

INFORMATION BROCHURE
for
Entrance Test for Research Degree Programmes
Doctor of Philosophy (Ph.D.)
and
Master of Philosophy (M.Phil.)
July 2017 SESSION



RESEARCH UNIT

Indira Gandhi National Open University MaidanGarhi,

New Delhi-110 068

1. a) Applications are invited for admission to MPhil and PhD programmes in select disciplines for the July session. The list of disciplines and number of seats available are given in Appendix II.
- b) The programmes are offered under regular mode in strict compliance of the UGC (Minimum Standards and Procedure for award of M Phil/ PhD Degrees) Regulations, 2016 and amendments thereto from time to time. Selected candidates will be governed by IGNOU Ordinance, IGNOU Regulation and IGNOU Guidelines for M Phil/ PhD Programmes (available at IGNOU website).
- c) Admission to the M Phil/ PhD programmes is strictly on merit, based on performance in Entrance Test and Interview.
- d) IGNOU offers M Phil/ PhD programmes under two categories: part time and full time. Both categories of students will be required to attend classes if course work is allotted to them.
- e) The M Phil/ PhD programmes involve coursework during the first six months of admission, which will be conducted in IGNOU Campus at New Delhi only. A student has to attend the coursework on a regular basis. At least 80 per cent attendance in classes is compulsory.
- f) As of now IGNOU does not have hostel facilities for students. Students have to make their own arrangements for stay.

2. ELIGIBILITY CRITERIA FOR M.PHIL./PH.D.

The eligibility criteria for admission to M Phil and PhD programmes are as follows:

For M.Phil.:

- a) Master's Degree from a University recognized by UGC in the relevant discipline with at least 55% marks [50% marks in the case of SC,ST and OBC(Non-creamy Layer)/ Differently-Abled and other categories of candidates as per the decision of UGC from time to time, or for those who had obtained their Master's Degree prior to 19th September, 1991].
- b) See Appendix II for further details.

For Ph.D.:

- (a) Master's Degree from a University recognized by UGC in the relevant discipline with at least 55% marks [50% marks in the case of SC,ST and OBC(Non-creamy Layer)/Differently-Abled and other categories of candidates as per the decision of UGC from time to time, or for those who had obtained their Master's Degree prior to 19th September, 1991].

- (b) Candidates holding M.Phil. degree (along with course work and dissertation both) or those candidates who have cleared NET (conducted by UGC/CSIR/ICAR) or any other equivalent examination will be exempted from appearing in the Entrance Test.
- (c) Those who have not cleared NET/any other equivalent examination or not holding M.Phil. Degree will be required to appear in the Entrance Test.
- (d) See Appendix II for further details.

3. SELECTION PROCEDURE:

Stage 1: Entrance Test:

- a) The Entrance Test will be conducted by the University on **20th of August 2017 (Sunday)** at National Level in select examination centres across the country (See Appendix I for the list)
- b) The list of candidates who will be required to appear for the Entrance Test will be displayed on IGNOU website, www.ignou.ac.in.
- c) Hall Tickets enabling the candidates to take the Entrance Test will also be displayed on IGNOU website. Candidates are required to download and print the same to appear in the Entrance Test.
- d) Candidates are required to bring with them an original identity proof having photograph, such as Aadhar Card, Voter ID Card, Driving License, Passport and ID Card issued by Govt. Agencies.
- e) Those who secure at least 50% marks in the entrance test (45% marks in case of SC/ST/PH) will be shortlisted for the interview in order of merit subject to the maximum limit of five times of the available seats. Entrance Test shall be qualifying in nature.

Stage 2: Interview/ Presentation

- a) Short-listed Candidates in the Entrance Test will be called for interview/presentation of Synopsis before the Discipline specific Doctoral Research Committee.
- b) Those candidates exempted from appearing in the Entrance Test will also be called for interview/presentation of Synopsis before the Discipline specific Doctoral Research Committee.
- c) Offer letters for admission will be sent to the Selected Candidates only.

Important Dates:

31st July 2017 (Monday) - Last date for submission of online application

20th August 2017 (Sunday)- Entrance Test

22 September 2017 (Friday) Tentative - Declaration of Result

Notes:

- 1. Candidates are required to apply on-line only. No offline/hardcopy of the form will be accepted.**
2. Application fee of Rs. 1,000/- is non-refundable under any circumstances.
3. Reservation of seats as per Government of India rules will apply.
4. For any discipline specific query at any stage, candidates are advised to contact the concerned Programme Coordinator (see AppendixII)
5. For Discipline specific syllabus for Entrance Test please refer to Appendix III
6. Being called for interview does not entitle a candidate to stake claim for admission. The Doctoral Research Committee may not recommend a candidate if the discipline does not have the specialization in which he/she wants to carry out research.

For any general query, please e-mail to rdp admission@ignou.ac.in/bijayala_xmi@ignou.ac.in or contact on the following numbers: 011-29571984/1985/1988/ 1998.

