



**AWADHESH PRATAP SINGH UNIVERSITY**  
REWA, MADHYA PRADESH



**PRE-Ph.D. COURSE WORK SYLLABUS  
(HAVING RESEARCH ETHICS IN RESEARCH  
METHODOLOGY)**

**AWADHESH PRATAP SINGH UNIVERSITY**

**REWA (M.P.)**

(Ordinance No. – 11, Ph.D.)

Ph.D. Degree Course Work Regulations 2016



Syllabus of

Ancient Indian History, Culture & Archaeology



2018-19

DEPARTMENT OF ANCIENT INDIAN HISTORY, CULTURE  
& ARCHAEOLOGY

Awadhesh Pratap Singh University, Rewa (M.P.)

# AWADHESH PRATAP SINGH UNIVERSITY

REWA (M.P.)

(ORDINANCE NO. – 11, Ph.D.)

## Ph.D. Degree Course Work Syllabus

Paper Code	Paper Name	Credit	Maximum Marks Internal/External	Minimum Passing Marks
Ph.D.- 101	<u>Research Methodology</u>	04	100 (80+20)	55
Ph.D.- 102	Review of Published research in the relevant field	03	100	55
Ph.D.-103	Computer Application	03	100 (80+20)	55
Ph.D.-104	Special Subject (AIH,C&A)	03	100 (80+20)	55
Ph.D.-105	Viva	03	100	55
	Total Credit	16		



**Paper Code - 101**  
**Research Methodology**

**Unit-I: Fundamentals of Research:**

Meaning of research, definition Importance and scope. Nature and Techniques. Step in research planning of research, type of research and its significance. Research Ethics : An overview of philosophy of research ethics, Scientific Conduct, Publication Ethics, Open Access Publishing, Publication Misconduct, Databases and Research Metrics. Historical and Scientific methods in social science. (AIHCA) step in research.

**Unit-II: Methods, Tools and Techniques-**

Library work, Field survey. Exploration, Excavation, Photographs, Laboratory work, Observation. Schedule and questionnaire. Characteristics of good Researcher, Data Analysis. Methods of data collection

**Unit-III: Methods of Research-**

Hypothesis Concept select of universe problem of formulation design and project scientific historical and comparative method in social science plagiarism preparation of synopsis

**Unit-IV: Documentation**

Quotations and citations Foot notes back notes Bibliography, Research book Research paper, Abstract, Review of relevant literature.

**Unit-V: Report writing**

Research Report- Type of Report - steps styles. Structure and contents, chapterization, reporting writing. Editing and Evaluating the final Thesis.

**Recommended Books:**

1. Kothari C.R., Research Methodology, Wiley Eastern Limited, New Delhi 1994.
2. Bennet, Rogar, Management Research, ILO, 1983
3. Gupta S.P., Statistical Methods, 30th ed., Sultan Chand, New Delhi 2001.

  
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Paper Code – 102  
Review of Published Research in the Relevant Field

Paper Code – 103

# Computer Application

## *Unit – I – Introduction to computer*

History, Characteristics of computer, Classification : Digital, Analog, Hybrid, Micro, Mini, Main and Super, Components of computer, Block diagram, software, hardware, low level and high level language, Compiler and interpreter.

## **Unit – II – Introduction to Operating System**

Need, function & programs. (MS office : MS word, Power Point, Excel) computer modelling, computer application in social sciences. Introduction to DOS, Internal commands, external commands.

## **Unit – III – Introduction to Windows**

Type of window, Programme manager, file manager, customizing windows with control panel, Print Manager, The PIF editors, sharing information among application (OLE – object Linking and Embedding).

## **Unit – IV – Introduction to Statistics (Frequency)**


Distribution – mean, mode, median, variance, regression correlation) with special emphasis using MS – Excel/ Social Science Packages).

## **Unit – V – Modern Technique**

Management information systems, Office automation, E-mail and electronic highway, Internet, Web Page Designing.

## **Recommended Books:**

1. Braham B, Computer System in Hotel & Catering industry, Cassell, 1988.
2. Clark A. Small Business Computer Systems, Hodder & Stoughton, 1987.
3. Parkinson LK & Parkinson ST, Using the Micro-computer in Marketing, Mcgraw Hill, 1987.





# Paper Code – 104

## Ancient History & Archaeology

### **Unit – I : Sources of Ancient History**

Literary Sources – Ved, Puran, epics etc.

Historical Sources –Arthasharta, harshcharit, rajtanrangni, astadhyai etc.

Archaeological Sources –Inscriptions, coins and monuments.

### **Unit – II : Indian Pre-History**

General introduction of Stone age (Palaeolithic, Mesolithic and Neolithic), tools techniques and Exploration & excavation.

### **Unit –III : Main feature of Harappan Civilization**

Origin, extent, other importance sites of Harappan Civilization.

### **Unit – IV: Main feature of Vedic Culture**

Vedic Culture, Beginning of iron Age in India and Characteristic of 600 B.C.

### **Unit – V : Architecture & sculpture**

Origin and development of Temple architecture, Stupa architecture, General feature of sculpture.

### **Recommended Books:**

1. Rice D. Talbet Carticle on History of Arts.
2. Shastri, P. Panchapagesa : Philosophy of Aesthetic Pleasure.
3. Gupta J., B.



**Awadhesh Pratap Singh University  
Rewa (M.P.)**

**Structure of Syllabus for Ph.D Course Work (Management) 2018-19 Onward  
(As per Ordinance No. 11 Doctor of Philosophy)**

Paper Code	Name of Theory Papers	Credits	Maximum Marks (Theory + Internal Assessment)	Minimum Passing Marks
Paper I	<u>Research Methodology</u>	4	100 (80+20)	55
Paper II	Review of Published Research in the Relevant Field	3	100	55
Paper III	Computer Applications	3	100(80+20)	55
Paper IV	Advance Course in Management	3	100(80+20)	55
Paper V	Comprehensive Viva-Voce	3	100	55
	Total	16 Credits		



**Signature of Members of Board of Studies**



**Ph.D (Management)**  
**Paper -1**  
**Research Methodology**

**Time: 3 Hours.**  
**Credit points:3**

**Theory Paper: Max.80**  
**Internal Assessment: Max. Marks: 20**  
**Minimum Passing Marks: 55**

**Note:** The paper setter is required to set two questions from each unit and the students will be required to attempt one question from each unit. All questions will be of equal marks.

**Unit I: An Introduction to Research Methodology**

Meaning, Objectives, Significance, Importance and scope of research in management, Review of Literature. **Research Ethics** : An overview of philosophy of research ethics, Publication Ethics, Open Access Publishing, Publication Misconduct, Databases and Research Metrics.

**Unit II: Research Design**

Meaning. Need and Features of a Good Research Design: Types of Research. Sampling Design Measurement and Scaling Techniques; Hypothesis: Meaning and its formulation.

**Unit III: Data Collection**

Methods and Types of Data Collection; Processing of Data- Editing, Coding, Classification, Field Work and Tabulation of Data

**Unit IV: Analysis of Data**

Utility and Importance of Statistics in Research; Measures of Central Tendency and Dispersion, Measure of Asymmetry (Skewness); Correlation and Regression, Z-test, t-test, F-test, Chi- Square test. ANOVA.

**Unit V: Interpretation and Report Writing**

Meaning. Technique and Precautions in Interpretation, Significance and Different steps in Report Writing Layout of the Research Report: Plagiarism and Paraphrasing. Research Related Software like SPSS and others.

***Suggested Readings***

1. Kothari C.R, *Research Methodology*, New Age Publications Ltd, New Delhi
2. Gupta S.P, *Statistical Methods*, 30<sup>th</sup> ed, S. Chand, New Delhi.
3. Beri G.C, *Marketing Research*, pearson Publications, New Delhi.
4. Malhotra Naresh, *Marketing Research: An Applied Orientatio*, Sixth edition, Pearson Publication
5. Singh, Yogesh Kumar, *Fundamental Of Research Methodology And Statistics*, new Age International, 2006
6. Rajen K. Gupta, richa Awasthy, *Qualitative Research in management: Methods and Experiences* SAGE Publication.



Signature of Members of Board of Studies

**Paper -II**  
**Review of Published Research in the Relevant Field**

**Theory Paper: Max.80**  
**Internal Assessment: Max. Marks: 20**  
**Minimum Passing Marks: 55**

**Note:** The paper setter is required to set two questions from each unit and the students will be required to attempt one question from each unit. All questions will be of equal marks.

The course on review of published research in the relevant field will be undertaken under the supervisor or the regular teacher of the centre of the coursework and the candidate has to consult the library or other resources to carry out the literature review. At the end of the coursework, the candidate has to submit a brief report on the literature review for evaluation which will be done by the two examiners.



Signature of Members of Board of Studies

## Paper -III

### Computer Applications

Time : 3 Hours.  
Credit Points: 3

Theory Paper: Max.80  
Internal Assessment: Max. Marks: 20  
Minimum Passing Marks: 55

**Note:** The paper setter is required to set two questions from each unit and the students will be required to attempt one question from each unit. All questions will be of equal marks.

#### Unit-I Basics of Computer & GUI Based Operating System

**Computers:-** An Introduction, Components of Computer System: - CPU, Input and Output Devices, Storage Media, Concept of Hardware and Software.

**Operating System:-**An Introduction, Basics of Operating System, The User Interface, Operating System Simple Settings, File and Directory Management, Types of files.

#### Unit-II: Word Processing & Power Point

**Word Processing :-**Introduction, Word Processing Basics, Opening and Closing Documents, Text Creation and Manipulation, Formatting the Text, Table Manipulation, Working with various shortcut keys: Select, Find, Replace, Cut, Copy and Paste text.

