for following specializations shall, thus, be organized by the University: **Epidemiology, Immunology, Medical Physics, Oncological Sciences, Pharmacology, Physiology and Pharmacy**

1. Doctoral Degree Program

The University offers Ph.D. in following areas:

S. No.	Specializations	Code	Eligible Subjects	Eligibility to seek admission in Ph.D. programme as per the UGC (Minimum Standards and Procedures for Award of Ph.D. Degree) Regulations, 2022
1.	Biochemistry	01	Master's degree in Biochemistry/ Biotechnology or any other related fields	Eligibility to seek admission to the Ph.D. programme will be: 1. Candidates who have completed any the following: • 1-year/2-semester master's degree programme after a 4-year/8-semester bachelor's degree programme OR • 2-year/4-semester master's degree programme after a 3-year bachelor's degree programme OR • Qualifications declared equivalent to the master's degree by the corresponding statutory regulatory body OR • Provided that a candidate seeking admission after a 4-year/8-semester bachelor's degree programme has a minimum of 75% marks in aggregate or its equivalent grade on a point scale wherever the grading system is followed. 2. Candidates who have completed the M.Phil. programme with at least 55% marks in aggregate or its equivalent grade in a point scale wherever grading system is followed or equivalent qualification from a foreign educational institution accredited by an assessment and accreditation agency which is approved, recognized or authorized by an authority, established or incorporated under a law in its home country or any other statutory authority in that country to assess, accredit or assure quality and standards of educational institutions, shall be eligible for admission to the Ph.D. programme. 3. Candidates must have secured at least 55% marks in aggregate or its
2.	Biotechnology	02	Master's degree in Biotechnology/ Biochemistry/ Botany/ Zoology/ Microbiology, or any other related fields	
3.	Epidemiology	04	Master's degree in Epidemiology/ Community Medicine or M.Sc. in Clinical Research	
4.	Immunology	06	Master's degree in Immunology/ Biochemistry/ Biotechnology/ Microbiology or any other related fields	
5.	Management (Finance, Human Resource, Marketing)	07	Master's degree in Commerce/ Business Administration/ Human Resource Management/ Finance/ Marketing or any other related fields	
6.	Medical Physics	08	Master's degree in Medical Physics or Master's degree in Physics with Post M.Sc. Diploma in Medical Physics	
7.	Microbiology	09	Master's degree in Microbiology/ Biotechnology or any other related fields	
8.	Oncological Sciences	11	Master's degree in Oncology Sciences/ Pharmacology/ Microbiology/ Biochemistry/ Biotechnology or any other related fields	
9.	Pharmacology	12	Master's degree in Pharmacology, or any other	

			related fields	equivalent grade in a point scale wherever grading system is followed or equivalent qualification from a foreign educational institution accredited by an assessment and accreditation agency which is approved, recognized or authorized by an authority, established or incorporated under a law in its home country or any other statutory authority in that country to assess, accredit or assure quality and standards of the educational institution. 4. A relaxation of 5% marks or its equivalent grade may be allowed for those belonging to SC/ST/OBC (non-creamy layer)/Differently Abled, Economically Weaker Section (EWS) and other categories of candidates as per the decision of the UGC from time to time.
10.	Pharmacy (Pharmaceutics, Pharmaceutical Chemistry, Pharmacology)	13	M. Pharm in appropriate branch of specialization in Pharmacy or related fields	
11.	Physiology	14	Master's degree in Physiology, or any other related fields	
12.	Yoga Sciences	16	Master's degree in Yoga, or any other related fields	

