Research Methodology (Syllabus)

1. Introduction
Scope and Meaning of Research, purpose and importance of Research, Research Process, Qualities of a good researcher, Principal elements of research, Characteristic features of research, Ethics in Research, Research establishments in various areas with Indian scenario, Research funding agencies and National and International Research awards.

2. Types of Research
Classification of research, types of research: Fundamental/pure research, Application oriented research, applied research, product development - concepts, examples and case studies.

Problem solving approach and societal oriented research - concepts, examples and case studies

Concepts of invention, innovation, entrepreneurship.

Introduction to research problem, Components of Research problem, Sources of selecting a suitable Research Problem,
Concepts of project definition, planning, scope, Project progress and Project status, Project management
Theoretical study and modelling, experimentation, field study, comparison of theoretical and experimental/field study & validation of results, error identification & reduction / elimination.

4. Sampling & Measurement Scaling
Introduction to Sampling, Definitions, Reasons for sampling, Considerations in choosing a Sample, Types of Sample- Probability sample and Non-probability sample, What Size Sample is needed? Rules of Measurement, Criteria of good measurement (Reliability and Validity); Basic Scales – Nominal, Ordinal, Interval and Ratio Scale, Plagiarism: concepts, importance and tools, importance of Impact factor, H index, citation, Fundamentals of Intellectual property rights, patents, copy rights, trade marks.
5. **Data collection & Analysis**
Primary and Secondary data, Sources, Advantages and Disadvantages of Secondary data, Importance of publications, Reputed Research journals of international and national level, Literature review: concepts, importance, sources of literature survey, Theoretical modeling and comparison of theory and experiments, Survey methods; Interview Method, Observation Method, Distinction between questionnaire and Schedule, Descriptive analysis; Tabulation, Cross-tabulation, parametric and non-parametric tests.

6. **Publications, plagiarism, Intellectual property rights**
Component of a research paper and referencing
Quality of research work and papers – indexing, impact factor, H Index, citation index
Meaning and principles of plagiarism, methods of plagiarism check, plagiarism checking software. Principles of intellectual property rights, patents, copyrights, trademarks and their importance.

7. **Writing PhD research proposal**
Components of PhD research proposal, Literature review, objectives, work plan, generation of results, analysis of results, output and importance of the results.
*Students will write a sample proposal in the given topic.*

**Suggested Readings**

2. **DIGITAL ELECTRONICS**: Logic Gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR; Boolean algebra, Error detection and correction codes, Karnaugh map, Multiplexers and Demultiplexers, BCD arithmetic circuits, Encoders and Decoders, Flip Flops : S -R, J-K, T, D, master-slave, edge triggered; Switching mode operation of p-n junction, D/A and A/D converters.

3. **MICROPROCESSOR**: Introduction to microprocessor, 8085/8086 microprocessor: Architecture & Block Diagram; Instruction Set of 8085/8086 microprocessor: data transfer instructions, arithmetic instructions, branch instructions, looping instructions; The 8255 PPI Chip Architecture; The 8259 Programmable Interrupt Controller, The 8237 DMA controller.

4. **DIGITAL SIGNAL PROCESSING**: Discrete-Time Signals, Discrete-Time Systems, Sampling Of Time Signals, Digital Filters, Multirate Digital Signal Processing, ADSP 2100, DSP processors, Applications of DSP in: Communications, speech processing, image processing, Biomedical and Radars

5. **INDUSTRIAL DRIVES**: Components of electrical drives; choice of electrical drive; dynamics of electrical drives; calculation of time and energy; loss in transient operations; steady state stability and load equalization. closed loop control phase-locked-loop (PLL) control; Thermal model of motor heating and cooling; classes of motor duty and motor rating. D.C. motors and induction motors etc. starting; braking and speed control of motors; quadrant drives; types of loads; torque and associated controls used in process industries; choice of motors and relays. Brushless DC motor, Stepper Motor, Switched Reluctance Motor

6. **POWER SYSTEM**: General layout & main components of thermal power station (in brief). Available hydropower; selection of site for hydroelectric power stations; their classifications; layout and main components (in brief). Nuclear power plants – fission energy; general layout and main components (in brief); waste disposal; types of nuclear reactors (in brief); general lay out and main components (in brief); types of nuclear radiations & their effect.