**Making Small Presentations:-** Using PowerPoint, Creation of Presentation, Preparation of Slides. Providing Aesthetics: Enhancing Text Presentation, Working with Colour and Line Style, Adding Effects, Adding Tables, Picture, Photos, Movies and Sound. Adding Headers and Footers, Presentation of Slides, Slide Show.

#### Unit-III: Spread Sheet

**Elements of Electronic Spread Sheet:-** Opening of Spread Sheet, Addressing of Cells, Printing of Spread Sheet, Saving Workbooks, **Manipulation of Cells:-** Entering Text, Numbers and Dates, Creating Text, Number and Date Series, Editing Worksheet Data, Inserting and Deleting Rows, Column, Changing Cell Height and Width, **Function and Charts:-**Using Formulas, Function, Charts. Statistical Calculation in Excel Sheet.

#### Unit- IV Computer Communication and Internet

Introduction, Basics of Computer Networks:- Local Area Network (LAN), Wide Area Network (WAN), **Internet:-** Concept of Internet, Basics of Internet Architecture, **Services on Internet:-** World Wide Web and Websites, Communication on Internet, Internet Services, Web Browsing Software, Search Engines, Printing Web Pages, Basics of E-mail, Email Addressing, Using E-mails, Creating, Sending and forwarding an E-mail.

#### Unit- V Management Information System

Conceptual Framework of Management Information System, Decision Support System, MIS and Decision Making, Use of Computers and Information Technology in Effective Management.

#### Suggested Readings:

1. Sangeeta Panchal, Alka Sabharwal, Foundations of Information Technology Coursebook 9: Windows 7 and MS Office 2007 (With MS Office 2010 Updates).
2. Prof. Satish Jain, M. Geetha: Complete guide for Step-by-Step Learning Quick and Easy Reference for learning MS Office 2010
3. Priya Sinha, Pradeep Sinha Computer Fundamentals 6th Edition 6th Edition.

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**Paper -IV**  
**Advance Course in Management**

**Time : 3 Hours.**  
**Credit Points: 3**

**Theory Paper: Max.80**  
**Internal Assessment: Max. Marks: 20**  
**Minimum Passing Marks: 55**

**Note:** The paper setter is required to set two questions from each unit and the students will be required to attempt one question from each unit. All questions will be of equal marks.

**Unit I: General Management**

Management in 21<sup>st</sup> Century, Business Process Re-engineering, Corporate Governance, Corporate Social Responsibility & Business Ethics, Benchmarking, Transformational Leadership, Team Building, Overview of Strategic Management.

**Unit II: Human Resource Management**

360 degrees Appraisal, Flexi Timing, Emotional Intelligence, Organizational Excellence, Learning Organization, Knowledge Management, Employee Empowerment, Potential Appraisal & Talent Management, Succession Planning, Career Planning and Management, Employee Engagement and Retention Strategies.

**Unit III: Marketing Management**

Marketing Strategy, Advertising and Sales Promotion, Consumer Behaviour, Creating & Delivering Customer Value, Marketing in a Liberalised Economy, Retail Management, One Roof Concept, Mall Culture, Organised Retail, On-line and Mobile Marketing, Multi Level Marketing, Green Marketing, Rural Marketing, Relationship Marketing & CRM, Social Marketing,

**Unit IV: Financial Management**

Activity Based Costing, Economic Value Added, Micro Finance, Derivatives Market in India, Stock & Commodity Markets, Corporate Portfolio Analysis in India, NBFC and SIPs , Credit Ratings, DIIs, FDIs & FIIs, Foreign Exchange Market in India, Recent Changes in Global Financial Markets.

**Unit V: Operations Management**

Enterprise Resource Planning, Business Process Outsourcing, Kaizen, Six Sigma, Just in Time Inventory, Flexible Manufacturing System, Quality Assurance & Quality Standards, ISI & ISO, Concept TQM, Supply Chain Management & Logistics.

**Suggested Readings:**

1. Gupta C K, Sharma S, *Financial Management*, Sahitya Bhawan Publications, New Delhi,
2. K.S. Thakur, *Emerging Issues in Business Management Paperback* – 30 Jul 2008
3. Charle B.Wankel. *21st Century Management: A Reference Handbook (21st Century Reference) 1st Edition*
4. Daniel Goleman, *Emotional Intelligence: Why it Can Matter More Than IQ Mass Market 2016*,
5. Philip T. Kotler, *Marketing Management Dec 2014*, Prentice Hall,
6. S. Chary, *Production & Operations Management – 16 Jul 2004*, Tata Mac Graw Hill.

*Atul Pandey*

**Paper -V**

**Comprehensive Viva Voce**

**Max. Marks: 100**  
**Minimum Passing Marks: 55**

**Credit Points: 3**

A comprehensive viva will be conducted at the end of the coursework. The candidate will be orally examined on the above four papers.



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**Signature of Members of Board of Studies**

AWADHESH PRATAP SINGH UNIVERSITY, REWA (M.P.)



# Syllabus

for

**Pre- Ph.D. Course Work**

**Psychology**

**wef 2018-19 and onwards**

**Publisher**

**Registrar**

**A.P.S. UNIVERSITY, REWA (M.P.)**

**AWADHESH PRATAP SINGH UNIVERSITY, REWA (M.P.)**



**AWADHESH PRATAP SINGH UNIVERSITY, REWA (M.P.)**  
**STRUCTURE FR SYLLABUS FOR Ph.D. COURSE WORK (PSYCHOLOGY) 2018-19 ONWARDS**  
**(AS PER ORDINANCE NO. 11 DOCTOR OF PHILOSOPHY)**

Paper Code	Name of Theory Papers	Credits	Maximum marks (Theory + Internal Assessment)	Minimum Passing Mark
Ph.D. 101	<u>RESEARCH METHODOLOGY</u>	4	100 (80+20)	55
Ph.D. 102	REVIEW OF PUBLISHED RESEARCH IN THE RELEVANT FIELD	3	100	55
Ph.D. 103	COMPUTER APPLICATIONS	3	100 (80+20)	55
Ph.D. 104	RECENT TRENDS IN PSYCHOLOGY	3	100 (80+20)	55
Ph.D. 105	COMPREHENSIVE VIVA-VOCE	3	100	55
<b>TOTAL CREDITS</b>		<b>16</b>		

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WADHESH PRATAP SINGH UNIVERSITY, REWA

(M.P.) Pre- Ph.D. Course Work Psychology

Paper-I

RESEARCH METHODOLOGY

Unit-I

**Social Research:** Meaning, Objectives, Characteristics and Qualities of Good Research. **Social Work Research** - Meaning, Scope and Importance, **Types of Research:** Pure & Applied, Longitudinal & Cross sectional and Qualitative & Quantitative. **Basic Concepts of Research:** Theory, Facts, Variables, Research Problem and Hypothesis. **Research Ethics** : An overview of philosophy of research ethics, Scientific Conduct, Publication Ethics, Open Access Publishing, Publication Misconduct, Databases and Research Metrics.

Unit-II

**Research Design:** Exploratory and Formulative; Descriptive & Diagnostic and Experimental, Evaluation Research, Case study, Rural Participatory Research.

Unit-III

**Social Survey:** Concept, Scope, Advantages and Disadvantages of Social Survey, social survey and social research - Techniques of sampling Sources of Data: Primary and Secondary sources. Tools of data collection: Observation, Schedule, Questionnaire and Interview.

Unit IV

**Skills of Doing Research:** Formulation of research problem, Review of literature, Data Analysis and interpretation, Preparation of Bibliography, References and Footnotes.

Unit-V

**Statistics in Social Work Research:** Frequency Distribution, Measures of Central Tendency, Measures of Dispersion, Correlation, Chi-square test, 't' test and Analysis of variance



**AWADHESH PRATAP SINGH UNIVERSITY, REWA (M.P.)**

**Pre- Ph.D. Course Work Psychology**

**Paper - III**

**COMPUTER APPLICATIONS**

**Unit - I: Introduction to Computer:**

History, Characteristics of Computer, Classification: Digital, Analog, Hybrid, Micro, Mini, Main and Super, Components of Computer System, Block Diagram, I/O and auxiliary storage devices. Only preliminary concepts (definition) of software, hardware, low level and high level language, Introduction to Internet Technology, Web Browser, Research Gateways.

**Unit - II: Introduction to Operating System:**

Needs, Functions, Control Programs, OS Supervisor, Job control programs concurrent OS; Popular OS for PC's Introduction to DOS-Internal commands, External commands (TREE, UNDELETE, CHKDSK, FDISK, FC, BACKUP, RESTORE, FORMAT, UFFORMAT, JOIN, XCOPY)

**Unit - III: Introduction of Windows:**

Program manager, File manager, Customizing windows with control panel, Print Manager, The PIF editors, sharing Information among applications (OLE-object Linking and Embedding)

**Unit - IV: Introduction to Microsoft Office:**

The office manager, Sharing Information with Microsoft office, The clip board, Editing Linked Information, Editing embedded objects, Components of Microsoft Office-Word, Excel, Power Point, Word Processing with Word; Word basics: Undo, Redo, Repeat, Insert Text, Replace Text, Formatting Text, Copying from now Word Document to other, Printing, Auto format, Autocorrect.

**Unit - V: Introduction of Statistical Package for Social Sciences:**

Using MS-Excel/Statistical Package for Social Sciences for Analysing the Descriptive Statistics Mean Median Mode, Standard Deviation and Graphical Representation and Analysis of Data.

