Swami Rama Himalayan University

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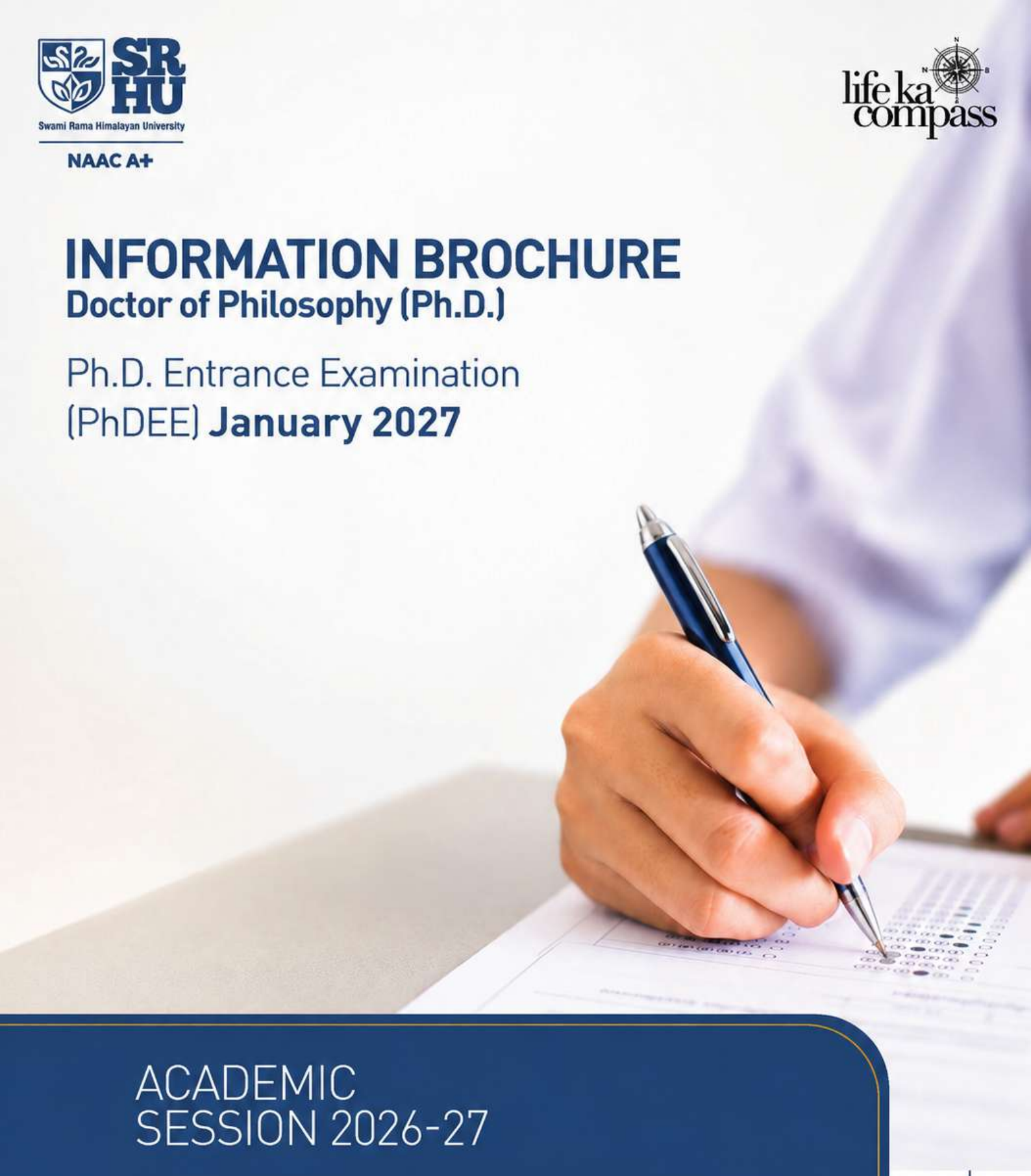
INFORMATION BROCHURE

Doctor of Philosophy (Ph.D.)

Ph.D. Entrance Examination
(PhDEE) **January 2027**



ACADEMIC
SESSION 2026-27

Doctor of Philosophy
(Ph.D.)

AT A GLANCE

Important Dates of Ph.D. Entrance Examination – January 2027		
1	Schedule for online submission of Application forms with requisite fee	17 November 2026 (Tuesday) 3 Jan 2027 (Sunday)
2	Date of downloading Admit-Cards from the University website	12 January 2027 (Tuesday)
3	Date of Entrance Examination	17 January 2027 (Sunday)
4	Date of Uploading Answer Keys on the University website	19 January 2027 (Tuesday)
5	Declaration of Entrance Examination Result	27 January 2027 (Wednesday)
6	Personal Interaction and Interview	2 February 2027 (Tuesday) 13 February 2027 (Saturday)
7	Final Result	19 February 2027 (Friday)
8	Date of Physical Document Verification and payment of fees	24 February 2027 (Wednesday)
9	Commencement of Ph.D. Course Work Classes First Week	First Week of March-2027

Link to fill online application for Ph.D.E.E. January 2027
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 RamaHimalayan 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 2027.

- 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. program 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. programs, 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. program 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 a foreign university are required to submit an equivalence certificate issued by the 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.

- The university will conduct its entrance examination on the date specified in this brochure, merely qualifying the Ph.D. Entrance Examination (written examination & personal interaction and interview) will not entitle the candidate to secure admission to the 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 program. 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 program 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 program. 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 program mid-stream thus depriving the right of another meritorious candidate who could have taken admission. **To avoid such a situation and also to ensure that seat(s) in the program 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 program or post-dated cheques in favour of Swami Rama Himalayan University for the balance unpaid tuition fee of the entire duration of the program as cash security.** The University shall have the right to encash the bank guarantee/post-dated cheques in case the candidate leaves the program mid-stream, after the admission.

- UGC/CSIR-NET/SLET/GATE/GPAT/M.Phil. Qualified candidates with valid certificate for PhD Admission are exempted from the Written Entrance Examination. However, they will have to appear for personal interaction and interview.