7. **TRANSMISSION SYSTEM**: Calculations of resistance, inductance, capacitance of a single conductor, multi conductor, single phase and three phase transmission lines; transposition; double circuit lines; skin and proximity effect;
Generalized ABCD constants; representation & steady state analysis of short and medium lines; regulation and efficiency; nominal–T and pi circuits; Long line: current –voltage relationship, hyperbolic solution; surge impedance; Surge impedance loading; lumped circuit equivalent representation; Ferranti effect; power flow through a transmission line; reactive power generation / absorption of a line; power transfer capability; shunt and series compensation (in brief). Improvement of power factor of the system using synchronous condensers.
Lingaya’s University  
School of Computer Science

1. **COMPUTER ARCHITECTURE & ORGANIZATION**: - Combinational Circuit: adder, subtractor, decoder, MUX etc. Sequential Circuit: Flip-flops, Registers, Counters, Machine Instructions and Addressing Modes, ALU & Data path, Memory interface, I/O Interface, Instruction pipeline, Cache, Main and secondary storage.

2. **COMPUTER NETWORKS**: - ISO/OSI stack, LAN technologies, Flow and error control techniques, IPV4, IPV6, TCP/UDP, Routing algorithms, Congestion control, Application layer protocols, Basic concepts of Switches, Bridges, Gateway & Routers, Basic concepts of Network security: Public and private key cryptography, Firewall, Digital signature etc.


6. **Database Management System**: Basic concept, ER model, Relationship Model, Relational algebra, Tuple Calculus, Data Base design, Integrity constraint, Normal Forms, Query languages (SQL), File structure, Concurrency Control and Transactions.

7. **Software Engineering and Web development**: Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project, design, coding testing, implementation, maintenance. HTML, XML, Scripting and Basic Concept of Client and server side programming.


LINGAYA’S UNIVERSITY SYLLABUS FOR
ENTRANCE TEST FOR Ph.D. Ph. D.
ENTRANCE TEST
DEPTT. – MECHANICAL ENGINEERING

(A) APPLIED MECHANICS AND DESIGN:

(i) **ENGINEERING MECHANICS:** Free body diagrams and equilibrium; kinematics and dynamics of particles and of rigid bodies in plane motion; impact.

(ii) **MECHANICS OF SOLIDS:** Stress and strain, force and bending moment diagrams; bending and shear stresses; deflection of beams; torsion of circular shafts; springs; thin walled sections; Euler's theory of columns; strain energy methods; thermal stresses; mechanical properties; material testing.

(iii) **THEORY OF MACHINES:** Kinematics and dynamics of plane mechanisms; dynamic analysis of slider-crank mechanism; gear trains; flywheels; bearings; governors; static & dynamic balancing of rotors.

(iv) **VIBRATIONS:** Free and forced vibration of single degree of freedom systems; effect of damping; vibration isolation; resonance; critical speeds of shafts.

(v) **DESIGN:** Design for static and dynamic loading; failure theories; principles of the design of machine elements such as shafts, spur gears, rolling and sliding contact bearings, brakes, clutches and various joints.

(B) PRODUCTION AND INDUSTRIAL ENGINEERING:

(i) **PRODUCTION ENGINEERING:** Unconventional Machining Processes, Computer controlled machines, CAD/CAM, CNC, Mechanics of Metal Cutting, Tool wear and Machinability, Economics of Metal cutting, Metal Forming, Casting Processes, Powder Metallurgy, Joining Processes, Finishing operations and super finishing processes, Measurement.

(ii) **INDUSTRIAL ENGINEERING:** Production systems, Systems approach, Productivity, Product design and development, Production Planning and Control, Statistical Quality Control, Operations Scheduling, Linear Optimization Models, Assignment and Transportation Models, Waiting Line models, Capacity Planning, Plant and Facility layout, Plant Location, Production and Assembly Line Balancing, Time and motion study, Work sampling, Predetermined Time Systems, Principles of Motion economy, Industrial safety, Cost concepts and Break Even analysis, Interest and Money time relationship, Demand and Supply Relationship, Market types and competition, Principles of Management, Motivation, Organization, Forecasting.