Appendix-I

List of Examination Centres for Entrance Test on August 20, 2017

Sl. No.	City	City Code
1.	Ahmedabad	01
2.	Bengaluru	02
3.	Bhopal	03
4.	Chandigarh	04
5.	Chennai	05
6.	Delhi	06
7.	Guwahati	07
8.	Hyderabad	08
9.	Kolkata	09
10.	Lucknow	10
11.	Mumbai	11
12.	Patna	12
13.	Trivandrum	13

Appendix- II

Discipline-wise Vacancy of Seats/ Specific eligibility criteria and Programme Coordinators

Sl No	Discipline	Programme	Seats available	Name of Programme Coordinator	Eligibility criteria	Contact	Remarks
1.	Geology	Ph D	20	Dr Meenal Mishra	Postgraduation in Geology or Geological Science or Applied Geology or Geo-Exploration or Mineral Exploration or Engineering Geology or Marine Geology or Earth Science and Resource Management or Petroleum Geosciences or Petroleum Exploration or Geochemistry or Geophysics or Hydrogeology or Geomatics or Geoinformatics or Remote Sensing and GIS from any recognized university	meenalmishra@ignou.ac.in 011-29571676	
2.	French	Ph D	02	Dr Deepanwita Srivastava	MA in French	deepan@ignou.ac.in 011-29571636	
3.	Journalism and Mass Communication	Ph D	15	Dr. K.S. Arul Selvan	Master Degree and/or MPHIL Degree in Journalism and Mass Communication.	ksarul@ignou.ac.in 011-29571605	

4.	Statistics	Ph D	08	Dr Neha Garg	M. Phil. in Statistics or qualified UGC-CSIR NET/SLET in Statistics with Post Graduation in Statistics/Applied Statistics. or Post Graduation in Statistics/Applied Statistics with minimum 55% from any recognized university.	nehagarg@ignou.ac.in 011-29572806	
5.	Geography	PH D M Phil	16 10	Dr Vijay Kumar Baraik	M.A./M.Sc. in Geography, Earth Systems Science and Relevant Discipline of Geospatial Technology”	vijabaraik@ignou.ac.in 011-29571673	
6.	Gender and Development Studies	Ph D	06	DrAnuAneja	Master’s degree in Gender Studies or Gender & Development Studies with 55% OR Master’s degree in other streams with one or two courses in the area of Gender Studies or Gender & Development Studies and/or with demonstrable evidence of teaching and / or research and publications in the area of Gender Studies or	anuaneja@ignou.ac.in 011- 29533464	

					Gender & Development Studies.		
7.	Women's studies	Ph D	07	DrNeelimaSrivastav	Master's degree in Women's Studies or Gender Studies with 55% OR Master's degree in other streams with one or two courses in the area of Women's/Gender Studies and/or with demonstrable evidence of teaching and / or research and publications in the area of Women's /Gender Studies.	nilimasrivastav@ignou.ac.in	011-29571612
8.	Biochemistry	Ph D	09	Dr ParveshBubber	Master's Degree from a recognized university or any other qualification recognized as equivalent thereto in Biochemistry/ allied subjects.	parvesh@ignou.ac.in	011-29572765
9.	Fine Arts	Ph D	04	Prof Sunil Kumar	M. Phil in the relevant field with 55% marks (50% for SC/ST/PWD candidates) from any recognized University/Institution. AND/OR Masters Degree in Fine Arts/	ksunil@gmail.com	011-29571652

					Visual Arts/Drg. & Ptg. /Design with 55% marks (50% for SC/ST/PWD candidates) from any recognized University/Institution.		
10.	Theatre arts	Ph D	01		M. Phil in the relevant field with 55% marks (50% for SC/ST/PWD/OBC candidates) from any recognized higher learning University/institution. AND/OR M. P. A. in Theatre Arts with 55% marks (50% for SC/ST/PWD candidates) from any recognized higher learning university/institution.		
11.	Physics (specialization available Physics Education and Reactor Physics)	Ph D	02	Dr Subhalakshmi ilamba	i) UGC-NET(including JRF)/UGC/CSIR-NET (including JRF)/SLET/GATE or should be a teacher fellowship holder, and ii) M Phil (Physics) Degree with course work	slamba@ignou.ac.in 011- 29572814	There will be no Entrance Test for Physics
12.	Chemistry	M Phil	06	Dr	Master's Degree and /or M Phil	javedfarooq@rediffmail.	

		Ph D	05	Javed Farooqi	Degree in Chemistry	com 011-29572822	
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Appendix- III
Discipline Specific syllabus

Ph. D. GEOLOGY

SECTION A. RESEARCH METHODOLOGY

Research Methodology in Geology: Definition, outcome and importance of geological research; theory and philosophy of research methodology in context to geology; emerging areas and interdisciplinary research in geology; Identifying and defining research problem; techniques involved in defining research problem and identifying gaps; sources of literature; implications of literature collection and its review. Preparation and planning for fieldwork; field kit and equipments; safety measures in field; field procedures and precautions taken during sampling; maintenance of field notebook; uses of topographical maps and satellite images; selection of traverses; recognition of geological features, rock types and stratigraphic contacts in field; use of clinometer compass, measurement of dip and strike of strata; measurements of geologic sections; uses of GPS; recording field observations in field notebook; geological mapping. Data collection; sampling methods; data collection methods in sedimentology, palaeontology, stratigraphy, structural geology and tectonics, mineralogy, petrology, ore

geology and hydrogeology; classification and presentation of data; role of statistics and computers in research; use of computer in data processing; methods of communicating and displaying analysed data; applications of Geographic Information System. Thin section preparation; petrological and palaeontological microscopes; Ore microscopy; SEM microphotography; preparation of samples for geochemical and XRD analysis, heavy mineral separation; construction of lithologs; geophysical exploration methods, remote sensing data. Intellectual property rights, patents, copyright and related rights; ethics-plagiarism and integrity.