2. Fee Structure

Fee Category		First Year	Second Year	Third Year
Tuition Fee	AIC	80,000/-	80,000/-	80,000/-
	PRU	60,000/-	60,000/-	60,000/-
Admission fee		20,000/-	–	–
Enrollment Fee		1,000/-	–	–
Refundable Security #		15,000/-	–	–
Course work Examination fee *		4,000/-	–	–
Supplementary Exam Fee (Per Course), if applicable		1,000/-	–	–
Laboratory Fee (If Applicable)		–	20,000/-	10,000/-
Research and Development Fee		–	15,000/-	30,000/-
Year/Semester wise fee to be paid	AIC	1,20,000	1,15,000/-	1,20,000/-
	PRU	1,00,000	95,000/-	1,00,000/-
Total Programme Fee	AIC	3,55,000/- (Three Lakhs Fifty Five Thousand)		
	PRU	2,95,000/- (Two Lakhs Ninety Five Thousand)		

*Fee is subject to revised.
One Time at the time of admission and will be refundable after the completion of programme.
Note:

1. Tuition fee may be paid in two instalments in a year.
2. On successful completion of the programme, scholars are required to registered for Alumni Association and Convocation.
3. A tuition fee of Rs. 40,000/- (Rupees fourth thousand only) per semester will be charges for an additional extension period as prescribed by the UGC from time to time.
4. Rs. 100/- (Rupees one hundred only) per day will be charged for late submission of fee.

3. Pattern of Entrance Examination

3.1. Written Entrance Examination

- Date of Written Entrance Examination: **16 March 2025 (Sunday)**
- Duration of Written Entrance Examination: **2 Hrs. (10:00 AM to 12:00 Noon)**
- Time of Reporting: 09:30 AM with original and valid Photo ID (PAN Card, Driving License and Aadhaar Card) along with the admit card downloaded from the University website.
- **Center for Written Entrance Examination:** Swami Rama Himalayan University Campus, Jolly Grant, Dehradun.

- Answer of the Multiple Choice Questions (MCQ) should be marked by the candidate using black ink ball point pen only.
- Language of question paper will be in English medium only.
- There is no penalty (negative marking) for wrong answer marked by the candidate.

3.2. Personal Interaction and Interview

- The Personal Interaction and Interview shall consider the following aspects, viz. whether:
  a) The candidate possesses the competence for the proposed research
  b) The research work can be suitably undertaken at the Institution/College
  c) The proposed area of research can contribute to new/additional knowledge
- The assessment of the Ph.D. candidates in Personal Interaction and Interview shall be based on following criteria:
  a) Presentation (15 Marks)
  b) Knowledge (20 Marks)
  c) Aptitude for Research (15 Marks)
- The Presentation should be based on the proposed Ph.D. research work which could be undertaken by the candidate after completion of the admission process.
- Note: UGC/CSIR-NET/SLET/GATE/GPAT/M.Phil. Qualified candidates are exempted from the Written Entrance Examination. However, they will have to appear for personal interaction and interview as notified. Such candidates are required to obtain 50% marks in the personal interaction and interview to qualify for admission to the Ph.D. program. The UGC/CSIR NET/SLET/GATE/GPAT/M.Phil. etc. certificate shall be deemed valid till three (3) years from the date of declaration of the result or issue of certificates.

S. No.	Examination	Marks	Syllabus	Duration	Timings
1	Written Entrance Examination	100	The Question paper will comprise of Multiple-Choice Questions (MCQ) of two sections: Research Methodology (50%) and Subject Specific (50%) (as per SRHU syllabus)	2 Hrs.	10:00 A.M. To 12:00 Noon
The Written Entrance Examination shall be qualifying with qualifying marks as 50%					
2	Personal Interaction and Interview	50	Qualified candidates are required to discuss their proposed area of research in the form of PPT, before duly constituted Departmental Research Committee (DRC)	30 Min	The date for personal interaction and interview will be intimated only to the candidates who qualify in the Written Entrance Examination.