1. DOCTORAL DEGREE PROGRAM

The University offers Ph.D. in the following areas:

S.NO	Specializations	Code	Eligible Subjects	Eligibility to seek admission in Ph.D. program 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. program will be: 1. Candidates who have completed any of the following: • 1-year/2-semester master'sdegree programme after a 4-year/8-semester bachelor's degree program. OR • 2-year/4-semester master's degree programme after a 3-year bachelor's degree program. 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 program has a minimum of 75% marks in aggregate or its equivalent grade on a point scale wherever the grading system is follwed. 2 Candidates who have completed the M.Phil. program 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 any 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. program. 3 Candidates must have secured at least 55% marks in aggregate or its equivalent grade in a point scale
2	Biotechnology	02	Master's degree in Biotechnology/ Biochemistry/ Botany/ Zoology/ Microbiology, or any other related fields	
3	Clinical Psychology	03	Master's degree in Clinical psychology/rehabilitation psychology/ applied psychology via regular mode.	
4	Epidemiology	04	Master's degree in Master's degree in Epidemiology/ Community Medicine or M.Sc. in Clinical Research	
5	Immunology	06	Master's degree in Immunology/ Biochemistry/ Biotechnology/ Microbiology or any other related fields	
6	Management	07	Master's degree in Commerce/ Business Administration/ Human Resource Management/ Finance/ Marketing or any other related fields	
7	Medical Physics	08	Master's degree in Medical Physics or Master's degree in Physics with Post M.Sc. Diploma in Medical Physics	
8	Microbiology	09	Master's degree in Microbiology/ Biotechnology or any other related fields	
9	Nursing Sciences	10	Master's degree in Nursing Sciences or any other related fields	
10	Cancer Biology/ Cancer Medicine	11	Master's degree in Oncology Sciences/ Pharmacology/ Microbiology/ Biochemistry/ Biotechnology or any other related fields	
11	Pharmacology	12	Master's degree in Pharmacology (Medical), or any other related fields	
12	Pharmacy	13	M. Pharm in appropriate branch of specialization in Pharmacy or related fields	
13	Psychology	14	Master's degree in psychology/ neuropsychology/child psychology/ cognitive psychology/ rehabilitation	

			psychology applied psychology/ social psychology in regular mode	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.
14	Physiology	15	Master's degree in Yoga, or any other related fields	
15	Yoga Sciences	16	Master's degree in Yoga, or any other related fields	
16	Clinical Research	17	Master's Degree (Bio based) or a professional degree (Bio based) declared equivalent to master's degree by the corresponding statutory body.	
17	Medical Biochemistry	18	MD Biochemistry /P. G Diploma in Clinical Pathology/ Postgraduate degree in Medical Biochemistry (MSc) via regular mode of study	
18	Computer Science	19	Master's degree in Computer Science/Computer Applications/ Information Technology (e.g., M.Sc. Computer Science, M.C.A., MTech. / M.E. in CS/IT or equivalent)	
19	Library & Information Science	20	Master of Library and Information Science or Equivalent from any recognized University	
20	Neurosciences	21	Master's degree or equivalent qualification in Biosciences, Life Sciences, Medical Sciences/Medicine (MBBS or an equivalent medical qualification), or other related biological or health sciences, including disciplines such as Neuroscience, Biotechnology, Biochemistry, Microbiology, Physiology, Anatomy, Pharmacology, Pharmacy, Zoology, Medical Laboratory Technology (MLT), Biomedical Sciences, or other allied fields relevant to Neuroscience.	

2. FEE STRUCTURE

2A. Fee Structure for all the programs except PhD in Library & Information Science

Fee Category		First Year	Second Year	Third Year
Tuition Fee	International	$ 2,000	$ 2,000	$ 2,000
	AIC	₹ 1,00,000/-	₹ 1,00,000/-	₹ 1,00,000/-
	PRU	₹ 75,000/-	₹ 75,000/-	₹ 75,000/-
Admission fee (National/International)		₹ 25,000 / $200	—	—
Enrollment Fee		₹ 2,000/-	—	—

Refundable Security # (National/International)		₹ 20,000 / $300	—	—
Course work Examination fee * (National/ International)		₹10,000/ $300	—	—
Supplementary Exam Fee (Per Course), if applicable		₹ 2,500/-	—	—
Laboratory Fee (If Applicable)		—	20,000/-	10,000/-
Research and Development Fee		—	15,000/-	30,000/-
Year/Semester wise fee to be paid	International	$ 2,800/-	$ 2,000/-	$ 2,000/-
	AIC	₹ 1,57,000/-	1,35,000/-	1,40,000/-
	PRU	₹ 1,32,000/-	1,10,000/-	1,15,000/-
Total Programme Fee	International	$ 6,800/- (USD Six thousand eight hundred)		
	AIC	₹ 4,32,000/- (INR Four Lakhs Thirty-Two Thousand)		
	PRU	₹ 3,57,000/- (INR Three Lakhs Fifty-Seven Thousand)		

2B. Fee Structure for PhD in Library & Information Science

Fee Category		First Year	Second Year	Third Year
Tuition Fee	International	$ 2,000	$ 2,000	$ 2,000
	AIC	₹ 90,000/-	₹ 90,000/-	₹ 90,000/-
	PRU	₹ 67,500/-	₹ 67,500/-	₹ 67,500/-
Admission fee (National/International)		₹ 10,000 / $200	—	—
Enrollment Fee		₹ 2,000/-	—	—
Refundable Security # (National/International)		₹ 25,000 / $300	—	—
Course work Examination fee * (National/ International)		₹7,500/ $300	—	—
Supplementary Exam Fee (Per Course), if applicable		2,500/-	—	—
Uniform (GST) and Sports		8,640/-	—	—
Research and Development Fee		—	—	—
Year/Semester wise fee to be paid	International	$ 2,800	$ 2,000/-	$ 2,000/-
	AIC	1,43,140	₹ 90,000/-	₹ 90,000/-
	PRU	1,18,840	₹ 67,500/-	₹ 67,500/-
Total Programme Fee	International	$ 6,800/- (USD Six thousand eight hundred)		
	AIC	₹ 3,23,140/- (Three Lakhs Twenty-Three Thousand one Forty)		
	PRU	₹ 2,53,840/- (Two Lakhs Fifty-Three Thousand Eight Forty)		

AIC- All India Candidates
PRU- Permanent Resident of Utttarakhand
*Fee is subject to revision.
One Time at the time of admission and will be refundable after the completion of the program.

Note:

1. Tuition fee may be paid in two instalments in a year.
2. On successful completion of the program, scholars are required to register for the Alumni Association and Convocation.
3. A tuition fee of **Rs. 40,000/- (Rupees forty thousand only)** per semester will be charged 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: **17 January 2027 (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.