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**AWADHESH PRATAP SINGH UNIVERSITY, REWA (M.P.)**

**Pre- Ph.D. Course Work Psychology**

**Paper - IV**

**Recent Trends in Psychology**

- Human needs and motivation: Meaning and Types of motivation Attitude: Content, Function, Formation of attitude and Attitude change, Persuasive communication, Prejudice and discrimination: Stereotypes in Indian Context.
- Emotional intelligence - Concepts their utilities and applications in daily life.
- Problem solving and creativity: theoretical approaches of creativity, Factors influencing creativity.
- III Mental Health: meaning, components and factors influencing mental health; Models of mental health interventions Stress: Nature, determinants and coping strategies.
- IV Personality: Nature, types and determinants; Personality theories of Sigmund Freud; R.B. Cattell; Carl Rogers; Gordon W. Allport and Abraham Maslow.
- V Current and their types Social Problems: Poverty; Socio-Economic Deprivation; Pollution; Castism; Beggary; Mental Tension and Illiteracy.

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AWADHESH PRAKASH SINGH UNIVERSITY,  
RAWAALPURI



Ph. D. COURSE WORK SHEET

Physics



# ADHESH PRATAP SINGH UNIVERSITY, REWA

STRUCTURE OF SYLLABUS FOR Ph.D. COURSE WORK (PHYSICS) 2018-19 ONWARDS  
(AS PER ORDINANCE NO. 11 DOCTOR OF PHILOSOPHY)

Paper Code	Name of Theory Papers	Credits	Maximum Marks (Theory+ Internal Assessment )	Minimum Passing Marks
Ph.D. 101	<u>RESEARCH METHODOLOGY</u>	4	100 (80+20)	55
Ph.D. 102	REVIEW OF PUBLISHED RESEARCH IN THE RELEVANT FIELD	3	100	55
Ph.D. 103	COMPUTER APPLICATIONS	3	100 (80+20)	55
Ph.D. 104	SPECIALIZATION SUBJECTS (ANY ONE OF THE FOLLOWING) MP104 (a) (Group-A) Astrophysics MP104 (b) (Group-B): Materials Science	3	100 (80+20)	55
Ph.D. 105	COMPREHENSIVE VIVA-VOCE	3	100	55
<b>TOTAL CREDITS</b>		16		

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Ph.D. 102

REVIEW OF PUBLISHED RESEARCH IN THE RELEVANT FIELD

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# AWADHESH PRATAP SINGH UNIVERSITY,

New

Ph.D. (Physics)

## Paper-ph.D. 101 research methodology

Time: 03 Hours

Theory Paper: Max . Marks-80

Internal Assessment: Max, Marks-20

Minimum Pass Marks-55

The paper setter is required to set in all Eight questions, out of which only four questions are to be attempted by the students. All questions will be of equal marks. Two questions are to be set from each unit. The students are required to attempt at least one question from each unit.

### Unit-I

Concepts in Research: Definition and Objective, Research Approach & Types of Research, Criteria of Good Research, Defining Research Problems. Research Design. Features of Good Research Design, Research Design With Reference to Physics, Basic Principles of Experimental Research Designs, Report, Paper & Dissertation Writing Concept. "An overview of philosophy of research ethics, Scientific Conduct, Publication Ethics, Open Access Publishing, Publication Misconduct, Databases and Research Metrics"

### Unit-II

Nature and Purpose of Mathematical Statistics, Tabulation and Statistical Inference, Tabular and Graphical Representation of Data Bar, Pie & Radar Diagrams, Mean, Median, Mode & Variance, Co-relation and Co-efficient, Random Sampling,  $X^2$  Test, Method of least squares curve Fitting of Straight Lines & Polynomials Data Fourier Techniques and application.

### Unit-III

Theoretical Modelling Methods. Bisection Method, General Idea of mathematical Modelling and Simulation - Monte Carlo Technique, Random Walk Problem, Newton Raphson Method, Least Square Fitting of Linear and Exponential Functions, Numerical Differentiate ons & Integration. Simpson's Rule, Runga Kutta Method.

### Unit-IV

General Idea of Preparation of Materials: Solid State Reaction Method and Wet Chemical Method, Electro-Deposition Methods: (Basics only), Elementary Idea of Vacuum Coating Methods, Basic Principles & Application of XRD, Sem, and FTTR, Methodology of Space Research - Ground Based & Satellite Observations, Cosmic Ray Detectors, Methods of Extracting Scientific Information from Space Data.

### Reference Books:

1. Research Methodology: Methods & Techniques: C.R. Kothari, New Age International Publisher, N. Delhi (2009)
2. How to Write and Publish: R.A. Dayand, B. Gastel, Cambridge University Press.
3. How to Research: L. Blaxter, C. Hughes and M. Tight Viva Books.
4. A Student Guide to Methodology: P. Clough &, C. Mutbrown, Sage Publications.
5. Fundamentals to Computers: V. Rajaraman (PHI)
6. Probability & Statistical For Engineers & Scientists: Shelder Ren Elsevier Academic Press.
7. Principles of Instrumental Analysis: Skoog & Leary.
8. Astronomy: Baker
9. Solar Terrestrial Physics: Akasofu & Chapman.
10. Experimental Methods in Modern Physics: A.P. Mellissinos.

The paper setter is required to set in all Eight questions, out of which only four questions are to be attempted by the students. All questions will be of equal marks. Two questions are to be set from each unit. The students are required to attempt at least one question from each unit.

**Unit - I**

Concepts in Research: Definition and Objective, Research Approach & Types of Research, Criteria of Good Research, Defining Research Problems, Research Design, Features of Good Research Design, Research Design With Reference to Physics, Basic Principles of Experimental Research Designs, Report, Paper & Dissertation Writing Concept. [ 2 ]

**Unit - II**

Nature and Purpose of Mathematical Statistics, Tabulation and Statistical Inference, Tabular and Graphical Representation of Data, Bar, Pie & Radar Diagrams, Mean, Median, Mode & Variance, Co-relation and Co-efficient, Random Sampling,  $\chi^2$  - Test, Method of Least squares curve Fitting of Straight Lines & Polynomials Data Fourier Techniques and applications

**Unit - III**

Theoretical Modelling Methods: Bisection Method, General Idea of Mathematical Modelling and Simulation - Monte Carlo Technique, Random Walk Problem, Newton Raphson Method, Least Square Fitting of Linear and Exponential Functions, Numerical Differentiations & Integration, Simpson's Rule, Runge Kutta Method.

**Unit - IV**

General Idea of Preparation of Materials: Solid State Reaction Method and Wet Chemical Method, Electro-Deposition Methods (Basics only), Elementary Idea of Vacuum Coating Methods, Basic Principles & Applications of XRD, SEM, And FTIR. Methodology of Space Research - Ground Based & Satellite Observations, Cosmic Ray Detectors, Methods of Extracting Scientific Information from Space Data.

**Reference Books:**

1. Research Methodology: Methods & Techniques: C.R. Kothari, New Age International Publisher, N. Delhi (2009)
2. How to Write and Publish: R.A. Day and, B. Gastel, Cambridge University Press
3. How to Research: L. Blaxter, C. Hughes and M. Tight Viva Books
4. A Student Guide to Methodology: P. Clough &, C. Muthbrown, Sage Publications.
5. Fundamentals to Computers: V. Rajaraman (PHI)
6. Probability & Statistical For Engineers & Scientists: Shelder Ren Elsevier Academic Press.
7. Principles of Instrumental Analysis: Skoog & Leary.
8. Astronomy: Baker
9. Solar Terrestrial Physics: Akasofu & Chapman.
10. Experimental Methods in Modern Physics: A.P. Mellissinos.

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The paper setter is required to set in all Eight questions, out of which only four questions are to be attempted by the students. All questions will be of equal marks. Two questions are to be set from each unit. The students are required to attempt at least one question from each unit.

**Unit - I :**

Anatomy of computers and their classification: Input and output devices. Concepts of computer ware, language processors and computer languages. Basics of operating system with emphasis on windows operating system. Concept of OLE. Basics of MS-Office: MS Word, MS Excel, MS Power Point, Internet and E-mail basier web search engines. Types of search engines.

**Unit - II :** Conceptual framework of computer languages (Algorithm, Flow charts). Need of structured programming. Top-down, bottom-up and modular programming design. Introduction to C and C++ language: basic structure of C++ program. Character set, keyword and identifiers C++ data types, variable and data type declaration. Arithmetic, relational, logical, assignment, conditional, increment and decrement operations, input and output statements.

**Unit - III :** Control statements: Branching, Looping and Jumping: If, If-else, if nested, if else statements, switch, while Do...While and For statements. Simple C++ programs (search of prime number between given range of numbers finding the smallest and largest of given numbers, sum of algebraic series, factorial of given number, roots of a quadratic equation, binary to decimal and decimal to binary convertor etc). Functions: need of function, call by value function by value and reference. Category of functions, no argument no return, argument but no return, argument with return. Recursion: One and Two dimensional arrays. String and string handling functions like strlen(), strcpy(), strcmp(), strstr(), strchr(), sizeof(), Strcmp(), arrays and string functions.

**Unit - IV :** Computer network : LAN, MAN, WAN, client server. Network topologies: Bus, Ring, Star, Mesh, Hybrid and History of internet, Service provider (ISP), Types of internet account-shell: Address, TCP/IP and IP address (IP connectivity-Dial up, Leased lines, Satellite. IP Address- Class A, Class B, Class C, Default, Subnet, Address, Absolute and relative). Web Technology: Web Browser: Internet Explorer, Netscape, Navigator, search engines, Web page: Introduction to HTML. HTML tags, <HTML>, <TITLE>, <HEAD>, <BODY>, <P>, <A>, <B>, <PRE>, <IMG>, <DIV>, <BR>, and their attributes. <IMG>, <a> and their attributes.

Statistical packages: MS-Excel, Statistical functions, SPSS package: structure and characteristics, application of statistical analysis in Physics. Origin software: Need, characteristics and application in Physics.