(C) THERMAL ENGINEERING:

(i) **THERMODYNAMICS:** Basic Laws of Thermodynamics, Availability, Irreversibility, Concept of Exergy, Thermodynamic cycles related to energy conversion.

(ii) **HEAT TRANSFER:** Basic modes of Heat Transfer, Heat Exchangers.


(iv) **FLUID MECHANICS AND MACHINES:** Fluid properties, Bernoulli's equation, Flow through pipes, Hydraulic machines.

(v) **TURBOMACHINES:** Euler's equation, Fans, Compressors and Pumps, Turbines.

(vi) **REFRIGERATION AND AIR CONDITIONING:** Refrigeration systems, Vapor Compression cycles, Vapor Absorption system, Refrigerants, Expansion devices, Condenser and evaporator, Psychometric process.

(vii) **GAS DYNAMICS:** Basic equations for fluid flow, Wave propagation, Rayleigh line , Fanno line, Shock waves.

(viii) **ENERGY CONVERSION SYSTEMS:** Energy sources, Basic cycles related to energy conversion system, Environmental evaluation.
1. **ENGINEERING MECHANICS**: System of Coplanar Forces, Centroids and Moment of Inertia, Friction, Kinematics of a particle, Kinematics of rigid bodies, Kinetics of particles and kinetics of rigid bodies, Momentum and Energy principles, Belt Friction.

2. **STRENGTH OF MATERIALS**: Shear force and bending moment, Simple Stresses and strains, Shear stresses in beams, Principal stresses and strains, Direct and bending stresses, Columns and struts, Thin cylinders.

3. **FLUID MECHANICS**: Fluid statics, pressure measurement, buoyancy & floatation, fluid kinematics, fluid dynamics, flow measurement, orifices, mouth pieces, notches, weirs, flow through pipes, dimensional analysis and models, laminar flow, turbulent flow in pipes, boundary layer theory, flow through channels, rapidly varied flow.

4. **SURVEYING**: Measurement of Horizontal distances, Chain surveying, Measurement of angles, Measurement of elevations, Theodolite Surveying, Tacheometric Surveying, Curves, Hydrographic surveying,

5. **THEORY OF STRUCTURES**: Fixed Beams, Continuous Beams, Moving Load, influence lines, Strain

6. **CONCRETE TECHNOLOGY**: Cement, Aggregates, Water, Admixtures, Fresh Concrete, Properties Of Hardened Concrete, Concrete Mix Design.


8. **WATER RESOURCES ENGINEERING**: Hydrology, Precipitation, Infiltration, Evaporation and evapotranspiration, Run-off, Hydrographs, Floods, Ground water hydrology, Irrigation.

9. **ENVIRONMENTAL ENGINEERING**:
   (i) **WATER SUPPLY ENGINEERING**: Introduction to Water Supply, Quality of Water, Sources of Water, Raw Water Conveyance, Treatment of Water, Distribution of Water,
   (ii) **SANITARY ENGINEERING**: Sewage and Sewerage, Sewer Design, Sewer Appurtenances, Sewer Pumping, Waste Water Characteristics, Sewage Treatment, Effluent Disposal,
SECTION A
General information on science and its interface with society to test the candidate's awareness of science, aptitude of scientific and quantitative reasoning. Common elementary computer science. History of development of computers, Mainframe, Mini, Micro's and Super Computer Systems. General awareness of computer hardware i.e., CPU and other peripheral devices (input/output and auxiliary storage devices). Basic knowledge of computer systems, software and programming languages i.e., Machine language, Assembly language and higher level language. General awareness of popular commercial software packages other Scientific application packages.

SECTION B


7. **ELECTRONICS**: Physics of p n junction. Diode as a circuit element; clipping, clamping; Rectification, Zener regulated power supply; Transistor as a circuit element: CC, CB and CE configuration. Transistor as a switch, OR, AND, NOT gates. Feed back in Amplifiers. Operational amplifier and its applications: inverting, non â€” inverting amplifier, adder, integrator, differentiator, wave form generator, comparator & Schmidt trigger. Digital integrated circuits NAND & NOR gates as building blocks, X OR Gate, simple combinational circuits, Half & Full adder, Flip-flop, shift register, counters. Basic principles of A/D & D/A converters; Simple applications of A/D & D/A converters.