- Answers to the Multiple-Choice Questions (MCQ) should be marked by the candidate using a black ink ballpoint pen only.
- Language of the question paper will be in English medium only.
- There is no penalty (negative marking) for a 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 the 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 for 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 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 of 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. program 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 program 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-supervisors and any other criteria as framed by the University from time to time.
- Ph.D. program shall also include a common coursework 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

Use black ballpoint pen only to darken the appropriate circle. Mark should be dark and should completely fill the appropriate circle. Candidate should not indicate the answer in any other way (i.e. tick mark, cross, dot line etc. are not accepted):

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	Clinical Psychology	Research in Psychological Assessment and Testing: Bio-Psycho-social Model of mental illness, Intelligence testing, Personality Assessment, Neuropsychological Assessment, Research in Psychotherapy: Bio-Psycho-social Model of psychotherapy, Integrated Psychotherapy, Humanistic Psychotherapy, Psychotherapy Based on Bhagwad Gita, Mindfulness Based Cognitive Therapy
3	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
4	Immunology	Cancer immunology and immunotherapy, Autoimmunity and Immunemediated diseases, Immune system development and Regeneration, Adaptive immunity, Innate immunity, Infectious diseases, Transplantation
5	Management	Accounting and Finance, Economics, Human Resource, Marketing Management
6	Medical Physics	Medical imaging, Nuclear medicine, Radiation protection and Radiation oncology
7	Cancer Biology/Cancer Medicine	Cancer genetics & Genomics, Cancer immunotherapy and vaccines, Cancer metabolism, Cell Signaling & 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
8	Pharmacology (Medical)	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.
9	Nursing Sciences	Child Health Nursing, Community Health Nursing, Medical Surgical Nursing, Mental Health Nursing, Obstetrics & Gynecological Nursing.
10	Pharmacy	Pharmaceutics, Pharmaceutical Chemistry, Pharmacology
11	Psychology	Researches on Cognition: Cognitive Psychology, Neuro-cognitive-behavioural Model, Memory and related areas, Sense Perception and related process Researches on Personality: Aptitude, Models of Human Personality, Bio-psychosocial Model of Personality, Thinking and creativity, Mental Defence Mechanism Researches on Behaviour Modification: Integrated model of Behaviour in western and Indian Psychology, Learning: Classical condition / Associative Learning, Learning : Operant condition / Instrumental Learning (Biofeedback and neurofeedback), Yoga Psychology Based Techniques to Modify Behaviour, SelfAwareness Training Model to modify Behaviour, Application of Yoga psychology
12	Physiology	Yoga in stress disorders, Exercise physiology, Occupational Health, Noncommunicable diseases
13	Yoga Sciences	Yoga and its allied subjects
14	Clinical Research	Healthcare interventions, Drug Development and Clinical Trials, Epidemiology, Public Health, and Real-World Evidence, Pharmacovigilance and Regulatory Science, Precision Medicine, Genomics, and Translational Research, Artificial Intelligence, Data Analytics, and Health Technology Assessment

15	Medical Biochemistry	Molecular and Cellular Basis of Disease, Clinical and Diagnostic Biochemistry, Cancer Biochemistry, Genetic and Epigenetic Regulation, Metabolic Disorders and Enzyme Deficiencies, Hormonal and Reproductive Biochemistry, Nutritional Biochemistry, Laboratory Quality and Automation, Immunological and Inflammatory Disorders, Bioinformatics
16	Computer Science	Artificial Intelligence, Data Science and Machine Learning, Cyber Security, Internet of Things (IoT), Wireless Network, Software Engineering, Blockchain Technology, Cloud Computing
17	Library & Information Science	Use of ICT in Library and Information Science, Scientometrics and Bibliometrics, Research Data Management, Innovative Technologies in Libraries, Digital Literacy
18	Neurosciences	Cellular and Molecular Neuroscience; Systems Neuroscience; Cognitive and Behavioral Neuroscience; Developmental Neuroscience; Neurophysiology; Glial Biology and Neuroimmune Interactions; Neural Circuitry and Synaptic Plasticity; Neurogenetics and Epigenetics; Neurodegeneration and Neuroprotection; Neurovascular Biology and Stroke; Neurotrauma and Neural Repair; Brain Tumors and Neuro-Oncology; Clinical and Translational Neuroscience; Neuropharmacology; Electrophysiology; Neuroimaging; Biomarker Discovery; Computational Neuroscience; Neuro-informatics and Artificial Intelligence; Brain–Computer Interfaces; Neuro-engineering; Stem Cell Biology and Regenerative Neuroscience; and Precision and Personalized Neurology.

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 based on application – Fundamental and Applied.

Descriptive Research, Qualitative and Quantitative.

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

Qualitative design of research based on 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 BIOCHEMISTRY

Unit - I

Structural organization of eukaryotic and prokaryotic cells. Ultrastructure of nucleus, mitochondria, endoplasmic reticulum (smooth and rough), Golgi apparatus Role of ER and GA in synthesis of membrane proteins. Lysosomes (primary and secondary lysosomes and their functions), peroxisomes, vacuoles and microbodies. Molecular constituents, physico-chemical properties, supramolecular structure, organization and architecture (fluid mosaic model) of bio-membranes. General principles of cell communication- extra-cellular signaling molecules and their receptors.

Unit - II

History of Microbiology, Identification, characterization and classification of microorganisms. Distinguishing characteristics between prokaryotic and eukaryotic cells Structure and function of Cell wall of bacteria, cell membranes, flagella, pili, capsule, gas vesicles, carboxysomes, magnetosomes and phycobilisomes.

Unit - III

Carbohydrate – Classification, structure and functions, Carbohydrate Metabolism, Protein Classification, structure and functions, Overview of Amino acid metabolism, Urea cycle. Lipids - Classification and structure, Fatty Acid Metabolism: Fatty Acid Oxidation. Fatty Acid Biosynthesis and Regulation. Nucleic Acid Metabolism.

Unit - IV

Structure and properties of nucleic acids, DNA Replication, Transcription, Translation, Gene regulation in prokaryotes and eukaryotes, Principles and Tools of Gene Cloning, Gene cloning: Steps of cloning, Genome, Genome Analysis and Applications of RDT.

Unit - V

Biochemical and analytical techniques: Microscopy and Biosensors, Centrifugation, Chromatography, Electrophoretic Techniques, Spectroscopy and Radiotracer Techniques.