SECTION B. GEOLOGY COURSES

2. Physical Geology and Geomorphology: Composition of the crust and Earth as a whole; basic concepts and significance of geomorphology; relationship between landforms and geomorphic processes- fluvial, aeolian, glacial, and marine; soils; geomorphology of India; applications of geomorphology; mountain building; volcanoes and earthquake; seismic belts of India.

3. Structural Geology and Tectonics: Classification of folds and faults; Mechanism of folding; concept of stress and strain and their geological significance; joints and unconformities. concept of plate tectonics; palaeomagnetism, polar wandering and reversal of Earth's magnetic field; sea-floor spreading, island arcs and mountain chains.

4. Stratigraphy and Palaeontology: Principles of stratigraphy, time scale and its divisions; stratigraphic classifications; stratigraphic nomenclature; stratigraphic correlation; facies concept in stratigraphy; marine transgression and regression; ice ages; broad stratigraphic subdivisions of India. Page 2 of 2 Fossil and modes of

fossilization; application of fossils in age determination; evolutionary trends and geologic distribution of Brachiopoda, Pelecypoda, Gastropoda, Cephalopoda, Trilobita, Echinoids, Graptolites and Corals; elementary idea about the origin of major groups of vertebrates; evolutionary history of Horse, Elephant and Man; plant life through geologic ages.

5. Mineralogy: Physical and optical properties of minerals; classification of minerals; mineralogy of silicates, polymorphism, isomorphism and pseudomorphism; solid solution and exsolution; Xray crystallography; concept of symmetry; crystallographic classification.

6. Petrology: Generation and evolution of magma; Bowen's reaction series; textures and classification of igneous rocks; phase equilibria: single, binary and ternary systems; silicate systems; genesis and tectonic setting of different magma types; cooling and crystallisation of magma. Sedimentation, lithification and diagenesis; structures and textures; classification of sedimentary rocks; depositional environments; sedimentation and tectonics; heavy minerals and their applications in provenance studies. Metamorphism and metamorphic processes; metamorphic differentiation; metamorphic facies; types of metamorphism and metamorphic rocks; metasomatism and anatexis.

7. Georesources and Economic Geology: Ore genesis; ore localisation and ore shoots; ore dressing and beneficiation; strategic, critical and essential minerals; national mineral policy; economic minerals of India; fossil fuels.

8. Geochemistry: Cosmic abundances of elements; geochemical classification and differentiation of the elements; trace element geochemistry; radiogenic and non-radiogenic isotopes; concept of geochemical and biogeochemical cycles and global climates.

9. Applied Geology:

Engineering Geology: Engineering properties of rocks; geological investigations, seismic parameters and remedial measures related to the construction of dams, bridges, highways and tunnels; mass movements with special emphasis on landslides and causes of hill slope instability. Mineral Exploration: Principles and methodology of geological prospecting for economic minerals and rocks; sampling methods, methods for estimating reserve and resources, grade and tonnage calculation of the deposits; pathfinder elements; geochemical and geophysical methods; mining in India. Hydrogeology: Hydrological cycle; hydrological properties of rock; distribution of surface and groundwater in the Earth's crust; global water budget; movement of groundwater; aquifers classification and characteristics; Darcy's law; Theis equation; water table; flow nets; groundwater provinces of India; groundwater quality and pollution; groundwater prospecting; desalination; springs and its types. Environmental Geology: Environment and energy; non-conventional energy resources; geoenvironment; environmental hazards, instrumentation and analysis; disposal of municipal, domestic, hospital, solid and nuclear wastes; oil spills; environmental impact assessment (EIA); environmental legislation: national/international standards; application of remote sensing and GIS in environmental management. Remote Sensing and GIS: Electromagnetic radiation; aerial photographs and their geometry; elements of photo and image interpretation;

satellite remote sensing; global and Indian space missions, sensor and their characteristics; digital image processing techniques; geological applications of remote sensing, GIS and GPS.

Ph. D.FRENCH

(To be uploaded soon)

Ph. D. Journalism and Mass Communication

1. Media and Society - functions, role, access and interaction. Contemporary developments in the media as an institution.
2. Concepts and models of various communication settings : Communication: Concept & Process; Models of Communication; Theories of Mass Communication
3. Different Schools of thoughts - related communication discipline : Media Content: Information, Education & Entertainment; Functions of Media; Impact of Media; and Media Economics and Finance.
4. Mass Audience; Access to Media; Mass Media Policies. Health & Education; Gender and Media; Media and Environment; Media & Human Rights.

5. Mass Communication and Culture; New Media, Networked Society – New Theory; Media Economics, Ownership, Control and Governance; The Production of Media Content; Media Content: Issues, Concepts and Method of Analysis;
6. The Behaviorist and Cognitive Orientations: The Learning Theories. The Yale Communication Research Studies. Persuasion and Attitude. Social Judgement Theory (Sherif et al.) Theory of Reasoned Action (Fishbein & Ajzen). The Cognitive Theories: The Balance, Dissonance, Congruity and Consistency theories and their applications to communication research.
7. Critical Orientations: The Feminist Theories – The Culture Studies Theories.
8. Children and Media Violence: Social learning Theory/Social Cognition (Bandura); Disinhibition and Cue Theory (Berkowitz); and Arousal Theory / Excitation Transfer (Tannenbaum and Zillman).
9. “Middle Range” Theories (Selections): Uses and Gratifications; Agenda Setting by the Media; Cultivation of Perceptions of Reality (George Gerber); Limited and Selective Influences Theory.
10. Overview of communication research paradigms: philosophical assumptions of positivism, interpretivism, critical paradigms. What is scientific? Logic of scientific reasoning: Terms, propositions, arguments; deductive and inductive reasoning in research
11. Research design: Quantitative Variables: Types of variables; unit of analysis; exploratory, explanatory and predictive research, Measurement: conceptual and operational definitions; levels of measurement: nominal, ordinal, interval, ratio; basic understanding of reliability and validity. Sampling: why sample? Samples and

population of interest; sampling design: probability and non-probability sampling; factors affecting choice of sampling design; sample size and determining sample size; stages of quantitative research