9. **CONDENSED MATTER PHYSICS:** Crystal classes and systems, 2d & 3d lattices, Bonding of common crystal structures, reciprocal lattice, diffraction and structure lector, elementary ideas about point defects and dislocations. Lattice vibrations, Phonons, specific heat of solids, free electron theory Fermi states ; heat capacity. Electron motion in periodic potential, energy bands in metals, insulators and semi-conductors ; fight binding approximation ; impurity levels in depend semi-conductors. Electronic transport from classical kinetic theory, electrical and thermal conductivity, Hall effect and thermoelectric power transport in semiconductors. Dielectric Polarization mechanisms, Clausus equation, Plezo, Pyto and ferroelectricity. Dia and Para magnetism ; exchange interactions, magnetic order, ferro, anti ferro and ferrimagnetism. Super conductivity basic phenomenology; Meissner effect, Type 1 and Type 2 Super conductions, 8CS, Paining mechanism.
LINAGYA'S UNIVERSITY
SYLLABUS FOR ENTRANCE TEST FOR Ph. D
ENTRANCE TEST
DEPTT. – APPLIED SCIENCE (MATHEMATICS)


2. **COMPLEX ANALYSIS**: Algebra of complex numbers, the complex plane, polynomials, Power series, transcendental functions such as exponential, trigonometric and hyperbolic functions. Analytic functions, Cauchy-Riemann equations. Contour integral, Cauchy's theorem, Cauchy's integral formula, Liouville's theorem, Maximum modulus principle, Schwarz lemma, Open mapping theorem. Taylor series, Laurent series, calculus of residues. Conformal mappings, Mobius transformations.

3. **ORDINARY DIFFERENTIAL EQUATIONS (ODES)**: Existence and Uniqueness of solutions of initial value problems for first order ordinary differential equations, singular solutions of first order ODEs, system of first order ODEs. General theory of homogenous and non-homogeneous linear ODEs, variation of parameters, Sturm-Liouville boundary value problem, Green's function.

4. **PARTIAL DIFFERENTIAL EQUATIONS (PDES)**: Lagrange and Charpit methods for solving first order PDEs, Cauchy problem for first order PDEs. Classification of second order PDEs, General solution of higher order PDEs with constant coefficients, Method of separation of variables for Laplace, Heat and Wave equations.


6. **LINEAR PROGRAMMING PROBLEM**: Simplex methods, duality. Elementary queuing and inventory models. Steady-state solutions of Markovian queuing models: M/M/1, M/M/1 with limited waiting space, M/M/C, M/M/C with limited waiting space, M/G/1.


8. **LINEAR INTEGRAL EQUATIONS**: Linear integral equation of the first and second kind of Fredholm and Volterra type, Solutions with separable kernels. Characteristic numbers and eigenfunctions, resolvent kernel.

1. **PHILOSOPHY OF EDUCATION**: Meaning of philosophy, scope of Philosophical inquiry, meaning of education with reference to individual growth and development, origin and purpose of human existence as the common denominator between Philosophy and Education, need for philosophy of education.

2. **SOCIOLoGY OF EDUCATION**: Development and scope, difference with Educational Sociology, sociological approach, researches in the area of Sociology of Education.


4. **PERSONALITY**: Concept, development, structure and dynamics of personality. Theories of Personality: Allport, Eysenck; Psychoanalytic approach of Freud, Erickson; Behavioural approach – Miller and Dollard and Bandura and Walter; Humanistic approach – Roger, Maslow; Indian Theories: Vedic, Rabindernath Tagore Mahatma Gandhi, and Sri Aurobindo.

5. **METHODS OF EDUCATIONAL RESEARCH**: Experimental; Normative Survey; Historical; Case Study; Developmental; Fundamental, Applied, Evaluative and Action Research; Qualitative Research: Phenomenological, Ethnomethodical and Naturalistic Enquiry.

6. **DATA ANALYSIS**: Measures of control tendency, measures of variability, correlations, properties and uses of normal distribution, standard uses, difference between Means, Hypothesis testing, ANOVA.