PH.D. SYLLABUS FOR ENTRANCE EXAMINATION BIOTECHNOLOGY

Unit - I

Structural organization of eukaryotic and prokaryotic cells. Ultrastructure of nucleus, mitochondria, endoplasmic reticulum (smooth and rough), Golgi apparatus, lysosomes (primary and secondary lysosomes and their functions), peroxisomes, vacuoles and microbodies. Identification, characterization and classification of microorganisms. Distinguishing characteristics between prokaryotic and eukaryotic cells Structure and function of Cell wall of bacteria, cell membranes, flagella, pili, capsule, gas vesicles, carboxysomes, magnetosomes and phycobilisomes.

Unit - II

Structure and properties of nucleic acids, DNA Replication, Transcription, Translation, Gene regulation in prokaryotes and eukaryotes, Principles and Tools of Gene Cloning, Gene cloning: Steps of cloning, Genome, Genome Analysis and Applications of RDT.

Unit - III

Biochemical and analytical techniques: Microscopy and Biosensors, Centrifugation, Chromatography, Electrophoretic Techniques, Spectroscopy and Radiotracer Techniques.

Unit - IV

Immunology: fundamental concepts and overview of the immune system: Components of innate and acquired immunity; phagocytosis; complement and inflammatory responses; innate immune response. Organs of immune system, primary and secondary lymphoid organs.

Enzyme Technology: Methods for large scale production of enzymes. Methods for immobilization of enzymes. Artificial enzyme, enzyme electrode.

Environmental biotechnology: Basic concepts and issues. Environment Pollution: Types of pollution, methods for measurement of pollution, methods for environmental management.

Unit - V

Structure and organization of animal cell, Equipment and materials for animal cell culture technology and Cryopreservation. Animal cell culture medium plant tissue culture: Setting up a cell culture laboratory, plant tissue culture media, Type of plant cell and tissue culture. Clonal propagation and production of virus free plants.

PH.D. SYLLABUS FOR ENTRANCE EXAMINATION CLINICAL PSYCHOLOGY

Unit - I

- Clinical Psychology: Definition
- Assessment in Clinical Psychology
- Intelligence tests
- Cognitive function tests
- Personality tests
- Projective Tests
- Rating Scales
- Neuropsychological Tests /Batteries

Unit - II

- Psychopathology: Concept, Definition
- Abnormal Psychology definition
- Models of abnormal behaviour
- Neurotic Disorders
- Psychotic Disorders

Unit - III

- Psychopathology
- Neuro Psychology
- Cognitive Psychology
- Personality Psychology

Unit - IV

- Psychotherapy: Definition
- Psychodynamic Therapy
- Behaviour Therapy
- Humanistic Psychotherapy
- Existential Psychotherapy
- Gestalt therapy
- Individual Therapy
- Group Therapy
- Family Therapy
- Couple's Therapy
- Child Therapy

Unit - V

- Socio-Cultural Influences on Behaviour
- Behavioral Science Research Methods
- Research Methods in Clinical Psychology

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
- Parallel
- Cross over
- 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.
- Social context of Medicine
- Concepts in Sociology
- 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.
- Family life of cycle
  - Family cycle & stress.
  - Family in Health & Disease.

2. Cultural factors in Health & Disease the Community

- Structure of Society
- Social class & Socio –economic status
- Social Problems of a Community
- Social Agencies
- Community Services

3. Communication

- The Communication Process
- Types of Communication
- Barriers of Communication

4. Health Education

- Definition
- Aims & objectives of Health Education
- 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 MANAGEMENT

Unit - I

Functions of management and manager, Managerial roles and skills, Evolution of management thought and Management thinkers. Scientific Management, General administrative theories, types, steps and approaches, Decision Making in various conditions, decision tree, structure and process of organization, Bases of depart mentation, Line & Staff concept; problems of use of staff & ways to avoid line-staff conflict. Authority & power, Delegation, Span of Management. Decentralization vs. centralization, Coordination, planning-control relationship, process of control, Japanese Management and Z-culture of American Companies, Chinese Style Management, Business process Re-engineering, business outsourcing, benchmarking, total quality management process, McKinsey's 7-S Approach.

Unit - II

What managers do, Definition of OB, Learning, Theories of Learning, Attitudes, Attitude Change, Values & Believes, Personality: Determinants of Personality, Perception, Motivation Process of Motivation, Early Theories of Motivation, Contemporary Theories of Motivation, Job Satisfaction, Leadership: Theories of Leadership; Leadership traits & Skills; Behavioral Styles in Leadership. Transactional Analysis, Life Position, Johari Window Model, Stages of Group Formation, Teams - Difference between Group & Team, Conflict Management: Definition of Conflict, Individual & Group Level Conflict; Organization level Conflict; Conflict Management, Organizational Change & Development, Learning Organization, Organizational Culture.

Unit - III

Concept of Human Resource Management, Recruitment & Selection, Tests and Interviews Orientation, Promotion, Types of Transfer, Separations, Outplacement, Training & Development Training vs. Development, Training need assessment, Types of training programmes, on-the-job and off-the-job, In basket Training, Sensitivity Training, Grid training, Apprenticeship training; Evaluation of Training Programmes. Performance Appraisal–objectives, uses, methods, Traditional vs. Modern Methods, Wages & Salary concepts, components of wages, criteria of wage fixation, Job evaluation - Concept, Methods.

Unit - IV

An overview of financial management, financial planning, constituents of financial sector, reforms measures in financial institutions and markets, role of a modern finance manager, major financial decisions in financial management. Emerging trends in financial markets – Capital market and money market, Mergers & Acquisitions motives, considerations in M & A decisions, Stock Market and Regulation in India: Stock Exchanges in India. Micro Financing in India; Role of banks. Demonetization and its impact on Indian economy. Concept of Goods and Services Tax-GST.

Unit - V

Nature and scope of Marketing Management, Marketing process, Marketing environment, Marketing Organizations, Marketing Challenges, Emerging Concepts in Marketing, Marketing Mix. Marketing Planning and Marketing Competitiveness, Customer Value, Marketing Planning Process, Identifying and analyzing the competitors. Four Ps of marketing. Marketing Issues and Relevance in 21st century business Enterprises. Competing through e–Marketing Components of e–marketing, Impact of e–Marketing on marketing Strategy. Product Life Cycle, Product Mix Decisions, Branding, Packaging and Labeling Decisions. Price: Objectives of Pricing, Pricing Policies, Pricing Methods, Managing Price Changes. Promotion: Advertising, Sales Promotion, Personal Selling, Public Relations.