**Reference Books:**

1. Let us c: Yashwat Kanetkar
2. Programming with C++: Balaguruswami
3. Internet and Web Page: VK Jain
4. Internet and Web page design: Dr. PD Murarka
5. C# 2008 in simple step Dreamtech Press

Signature  
Date

# Ph.D. (PHYSICS)

Ph.D. 101 (I) - Astrophysics

Time: 03 Hours

Theory Paper: Max. Marks 80  
Internal Assessment: Max. Marks 20  
Minimum Pass Marks 55

The paper setter is required to set in all **Eight questions**, out of which only **four questions** are to be attempted by the students. All questions will be of equal marks. Two questions are to be set from each unit. The students are required to attempt at least one question from each unit.

## Unit - I: Solar output and Cosmic Ray Modulation:

Physical Characteristics of Sun, Solar Structure, Development of Centre of Activity, Sunspots, Prominences and Flares, The Sun and Interplanetary Space, the Solar Atmosphere (Photosphere, Chromosphere and Corona), Solar Wind and concept of heliosphere, solar Wind Observation, Solar and Interplanetary Magnetic Fields, Interplanetary Sector Structure, Theory of Solar Cycle Evolution, Solar Flares and Coronal Mass Ejections, Variational Characteristic of different types of Solar Modulation, Long and Short Term Cosmic Ray Variation, Forbush Decreases, Ground level Enhancement, Cosmic Ray Propagation Models (Diffusion, Convection and Drift Model).

## Unit - II Magnetospheric Processes

Structure of Geomagnetosphere, Different Regions of Magnetosphere and Associated Phenomena, Magnetospheric Models, the Concept of Closed and Open Magnetosphere, Interplanetary and Geomagnetic Disturbances, Shock Wave in Interplanetary Space, Magnetospheric Storms, Interaction of Solar plasma with Magnetosphere, Collision of the Interplanetary (IMF) Wave with the Magneto Sphere, Storms Sudden Commencement (SSC), Interaction of Solar Plasma with Magnetosphere, Morphology of Geomagnetic Storms, Polar Sub Storms and Auroral Phenomena, Association of geomagnetic Storms with Solar and Interplanetary Parameters, Near Earth Space Weather.

## Unit - III : Radio Astronomy

Telescopes, Reflection and Refraction Telescope, Ground Based Optical Telescope (Visible And Infra-Red), Space Telescope (Ultraviolet to Sub Millimetre), Radio Single Dishes and Aperture Synthesis, Radio Telescope (Beyond the Sub Millimetre Range), Large Telescope of the future. Radio Astronomy, Quasars and Molecules in Space, Infra-Red and X-Ray Astronomy, Lightbulb Astronomy, Neutron Detector.

## Unit - IV Stars and Galaxies

Formation of Stars, Evolution of Stars, Stellar Spectra and the Hertzsprung-Russell Diagram, Explanation of the Main Sequence (the Mass-Luminosity Relation), Variable Stars, the Pulsation Theory of Variable Stars, Redden stars, The Chandrasekhar and Morphology of Galaxies, Formation and Evolution of Galaxies, Rotation of the Galaxy (Differential Rotation) the General Structure of Galaxy (the Central Region, the Galactic Disk and the Galactic Halo), the Mass of The Galaxy, the Core of Spiral Structure, Luminosity Distribution in a Galaxy, Distances of Galaxies, Radio Galaxies, Seyfert Galaxies, Nebulae, Novae, Super Nova, Chandrasekhar Limit and Black Holes.

## Reference Books:

1. Discovering Astronomy, R. Robert Robbins and William, H. Jefferys (John Wiley)
2. Observational Astrophysics, P. Lena, F. Lalrin and F. Mignard (Springer)
3. Astronomy and Astrophysics with elements of Cosmology, V. B. Mathia (Narosa)
4. Advanced Stellar Astrophysics, William K. Rose
5. Galaxies and Cosmology, F. Combes, P. Boisse, A. Mazure, A. Blanchard
6. An Introduction to Astrophysics, Baidyanath Basu
7. Physics and The physical Universe, Jerry B. Morton
8. Principles of Astronomy, P. Stanley Wyatt, James Blaker
9. The State Of Universe - Ed. By G. Bath
10. Astronomy - D.H. Menzel
11. Source Book of Space Physics - Glasstone,
12. Space Science & Earth Environment - S.S. Dejeonkar
13. Star & Planet - Albet
14. The Sun - Albet
15. Solar & Terrestrial Phys - Akisafu & Chapman
16. Cosmic Rays - Deiman
17. Cosmic Rays - Sridharan
18. Progress in CERN Int. Symposium, J. Raedeler

*Handwritten signatures and dates:*  
The 1st  
27/07/19

Time: 03 Hours

Ph.D. (PHYSICS)

Ph. D. 104 (II): Materials Science

Theory Paper : Max. Marks-80

Internal Assessment : Max. Marks-20

Minimum Pass Marks-55

The paper setter is required to set in all **Eight** questions, out of which only **four** questions are to be attempted by the students. All questions will be of equal marks. Two questions are to be set from each unit. The students are required to attempt at least one question from each unit.

#### Unit - I: Crystal Graph and Nanomaterials Basics

**Nucleation & Growth:** Concept of Nucleation and their Types - Homogeneous & Heterogeneous Nucleation Processes, Growth and Overall Transformation Kinetics. Micro to Nano: Properties of Nano-particles, Nature of Carbon Bonds and Carbon Allotropes, Structure and Properties of  $C_{60}$ , Graphene and Carbon Nanotubes, Synthesis of Nanomaterials - Top Down and Bottom Up Approach, Chemical Route of Synthesis of Magnetic Nanoparticles: Sol-Gel Synthesis methods, Nano materials in Energy application (solid state Batteries, smart window and solar cells basics only).

#### Unit - II

**Solid State Ionics:** Super Ionic Solids- Definition and Characteristic Features, General Classification of Superionic Solids, Basic Idea of Ion Transport in Solids, Polymer Electrolytes and their Types. Mechanism of Ion Transport in Polymer Electrolyte-Macroscopic Approach: VTF and WLF Forms, Configurational Entropy Models, Application of Superionic Solids with emphasis to Electrochromic Display Devices, Sensors and Solid State Batteries (Without Theory).

#### Unit - III

**Solar Cells:** Sun's Spectrum, Solar Constant, Air Mass, Method of Measuring Solar Radiation (Out line only) Direct and Indirect Band Gap Materials, P-N Junction Diode, Photovoltaic Effect, Solar Cell Parameters and I-V Characteristics, Design Consideration for Solar Cell Fabrication, Type of Solar Cells. Metal Semiconductor Contacts and Photoelectrochemical Solar Cells (Basic Concept Only). Organic Solar Cells, Basic principles and types, Photovoltaic modules and arrays.

#### Unit - IV

**Superconductors.** Comparison Between Superconductor & Ideal Conductor, High  $T_c$  Cuprate (HTSC) Families, Structure of  $YBa_2Cu_3O_{7-x}$  and Variation of  $T_c$  with X, General Characteristics of Cuprate Superconductors, Methods of Preparation of High  $T_c$  Superconductors in Bulk and Thin Film Forms. Type II Superconductivity, Phase Diagram of  $La_{2-x}Sr_xCuO_4$ , Electronic Structure of Cuprates, Two Band Model & Hubbard Model, Normal State Properties, Critical Current of Pure Elements, Critical Current in Mixed State, Role of Inhomogeneity in Flux Pinning Depinning, Anisotropies in HTSC, Limitations of BCS Theory, RVB Theory of High  $T_c$  Superconductivity

#### Reference Books:

1. S. Chandra: Superionic Solids & Applications.
2. F M Gray: Solid Polymer Electrolytes-Fundamentals & Technological Applications
3. Fonash: Solar Cell.
4. Fa hrenbruch and Bebe: Fundamentals of Solar Cells.
5. R.:K. Kotnala, N.P. Singh: Essentials of Solar Cells.
6. S.M. Sze: Physics & Technology of Semiconductor Devices.
7. S.Chandra: Photoelectrochemical Solar Cells.
8. A. K. Saxena High Temperature Superconductor
9. T.V. Ramakrishna & C.N.R. Rao: Superconductivity Today
10. S.V. Subramaniam & E.S.R. Gopal: High Temperature Superconductors.
11. A. S. Edelstein and R.C. Cammarata: Nanomaterials: Synthesis, Properties, Characterization and Applications
12. H.S. Nalwa :Encyclopedia of Nanotechnology
13. Handbook of Nanotechnology: Bhushan (Ed), Springer Verlag, New York (2004)
14. CNR Rao and Govindaraj: Nanotubes And Nanowires.
15. Handbook of Analytical Instruments, R.S. Khandpur
16. Thermal Methods of Analysis: W.W. Wendlandt
17. Elements of X-Ray Diffraction, B.D. Cullity -
18. Tuan Vo-Dinh: Nanotechnology In Bi:logy and Medicine. Methods, Devices and Application
19. Mao Hong Fan, Chin-Pao Huang, Alan E Bland, Z Honglin Wang, Rachid Shiman, Ian Write: Environmental Technology



**AWADHESH PRATAP SINGH UNIVERSITY,  
REWA (M.P.)**



**Ph. D. COURSE WORK STRUCTURE**

**Mathematics**

*Curry*

**2018-19**

# AWADHESH PRATAP SINGH UNIVERSITY, REWA

STRUCTURE OF SYLLABUS FOR Ph.D. COURSE WORK (MATHEMATICS) 2018-19 ONWARDS  
(AS PER ORDINANCE NO. 11 DOCTOR OF PHILOSOPHY)

Paper Code	Name of Theory Papers	Credits	Maximum Marks (Theory+ Internal Assessment )	Minimum Passing Marks
Ph.D. 101	<u>RESEARCH METHODOLOGY</u>	4	100 (80+20)	55
Ph.D. 102	REVIEW OF PUBLISHED RESEARCH IN THE RELEVANT FIELD	3	100	55
Ph.D. 103	COMPUTER APPLICATIONS	3	100 (80+20)	55
Ph.D. 104	SPECIALIZATION SUBJECTS (ANY ONE OF THE FOLLOWING): MP 104 (I) : RIEMANNIAN GEOMETRY AND COSMOLOGY  MP 104 (II): GENERATING FUNCTIONS	3	100 (80+20)	55
Ph.D. 105	COMPREHENSIVE VIVA-VOCE	3	100	55
<b>TOTAL CREDITS</b>		<b>16</b>		

*Pratap Singh*

**Ph.D. MATHEMATICS**  
**Ph. D. 101: RESEARCH METHODOLOGY**

Time: 03 Hours

Theory Paper : Max. Marks-80  
Internal Assessment Max. Marks-20  
Minimum Pass Marks-55

The paper setter is required to set in all **Eight questions**, out of which only **four** questions are to be attempted by the students. All questions will be of equal marks. Two questions are to be set from each Unit.