- A candidate who has secured a minimum of 50% marks each in the Entrance Examination and Personal Interaction and Interview separately, shall be considered eligible for admission into the Ph.D. programme of the University.
- The final merit list is based on a weightage of 70% to the Written Entrance Examination and 30% to the performance in the Personal Interaction and Interview.
- The minimum eligibility criteria indicated above for each programme is only an enabling clause. The admission to Ph.D. program is subject to the scrutiny of eligibility of the candidates; availability of seats/supervisors/co-supervisor and any other criteria as framed by the University from time to time.
- Ph.D. programme shall also include of a common course work program of six months (one semester) for all Ph.D. candidates, which must be mandatorily cleared by the candidates within two attempts.
- A relaxation of 5% marks will be allowed in the entrance examination for the candidates belonging to the SC/ST/OBC/differently abled category, Economically Weaker Section (EWS), and other categories of candidates as per the decision of the UGC from time to time.

4. Areas of Research

Prospective candidates may go through the areas of research as are available in the various departments of Swami Rama Himalayan University.

S. No.	Program	Areas of Research
1.	Biochemistry, Biotechnology, Microbiology	Environmental Biotechnology, Biological Research, Biochemistry, Microbiology Genetics, Neurobiology, Virology, Human, Animal, Plant, Microbial Cell and Molecular Biology. Nano Biotechnology, Nano toxicology, Bio informatics and Systems Biology.
2.	Epidemiology	Health services research, Cancer Epidemiology, Cardiovascular Epidemiology, Clinical Epidemiology, Environmental and Occupational Epidemiology, Epidemiologic Methods, Epidemiology of Aging, Infectious Disease Epidemiology, Nutritional Epidemiology, Reproductive, Perinatal and Pediatric Epidemiology, Social Epidemiology, Public and Population Health, Global Health Epidemiology, Molecular Epidemiology
3.	Immunology	Cancer immunology and immunotherapy, Autoimmunity and Immune-mediated diseases, Immune system development and Regeneration, Adaptive immunity, Innate immunity, Infectious diseases, Transplantation
4.	Management (Finance, Human Resource, Marketing)	Accounting and Finance, Economics, Human Resource, Marketing Management
5.	Medical Physics	Medical imaging, Nuclear medicine, Radiation protection and Radiation oncology
6.	Oncological Sciences	Cancer genetics & Genomics, Cancer immunotherapy and vaccines, Cancer metabolism, Cell Signalling & Regulation, Cell based therapy, Computational Oncology, Clinical Oncology, Cancer prevention, Drug Development and Clinical Trials, Community Oncology, Palliative and Supportive Oncology, Nursing and Psychosocial Issues in Oncology
7.	Pharmacology	Clinical pharmacology, Cardiovascular pharmacology, Neuropharmacology, Respiratory pharmacology, Renal pharmacology, Gastrointestinal pharmacology, Cancer pharmacology, Pharmacovigilance, Adverse drug reaction monitoring, Drug interaction studies, Pharmaco-epidemiological studies and Pharmaco-economics, Drug utilization studies.
8.	Pharmacy	Pharmaceutics, Pharmaceutical Chemistry, Pharmacology
9.	Physiology	Yoga in stress disorders, Exercise physiology, Occupational Health, Non-communicable diseases
10.	Yoga Sciences	Yoga and its allied subjects

5. Ph.D. Syllabus for Entrance Examination

Research Methodology (Common for all candidates)

Unit - I

Introduction of Research, Nature and purpose of scientific enquiry, Parameters of research, Problem Definition, Definition of construct and variables, Research Process, Steps in Research Process.

Unit - II

Research Design, Concepts and Type of research design, Design of research on the basis of application– Fundamental and Applied.

Descriptive Research, Qualitative and Quantitative.

Quantitative design of research on the basis of Mathematical and Statistical methods, Field and laboratory experiment.

Qualitative design of research on the basis of Exploratory, case study, Focus Group and descriptive. Surveys and observations.

Unit - III

Measures of Central Tendency: Mean, Median and Mode.