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, thermo-luminescent 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 MICROBIOLOGY

Unit - I General Microbiology

Major contribution of scientists and development of microbiology, distinguishing characteristics between prokaryoticand eukaryotic cells, Structure and function of Cell wall of bacteria. Methods of sterilization, Staining methods, Microbiological media, Preservation and Maintenance of Microbial cultures Bacterial nutrition, Endospore, exospore.

Unit - II Microbes and application

Production of alcoholic beverages, organic acids, Types of fermentor/bioreactors; Types of fermentation (Solid state, surface and submerged fermentation). Cultivation of fungi for food-mushrooms, mycorrhizae and their application, mycotoxins. Biofertilizers and biopesticides;

Unit - III Microbes and ecosystem

Solid wastes; sources and management (composting, vermiculture and methane production). Single cell protein, Wastewater treatment-physical, chemical and biological treatment processes; algal blooms and human health, biotechnological application of microbes form extreme environment. Microbial degradation of hydrocarbons, xenobiotics; Bio-deterioration of paper-leather-wood- textiles-cosmetics; Metal corrosion and control, Global warming and possible control measures.

Unit - IV Food and dairy microbiology

Microbiology of milk and milk products: Sources of contamination of milk; Fermented dairy foods – cheeses, acidophilus milk, kefir and yoghurt; Nutritional and therapeutic benefits of fermented milk products; Probiotic foods; Spoilage of fermented dairy products; Quality control in dairy industry. Food fermentations: Food spoilage and prevention; genetically modified foods. Foods produced by Microbes - Fermented foods. Enzymes and their uses in food industry, Food borne infections and intoxications.

Unit - V Recombinant DNA Technology

Introduction to DNA technology and application, Cloning vector (characteristics applications), Preparation of cloning vectors, suitable markers, Isolation of nucleic acids. Basic steps of gene cloning, Cloning Strategies, Screening strategies of recombinants, Synthesis of cDNA, Construction of cDNA and genomic libraries, Blotting techniques: southern, northern and western blotting, Probe labeling and hybridization.

PH.D. SYLLABUS FOR ENTRANCE EXAMINATION NURSING SCIENCES

(Syllabus of PhD entrance examination is common for all nursing clinical specialties)

Unit - I Bio-Psycho social basis of health and illness

- Health promotion and models of prevention
- Disease process, pathophysiological basis, treatment and nursing management of common problems of patients
- Psychosocial aspects and Human relations

Unit – II Concepts and applications of Nursing Practice

- Nursing as a profession
- Philosophies and nursing theories
- Epidemiology, Health care delivery system, national health policy
- Ethics in nursing
- Basic and Advanced Nursing Practice
- Current trends and issues

Unit - III Application of basic nursing concepts in all clinical specialties

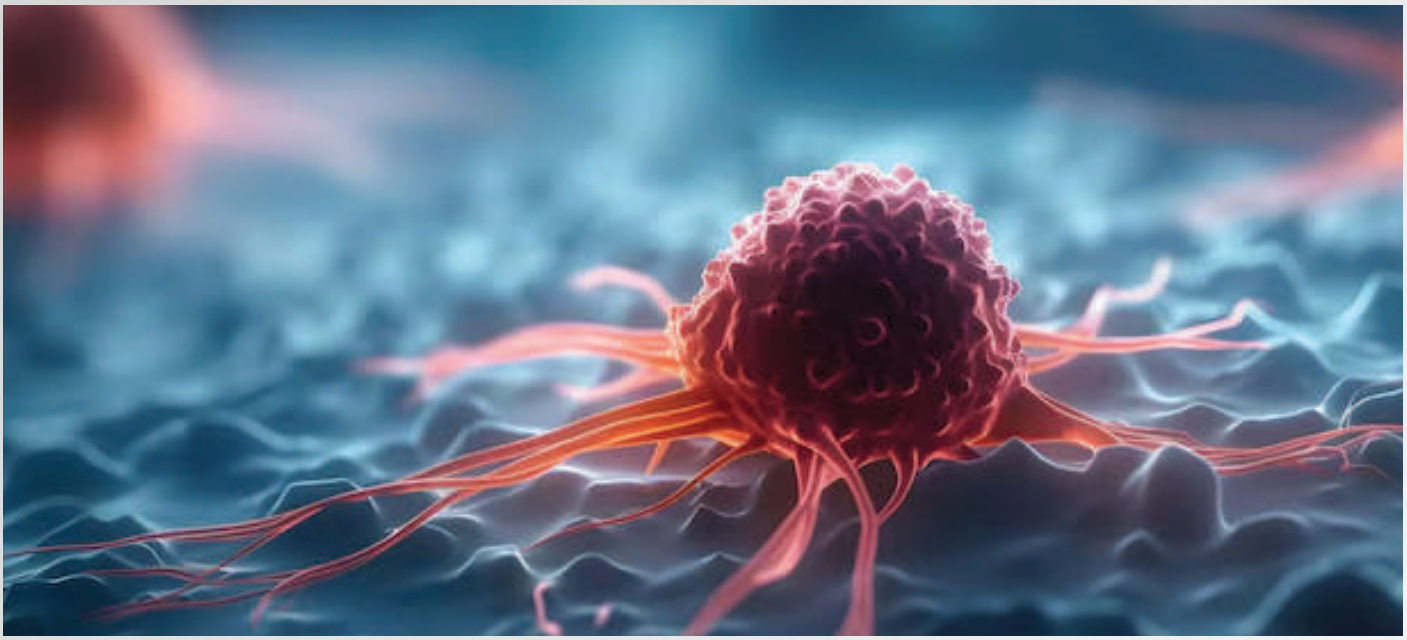
Unit - IV Concepts and applications of Nursing Education

- Educational Philosophies, trends issues, policies
- Teaching learning process
- Instructional media and methods
- Measurement and evaluation
- Administration of nursing curriculum
- Role of a nurse educator

Unit - V Concepts and applications of Nursing management and administration

- Philosophy, theories and principles of management and leadership applied to nursing
- Quality assurance
- Legal and ethical issues
- Management information system, nursing informatics

PH.D. SYLLABUS FOR ENTRANCE EXAMINATION CANCER BIOLOGY/CANCER MEDICINE



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 (MEDICAL)

(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 & antiepilepticsstration

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 the 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 (Preclinical 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 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.