- Unit-I:** The students are required to attempt at least one question from each unit. Introduction to research methodology. Meaning Objectives and Types of research. Motivation in research. Research approaches. Research methods versus methodology. Significance of research. Criteria of good research. Research design. **Research Ethics**: An overview of philosophy of research ethics. Scientific Conduct. Publication Ethics, Open Access Publishing, Publication Misconduct, Databases and Research Metrics.
- Unit-II:** Tensors and their transformation laws. Symmetric and skew-symmetric tensors. Contraction, Metric tensor. Definition and examples of differentiable manifolds. Vector fields, Lie bracket. Connections, Covariant derivative. Curvature tensor. Bianchi's identities.
- Unit-III:** Definition and examples of fixed point and common fixed point, Contraction mapping. Contractive mapping. Non-Expansive mapping, Lipschitz mapping. Relation between these mappings and continuous mapping, Banach contraction principle and its generalizations, Fixed point theorem of Brouwer and Schauder, Fixed point theorem for multi-functions.
- Unit-IV:** Hypergeometric Function: Function  $F(a, b; c; z)$ , Evaluation of  $F(a, b; c; 1)$ , Contiguous function relations, Elementary Series Manipulations, Generalized hypergeometric functions, Definition and elementary properties of the  $H$ -function of one and two variables.

**Text Books:**

1. CR. Kothari, Research Methodology, New Age International publishers (2004)
2. Catherine Dawson, Practice Research Methods. UBS Publishers Distributors, New Delhi (2002).
3. Ranjit Kumar, Research Methodology - A step by step Guide for Beginners (2nd Ed.). Singapore Pearson Education (2005).
4. B.B Sinha. An Introduction to Differential Geometry, Kalyani Publishers, New Delhi, 1982
5. R.S. Mishra, A Course in Tensors with Applications to Riemannian Geometry. Pothishala Pvt. Ltd. Allahabad India, 1985.
6. U.C. De and A.A. Shaikh, Differential Geometry of Manifolds, Narosa Publishing House Pvt. Ltd., 2007.
7. E.D. Rainville, Special Functions, Chelsea Publ. Co, Bronx, New York (1971).
8. H.M. Shrivastava, K.C. Gupta and S.P. Goyal, The  $H$ -function of One and Two Variables with Applications. South Asian Publishers, New Delhi.
- Sankatha Singh, Bruce Watson and Pramila Shrivastava, Fixed point theory and best approximation, The KKM-Map Principle, Kluwer Academic Publishers, London.

Ph.D. MATHEMATICS

**Ph.D. 103 : COMPUTER APPLICATIONS**

Time: 03 Hours

Theory Paper : Max. Marks-80  
Internal Assessment : Max. Marks-20  
Minimum Pass Marks-55

The paper setter is required to set in all **Eight questions**, out of which only **four** questions are to be attempted by the students. All questions will be of equal marks. Two questions are to be set from each unit. The students are required to attempt at least one question from each unit.

- Unit-I:** Typesetting Mathematical Text with LATEX: Sample Document, Type style, Environments, Lists, Centering, Tables, Verbatim, Vertical and Horizontal Spacing, Equation Environments, Fonts, Hats and Underlining, Braces, Arrays and Matrices, Customized Commands, Theorem-like Environments, Math Styles.
- Unit-II:** Document classes and the overall structure, Titles for Documents, Sectioning Commands, Packages, Inputting Files, Inputting Pictures, Making a Bibliography, Making an Index, Slides
- Unit-III:** MATLAB: Basics of MATLAB, MATLAB Window, Input-Output, File types, Working with arrays of numbers, Creating and Printing Simple Plots, Creating, Saving and Executing a Script file, Creating and Executing a function file, Matrices and Vectors Input, Indexing, Matrix manipulation, Creating Vectors, Matrix and Array operations, Saving and Loading Data, Plotting Simple Graphs.
- Unit-IV:** Introduction to Internet- Internet evaluation and concept, Internet vs Intranet, Internet service provider (ISP) and its functions, Connectivity- Dialup, Leased line, VSAT, URLs, Portals, Internet Services, Applications, Email- Basics of sending and receiving, Internet chatting- Voice chat, Text chat, World Wide Web (www)- Web browsers and its functions, Searching the web, HTTP, URLs, Web services, Web Protocols, Network layers and TCP/IP protocols, Advantages and disadvantages of Internet and world wide web.

**Text Books:**

1. David F. Griffiths, Desmond J. Higham, Learning LATEX. Society for Industrial and Applied Mathematics, Philadelphia (1997).
2. Laslie Lamtort, LATEX, Addison Wesley publication company (1994).
3. Amos Gilat, MATLAB-An Introduction with Applications, John Wiley & Sons, Inc. 2010.
4. Rudra Pratap, Getting Started with MATLAB, Oxford University Press, 2002.
5. V.K.Jain, Internet and Web Page Designing, B.P.B. Publications.





Ph.D. MATHEMATICS

**Ph. D. 104 (I) : RIEMANNIAN GEOMETRY AND COSMOLOGY**

Time: 03 Hours

Theory Paper : Max. Marks-80  
Internal Assessment : Max. Marks-20  
Minimum Pass Marks-55

The paper setter is required to set in all **Eight questions**, out of which only **four** questions are to be attempted by the students. All questions will be of equal marks. Two questions are to be set from each unit. The students are required to attempt at least one question from each unit.

- Unit-I** Lie Derivative in Riemannian Space: Motion, Killing Vector Field, Properties of Killing Vector Field, Lie Derivative of Christoffel Symbols, Affine Motion, Lie Derivative of Scalar, Covariant Vector and Contravariant Vector, Commutation Formula, Conformal Motion, Collineation, Conformal Collineation.
- Unit-II** Almost complex manifolds, Nijenhuis tensor, Contravariant and covariant almost analytic vectors, Almost Hermite manifold, Almost analytic vector fields, Curvature tensor, Kahler manifolds, Holomorphic sectional curvature.
- Unit-III** Principle of equivalence and Principle of general covariance, Energy-momentum tensor, Energy-momentum tensor for perfect fluid, Newtonian approximation of equations motion, Derivation of Einstein's field equations, Poisson equation as approximation of field equations.
- Unit-IV** Static cosmological models, Einstein Universe, deSitter universe, Their physical and geometrical properties.

**Books Recommended:**

- [1] B.B.Sinha, An Introduction to Differential Geometry, Kalyani Publishers, New Delhi, 1982.
- [2] R.S. Mishra, A Course in Tensors with Applications to Riemannian Geometry, Pothishala Pvt. Ltd., Allahabad India, 1985.
- [3] U.C. De and A.A.Shaikh, Differential Geometry of Manifolds, Narosa Publishing House Pvt. Ltd., 2007.
- [4] S.R. Roy and Raj Bali, Theory of Relativity, Jaipurindia Publishing House.
- [5] J.V. Narlikar, Lectures on General Relativity and Cosmology, Mac Millan Co.India.



Ph.D. MATHEMATICS

Ph. D. 104 (I) : RIEMANNIAN GEOMETRY AND COSMOLOGY

Time: 03 Hours

Theory Paper : Max. Marks-80

Internal Assessment : Max. Marks-20

Minimum Pass Marks-55

The paper setter is required to set in all **Eight questions**, out of which only **four** questions are to be attempted by the students. All questions will be of equal marks. Two questions are to be set from each unit. The students are required to attempt at least one question from each unit.

- Unit-I** Lie Derivative in Riemannian Space: Motion, Killing Vector Field, Properties of Killing Vector Field, Lie Derivative of Christoffel Symbols, Affine Motion, Lie Derivative of Scalar, Covariant Vector and Contravariant Vector, Commutation Formula, Conformal Motion, Collineation, Conformal Collineation.
- Unit-II** Almost complex manifolds, Nijenhuis tensor, Contravariant and covariant almost analytic vectors, Almost Hermite manifold, Almost analytic vector fields, Curvature tensor, Kahler manifolds, Holomorphic sectional curvature.
- Unit-III** Principle of equivalence and Principle of general covariance, Energy-momentum tensor, Energy-momentum tensor for perfect fluid, Newtonian approximation of equations motion, Derivation of Einstein's field equations, Poisson equation as approximation of field equations.
- Unit-IV** Static cosmological models, Einstein Universe, deSitter universe, Their physical and geometrical properties.