12. Data collection methods: Quantitative Experimentation: Logic of experimentation: testing causal relationships; random assignment; internal and external validity; sampling in experiments; experimental designs; field experiments. Survey research: General features of survey design; strengths and limitations; survey research designs: cross-sectional and longitudinal. Questionnaire construction: Steps leading to construction of questionnaire; content and format; leading and loaded questions; pre-testing questionnaires; tabulating data.

13. Data analysis: Quantitative. Introduction to statistics, Measures of central tendency: Mean, median, mode; when to use them. Measures of dispersion: range, semi-quartile range, standard deviation. z-scores: location of scores and standardized distributions. Introduction to probability; Probability and samples: The distribution of sample means; Hypothesis testing procedure.

Ph. D. Statistics

Part-A: Research Methodology

Meaning of research, Role of research in important areas, Process of research, Types of research, research approach, Significance of research, Research problem: Definition, Selection and necessity of research problem.

Primary and secondary data, Qualitative and quantitative data, Classification of measurement scales, Goodness of measurement scales, Scaling, Scale classification bases, Scaling techniques, Methods of collecting primary data,

Merits and demerits of different methods of collecting primary data, Non response, Classification and tabulation of data.

Introduction to sampling, Advantages of sampling over complete enumeration, Probability and non-probability sampling, Sampling and non-sampling errors, Basic concepts of simple random sampling and design of experiments.

Measures of central tendency, Measures of dispersion, Probability distributions (Binomial, Poisson, Normal), Simple correlation and regression, Multiple and partial correlation., Testing of hypothesis (z, t, F and chi-square tests).

3. Part-B: Statistics

Sample space, Probability, Conditional probability, Independent events, Bayes theorem, Random variables, Distribution functions (Univariate and Bi-variate), Moments and moment generating function, Independent random variables, Marginal and conditional distributions, Characteristic function, Central limit theorem (i.i.d. case).

Standard discrete (Rectangular, Geometric, Negative binomial, Hyper-geometric) and continuous distributions (Uniform, Exponential, Beta, Gamma), Bivariate normal distribution, Sampling distributions (t, F, z, chi-square).

Properties of good estimators (unbiasedness, Consistency, Efficiency, Sufficiency, Complete and minimal Sufficient statistic), Exponential families, Methods of estimation (least square, maximum likelihood, method of

moments, minimum chi-square), Mean square error, Minimum variance unbiased estimators, Rao-Blackwell theorem, Lehmann-Scheffe theorem, Cramer-Rao lower bound,

Basics of testing of hypothesis, Neyman-Pearson lemma, Most powerful and uniformly most powerful tests, Likelihood ratio tests, Unbiased test, Non-parametric tests for one or more samples problems (Sign, Wilcoxon, Mann-Whitney, Kolmogorov Smirnov, Run , Kruskal Wallies test).

Gauss-Markov theorem, Estimability of parameters in linear models, BLUE.

Markov chains with finite and countable state space, Classification of states, Limiting behavior of n-step transition probabilities, Stationary distribution, Poisson process, Birth-and-death process.

Multivariate normal and its properties, Distribution of quadratic forms, Canonical correlation, Principle components analysis, Factor analysis, Classification and discriminant analysis.

Stratified sampling, Systematic sampling, Probability proportional to size sampling, Ratio, regression and product methods of estimation, Cluster sampling, Multi stage sampling, Two-phase sampling, Successive sampling

Analysis of variance and covariance, Completely randomised designs, Randomised block designs, Latin-square designs, Missing plot techniques, Orthogonality, BIBD, 2^k factorial experiments, Confounding.

Linear programming problem, Simplex methods, Duality, Assignment, Transportation problems, Queuing theory, 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. Elementary inventory models.

Ph. D. Geography

PART A

RESEARCH METHODOLOGY

- Objectives of research; Research methods versus Methodology
- Types of research: Descriptive vs. Analytical; Applied vs. Fundamental; Quantitative vs. Qualitative; Conceptual vs. Empirical
- Literature Review: Methods and Importance
- Research design: Need, Types and Features of research design, Formulating Research Problem
- Sampling Techniques: Probability and Non-probability sampling
- Collection and analysis of Data: Importance and Methods of data collection, Data Analysis with Statistical Packages
- Use of Cartography, Remote Sensing, GIS and GPS in Geographical Research
- Ethical issues in Research: Copy right, Intellectual Property Rights; Plagiarism