PH.D. SYLLABUS FOR ENTRANCE EXAMINATION PSYCHOLOGY

Unit-I Advances in Psychology and Cognitive Psychology researches:

- Concept and definition of Psychology,
- Human Mind, psyche, and consciousness
- Emotions; Concept and Nature, Components and types of emotions, Emotional hygiene
- Perception (Sense Perception and Cognition), Types and alteration in perception
- Attention, Types of Attention
- Learning; Theories of learning;
- Memory; concept, Process, types
- Concept formation, reasoning
- Judgment and decision-making,
- Problem solving,
- Language processing
- Motivation; Theories of motivation
- Intelligence, Classification and theories of Intelligence
- Intelligence and Cognition
- Aptitude and Creativity
- Human personality; Personality Theories and bio psychosocial models of personality

Unit - II Biological Basis of Behaviour

- Physiological and psychological constructs of human behaviour
- Basic Physiological aspects of Autonomic nervous system
- Basic physiology of biological Motives (Hunger, Thirst, Sleep, elimination need, sex)

Unit - III Yoga Psychology and Positive Psychology

- Fundamental of Yoga Psychology
- Positive Psychology: Concept, History, Nature, Dimension and scope of Positive Psychology
- Conflict and Frustration
- Psychology of Dream
- Defense Mechanism

Unit - IV Different areas of Psychology

- Child and adolescent Psychology
- Developmental Psychology
- Neuro-Cognitive: Behavior model, Bio-psychosocial model of human behavior.
- Social Psychology
- Applied Psychology
- Abnormal Psychology
- Clinical Psychology
- School/ Education Psychology
- Health Psychology Health Psychology

Unit - V Recent Developments in Psychology

- Yoga based techniques to modify behavior.
- Concept of Mindfulness
- Concept of Self awareness

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 CLINICAL RESEARCH

Unit I History and Ethics in Clinical Research

- Evolution and milestones in clinical research
- Key terminologies and definitions in clinical research
- Ethical foundations of human research: Nuremberg Code, Belmont Report, Declaration of Helsinki
- Notable unethical studies and their impact: Tuskegee Syphilis Study, Thalidomide Tragedy, Henrietta Lacks Case
- Emergence of modern research ethics and regulatory frameworks

Unit - II Global and Indian Clinical Trial Landscape

- Clinical trials in a global context: Scope, trends, and harmonization
- Overview of regulatory bodies: FDA, EMA, CDSCO, DCGI and ICMR
- Clinical trial registration: CTRI and global registries
- Opportunities and challenges in conducting clinical research in India
- Public perception, awareness, and industry-academic collaboration

Unit - III Drug Discovery and Development Process

- Approaches to drug discovery: Target-based, phenotypic, and repurposing strategies
- Stages in the drug development pipeline: Discovery to commercialization
- Preclinical studies: In vitro, in vivo, animal models, and toxicology assessments
- Concepts of investigational new Drug (IND) applications
- Translational research and bridging the bench-to-bedside gap

Unit - IV Clinical Trial Phases and Study Design

- Overview of clinical trial phases: Phase 0 (microdosing) to Phase IV (post-marketing)
- Exploratory IND and adaptive clinical trials
- Pharmacokinetics (PK), Pharmacodynamics (PD), and their roles in Clinical Research
- Types of clinical trials: Interventional, observational, equivalence, non-inferiority, and pragmatic trials
- Core study design elements: Randomization, blinding, control groups, endpoints

Unit - V Regulatory, Ethical, and Data Management Framework

- Principles of Good Clinical Practice (ICH-GCP) and their implementation
- Regulatory submission pathways: IND, NDA, ANDA, BLA (US-FDA)
- National regulations: NDCT rules 2019, compensation guidelines, and clinical trial insurance
- Clinical data lifecycle: Collection, monitoring, quality assurance, and auditing
- Case Report Forms (CRFs), Electronic Data Capture (EDC), and eSource systems

Textbooks:

- **Fundamentals of Clinical Trials** by Lawrence M. Friedman, Curt D. Furberg, and David L. DeMets, Year: 2020, 4th Edition
- **Good Clinical Practice: A Question & Answer Reference Guide** by Michelle A. M.**Year:** 2021, **Edition**: 2nd Edition
- **Pharmaceutical Sciences: Drug Development and Regulatory Issues** by Dipak Kumar Saha. 2019, 1st Edition
- **Clinical Trials: A Practical Guide"** by Duolao Wang & Ameet Bakhai. 2022, 1st Edition
- **Drug Discovery and Development: Technology in Transition"** by Raymond G. Hill.2016. 3rd Edition

Reference Books

- **Clinical Trials: Study Design, Endpoints, and Biomarkers, Drug Testing, and Approval** by E. M. Peter, 2021. 5th Edition
- **Translational Medicine: A Guide to Drug Development** by William P. B.2018,1st Edition
- **Global Clinical Trials: A Guide to Best Practices** by Curtis L. Meinert.2022, 2nd Edition
- **Indian Clinical Trials: A Guide to the Regulatory Process** by S. K. S. R. S. R.2021. 3rd Edition

Online Resources

- ICH GCP Guidelines: **ICH-GCP Guidelines**
- U.S. FDA Regulatory Resources: **FDA Regulatory Resources**
- Good Clinical Practice (GCP) Training: **GCP Training**

PH.D. SYLLABUS FOR ENTRANCE EXAMINATION MEDICAL BIOCHEMISTRY

Unit - I (Carbohydrates & Enzymes)

1.1 Biomolecules and Cell biology
1.2 Enzymes Bioenergetics and Biological Oxidation
1.3 Intermediary metabolism of Carbohydrates
1.4 preparation of all reagent

Unit - II (Lipids and Proteins & Analytical Assay)

2.1 Intermediary metabolism of Lipids and Proteins,
2.2 Nutrition, Vitamins and Minerals,
2.3 Basic principles and practice of clinical biochemistry,
2.4 Analytical techniques and instruments
    2.4.1 Analytical Balance
    2.4.2 pH-measurement
    2.4.3 Centrifugation
    2.4.4 Photocolorimetry
    2.4.5 Spectrophotometry
    2.4.6 Electrophoresis
    2.4.7 Chromatography
2.5 Analytes in body fluid

Unit - III (Molecular, Genetics & Molecular Techniques)

3.1 Molecular biology,
3.2 Principles of human genetics and Human Genome Project
3.3 Stem cells and regenerative medicine
3.4 Principle and application of Molecular techniques

Unit - IV (Cancer & Defense Systems)