**Books Recommended:**

- [1] B.B.Sinha, An Introduction to Differential Geometry, Kalyani Publishers, New Delhi, 1982.
- [2] R.S. Mishra, A Course in Tensors with Applications to Riemannian Geometry, Pothishala Pvt. Ltd., Allahabad India, 1985.
- [3] U.C. De and A.A.Shaikh, Differential Geometry of Manifolds, Narosa Publishing House Pvt. Ltd., 2007.
- [4] S.R. Roy and Raj Bali, Theory of Relativity, Jaipurindia Publishing House.
- [5] J.V. Narlikar, Lectures on General Relativity and Cosmology, Mac Millan Co.India.

Ph.D. MATHEMATICS  
**Ph. D. 104 (II): GENERATING FUNCTIONS**

*03 Hours*

Theory Paper : Max. Marks-80  
Internal Assessment : Max. Marks-20  
Minimum Pass Marks-55

The paper setter is required to set in all **Eight questions**, out of which only **four** questions are to be attempted by the students. All questions will be of equal marks. Two questions are to be set from each unit. The students are required to attempt at least one question from each unit.

### UNIT-I

#### **Series Rearrangement Technique:**

Some useful Lemmas, Description of the series rearrangement technique, Applications to Jacobi Polynomials (Linear Generating Functions, Extended linear generating functions).

### UNIT-II

#### **Decomposition Technique:**

Bilinear Generating functions, Trilinear Generating functions, Bilateral Generating functions, Generating functions for Gegenbauer (or Ultraspherical) polynomials, Generating functions for Jacobi Polynomials, Generating functions for Laguerre Polynomials.

### UNIT-III

#### **Operational Techniques:**

Preliminaries on the Laplace and Inverse Laplace Transforms, Linear, Bilinear and Bilateral Generating functions, Use of Differential operators.

### UNIT-IV

#### **Fractional Derivative Technique:**

Brief Historical Survey, Application to Hypergeometric functions, Linear Generating functions, Bilinear Generating Functions.

#### **Book Recommended:**

1. **A Treatise on Generating Functions**, H. M. Srivastava and H. L. Manocha, Ellis Horwood Ltd. Publishers, 1984.



(21)

Awadhesh Pratap Singh University  
Rewa (M.P.)

Ph.D. Course Work Structure

ENVIRONMENTAL BIOLOGY



2019-2020



<u>Research Methodology</u>	4	100 (80+20)	55
Review of published research in the Relevant field	3	100	55
Computer applications	3	100 (80+20)	55
Themes and Issues of Environment	3	100 (80+20)	55
Comprehensive Viva-Voce	3	100	55
Total		16 VCredits	

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**A.P.S. University, Rewa**  
**Syllabus for Ph.D. Course work 2019-20**  
**Subject: Environmental Biology**  
**Paper 1 Research Methodology**

**Unit-1**

objectives and types of research. Scope and significance of Research, historical review, search and research problem, reference and literature search, records and presentation of data, scientific research papers writing, abstracts and other literature, **Research Ethics** : An overview of philosophy of research ethics, Scientific Conduct, Publication Ethics, Open Access Publishing, Publication Misconduct, Databases and Research Metrics.

Rules for maintaining biosafety in the laboratory, research journal, impact factor and paper citation index. Experimental design. Interpretation and Report Writing

- Science of sampling, need of sampling, sample size and its determination. Random and non-random sampling.
- Plant and animal sampling, community analysis, IVI, Indices of species diversity, Richness and Similarity index.

**Unit-2**

- Analytical & chromatographic methods: Micrometry, gravimetry, chromatography. electrophoresis, HPLC, GLC, Gas chromatography, Mass spectroscopy
- Spectroscopic technique of Analysis, Spectrophotometer- single and double beam. UV Visible spectrophotometry, NMR, Raman spectrophotometer, Atomic Absorption Spectrophotometer, Flame photometer.
- Air Pollution monitoring technique, Gaseous and particulate sampling. High Volume air sampler. Respirable dust sampler. Water sampling technique, water quality analysis; estimation of DO, BOD, COD, Hardness, Alkalinity, Acidity etc.
- productivity: primary and secondary

**Unit-3**

- Microbial culture sterilization techniques, Culture media- types and preparation, colony counting techniques.
- Identification and enumeration of microorganisms, Preservation and storage and maintenance of microorganisms.
- Determination of MPN, confirmatory tests.
- Microscopic study of blood cells, cell organelles, spores etc.

**Unit-4**

- Basic elements and tools of statistical analysis, Measures of central tendencies- mean, mode, median, standard deviation, Planning and execution of survey, Test of significance, students't'-test, chi-square test, correlation and regression analysis. Probability distribution, Analysis of variance- one and two way classification.

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A.P.S. University, Rewa  
Syllabus for Ph.D. Course work 2019-20  
Subject: Environmental Biology  
Paper II (Ph.D. 102)  
Review of published research in the relevant field

**Objective:** To learn the preparation of research proposal through review of literature in chosen field of research, will be under-taken under the supervisor or the regular teacher of the centre of course work. at the end of course work the candidate has to submit a **brief report** on the literature review for evaluation, which will be done by two examiners.

*Dr. Mohan*

A.P.S. University, Rewa  
Syllabus for Ph.D. Course work 2019-20  
Subject: Environmental Biology

Paper III Computer Application

**Unit I**

Introduction to computer: History and Generation of computer, Characteristic to computer, Classification: digital, analogue, hybrid, Micro, mini and Super, Components of computer System.

**Unit II**

Introduction to Operating system: Need, functions, control programs, OS supervisor, Job control programs concurrent, C. S., popular OS for PC's. Introductions to DOS, Internal commands, External commands, (TREE, UNDELTE, CHKDSK, FDISK, FC, BACKUP, RESORE, FORMAT, UNFORMAT, JOIN, XCOPY)

**Unit III**

Introduction to windows: Program manager, file manager, customizing windows with control panel, print manager. File shearing. Computer languages and machine language Programming in C/C++

**Unit IV**

Introduction to MS office: The office manager, Starting information with MS office, The clipboard, Word, Excel, Power point. Word processing with word; word basis, Undo, redo, repeat, Insert, text, replace Text, copying form one word document to other. Printing, auto formation, autocorrect. Internet- introduction and application: LAN, WAN, MAN, WWW, Search engines, WiFi, LiFi.





A.P.S. University, Rewa  
Syllabus for Ph.D. Course work 2019-20  
Subject: Environmental Biology

Paper IV Problems and Issues of Environment

1. Greenhouse effect, Green house gases and their sources, Global warming and climate disaster, Environmental problems due to climate change, melting of ice caps and rising sea level.
2. Air pollution; sources and types of air pollutants, Ozone layer depletion, Acid rain, PAN, Urban air quality and human diseases, Effect of air pollution on living organisms, Urban sprawl, Air pollution management, control of Air pollution, Air quality criteria and Standards.
3. Water pollution; sources and types of water pollutants, Drinking water pollution and human diseases, Toxicity of Heavy metals and their effects on biota, Eutrophication, drinking water crisis. water quality standards, treatment of sewage and industrial effluents
4. Environmental degradation; Fossil fuels utilization and Environmental issues, Soil degradation, Deforestation, natural habitat degradation, Pesticides and environmental problems, Ecosystem degradation, Environmental disasters; Landslides, Flood, Cyclones, Forest fire, Drought, Avalanche. First Earth summit, second earth summit, Kyoto protocol, carbon trading, International conventions on biodiversity.
5. Solid wastes; sources, generation and composition of municipal solid wastes, Industrial wastes, Biomedical wastes, Disposal techniques of solid wastes, Electronic waste (e-waste); sources, types, recycling and environmental impacts of e-wastes. municipal solid waste management techniques, concept of 5R.



STRUCTURE OF SYLLABUS FOR Ph.D. COURSE WORK (PHILOSOPHY) 2018-19 ONWARDS

(AS PER ORDINANCE NO. 11 DOCTOR OF PHILOSOPHY)

Paper Code	Name of Theory Papers	Credits	Maximum Marks (Theory + Internal Assessment)	Minimum Passing Marks
Ph.D.101	Research Methodology	4	100 (80+20)	55
Ph.D. 102	Review of Published Research in the Relevant Area	3	100	55
Ph.D. 103	Computer Applications	3	100 (80+20)	55
Ph.D. 104	Specialization Subjects (Any One of the following) : MP104 (I) Indian Metaphysics & Epistemology MP 104 (II) Western Metaphysics & Epistemology	3	100 (80+20)	55
Ph.D. 105	Comprehensive Viva-Voce	3	100	55
	Total Credit	16		

*Final*  
*P.O.*

**Ph.D. PHILOSOPHY**  
**Ph.D. 101 : RESEARCH METHODOLOGY**

**TIME: 03 Hours**

**Theory Paper: Max Marks-80**  
**Internal Assessment: Max Marks-20**  
**Minimum Passing Marks-55**

The paper setter is requested to set in all Eight questions, out of which only four questions are to be attempted by the students. All questions will be of equal marks. Two questions are to be set from each The students are required to attempt at least one question from each unit.

**इकाई-1/ Unit-1**

अनुसंधान का अर्थ, अद्देश्य एवं अनुसंधान के प्रकार, शोध-प्रविधि की पद्धतियाँ, अनुसंधान की प्रकृति एवं प्रक्रिया।

Meaning, Objectives and Scope of Research, Kinds of Research, Methods of Research Methodology, Nature and Process of Research. **Research Ethics** : An overview of philosophy of research ethics, Scientific Conduct, Publication Ethics, Open Access Publishing, Publication Misconduct, Databases and Research Metrics

**इकाई-II/ Unit-II**

शोध प्रबन्ध एवं शोधपत्र, शोधार्थी एवं शोध निर्देशक, शोध विषय का चयन एवं शीर्षक निर्धारण, शोध प्रबन्ध का स्वरूप एवं उसकी रूपरेखा सामग्री संकलन।

Thesis and Research Paper, Research Scholar and Research Guide, Selection of Subject and Topic, Synopsis and Nature of Thesis, Matter Collection

**इकाई-III/ Unit-III**

शोध प्रबन्ध के मुख्य अंग – अध्याय अथवा परिच्छेद व्यवस्था, अनुच्छेद व्यवस्था, उद्धरण, पादटिप्पणी, ग्रन्थसूची, परिशिष्ट उपोद्घात।

Main Parts of Thesis-Chapters, Paragraphs, Quotations, Footnotes, Bibliography, Index, Preface.