PART -B

Geography

- **Unit 1: Geographical Thought**
Geography during the Ancient and Medieval Period, Foundations of Modern Geography: Contribution of German, French, British and American Schools; Conceptual and Methodological Developments during the 20th Century, Dichotomy between Systematic Vs. Regional Geography, Physical Vs. Human Geography, and Determinism Vs. Possibilism; Areal Differentiation and Spatial Organisation, Quantitative Revolution, Impact of Positivism, Humanism, Radicalism and Behaviouralism in Geography.
- **Unit 2: Geography of India**
Physiography, Climate, Natural Resources: Vegetation, Soils, Water, Coastal and Marine, Mineral and Power; Agriculture, Agro-Climatic Regions, Irrigation, Major Industries and Industrial Regions, Population, Settlement Patterns, Urbanisation, Transport and Communication, Major Geographical Regions of India.
- **Unit 3: Methods and Techniques in Geography**

Cartography, Remote Sensing, GIS and GPS: Map as a Tool in Geographical Studies, Techniques Showing Spatial Patterns of Distribution, Types of Maps: Composite, Choropleth, Isopleth and Chorochromatic; Accessibility and Flow Maps, Cartographic Representation of Data, Computer Applications in Cartography, Symbolisation and Generalisation; Principles of Remote Sensing, GIS and GPS; EMR, Platforms and Sensors, Elements of Image Interpretation, Components of GIS, Data Structure, Applications of Remote Sensing, GIS and GPS in Geography.

Statistical Methods: Data Sources and Types of Data, Statistical Diagrams, Descriptive Statistics, Measures of Central Tendency, Measures of Dispersion, Lorenz Curve and Gini Coefficient, Correlation and Regression, Theory of Probability, Sampling Techniques and Tests of Significance, Scaling: Ranking Method, Normal Distribution and Z-Score.

- **Unit 4: Physical and Human Geography**

Geomorphology: Fundamental Concepts, Endogenic and Exogenic Forces, Geosynclines and Mountain Building, Isostasy, Continental Drift and Plate Tectonics, Denudational Processes: Mass Wasting, Weathering and Erosion; Cycle of Erosion and Evolution of Landscape: Theories of Davis, Penck and King; Fluvial, Glacial, Aeolian, Karst and Coastal Landscapes.

Climatology and Biogeography: Composition and Structure of the Atmosphere, Insolation and Heat Budget of the Earth, Temperature, Precipitation, Atmospheric Pressure and General Circulation of Winds, Monsoons and Jet Streams, Stability and Instability of the Atmosphere, Air-Masses, Fronts, Cyclones, Koeppen's and Thornthwaite's Classification of World Climates, Hydrological Cycle, Flood and Drought, Air Pollution, Global Warming, Human Ecosystem, Bio-Diversity, Conservation and Management of Ecosystems.

Oceanography: Physical and Chemical Properties of Sea Water: Temperature and Salinity of the Oceans; Origin of Ocean Basins, Bottom Reliefs of Indian, Atlantic and Pacific Oceans, Ocean Deposits, Coral Reefs, Ocean Currents and Tides, Sea-Level Changes.

Population Geography: Distribution, Growth and Migration, Sex-Ratio, Literacy, Demographic Transition.

Settlement Geography: Site, Situation, Types, Size, Spacing and Internal Morphology of Rural and Urban Settlements, Urban Fringe, City Region, Umland, Settlement Systems, Primate City, Rank-Size Rule, Settlement Hierarchy, Christaller's Central Place Theory.

Economic Geography: Recent Approaches in Economic Geography, Location of Economic Activities and Spatial Organisation of Economies; Classification of Economies; Sectors of Economy: Primary,

Secondary, Tertiary; Landuse and Landcover, Natural Resources: Renewable and Non-Renewable; Conservation of Resources.

Agricultural Geography: Concept and Techniques of Delimitation of Agricultural Regions; Measurement of Agricultural Productivity and Efficiency; Crop Combinations and Diversification; Von Thunen's Model, Agricultural Regions of the World.

Industrial Geography: Classification of Industries, Weber's and Losch's Theories of Industrial Location, Resources-Based and Footloose Industries.

Geography of Transport and Trade: Models of Transportation and Transport Cost, Inter-Regional and Intra-Regional Accessibility and Connectivity; Comparative Cost Advantages.

Political Geography: Global Strategic Views (Heartland and Rimland Theories), Geopolitics, Concept of Nation, State and Nation-State, Boundaries and Frontiers, Politics of World Resources, Geography and Federalism.

Social Geography: Social Structure and Social Processes, Elements of Social Geography, Ethnicity, Tribe and Caste, Concept of Social Well-Being, Environment and Culture, Concept of Culture: Areas and Cultural Regions, Dwelling Places as Cultural Expressions.

Regional Planning: Concept of Region, Types of Regions and Methods of Regionalisation, Regional Hierarchy, Regional Planning, Regional Planning in India, Concept of Development, Indicators of Development, Regional Imbalances, Growth Pole and Growth Centers.