4.1 Environmental Biochemistry, detoxification and molecular and genetic aspects of cancer
4.2 Immunology
4.3 Assessment of organ system functions
4.4 Hazards in the Biochemistry laboratory and Biomedical waste management

Unit - V (Miscellaneous)

5.1 Recent Advances in Biochemistry
5.2 Teaching Methodology
5.3 Quality Control Techniques in Lab.

PH.D. SYLLABUS FOR ENTRANCE EXAMINATION YOGA SCIENCES

Unit - I Fundamentals of Yoga: History and Various Schools of Yoga

History and Development of Yoga; Meaning & Definitions, Misconceptions, Aim and Objectives of Yoga. Introduction to Vedas, Upanishads and Prasthanatrayee; Concept of Purushartha Chatushtaya. Basic concepts of Shad-darshanas-Epistemology, Metaphysics, Ethics and Liberation with special emphasis to Samkhya, Yoga and Vedanta Darshana. Introduction to Epics and Smriti- yoga in Ramayana (Aranyakand), Mahabharata (Shantiparva) and Yajnavalkya Smriti. Brief introduction and yogic contribution of Maharshi Patanjali and Guru Gorakshanath Traditions. Yoga in Narada Bhakti Sutra and Yoga in the Literature of Saints- Kabirdas, Tulasidas and Surdas

Unit - II Yogic Texts: Principal Upanishads, Bhagavad Gita, Yoga Vasishtha

Brief Introduction of Ten Principal Upanishads. General Introduction to Bhagavad Gita, Definitions of Yoga, their relevance & Scope; Essentials of Bhagavad Gita - meanings of the terms Atmaswarupa, Stithaprajna, Sankhya Yoga. Salient features of Yoga Vashitha, Concept of Adhis and Vyadhis. Patanjala Yoga Sutra: SAMADHI PADA: Yoga, meaning & Nature of yoga; Concept of Chitta, Chitta-Bhumis, Chitta-Vrittis, Chitta-Vrittinirodhopaya, Abhyasa and Vairagya as the tools. SADHANA PADA: Concept of Kriya Yoga, theory of Kleshas; Concept of Karmashaya and Karmvipaka, VIBHUTI PADA: Introduction of Dharana, Dhyana and Samadhi, Nature of Sanyama; Concept of Chitta samskara, Parinamatraya and vibhutis. KAIVALYA PADA: Five means of Siddhis, concept of Nirman Chitta.

Unit - III Hatha Yoga Texts

Introduction to Hatha Yoga and Hatha Yoga Texts. Yoga Beeja, Goraksha Samhita, Vashishtha Samhita, Shiva Samhita, Siddhasiddhantapaddhati, Hatha Pradeepika, Gheranda Samhita and Hatha Ratnavali. Aims & objectives, misconceptions about Hathayoga, prerequisites of Hathayoga (dasha yama and dasha niyama), Sadhaka and Badhaka tattvas in Hathayoga; Concept of Ghata, Ghatashuddhi, Concept and importance of Shodhana kriyas in Hathayoga; Importance of Shodhana kriyas in health and disease; Concept of Matha, Mitaahara; Rules & Regulations to be followed by Hatha Yoga Sadhakas.

Unit - IV General Psychology & Human Anatomy and Physiology

IIntroduction to Altered States of Consciousness. Sleep: Stages of sleep, sleep disorders; Behavioural Psychology: Psychology as a science of behaviour; Psychological basis of behaviour; Personality: Nature and Types of Personality; Determinants of Personality: Heredity and Environment; Facets and Stages of Personality Development; Cognitive Psychology: Sensation, Perception, Attention, Memory, Learning: Their definitions and types. Introduction to Human Anatomy and Physiology Introduction to cell, tissue, organs and systems; Basic cell physiology-Cell Introduction, Cell Organelles, Cell membrane, Movement of the substances and water through the cell membrane, Bioelectric potentials.

Unit - V Diet and Nutrition & Yoga and Health

Basic concepts and components of food and nutrition Understanding Nutrition, Basic Terminology in Relation to Nutrition Requirement, Yogic concept of diet and its relevance in the management of lifestyle.

Definition & Importance of Health According to WHO; Dimensions of Health: Physical, Mental, Social and Spiritual Concepts of Trigunas, Pancha-mahabhutas, Pancha-prana and their role in Health and Healing; Concept of Pancha-koshas & Shat-chakra and their role in Health and Healing; Role of Yoga in preventive health care Yoga as a way of life, Heyamdukhamanagatam; Potential causes of Ill-health Tapatrayas and Kleshas, Physical and Physiological manifestation of Disease: Vyadhi, Alasya, Angamejayatva and Ssvasa-prashvasa.

PH.D. SYLLABUS FOR ENTRANCE EXAMINATION COMPUTER SCIENCE

Unit - I Discrete Mathematics & Theory of Computation

- **Discrete Mathematics:** Set theory, relations, and functions; propositional and predicate logic; combinatorial counting techniques (permutations, combinations, Pigeonhole principle); Boolean algebra and recurrence relations.
- **Theory of Computation:** Formal languages, automata theory (finite automata, pushdown automata, and Turing machines), computability, and complexity theory (P vs NP, NP-hard, NP-complete problems).

Unit - II Data Structures & Algorithms

- **Data Structures:** Arrays, linked lists, stacks, queues, trees (binary trees, AVL trees, B-trees), heaps, graphs (representation and traversal).
- **Algorithms:** Sorting (Quick, Merge, Bubble, Insertion, Heap), searching (binary search, hashing), and advanced algorithmic paradigms such as divide and conquer, dynamic programming, greedy algorithms, and backtracking.
- **Complexity Analysis:** Time and space complexity, asymptotic notations, and optimization strategies.

Unit - III Operating Systems & Computer Networks

- **Operating Systems:** Process management, multithreading, CPU scheduling, memory management (paging, segmentation, virtual memory), synchronization, semaphores, deadlock prevention, file systems, and I/O manageme
- **Computer Networks:** TCP/IP model, OSI model, data link layer protocols, network layer routing, transport layer (TCP, UDP), cryptography (symmetric and asymmetric encryption), network security principles, and secure communication protocols.

Unit - IV Database Systems & Software Engineering

- **Database Systems:** Relational database models, SQL, normalization, transaction management, concurrency control, and database recovery mechanisms.
- **Software Engineering:** Software development life cycle (SDLC), Agile methodologies, software design patterns, requirement analysis, testing and maintenance, quality assurance, UML diagrams, and software documentation practices.