**इकाई-IV/ Unit-IV**

शोध प्रबन्ध प्रतिवेदन – प्रतिवेदन का प्रारम्भिक भाग, प्रतिवेदन का मुख्य भाग, सन्दर्भ विभाग।

Thesis Report, Preliminary Section or Front Matter, Main Body of the Report, Reference Section.

**Suggested Readings:**

1. डॉ. अभिराजराजेन्द्र मिश्र एवं डॉ. (श्रीमती) राजेशकुमारी मिश्रा, शोधप्रविधि एवं पाण्डुलिपिविज्ञान, अक्षयवट प्रकाशन, इलाहाबाद, 2008
2. डॉ. मनोरमा शर्मा, संगीत अनुसंधान प्रक्रिया, हरियाणा ग्रन्थ अकादमी, पंचकूला, 1990
3. डॉ. रहस विहारी द्विवेदी, साहित्यानुसन्धानावबोधप्रविधि: शिववांगमुनिप्रमेधाप्रकाशनम्, जबलपुर, 2011
4. प्रो. आनन्द प्रकाश सिंह, सामाजिक अनुसंधान, यूनिवर्सिटी पब्लिकेशन, नई दिल्ली, 2008
5. डॉ. विनयमोहन शर्मा, शोध प्रविधि, मयूर पेपरबैक्स, नई दिल्ली, 2016
6. वंदना वोहरा, रिसर्च मैथडोलॉजी, ओमेगा पब्लिकेशन्स, नई-दिल्ली, 2012
7. C.R. Kothari, Research Methodology Methods & Techniques, Wishwa Prakashan, New Delhi, 1998

*P. An*

*Sharma*

Ph.D. PHILOSOPHY

Ph.D. 102 : Review of Published Research in the Relevant Area

TIME : 03 Hours

Max Marks - 100

Minimum Passing Marks - 55

संबंधित क्षेत्र में प्रकाशित—शोध सामग्री की समीक्षा।

Review of Published Research in the Relevant Area.

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*P. Q.*



Ph.D. PHILOSOPHY  
Ph.D. 103 : COMPUTER APPLICATIONS

TIME : 03 Hours

Theory Paper : Max Marks - 80

Internal Assessment : Max Marks - 20

Minimum Passing Marks - 55

The paper setter is requested to set in all Eight questions, out of which only four questions are to be attempted by the students. All questions will be of equal marks. Two questions are to be set from each unit. The students are required to attempt at least one question from each unit.

Unit - I / इकाई - I

कम्प्यूटर का परिचय - कम्प्यूटर का इतिहास, कम्प्यूटर की विशेषताएँ, वर्गीकरण, डिजिटल, एनालॉग, हाईड्रिड, माइक्रो, मिनी, मेन फ्रेम एवं सुपर कम्प्यूटर प्रणाली के घटक एवं कम्प्यूटर का ब्लाक चित्र, इनपुट, आउटपुट एवं द्वितीयक संग्रहण युक्तियाँ, हार्डवेयर एवं साफ्टवेयर की अवधारणा, उच्च स्तरीय एवं निम्न स्तरीय भाषाएँ, अनुवादक कम्पाइलर एवं इन्टरप्रेटर।

Introduction of Computer - History of Computer, Characteristics of Computer, Categorization, Digital, Analog, Hybrid, Micro, Mini, Mainframe and super Computer, Components of Computer System and block-diagram of Computer. Input, Output, secondary Storage devices. Concept of Hardware and Software. High and low level Languages. Translators, Compiler and interpreter.

Unit - II / इकाई - II

आपरेटिंग सिस्टम का परिचय - आवश्यकता, कार्य, कंट्रोल प्रोग्राम एवं जॉब कंट्रोल प्रोग्राम का करेन्ट आपरेटिंग सिस्टम पर्सनल कम्प्यूटर के लिए प्रसिद्ध आपरेटिंग सिस्टम-एम.एस.डॉस एवं विन्डोज। डॉस के आन्तरिक एवं बाह्य कमाण्ड, बाह्य कमाण्ड-(ट्री, अनडिलीट, चेकडिस्क, एफडिस्क, एफसी, वेकअप, रिस्टोर, फॉरमेट, अनफारमेट, ज्वाइन) वैच और कानफिग फाइल की अवधारणा, फिल्टरिंग पाइपिंग एवं रिडायरेक्टिंग।

Introduction to Operating System - Requirement, Working, Current operating system for control program and job Control program. Famous operating system for personal computer - M.S. Dos and windows. Internet and external commands of Dos. External command - (TREE, UNDELETE, CHKDSK, FDISK, FC, BACKUP, FORMAT, UNFORMAT, RESTORE, JOIN), Concept of batch and config files, Filtering, Piping and redirecting.

Unit - III / इकाई - III

विन्डोज का परिचय - प्रोग्राम मैनेजर, फाइल मैनेजर, कंट्रोल पैनल प्रिंट मैनेजर, पी.आई.एफ. एडिटर, एक अनुप्रयोग से दूसरे अनुप्रयोग में सूचना का आदान-प्रदान (ओ.एल.ई.)।

Introduction to Windows - Program manager, File Manager, Control Panel, Print Manager PIF editor, Exchange of information from one application to another (O.L.E.).

Unit - IV / इकाई - IV

माइक्रोसाफ्ट-ऑफिस मैनेजर, माइक्रो साफ्ट ऑफिस के साथ सूचना का आदान-प्रदान, जोड़ी एवं रखी गई सूचना को एडिट करना, माइक्रो साफ्ट ऑफिस के घटक-वर्ड, एक्सल एवं पावर प्वाइंट, वर्ड के साथ शब्दों की प्रोसिसिंग, जैसे-अन्डू, रिडू, रिपीट, इन्सर्ट टेक्स्ट, रिप्लेस टेक्स्ट, टेक्स्ट की फार्मेटिंग करना, नये वर्ड डॉक्यूमेंट की कापी अन्य वर्ड डॉक्यूमेंट में करना, प्रिंटिंग प्रक्रिया, आटो फारमेट एवं आटो करेक्ट की प्रक्रिया, आवृत्ति वितरण, माध्य, मध्यिका, बहुलक, प्रसरण, समाश्रयण, सहसंबंध, इन सब का प्रयोग एम.एस. एक्सल अथवा सामाजिक विज्ञान पैकेज के विशेष सन्दर्भ में।

Introduction to Microsoft office - Office Manager, exchange of information with Microsoft office-Editing added and stored information, Components of Microsoft Office - word, Excel and Power Point. Word Processing with MS Word like - Undo, Redo, Repeat, insert text, replace text, formatting the text, Copying new word document to other word document, Printing Process, Process of auto format and auto correct, Introduction to statistics analysis, frequency distribution, Mean, Median, mode, proliferation, Regression, correlation; use of all these in M.S. Excel or in the particular context of the social Science Package.

Suggested Readings

1. P.K. Sinha, Computer Fundamentals, BPB Publ.
2. Satish Jain, Introduction to Computer Science, BPB, Publ.
3. R. Mansfield, The Compact Guide to M.S.- OFFICE, BPB, Publ.
4. R. Thomas, Dos 6 and 6.2 instant Reference BPB, Publ.
5. Murray, Mastering POWER POINT 6.0 for windows, BPB, Publ.
6. Ray M. And H.S. Sharma, Mathematical Statistics, Ram Prasad and Sons.

*Sharma*  
P. Q.

Ph.D. PHILOSOPHY  
Ph.D. 104 (I) : INDIAN METAPHYSICS & EPISTEMOLOGY

Time : 03 Hours

Theory Paper : Max Marks - 80  
Internal Assessment : Max Marks - 20  
Minimum Passing Marks - 55

The paper setter is requested to set in all Eight questions, out of which only four questions are to be attempted by the students. All questions will be of equal marks. Two questions are to be set from each unit. The students are required to attempt at least one question from each unit.

इकाई - I / Unit - I

उपनिषदों में ब्रह्म का स्वरूप, चार्वाक दर्शन का भौतिकवाद, प्रमा का अर्थ एवं स्वरूप, अप्रमा।  
Nature of Brahman in Upanishads, Materialism of Charvaka Philosophy, Meaning and Nature of Prama, Aprama.

इकाई - II / Unit - II

जैन दर्शन में जीव का स्वरूप, बौद्ध दर्शन का अनात्मवाद, ख्यातिवाद - अन्यथाख्याति, विपरीतख्याति, अख्याति, अनिर्वचनीयख्याति, सत्ख्याति।  
Nature of Jiva in Jaina Philosophy, Anatmavada of Bouddha Philosophy, Khyativada - Anyathakhyativada, Viparitkhyativada, Akhyati, Anirvachaniyakhyati, Satkhyati.

इकाई - III / Unit - III

संस्कृत का सत्कार्यवाद, विकासवाद, योग दर्शन में ईश्वर का स्वरूप, अष्टांग योग, शांकर दर्शन में ब्रह्म का स्वरूप, शांकर दर्शन में माया का स्वरूप।  
Sankaryavada of Samkhya, Nature of God in Yoga Philosophy, Ashtanga Yoga, Nature of Brahman in Shankara's Philosophy, Nature of Maya in Shamkara's Philosophy.