Unit - IV

Reading Comprehension

A passage to be set with questions to be answered (General)

Unit - V

Reasoning- Mathematical, Logical and Analytical

Number Series; Letter Series; Codes, Verbal Analogies; Word Analogy – Verbal Classification, Reasoning Logical Diagrams, Venn diagram, Analytical Reasoning

Ph.D. Syllabus for Entrance Examination - Epidemiology

Unit-I: Design & Conduct of clinical and epidemiological studies

1. Descriptive Studies
   1.1 Types- Correlation studies
   - Case reports and case series
   - Cross sectional Surveys
   1.2 Time, place and person distribution (Please check the bullet numbering)

   1.3 Hypothesis formulation

2. Case Control Studies
   2.1 Design of case control studies
   2.2 Selection bias
   2.3 Matching
   2.4 Analysis
   2.5 Interpretation

3. Cohort Studies
   3.1 Study design
   3.2 Timing of measurements
   3.3 Selection of subjects
   3.4 Data collection
   3.5 Analysis
   3.6 Interpretation

4. Clinical studies (Design & Conduct)
   4.1 Research question
   4.2 Hypothesis
   4.3 Core design
      a) Parallel
      b) Cross over
      c) Mixed
   4.4 Study participants
   4.5 Sample size calculation
   4.6 Statistical power
   4.7 Allocation
   4.8 Masking
   4.9 Treatment groups
   4.10 Ethical issues
   4.11 Data collection
   4.12 Analyses
   4.13 Interpretation

Unit-II: Chronic Disease Epidemiology

1. Chronic Disease: A Public Health Perspective
2. Epidemiology of Non-Communicable Diseases
   - Cardiovascular Diseases including stroke
   - Cancers particularly in relation to India
   - Type II Diabetes

Unit-III: Ethical Issues Design, Conduct & Reporting of Medical Research

1. Gold standard
2. Ethical frameworks for conduct of clinical trial
   - Issues in clinical trial design
   - Informed consent
3. Four golden rules of ethical conduct in clinical research
   - Respect for patient autonomy
   - Maximization of research impact on medical treatment
   - Minimization of risk to research participants
   - Scientific integrity

Unit-IV: Public health surveillance system

1. Population health: assessment, indicators, and measures
- Introduction to public health surveillance
- Population health information
- Population health and community health assessment
- Population health indicators
- Disease surveillance at state and local level
- Surveillance: The Sentinel Health Event Approach

2. Information systems
- Types of health information systems in India
- Evaluating Public health surveillance system

3. Types of surveillance
- Chronic disease surveillance
- Occupational and environmental surveillance
- Infectious disease surveillance
- Syndromic surveillance

Unit-V: Social Problems, Communication & Health Education

1. a. Social context of Medicine
b. Concepts in Sociology
c. Psychology
- Emotions
- Role of emotions in health & disease
- Control of emotions
- Learning
- Conditions affecting learning
- Types of Learning
- Personality - Components of Personality and I.Q.

d. Family life of cycle
- Family cycle & stress
- Family in Health & Disease

2. Cultural factors in Health & Disease

The Community

a. Structure of Society
b. Social class & Socio –economic status
c. Social Problems of a Community
d. Social Agencies
e. Community Services

3. **Communication**
    a. The Communication Process
    b. Types of Communication
    c. Barriers of Communication

4. **Health Education**
    a. Definition
    b. Aims & objectives of Health Education
    c. Approaches, Models, Contents, Principles and Practices of Health Education

Ph.D. Syllabus for Entrance Examination - Immunology

Unit - I

Principles of Immunization, Techniques for analysis of immune response. General Idea of Active and passive immunization; Live, killed, attenuated, subunit vaccines; recombinant DNA and protein based vaccines, plant-based vaccines, reverse vaccinology; Peptide vaccines, conjugate vaccines; Hybridoma, antibody engineering - chimeric and hybrid monoclonal antibodies; Transfusion of Immunocompetent cells; stem cell therapy; Cell based vaccines.