Unit - V Artificial Intelligence & Data Mining

- **Artificial Intelligence:** Problem-solving techniques, heuristic search methods, game theory, expert systems, supervised and unsupervised learning, neural networks, deep learning, reinforcement learning, and AI applications.
- **Data Mining:** Data pre-processing, feature selection, classification (decision trees, SVM, k-NN), clustering (K-means, hierarchical), association rule mining, data warehousing, OLAP technologies, and business intelligence.

Unit - VI Basics of Research

- Introduction to research and identification of research problems
- Formulation of research objectives and hypotheses
- Types of research design: Experimental, observational, case study, and survey
- Fundamental concepts of sampling techniques, data collection methods, and bias minimization

Unit - VII Research Ethics and Good Practices

- Importance of ethics in research
- Ethical practices in writing, referencing, and publishing
- Understanding plagiarism and its prevention
- Overview of research misconduct
- Introduction to journal selection, impact factors, and indexing systems like Scopus and Web of Science

Unit - VIII Basics of Data Analysis

- Overview of research approaches in Computer Science: theoretical and practical.
- Introduction to descriptive statistics: mean, median, mode, standard deviation.
- Data visualization using basic graphical representations such as charts and plots.

Unit - IX Scientific Writing and Presentation

- Structure and components of scientific and technical reports
- Fundamentals of thesis and research report writing
- Basics of referencing and citation practices
- Principles of effective visual presentation using charts, diagrams, and graphs
- Guidelines for preparing and delivering academic presentations

Unit - X Data Management

- Best practices for organizing and storing research data
- Importance of reproducibility and transparency in research.
- Introduction to open data sharing and open-access publishing

PH.D. SYLLABUS FOR ENTRANCE EXAMINATION LIBRARY & INFORMATION SCIENCE

Unit I: Foundations of Library & Information Science and Information Environment

- Data, Information, Knowledge and Wisdom
- Information Life Cycle and Information Society
- Communication: Concepts, Models, Barriers; Scholarly Communication Trends
- Information Industry and Information Policies
- IPR, Copyright, RTI Act, IT Act, Plagiarism
- National Knowledge Commission, National Mission on Libraries
- Historical Development of Libraries in India
- Library Legislation and Library Acts
- Laws of Library Science
- LIS Profession, Professional Ethics, Associations (ILA, IASLIC, IFLA, ALA etc.)
- Information Literacy: Standards and Models
- User Studies and User Education

Unit II: Information Sources, Services and Systems

- Nature and Types of Information Sources (Primary, Secondary, Tertiary)
- Reference Sources (Print & Electronic)
- Databases: Bibliographic, Full-text, Numeric, Multimedia
- Evaluation of Information Sources and Web Resources
- Reference and Referral Services
- CAS, SDI, Inter Library Loan, Document Delivery
- Community Information Services
- Web 2.0 & 3.0; Library 2.0
- National and International Information Systems & Networks (INFLIBNET, DELNET,
- ERNET, INIS, AGRIS, etc.)
- Library Resource Sharing and Consortia
- Types of Libraries and Information Systems (Academic, Public, Special, Corporate, Health,
- Agricultural, Engineering, Archives, etc.)

Unit III: Knowledge Organization and Information Retrieval

- Universe of Knowledge and Modes of Formation of Subjects
- Classification: Theories, Principles, DDC, UDC, CC
- Cataloguing: CCC, AACR-II, RDA
- Bibliographic Standards: ISBD, MARC21, CCF, FRBR, Bibframe
- Metadata Standards: Dublin Core, METS, MODS, EAD
- Indexing Systems (Pre-coordinate & Post-coordinate)
- Abstracting: Types and Guidelines
- Thesaurus Construction and Vocabulary Control
- Information Retrieval Systems: Models and Evaluation
- Standards for Bibliographic Information Interchange (ISO 2709, Z39.50, etc.)

Unit IV: Library Management and Information Technology Applications

- Principles and Functions of Management
- Library Operations: Acquisition, Technical Processing, Circulation, Serial Control
- Human Resource Management
- Financial Management and Budgeting
- TQM, Six Sigma, Performance Evaluation
- Project Management (SWOT, PEST, PERT/CPM)
- Marketing of Library Services

- Library Building and Infrastructure; Green Libraries
- Computer Fundamentals, Networks, Internet Protocols
- Library Automation, Digital Libraries, Institutional Repositories
- Digitization and Digital Preservation
- RFID, Barcode, CMS
- AI, Cloud Computing, Semantic Web, Big Data
- Data Security and Network Security

Unit V: Research Methods and Metric Studies in LIS

- Research: Concept, Types and Ethics
- Research Methods: Historical, Descriptive, Experimental, Delphi
- Research Design and Hypothesis Formulation
- Sampling Techniques
- Data Collection Methods
- Data Analysis and Statistical Techniques
- Research Report Writing and Citation Tools
- Bibliometrics, Scientometrics, Webometrics, Altmetrics
- Impact Metrics: Impact Factor, h-index, g-index, i10-index
- Trends in LIS Research

PH.D. SYLLABUS FOR ENTRANCE EXAMINATION LIBRARY & INFORMATION SCIENCE

Unit - I Cell Biology and Basic Molecular Biology:

Cell structure and function; Biomolecules;
Cell membrane and membrane transport; DNA, RNA and proteins; Central dogma of molecular biology; Cell division; Basic gene expression.

Unit - II Basic Biochemistry:

Structure and function of carbohydrates, lipids, proteins and
nucleic acids; Enzymes and enzyme kinetics; Bioenergetics; Basic metabolism of carbohydrates, lipids and proteins; Biological oxidation.

Unit - III Human Physiology:

General physiology; Cell and membrane physiology; Nervous system;
Muscle physiology; Cardiovascular physiology; Endocrine physiology; Homeostasis.

Unit - IV Fundamentals of Neuroscience:

Organisation of the central and peripheral nervous systems;
Neurons and glial cells; Action potentials and nerve conduction; Synaptic transmission;
Neurotransmitters and receptors; Sensory and motor systems; Learning and memory; Basic concepts of neurological disorders.

Unit - V Research Methodology:

Scientific method; Experimental design; Research ethics; Basic
laboratory techniques; Principles of microscopy; Principles of polymerase chain reaction (PCR);
Principles of Western blotting; Principles of immunohistochemistry; Basic biostatistics and data interpretation.
Candidates are expected to possess a sound understanding of undergraduate-level biological sciences and human physiology.

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