Ph. D. Gender and Development Studies

COURSE- I (8 Credits)

1. Gender and Development: Concepts and Theories (8 Credits)

1: Concepts and Theories

Basic Concepts, Gender Based Division of Labour in Pre-industrial & Industrial Society, Feminism and Feminisms, Theories in Gender Economics

2: The Development Debate

WID- WAD- GAD, Power and Decision making, Negotiation of Spaces, Gender and Property Rights, HDI, GDI, GEM- Approaches & Indicators

3: Gender Profile: Demographic, Nutrition and Health Dimensions

Demographic Characteristics, Trajectory of Migration, Nutritional Needs, Gender and Health: The Life Cycle Approach, Occupational Health

4: Gender, Culture, Education and Social Development

Culture, Ethnicity and Gender, Communication Media and Gender Issues, Education and Social Development, Emerging Roles and Identities, Social Equity and Distributional Aspects

5: Gender and Livelihoods

Sustainable Environment, Food Security, Land Rights, Gender, Water and Sanitation, Security of Tenure

6: Gender and Work

Productive and Unproductive Work, Female Headed Households, Women in Poverty Groups, Visibility of Women in Statistics and Indicators, Gender Concerns in Formal and Informal Sector

7: Case Studies and Selected Readings

COURSE- II (8 Credits)

1. Research Methodology in Gender and Development Studies (8 Credits)

1: Researching Gender- I

Methodology: Epistemology, Ontology and Social Inquiry; Contextualizing Gender: Debates (Marxism, Hermeneutics, Post- modernism, Post- colonialism and Post- structuralism); Changing Notions of Development: Debates in Development- Underdevelopment (Dependency Theory and its Critiques; WAD/WID/GAD; Sustainable Development, Ecological Security); Construction of Gender, Variations in Femininity and Masculinity: Cross- Cultural Perspectives; Sex Role Ideology; Ethnographic and Cultural Studies; Life Histories and Narratology/Discourse Analysis

2: Researching Gender- II

Gender Segregation in the Labour Force, Processes of Gendering and the Institutionalization of Gender, Studying Gender Relations, Household and Domestic Labour, Gender Analysis, Poverty and Food Security, Basic Needs and Development Goals

3: Social Inquiry: A Feminist View

Feminist Epistemology, Feminist Paradigms, Feminist Research Methods and Ethics, Situating Differences, Interdisciplinary Methods in Feminist Research

4: Research Design, Types and Strategies

Research Design, Exploratory Studies, Surveys, Historical, Experimental, Ethnographic and Case Studies; Types of Research- Fundamental, Applied Research, Action Research, Experimental, Ex-Post Facto Research, Descriptive, Correlational Research, Participatory Research; Special Approaches for Studying Gender- Sensitive, Problem- Centred, Policy-Relevant and Action Oriented Research; Linking Policy and Research as Strategies for Advocacy

5: Sampling

Definition of Population, Sample, Merits and Demerits of Sampling; Probability Sampling: Random Sampling, Multi-stage Sampling, Cluster Sampling, Non- Probability Sampling, Purposive Sampling, Convenience Sampling, Quota Sampling; Sampling Designs for Various Types of Research; Critical Review of Sampling Design of Different Research Studies

6: Tools and Techniques of Research

Questionnaire, Interview (Media and Internet), Scaling, Measurement, Focus Group Discussions, Observation, Narration, Gender Analysis Matrix and Impact Flow Chart

7: Selected Studies in Gender and Development

Factors Determining and Influencing Gender and Development; Gender Division of Responsibility for Labour, Time use and Management; Women's Status and Challenges; Household allocation of Resources; Access to Natural Resources; Time scale for Rural Households; Value Added Analysis for Households; Production/Goods/Resources; Household Decision Making; Security Lapses, Provisions and Challenges

8: Data Analysis

Quantitative Data Analysis; Parametric Tests used for Quantitative Data Analysis; Qualitative Data Analysis, Non-Parametric Tests used for Analysis of Qualitative Data; Presentation of Data (Tables, Graphs etc.); Interpretation of Data

9: Preparing and Presenting Research Reports

Evaluation Research; Report Writing/Paper Presentation, Bibliography/References/Citations; Research Ethics; Research Proposals Seeking Grants; Research Funding Sources

Ph. D. Women's Studies

OUTLINE OF CONCEPTS AND THEORIES IN WOMEN'S STUDIES COURSE (8 CREDITS)

Theme 1: Introducing Women's studies (a) Emergence of women's studies – background and debates in our context and elsewhere. Women's studies as a perspective, debates of autonomy vs. integration. Recent debates and institutional shifts towards Gender studies.

(b) Interrogating Disciplines: Some examples in different fields to show how feminist have questioned and changed the orientations of different disciplines eg. sociology, history, economics, political science, psychology, literature, philosophy. Suggested readings from different disciplines will be included.

(c) Comparative Frameworks: Contextualizing Women's Studies in India -- The subject of "women" in the Indian context – contested terrain of women's studies in relation to the women's movement and feminism. Discussion of the India/West distinction that invariably arises – both in a general situation of third world dependencies on western theories in higher education, but also the specific historical identification of women with Indian culture and hence an association of feminism with the West beginning during the colonial/nationalism period and its legacies.

(d) Locating "women" in history: some examples, eg. women and "status" – (social reform, "the status of women" as a local and global indicator.); Women and the nation/culture; Women and development; women and empowerment.

Theme 2: Some Key concepts:

Purpose:

To show how certain well known concepts such as patriarchy, or the sex-gender distinction, have been shaped by a set of related concepts – such as status/position, public/private, but also to debates on equality/difference, structure/agency and so on. And secondly, to show the intimate link between such concepts and those of class, caste/race and so on in order to explicate the nature of power.

- (a) Power
- (b) Equality/Difference
- (c) Patriarchy

(d) Sex and gender; debates around women and gender, sexuality/heterosexuality, masculinity/femininity.

Gender/class, gender/caste as examples of intersectionality to be dealt with in greater detail later.

(e) Body

Theme 3: Political Economy, State and Citizenship:

Issues of development, class and labour, the nation and the state, have been the most enduring frameworks for locating women and gender, especially in contexts like ours. Some sense of changing problems and debates – eg. Development and globalization; the more recent feminist redefinitions and use of notions of citizenship, etc.