Unit - II

Host-pathogen interactions, Introduction to the Immune System, Cells and Organs of the Immune system, Innate immune responses Cells of the innate immune system, Inflammatory response. Components of immune system.

Unit - III

Structure and function of antibody. Inflammation, opsonization. Primary and secondary lymphoid organs. Complement. Fluorochromes and staining techniques for live cell imaging and fixed cells; immunofluorescence, immunoelectron microscopy; Flow cytometry:

Unit - IV

B cell, T cell ontogeny. Characteristics of antigen, T cell dependent and independent antigens. Hypersensitivity. Primary and Secondary immune responses. Techniques in humoral immunology. Treatment of autoimmune diseases; Transplantation – Immunological basis of graft rejection; Clinical transplantation and immunosuppressive therapy; General Idea of Tumor immunology,

Unit -V

Cytokines. T cell education, Affinity maturation. Immunological Memory. Cell-cell interaction, signal transduction. Development of tolerance. Characteristics of T helper and Tc TL and B cell peptide. Transplant immunology. Bone marrow chimera. Auto immunity, molecular mimicry, Therapy. Monoclonal antibody. Techniques in molecular immunology.

Ph.D. Syllabus for Entrance Examination - Medical Physics

Unit - I

Production and properties of X-rays, structure and types of X-ray tubes, insulation and cooling of X-ray tubes, filament and high voltage transformers and circuits, half and full wave rectifiers, three phase and constant potential generators, automatic brightness control, automatic exposure control, measurement of kV and mA, timers, image intensifiers, flat panels and close circuit TV systems. General Properties of alpha, beta and gamma rays, Laws of radioactivity, Artificial Radioactivity, Particle Accelerators – Van De Graff generator, Cyclotron, Betatron, Linear Accelerator, Klystron and Magnetron, Travelling and Standing wave Acceleration. Interactions of radiation with matter.

Unit - II

Radiation quantities and units, linear and mass attenuation coefficients, charge particle equilibrium, ion chambers- parallel plate, cylindrical and spherical, Bragg-Gray-cavity theory, beam quality index. Diodes, MOSFET, Operation amplifier and their characteristics, theory and design of a condenser type ion chambers and thimble chambers, proportional and GM counters, Scintillation and semiconductor detectors, radiographic and radiochromic films, thermoluminescent dosimeters (TLD), optically stimulated luminescence dosimeters (OSLD), pocket dosimeters, farmer dosimeters, well type chamber, radiation field analyzer and water phantom dosimetry system, gamma zone monitor, contamination monitor, personal monitoring dosimeters.

Unit - III

Construction and working of a tele-cobalt unit and a medical linear accelerator, output calibration of Co-60 gamma rays, high energy X-rays and electron beams, CT and virtual simulation, central axis dosimetric parameters, beam modifying and shaping devices, energy specification and depth dose characteristics of electron beams, QA in radiation therapy. Definitions and classification of brachytherapy techniques- surface mould, intracavitary, interstitial and intraluminal techniques, properties of commonly used brachytherapy sources, dose rate considerations and classification of brachytherapy techniques, Paterson Parker and Manchester doses systems, after loading techniques, ISO requirements and QA of brachytherapy sources.

Unit - IV

Conventional radiography and fluoroscopy techniques, filters and collimators, devices and methods to reduce scatter, image quality, digital and computed radiography, mammography and computed tomography, magnetic resonance imaging and medical ultrasound equipment, QA of conventional radiography system and CT equipment. Techniques and instruments in radionuclide imaging- radionuclide generator and their operational principles, gamma camera and its system components, physics and instrumentation of positron emission tomography and single photon emission computed tomography, image quality parameters and quality control in nuclear medicine.