8. **DEVELOPING A RESEARCH PROPOSAL**: Problem and its sources; Selection and definition of problem; Objectives – Primary, secondary and concomitant; Hypothesis: Nature, definition, types, sources; Characteristics of a good hypothesis; Directional and non-directional hypothesis.
LINGAYA’S UNIVERSITY
SYLLABUS FOR ENTRANCE TEST FOR Ph.D.
ENTRANCE TEST
DEPTT. – APPLIED SCIENCE (CHEMISTRY)

INORGANIC CHEMISTRY:
1. **CO-ORDINATION COMPOUNDS OF METALS:** Step wise and overall formation constants and their interaction, trends in stepwise constants, factors affecting the stability of metal complexes with reference to the nature of metal ion and ligand, chelate effect and its thermodynamic origin, determination of binary formation constants by pH metry and spectrophotometry.

2. **BORON COMPOUNDS:** Higher boranes, carboranes and metalloboranes, compounds with metalmetal multiple bonds, metal carbonyls and halide clusters.

MATERIALS CHEMISTRY:
1. **MULTIPHASE MATERIALS:** Two component phase equilibria, eutectic phase formation (Pb-Sn), Solid solution, Cu-Ni, peritectic phase formation: Fe -Ni, Fe-C phase diagram, phase transformation in Fe -C alloys, Solid solutions and intermetallic compound.

2. **HIGH TC MATERIALS:** Defect pervoskites, high Tc superconductivity in cuprates, preparation and characterization of 1, 2, 3, and 2, 1, 4, materials, normal state properties, anisotropy, temperature dependence of electrical resistance, optical photon modes, superconductivity state, heat capacity, coherence length, elastic constants, position life times, microwave absorption pairing and multigap structure in high Tc materials, applications of high Tc materials.

3. **CORROSION:** Definition, Classification, Units and rate of corrosion, Electrochemical corrosion reaction, Rusting, Polarization, Activation Polarization, Concentration Polarization, Passivity, Inhibitors, Electrochemical series of metals, Galvanic series of metals and Alloys, Galvanic corrosion, Ceramic corrosion, Pitting corrosion, Intergranular corrosion, Stress corrosion.

4. **POLYMER CHEMISTRY:** General characteristics of chain growth polymerization, alkene polymerization by free radical, anionic and cationic initiators, ring opening polymerization of ethers, lactones and lactams. General characteristics of step growth polymerization, synthesis of polymers by step polymerization, polyesters, polycarbonates, polyamides, polyphenylene oxide, polysulphones, polysiloxanes Zeigler-Natta co-ordination polymerization. Copolymerisation, general characteristics, copolymer equation and its application, monomer reactivity ratio and copolymer structure, block copolymer and graft copolymer.

ORGANIC CHEMISTRY:

2. **STEREOCHEMISTRY AND CONFORMATIONAL ANALYSIS:** Concept of chirality, Asymmetric synthesis (including enzymatic and catalytic nexus) enantio and diastereo -selective synthesis, racemization, resolution, Walden inversion. Effects of conformation on reactivity in acyclic compounds and cyclohexanes, Conformational analysis of cyclohexane.

PHYSICAL CHEMISTRY:
1. **SPECTROSCOPY:** Theoretical treatment of rotational, vibrational and electronic spectroscopy. Principles of NMR, EPR, Mössbauer and photoelectron spectroscopy.

2. **CHEMICAL EQUILIBRIUM:** Free energy and entropy of mixing, partial molar quantities, Gibbs -Duhem equation. Equilibrium constant, temperature -dependence of equilibrium constant, phase diagram of one-and two-component systems, phase rule.
MANAGERIAL ECONOMICS: Nature and scope of Managerial Economics. Importance of Managerial decision—making; Marginal analysis; Objective of a firm, Demand function, Elasticity of demand and its significance in Managerial decision-making; Consumer equilibrium-utility and indifference curve approach; Price, income and substitution effects; Fundamentals of demand estimation and forecasting; Short-run and long-run production functions; Cost curves and economics of scale; Price and output determination under perfect competition, monopoly, monopolistic, competition, and oligopoly; Pricing strategies and tactics; National Income— alternative concepts aid measurement of National income; Inflation—types, measurement and control; Balance of Payments; Monetary and Fiscal Policies.