Theme 4 :Discrimination, Intersectionalities and Group Identities:

Women and gender issues in relation to questions of caste, tribe, community, and so on will be explored. Comparisons with questions of race and ethnicity are necessary along with questions of identity and difference, notions of community as well as of intersectionality.

(a) Caste

(b) Tribe

(c) Race/ethnicity

(d) Community

(e) Disability

(f) Non-normative Sexualities

(g) Cultural Relativism

Theme 5: Women, Gender and the Family/Household:

This is to locate the significance of the family/household domain – drawing especially from contemporary sociological insights into the changing and diverse forms of the family, kinship and marriage as institutions, property and so on.

- (a) Conceptions of Family and Household
- (b) Intra-household Inequalities
- (c) Critiques of Family and Marriage
- (d) Property/inheritance/authority
- (e) Labour and the Care Economy

Theme 6: Culture and Representation

The question of culture requires distinct attention, given the immensely critical relationship between women and culture in contexts like ours. This will lead to revisiting of the historical relationship between women and culture and to introduce theories that have interrogated culture, such as those of representation and so on.

- (a) Defining culture and representation
- (b) Politics of culture
- (c) Politics of representation
- (d) Institutions and Cultural production
- (e) Cultural Production/Technologies

Theme 7: Interrogating Feminisms

Political theories provide us with a standard list of different feminisms – liberal, socialist/Marxist, radical, postmodern and so on. What is the salience of such approaches for us today? How can they be meaningfully

analyzed to help students grasp different orientations towards interpreting and questioning contemporary phenomena?

- (a) Feminization of Labour Debate - introduce conventional feminist approaches through an example eg. abortion, or labour
- (b) Challenges to Normative Feminism – e.g. new practices of veiling, sex worker movements
- (c) Critiques of International Human Rights Discourses e.g. CEDAW, Trafficking, arranged marriage
- (d) “Woman” in feminist theory – challenges from marginalized masculinities, blurred gender boundaries, post-feminism.

Theme 8: Concepts/Languages and Translation

This topic addresses an issue that needs more attention than is usually given – that of the language of our concepts and theories. The dominance of English (worldwide and in India) as the language of social science, and of women’s studies will be addressed here, in some contrast to the languages of politics, of the movement, of everyday life and of specific fields like literature.

What kinds of approaches have been devised to address concepts and theories outside English? What is the role of translation in this endeavour? Possible notions of bilingualism as productive for the future of women’s studies in our changing context.

The topic will also address approaches to women’s relationships to language especially as they have been explored in linguistic, literary and psychoanalytical theories.

Ph.D. Biochemistry

7. Ph. D.(Fine Arts)

1. Principles of Aesthetics: Indian & Western

- Indian aesthetics and its scope.
- Principles of Painting with reference to *Shilpashastra/Chitrasutra* etc.
- Concepts of the *RasSutra* and its commentaries.
- Western creative process: Emotion & Imagination, Inspiration & Intuition, Imitation & Expression.

2. History of Art: Western & Indian

- Introduction to Social & Historical background of Art of 20th century, with references of European periods (Romanticism, Realism, Impressionism, Post-impressionism, symbolism), Fauvism, Expressionism and Cubism.
- Post-Independence Indian art movements- Abstraction in Indian Painting: Post Independence Era, Progressive Group, Calcutta Group, Choramandal Artists Group, Baroda Group.
- Non representational Art: V.S. Gaitonde, Jeram Patel, Nasreen Mohammadi, S.H. Raza.
- Contemporary Indian art and Artist.
- Post modern Art in India.

3. Understanding of Art management and marketing

- Public relation and media
- On line exhibition and Art marketing
- Art galleries, Art exhibition, publicity, invitation.
- Evaluation of Art work.
-

4. Computer Application

- Application of Vector & Rector based software.

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Ph D Theatre Arts

1. History and origins of Western and Indian Theatre
2. Elements of Theatre and Drama (Western and Indian)
3. Bharata's Natyasastra
4. Origin and development of Traditional Theatre Forms of India
5. Origins of development of Folk Theatrical Forms of India and Southeast Asia
6. History and Development of Modern Western Drama and Theatre
7. History and development of Modern Indian Drama and Theatre
8. Makers of Modern Theatre (Indian and Western)
9. Major acting theories
10. Theatre Aesthetics (Western and Indian)
11. Indigenous Theatre Practices (Indian context)
12. Technical aspects of Theatre (Stage craft, design, lighting, costumes and make-up and direction)
13. Theatre Semiotics
14. Post modern theories of theatre
15. Theatre Research methodologies.

Ph. D Chemistry

PART A- RESEARCH METHODOLOGY

1. Objectives of research
2. Research methods versus Research Methodology
3. Types of research:
 - Descriptive versus Analytical;
 - Applied versus Fundamental;
 - Quantitative versus Qualitative;
 - Conceptual versus Empirical
4. Literature Review: Methods and Importance
5. Research design: Need, Types and Features of research design,
6. Formulating Research Problem
7. Collection and analysis of Data: Importance and Methods of data collection,
8. Data Analysis with Statistical Packages
9. Ethical issues in Research: Copyright, Intellectual Property Rights; Plagiarism

PART B

I :Inorganic Chemistry

1. **Chemical periodicity**
2. **Structure and bonding** in homo- and heteronuclear molecules, including shapes of molecules (VSEPR Theory).
3. **Concepts of acids and bases:** Hard-Soft acid base concept, Non-aqueous solvents.
4. **Main group elements and their compounds:** Allotropy, synthesis, structure and bonding, industrial importance of the compounds.