Unit -V

Anatomy and physiology as applied to radiodiagnosis and radiotherapy, action of radiation in living cells, survival curve and its parameters, target theory, LET, RBE, dose rate and dose fractionation, somatic and genetic effects of ionizing radiation, physical and biological factors affecting cell survival, 5 R's of radiobiology, dose fractionation and linear quadratic model. ICRP principles of radiation protection, ALARA, dose limits, equivalent dose and effective dose, effect of distance, time and shielding on dose, personal and area monitoring, categories of exposures- occupational, public and medical exposure, safety in handling of radionuclides and disposal of radioactive waste, radiation legislation and radiation protection rules.

Ph.D. Syllabus for Entrance Examination - Oncological Sciences

Unit - I

Introduction, growth characteristics of cancers cells; Morphological and ultrastructural properties of cancer cells. Types of growth: hyperplasia, dysplasia, anaplasia and neoplasia. Nomenclature of neoplasms. Differences between benign and malignant tumors. Epidemiology of cancer, common cancer worldwide, India.

Unit - II

Cancer biology and biochemistry-Biological basis of cancer/Molecular biology of cancer Aberrant metabolism during cancer development; Tumor markers; cellular proto-oncogenes- oncogene activation. Growth factors-EGF, TNF- and TGF- and growth factor receptors. Signal transduction in cancer. Role of transcription factors.

Unit - III

Etiology/Carcinogens: Oncogenic Viruses, Physical factors, Chemical Factors, Dietary Factors, Lifestyle, carcinogenesis- Initiation, promotion and progression. Free radicals, antioxidants in cancer; Hormone mediated carcinogenesis in humans.

Unit - IV

Cell Cycle Regulation-Tumor suppressor genes p53, p21, Rb, BRACA1 and BRACA2. Telomeres, Telomerase, and Immortality; cell- cell interactions, cell adhesion-invasion and metastasis - VEGF signaling, angiogenesis; Apoptosis in cancer-Cell death by apoptosis, role of caspases; Death signaling pathways: mitochondrial and death receptor pathways.

Unit - V

Cancer Control strategies: Primary prevention, Early Diagnosis, Common Symptom, Prediction of aggressiveness of Cancer, Cancer treatment Modalities: Palliative care, pain control, end of life care,
Different forms of therapy: advantages and limitations. Common anticancer drugs, Psychosocial issues in cancer care.

Ph.D. Syllabus for Entrance Examination - Pharmacology

Unit - I: Basic & Systemic Pharmacology

General Pharmacology:

- Pharmacology –history and development
- Pharmacokinetics
- Pharmacodynamics
- Adverse drug reactions
- Drug interactions and iatrogenic disorders
- Pharmacogenetics & genomics

Autonomic nervous system:

- Anatomical and physiological considerations of the autonomic nervous system
- Cholinergic system- Cholinergic agonists, anticholinesterases and antimuscarinic drugs
- Adrenergic system- Adrenergic drugs, Alpha adrenergic blocking agents, Beta adrenergic blocking agents

Autacoids & related drugs

- Prostaglandins & prostaglandin analogues
- Histamine & antihistaminics
- Pharmacology of serotonin & drug therapy of migraine
- NSAIDs & drug therapy of Rheumatoid arthritis & gout

Central Nervous system:

- Physiology and pharmacology of neurohumoral transmission in the central nervous system
- Anaesthetic agents used in general anaesthesia
- Central & peripheral analgesics- Opioids & NSAIDs
- Psychopharmacology- Antipsychotics, Antidepressant drugs & Antianxiety drugs
- Sedative-hypnotics & antiepileptics

Unit - II: Systemic Pharmacology

Cardiovascular system

- Basic physiology of cardiovascular system including electrophysiology of the heart, mechanics of myocardial contraction and RAAS system
- Anti-hypertensive agents
- Antiarrhythmic drugs
- Drugs for CHF
- Angina pectoris & MI
- Hypolipidemic drugs
- Drugs acting on coagulation system
- Antiplatelet drugs

Endocrinology:

- Physiological considerations of endocrine system in relation to pharmacological actions of drugs & drug targets
- Antidiabetic drugs
- Thyroid and anti-thyroid drugs
- Corticosteroids
- Sex Steroids & related drugs
- Drugs affecting calcium homeostasis

Chemotherapy

- Introduction to mechanism of action and principles of anti-microbial therapy
- Antimicrobial agents
- Antibacterial agents
- Antifungal agents
- Antiviral agents
- Antimalarial agents
- Antiamoebic agents
- Antineoplastic agents & immunomodulators

Respiratory Pharmacology

- Respiratory physiology in relation to pharmacological actions of drugs & drug targets
- Drugs used in Bronchial Asthma
- Drugs used in the treatment of cough

GIT Pharmacology

- Physiology of GI system in relation to pharmacological actions of drugs & drug targets
- Antiulcer drugs
- Antiemetics
- Drugs used in diarrhea & constipation

Unit - III: Clinical & Applied Pharmacology

- Clinical pharmacokinetics, concentration effect relationship, pharmacokinetic parameters, target concentration strategies, plateau principle and population pharmacokinetics
- Bioavailability & Bioequivalence studies
- Therapeutic drug monitoring
- ADR monitoring and prevention
- Bioavailability and bioequivalence studies
- Pharmacoeconomics and pharmacoepidemiology
- Principles of rational drug therapy with emphasis on antimicrobial chemotherapy
- Concept of essential drugs
- Drug therapy in extremes of age (Neonatal/Geriatric)
- Drug therapy in pregnancy and lactation
- P drug & P-medicine
- Prescription auditing and critical evaluation of research papers, promotional materials / drug advertising materials etc.
- Evidence based medicine
- Recent advances

Unit - IV: Research Methods in Pharmacology

- Keeping and breeding of laboratory animals
- Drug regulations
- Bioassay and its importance
- Drug development (Pre clinical and clinical)
- Drug discovery & evaluation through pharmacological assays
- Screening methods in pharmacology for evaluation of drug activities
- Acute/ subacute and chronic toxicity studies on animals
- Clinical trials
- Design, implementation and evaluation
- Phase 0, I, II, III, IV

- Ethical and legal aspects in clinical trials and drug therapy
- Basic Biostatistics
- Research protocol and thesis writing, offline and online literature search and basics of MS-PowerPoint

Unit - V: Recent advances in Pharmacology

- Recent advances in ANS Pharmacology
- Recent advances in CNS Pharmacology
- Recent advances in CVS Pharmacology
- Recent advances in Endocrine Pharmacology
- Recent advances in antimicrobial and antineoplastic Pharmacology
- Recent advances in Respiratory Pharmacology
- Recent advances in GIT Pharmacology
- Recent advances in drug discovery & development

Ph.D. Syllabus for Entrance Examination - Physiology

Unit-I: Neurophysiology

- Experimental basis of action potential (AP) recording in nerve & ionic basis of its generation.
- Understanding neuromuscular transmission & mechanisms of contraction of muscles.
- Understanding the organization of the nervous system.
- Basic functions of synapses & neurotransmitters.
- Concept of various sensory receptors, ascending & descending tracts of spinal cord.
- Functional aspects of autonomic nervous system, hypothalamus, cerebellum & basal ganglia.
- Recent advances in neurophysiology.

Unit-II: Endocrinology

- General principles of endocrinology including classification.
- Mechanism of actions and feedback control of hormones.
- Hormonal aspects of growth, development & obesity
- Concept of insulin, pathophysiology of Diabetes Mellitus
- Understanding hormonal regulation of calcium balance.