ORGANIZATIONAL BEHAVIOR AND ETHICS : The concept and significance of organizational behavior- Skills and roles in an organization- classical, Neo-classical and modern theories of organizational structure-Organizational design- Understanding and Managing individual behavior personality-Perception-Values-Attitudes-Learning-Motivation, Understanding and managing group behavior, process-Inter-personal and group dynamics-communication- leadership-managing change-managing conflicts, Organizational development. Ethics and management system; ethical issues and analysis in management; Value based organizations; Personal framework for ethical choices; Ethical pressure on individual in organizations; Gender issues; Ecological consciousness; Environmental ethics; Social responsibilities of business; Corporate governance and ethics.

BUSINESS STATISTICS Univariate Analysis : An overview of central tendency, dispersion, skewness. probability Theory; Classical, relative and subjective probability, - Addition and multiplication probability models; Conditional probability and Baye’s Theorem. Probability Distributions: Binomial, Poisson, and normal distributions; Sampling and sampling methods; Sampling and non-s Sampling; Law of Large Number and Central Limit Theorem; Sampling distributions and their characteristics. Statistical Estimation and Testing: Point and interval estimation of population mean, proportion, and variance; Statistical testing of hypothesis and errors; Large and small sampling tests—Z, t and F tests. Non—Parametric Tests: Chi-square tests; Sign tests; Wilcoxon Signed— Rank tests; Kruskal—Wallis test. Correlation and Regression Analysis : Two variables case. Index Numbers : Meaning and types; Weighted aggregative indices-Laspeyre’s and Paasch’s indices; Laspeyre’s and Paasch’s indices compared, indices of weighted average of (price and quantity) relatives; Tests of adequacy Special problems—shifting the base; splicing, overlapping index series; Uses and problems of Index number; Time Series Analysis; Trend Analysis. Statistical Quality Control : Causes of variations in quality characteristics, Quality control charts, - purpose and. logic; Constructing a control chart computing the control limits (X and R charts); Process under control and out of control, Warning limits; Control charts for attributes -fraction defectives and number of defects Acceptance sampling.


MARKETING MANAGEMENT: Marketing Environment and Environment scanning; Marketing information systems and marketing research; understanding consumer and industrial markets; demand measurement and forecasting; market segmentation - targeting and positioning; product decisions, product mix, product life cycle; new product development; branding and packaging; pricing methods and strategies. Promotion mix; advertising; Personal selling; channel management; vertical marketing systems; Evaluation and control of marketing effort; Marketing of services; Customer relation management, Uses of internet as a marketing medium-other related issues like branding, market development, advertising and retailing on the net.

PRODUCTION MANAGEMENT: Role and scope of production management; Factory location; Layout planning and analysis; Production Planning and control - production process analysis; Demand forecasting for operations; Determinations of product mix; Production scheduling; Work measurement ; Time and motion study; Statistical Quality Control; Role and scope of operations research; linear programming; sensitivity analysis; duality; transportation model; inventory control; Queueing Theory; decision theory; Markov Analysis; PERT/CPM.

ENTREPRENEURSHIP: Concepts- types, characteristics; motivation; competencies anits development; innovation and entrepreneurship; small business - concepts government policy for promotion of small and tiny enterprises; process of business opportunity identification; detailed business plan preparation; managing small enterprises; planning for growth; sickness in small enterprises; rehabilitation of sick enterprises; Intrapreneurship (organizational entrepreneurship).
1. **English Literature from 14th century to 16th century:**
   Characteristic features of the literary works of this period; Basic information about the prominent works and their authors

2. **17th century English Literature:** Characteristics of the Restoration period; Prominent writers and their contributions; Major features of the literary works; Significance of this period

3. **Romantic Period in English Literature:** Characteristics of the period; Prominent writers and their works; Dominating features of the literary works of this period

4. **Victorian Age:** Characteristics of the period; Literature as a mirror to the social life; Prominent works and their significance

5. **Modern & Post-modern Literature:** Characteristic features of the period; Prominent works and authors of the age; Salient features of the literary works of this period

6. **Literary tools:** Literary terms; Figures of speech; Literary forms & genres

7. **Usage of English Grammar:** Remedial English; Summarization; Comprehension; Editing the passage
Lingaya’s University, Faridabad Department of Clinical Research Syllabus for Ph.D Entrance Examination

ENTRANCE EXAMINATION SYLLABUS FOR PhD

1) Clinical Pharmacology: Principles of Basic Pharmacology, Pharmacokinetics (ADME), Pharmacodynamics (mechanism of Action), Toxicity Studies, Dose Response relationship, Therapeutic index, Neurological disorders, malignant diseases, Infectious diseases,


Reference Book: Basic Principles of Clinical research and Methodology by S.K Gupta
ICMR, FDA and CDSCO websites.