5. **Transition elements and coordination compounds:** structure, bonding theories, spectral and magnetic properties, reaction mechanisms.
6. **Inner transition elements:** spectral and magnetic properties, redox chemistry, analytical applications.
7. **Organometallic compounds:** synthesis, bonding and structure, and reactivity. Organometallics in homogeneous catalysis.
8. **Cages and metal clusters.**
9. **Analytical chemistry-** separation, spectroscopic, electro- and thermoanalytical methods.
10. **Bioinorganic chemistry:** photosystems, porphyrins, metalloenzymes, oxygen transport, electron- transfer reactions; nitrogen fixation, metal complexes in medicine.
11. **Characterisation of inorganic compounds** by IR, Raman, NMR, EPR, Mössbauer, UV-VIS, NQR, MS, electron spectroscopy and microscopic techniques.
12. **Nuclear chemistry:** nuclear reactions, fission and fusion, radio-analytical techniques and activation analysis.

II: Physical Chemistry

1. **Basic principles of quantum mechanics:** Postulates; operator algebra; Model systems: particle-in-a-box, harmonic oscillator; Hydrogen atom, including shapes of atomic orbitals; orbital and spin angular momenta; tunneling.
2. **Approximate methods of quantum mechanics:** Variation principle; perturbation theory up to second order in energy; applications.
3. **Atomic structure and spectroscopy:** term symbols; many-electron systems and antisymmetry principle.
4. **Chemical bonding:**Elementary aspects of MO and VB theories; Huckel theory for conjugated π -electron systems.
5. **Chemical applications of group theory:** symmetry elements; point groups; character tables; selection rules.
6. **Molecular spectroscopy:** Rotational and vibrational spectra of diatomic molecules; electronic spectra; IR and Raman activities – selection rules; basic principles of magnetic resonance.
7. **Chemical thermodynamics:** Laws, state and path functions and their applications; thermodynamic

description of various types of processes; Maxwell's relations; spontaneity and equilibria; temperature and pressure dependence of thermodynamic quantities; Le Chatelier principle; elementary description of phase transitions; phase equilibria and phase rule; thermodynamics of ideal and non-ideal gases, and solutions.

8. **Statistical thermodynamics:** Boltzmann distribution; kinetic theory of gases; partition functions and their relation to thermodynamic quantities – calculations for model systems.
9. **Electrochemistry:** Nernst equation, redox systems, electrochemical cells; Debye-Huckel theory; electrolytic conductance – Kohlrausch's law and its applications; ionic equilibria; conductometric and potentiometric titrations.
10. **Chemical kinetics:** Empirical rate laws and temperature dependence; complex ; steady state approximation; determination of reaction mechanisms; collision and transition state theories of rate constants; unimolecular reactions; enzyme kinetics; salt effects; homogeneous catalysis; photochemical reactions.
11. **Colloids and surfaces:** Stability and properties of colloids; isotherms and surface area; heterogeneous catalysis.
12. **Solid state:** Crystal structures; Bragg's law and applications; band structure of solids.
13. **Polymer chemistry:** Molar masses; kinetics of polymerization.
14. **Data analysis:** Mean and standard deviation; absolute and relative errors; linear regression; covariance and correlation coefficient.

III. Organic Chemistry

1. **IUPAC nomenclature** of organic molecules including regio- and stereoisomers.
2. **Principles of stereochemistry:** Configurational and conformational isomerism in acyclic and cyclic compounds; stereogenicity, stereoselectivity, enantioselectivity, diastereoselectivity and asymmetric induction.
3. **Aromaticity:** Benzenoid and non-benzenoid compounds – generation and reactions.
4. **Organic reactive intermediates:** Generation, stability and reactivity of carbocations, carbanions, free radicals, carbenes, benzynes and nitrenes. 5. Organic reaction mechanisms involving addition, elimination and substitution reactions with electrophilic, nucleophilic or radical species. Determination of reaction pathways.

6. **Common named reactions and rearrangements** – applications in organic synthesis.
7. **Organic transformations and reagents:** Functional group interconversion including oxidations and reductions; common catalysts and reagents (organic, inorganic, organometallic and enzymatic). Chemo, regio and stereoselective transformations.
8. **Concepts in organic synthesis:** Retrosynthesis, disconnection, synthons, linear and convergent synthesis, umpolung of reactivity and protecting groups.
9. **Asymmetric synthesis:** Chiral auxiliaries, methods of asymmetric induction – substrate, reagent and catalyst controlled reactions; determination of enantiomeric and diastereomeric excess; enantio-discrimination. Resolution – optical and kinetic.
10. **Pericyclic reactions:** electrocycloisatation, cycloaddition, sigmatropic rearrangements and other related concerted reactions. Principles and applications of photochemical reactions in organic chemistry.
11. **Synthesis and reactivity of common heterocyclic compounds** containing one or two heteroatoms (O, N, S).
12. **Chemistry of natural products:** Carbohydrates, proteins and peptides, fatty acids, nucleic acids, terpenes, steroids and alkaloids. Biogenesis of terpenoids and alkaloids.
13. **Structure determination of organic compounds** by IR, UV-Vis, ^1H & ^{13}C NMR and Mass spectroscopic techniques.