Unit-III: Cardiovascular System, Exercise Physiology & Yoga

- Physiological anatomy of cardiac muscle including excitation contraction coupling.
- Control of excitation by autonomic system.
- Concept of ECG & cardiac vector.
- Basic concept of cardiac cycle and cardiac output
- Biophysical aspect in circulatory system.
- Concept of blood pressure, its measurement & various mechanisms that control blood pressure.
- Exercise physiology.
- Yoga and lifestyle modification

Unit-IV: Respiratory Physiology

- Understanding the mechanics of respiration including concept of compliance
- Understanding pulmonary volumes-capacities & their measurement by spirometer
- Concept of gaseous exchange in lungs & how transport of gases occur in blood.
- Basic understanding of chemical & neuronal control of respiration.
- High altitude pulmonary physiology, respiratory alteration in deep-sea diving & space physiology.

Unit-V: Renal and Gastrointestinal physiology

- Concept of body fluid & its regulation.
- Functional anatomy of Kidney
- Urine formation mechanisms
- Urinary concentration mechanisms including countercurrent system
- Concepts of acid base balance.
- Functional anatomy of gastrointestinal tract (GIT).
- Concept of various types of motility & its regulation
- Overview of various secretions, including digestion & absorption of various nutrients.

Ph.D. Syllabus for Entrance Examination - Pharmacy

UNIT- I.

Electro Magnetic Spectrum, Definition, equation and applications of Beer's law, Hook's law & Bragg's Law. Principles of various spectroscopic analytical techniques like UV-Visible I.R, Fluorimetry, Nephelo- Turbidimetry, NMR and Mass Spectroscopy. Principle and applications of various chromatographic techniques like GC, HPLC, HPTLC, Ion Exchange, Size Exclusion and Electrophoresis.

UNIT- II.

Classification, advantages and disadvantages and methods of mixing of powders. Types of Tablets, Excipients used in tablets. Sugar coated tablets, film coated tablets, quality control tests. Types of Capsules, raw materials for gelatin capsule shell, storage conditions of capsules. Novel drug delivery systems: advantages and disadvantages, concepts, types of drug delivery systems, Applications of microspheres, liposomes, niosomes, nanoparticles,

Definition, classification, advantages and disadvantages, additives used in suspension & emulsion, stability of suspension. The dynamics of drug absorption, distribution, metabolism and elimination. Molecular mechanisms of drug action (general). Drug toxicity and poisoning. Ionization, Solubility, Partition Coefficient, Hydrogen bonding, Protein Binding and Bioisosterism.

UNIT-III.

Plant tissue culture, Growth media, Plant growth regulators, Callus & Suspension cultures, immobilization, hairy root culture. Transgenic plants and their applications, Plant tissue culture as source of secondary metabolites. Enzymes, Biological sources, and uses of: Papain, Bromelain, Urokinase, and streptokinase.

UNIT-IV.

Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship and synthesis of Sulphonamides, Antitubercular agents, Antimalarial agent, Antibiotics, Antineoplastic agents, Antianginal, Anti-hypertensive Agents, Anti-arrhythmic Drugs, Corticosteroids. Scope and relevance of preclinical and clinical trials. Adverse drug reactions (ADRs). Role of pharmacovigilance ability in ADR monitoring. Receptors- Adrenergic, cholinergic, histaminergic, and dopaminergic receptors.

UNIT-V.

Principle and Applications of different extraction & isolation methods viz., Maceration, Percolation, Sohxlet extraction, microwave extraction, supercritical fluid extraction. Adulteration and evaluation of crude drugs, Different methods of adulteration, Evaluation of drugs by organoleptic, microscopic, physical, chemical, and biological methods. Phytoconstituents definition, classification, and pharmaceutical importance of alkaloids, glycosides, steroids. Significance and determination of Extractive values, Ash values, Heavy metals, Pesticidal residue and microbial load in herbal preparations.

NAAC A+

Swami Rama Himalayan University

Swami Ram Nagar, Jolly Grant,
Dehradun – 248016, Uttarakhand (India)
Phone: 0135- 2471105, +917055213605
Email: director.research@srhu.edu.in

srhu.edu.in