3) Biostatistics: Basic Definition and Application, Types of Data (Nominal Data, Ordinal data, Ranked Data, Discrete Data, Continuous Data ), Measures of Central Tendency (Mean, Median, Mode), Measures of Dispersion (Variance, standard Deviation, Coefficient Of variance ), Parametric and Non-Parametric Tests, Hypothesis Testing, Probability, Frequency Distribution

Reference Book: Principles of Biostatistics by Marcello Pagano

4) Pharmacogenomics: Importance of Study in Pharmacogenomics, Pharmacogenetic Phenotypes, Gene Therapy, Classification of Enzymes, Basic aspects of Enzyme Kinetics, Recombinant DNA Technology, Cellular organization, DNA Replication, Immunity, Analytical Techniques

Reference Books: Pharmacogenomics introduction and Clinical perspective by Joseph.S.Bertino
Concepts in Pharmacogenomics by Zdanowicz
5) Clinical Research Methodology: Epidemiological Studies, Clinical Trial Design, Phases of Clinical Research, Aim of different Phases, Intellectual Property Rights (TRIPS and GATT), Indian Patent Law, Endpoints in Clinical Trials, Quality of Life Studies, Pharmacoeconomic studies

Reference Books: Guide to Clinical Trials by Bert Spilker, Lippincott Williams and Wilkins
Basic Principles of Clinical research and Methodology by S.K Gupta

6) Bioethics: Background of ethics in Clinical Research, Ethical Principles, Ethics Committees- Roles and Responsibilities, Privacy and Confidentiality, Importance of Informed Consent Form in Clinical Research, use of placebo

Reference Books: Protecting Study Volunteers in research by C.M Dunn, Thomson Centre watch, Boston

7) Clinical Trial Management: Basics of Project Management, Steps involved in Project Development, Managing the project Team, Tracking Management of Project, Clinical Research Outsourcing, Offshoring, Monitoring of Clinical Trials, Audits and Inspection

Reference Books: Project Management by Gray, Larson, Desai
The CRA’s guide to Monitoring Clinical Research by Karen E. Woodin and John C. Schneider

Basic Principles of Clinical research and Methodology by S.K Gupta

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Mass Communication
Syllabus for Ph.D.

Principal of Mass Communication- Media systems and theories: authoritarian, libertarian, socialistic, social-responsibility, development, participatory. Mass media: public opinion and democracy. Media culture and its production. Media organizations, media content, market-driven media content- effects, skyvasion, cultural integration and cultural pollution. Issue of media monopoly- cross-media ownership;

History of Media- Early communication systems in India- development of printing- early efforts to publish newspapers in different parts of India. Newspapers and magazines in the nineteenth century- first war of Indian Independence and the press- issue of freedom, both political freedom and press freedom. Birth of the Indian language press- contribution of Raja Ram Mohan Roy; birth of the Indian news agencies. The Indian press and freedom movement- Mahatma Gandhi and his journalism; social, political and economic issues before independence and the Indian press; historical development of important newspapers and magazines in English; important personalities of Indian journalism. The press of India after Independence; social, political and economic issues and the role of the Indian press problems and prospects.

Print Media and Electronic Media- Investing reporting- purposes, sources, styles, techniques. Columns- development, criticism, reviews, feature writing, news analysis, backgrounding. - Political reporting -Legislative reporting -Diplomatic reporting. Evolution and growth of electronic media: radio, television and internet. Characteristics or radio, television and Internet as medium of communication- spoken, visual and multiple versions of information through links. Principles and techniques of audio-visual communication thinking audio and pictures, grammar of sound, visuals and web production.

Public Relation and Corporate Communication- Evolution and history of public relations- definitions of PR, PR and allied disciplines (publicity, propaganda, public affairs, lobbying, etc.). Interface of PR with various management disciplines (human resource development, finance, marketing, law, etc.)- publics in PR, PR tools (interpersonal, mass media and selective media)-PR in industry (public sector, private sector and multinational)- PR in central and state governments and the functioning of various media units of the State and Union governments.

Communication Research- Definition- elements of research- scientific approach- research and communication theories- role- function- scope and importance of communication research- basic and applied research. Research design components- experimental, quasi-experimental, bench mark, longitudinal studies- simulation- panel studies- content analysis. Methods of communication research- census method, survey method, observation method- clinical studies- case studies- content analysis. Tools of data collection: sources, media source books, questionnaire and schedules, people’s meter, diary method, field studies, logistic groups, focus groups, telephone, surveys, online polls. Random sampling methods and representativeness of the samples, sampling errors and distributions in the findings.

Media Law and Ethics Media Law: Constitution of India: fundamental rights- freedom of speech and expression and their limits- provisions of declaring emergency and their effects on
media- provisions for amending the constitution; provisions for legislature reporting; parliamentary privileges and media; theory of basic structure; union and states; and election commission and its machinery. Specified press laws in India- Contempt of Courts Act 1971- civil and criminal law of demotion- relevant provisions of Indian Penal Code with reference of sedition, crime against women and children; laws dealing with obscenity; Official Secrets Act, 1923, vis-à-vis right to information- Cinematograph Act, 1953; Prasar Bharati Act; WTO agreement and intellectual property right legislations, including Copyright Act, Cable Television Act. Media’s ethical problems including privacy, right to reply, communal writing and sensational and yellow journalism; freebies, bias, coloured reports; ethical issues related with ownership of media- role of press and/or media councils and press ombudsmen in the world- Press Council of India and its broad guidelines for the press- codes suggested for the press by Press Council and Press Commissions and other national and international organizations- and codes for radio, television, advertising and public relations.

**International Communication**- Impact of new communication technology on news flow- satellite communication- its historical background- status- progress- effects- information super highways- international telecommunication and regulatory organizations- UNESCO’s efforts in removal imbalance in news flow- debate on new international Information and Economic Order- MacBride Commission’s report- non-aligned news agencies news pool- its working, success, failure. Issues in international communication- democratization of information flow and media systems- professional standards; communication research- telecommunication tariffs; information- prompted cultural imperialism- criticisms; violence against media persons; - effects of globalization on media systems and their functions; transnational media ownership and issues of sovereignty and security; international intellectual property rights; international media institutions and professional organizations; code of conduct.

**Inter-Cultural Communication**- Culture- definition- process- culture as a social institution- value systems- primary- secondary- eastern and western perspectives. Inter-cultural communication- definition- process- philosophical and functional dimensions- cultural symbols in verbal and non-verbal communication. Perception of the world- Western and Greek (Christian)- varied eastern concepts (Hindu, Islamic, Buddhist, others)- retention of information- comparison between eastern and western concept. Communication as a concept in western and eastern cultures (Dwaitha- Adwaitha- Vishishtadwaitha- Chinese (DaoTsu and Confucius- Shinto Buddhism) and also Sufism. Culture, communication and folk media- character, content and functions- dance and music as instruments of inter-cultural communication; UNESCO’s efforts in the promotion of inter-cultural communication- other organizations- code of ethics.
School of Pharmacy
Lingaya’s University, Faridabad
Ph. D. Entrance Exam Syllabus


**Pharmaceutical Chemistry:** Structure, nomenclature, classification, synthesis, SAR and metabolism of the category of drugs, which are official in Indian Pharmacopoeia and British Pharmacopoeia. Introduction to drug design. Stereochemistry of drug molecules. Hypnotics and Sedatives, Analgesics,

**Pharmacognosy & Phytochemistry:** Chemistry, tests, isolation, characterization and estimation of phytopharmaceuticals belonging to the group of Alkaloids, Glycosides, Terpenoids, Steroids, Bioflavanoids, Purines, Guggul lipids. Pharmacognosy of crude drugs that contain the above constituents. Standardization of raw materials and herbal products. WHO guidelines. Quantitative microscopy including modern techniques used for evaluation. Biotechnological principles and techniques tissue culture.


**Pharmaceutical Jurisprudence:** Drugs and Cosmetics Act and rules there under with respect to manufacture, sales and storage. Pharmaceutical ethics. Pharmacy Act and any other acts and rules pertaining to the field of Pharmacy applicable in India.