इकाई - IV / Unit - IV

स्वतंत्र प्रामाण्यवाद एवं परतः प्रामाण्यवाद, जैन दर्शन का स्याद्वाद, न्याय दर्शन - प्रत्यक्ष, अनुमान, शब्द व उपमान।  
Swntah Pramanyavada & Paratah Pramanyavada, Syadavada of Jaina Philosophy, Nyaya Philosophy - Prntyaksha, Anumana, Shabda, Upaman.

Suggested Readings :

1. डॉ. चन्द्रधर शर्मा, भारतीय दर्शन अलोचन और अनुशीलन, मोतीलाल बनारसीदास, दिल्ली 1995
2. डॉ. वी.एन. सिंह एवं डॉ. आशा सिंह, भारतीय दर्शन, स्टूडेंट्स फ्रेंड्स एण्ड कम्पनी, काशी हिन्दू विश्वविद्यालय मार्ग लंका, वाराणसी-5, 1996
3. प्रो. हरेन्द्र प्रसाद सिन्हा, भारतीय दर्शन की रूपरेखा, मोतीलाल बनारसीदास, दिल्ली, 1963
4. बलदेव उपाध्याय, भारतीय दर्शन, शारदा मन्दिर वाराणसी, 1997
5. नन्द किशोर देवराज, भारतीय दर्शन, उत्तर प्रदेश हिन्दी ग्रन्थ अकादमी, लखनऊ, 1975
6. Dutta & Chatterjee, An Introduction to Indian Philosophy, University of Calcutta, 1968.
7. M. Hiriyanna, Outlines of Indian Philosophy, George Allen and Unwin, Lodon-1932.

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D. Q.

Awadhesh Pratap Singh University  
Rewa (M.P.)

Ph.D. Course Work Structure

BIOTECHNOLOGY



2019-2020



Ph.D. 101	Research Methodology	4	100 (80+20)	55
Ph.D. 102	Review of published research in the Relevant field	3	100	55
Ph.D. 103	Computer applications	3	100 (80+20)	55
Ph.D. 104	Animal and Plant Biotechnology	3	100 (80+20)	55
Ph.D. 105	Comprehensive Viva-Voce	3	100	55
	Total		16 Credits	

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A.P.S. University, Rewa  
Syllabus for Ph.D. Course work 2019-20  
Subject: Biotechnology  
Paper 1 Research Methodology

### Unit-1

Meaning, objectives and types of research. Scope and significance of Research. historical review, search and research problem, reference and literature search, records and presentation of data, scientific research papers writing, abstracts and other literature. **Research Ethics** : An overview of philosophy of research ethics. Scientific Conduct. Publication Ethics. Open Access Publishing. Publication Misconduct. Databases and Research Metrics.

- Rules for maintaining biosafety in the laboratory, research journal, impact factor and paper citation index. Experimental design. Interpretation and Report Writing.
- Science of sampling, need of sampling, sample size and its determination. Random and non-random sampling.
- Population genetics, hardy-Weinberg law, genotype and allele frequency distribution, genetic drift.

### Unit-2

- Analytical & chromatographic methods: Micrometry, gravimetry, chromatography, affinity chromatography, paper and thin layer Chromatography, size exclusion chromatography, HPLC, GLC. Gas chromatography.
- Spectroscopic technique of Analysis, Spectrophotometer- single and double beam. UV Visible spectrophotometry, IR-Spectroscopy, NMR, Mass spectroscopy, Raman spectrophotometer, Atomic Absorption Spectrophotometer, Flame photometer.
- Centrifugation technique, Immunological technique, hniqElectrophoretic technique electrophoresis Sequencing of DNA and Protein, Blotting tecues, pH meter.

### Unit-3

- Microbial culture sterilization techniques, Culture media- types and preparation, colony counting techniques.
- Identification and enumeration of microorganisms, Preservation and storage maintenance of microorganisms.
- DNA Damage analysis, Comet assay, cloning and transformation techniques
- Microscopic study of blood cells, cell organelles, spores etc.
- Animal cell culture technique and ethical issues. Bio safety level.
- Microscopic Technique: Light microscope, compound microscope, Phase-contrast microscope. Electron Microscope: TEM and SEM

### Unit-4

- Basic elements and tools of statistical analysis, Measures of central tendencies- mean, mode, median, standard deviation, Planning and execution of survey, Test of significance, students't'-test, chi-square test, correlation and regression analysis. Probability distribution, Analysis of variance- one and two way classification.
- Bioinformatics; Genomics, proteomics, NCBI, Pubmed, BLAST, FASTA.



A.P.S. University, Rewa  
Syllabus for Ph.D. Course work 2019-20  
Subject: Biotechnology  
Paper II (Ph.D. 102)  
Review of published research in the relevant field

Objective: To learn the preparation of research proposal through review of literature in chosen field of research, will be under-taken under the supervisor or the regular teacher of the centre of course work. at the end of course work the candidate has to submit a brief report on the literature review for evaluation, which will be done by two examiners.

Dr. Ashu

A.P.S. University, Rewa  
Syllabus for Ph.D. Course work 2019-20  
Subject: Biotechnology  
Paper IV Animal and Plant Biotechnology

Unit I:

Mendelian genetics-principles, Human genetics (pedigree analysis, karyotypes and genetic disorder). Nature of Gene Concept, Chemical Nature of Gene, Nucleotide, Genome, Prokaryotes and Eukaryotes Genome. DNA Replication: General features of Chromosomal Replication: and its Enzymology. Transcription in prokaryotes and Eukaryotes: Initiation, elongation and termination. Regulation of gene expression in prokaryotes: Operon concept, induction and Repression, Structure and regulation of lactose, tryptophan operons. Genetic Code: Evidence and properties; Wobble hypothesis; Transcriptional adaptors and amino acyl tRNA synthases. Translation: Successive stages of protein synthesis in prokaryotes and its comparison with eukaryotes. chromosomal aberration. Molecular technique: Electrophoresis of DNA, SDS-PAGE, Blotting, DNA Fingerprinting, Foot-printing, DNA sequencing, Gene mapping, PCR, Sequencing, Genome Mapping.

Unit II:

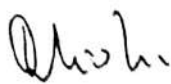
The recombinant DNA Technology: General concept and principle of cloning Enzymes: Nucleases and restriction endonucleases- properties and types; phosphomonoesterases; polymerase; terminal deoxynucleotidyl transferase; poly A polymerase, Linkers, adaptors and homopolymer tailing. prokaryotic host- vector system: Characteristics of E.coli as host; vectors for cloning in E.coli (plasmid, bacteriophage- EMBL, DASH, gt10/11, ZAP etc and plasmid-phage) Other Prokaryotic host vector systems: BAC, Introduction and organization of animal cell and tissue culture laboratory, Primary and established cell line cultures, Serum and protein free defined media and their applications, role of CO<sub>2</sub> and supplements, Stem cell basics, culture and their application. Embryo transfer technology, principles and application

Unit III:

Plant Tissue Culture: Basic aspects of plant biotechnology (History, application, scope and importance), laboratory and culture media for plant tissue culture, cell Culture and its applications. Clonal Propagation and Protoplast Culture: Micro propagation, uses of Haploids, Protoplast isolation, Regeneration of plant, Somatic Hybridization. Gene delivery method in intact and cultured tissues and cells, Agrobacterium, Ti-Plasmid, cointegration and binary vectors, viral vectors, direct DNA uptake, microinjection delivery. Techniques for production of transgenic plants resistant/ tolerant to herbicides; pathogens, pests and abiotic stresses (drought, salt, frost), transgenic plants for production of molecules of commercial importance. Antisense RNA and ribosome technology

Unit IV:

Objectives, roles and landmarks in plant breeding, Plant breeding techniques: Mutational breeding and distant hybridization, Introduction to plant tissue culture: Tissue Culture Media preparation. Initiation of callus culture and its maintenance Generation of genetically modified crops for resistance against biotic and abiotic stresses and nutritional quality, Seed production techniques: release of new varieties, Somaclonal variation and its application for plant improvement Anther culture: haploid and Diploid plant cell production and their applications. Protoplast isolation and fusion, selection of hybrid cell and cybrids.





A.P.S. University, Rewa  
Syllabus for Ph.D. Course work 2019-20  
Subject: Biotechnology  
Paper 3 Computer Application

Unit I

Introduction to computer: History and Generation of computer, Characteristic to computer.  
Classification: digital, analogue, hybrid, Micro, mini and Super. Components of computer System.

Unit II

Introduction to Operating system: Need, functions, control programs, OS supervisor, Job control programs concurrent, C. S., popular OS for PC's. Introductions to DOS, Internal commands, External commands, (TREE, UNDELTE, CHKDSK, FDISK, FC, BACKUP, RESORE, FORMAT, UNFORMAT, JOIN, XCOPY)

Unit III

Introduction to windows: Program manager, file manager, customizing windows with control panel, print manager. File shearing. Computer languages and machine language  
Programming in C/C++

Unit IV

Introduction to MS office: The office manager, Starting information with MS office, The clipboard, Word, Excel, Power point. Word processing with word; word basis, Undo, redo, repeat, Insert, text, replace Text, copying form one word document to other. Printing, auto formation, autocorrect. Internet- introduction and application: LAN, WAN, MAN, WWW, Search engines, WiFi, LiFi.





**AWADHESH PRATAP SINGH UNIVERSITY**

**REWA (M.P.)**

Ph.D. Course Work Structure

COMPUTER SCIENCE



2019-20

A.P.S. university, Rewa  
Syllabus for Ph.D. Course work 2019-20  
Subject: Computer Science  
Structure of syllabus for Ph.D. course work

Paper Code	Name of Theory Paper	Credits	Maximum Marks (Theory + Internal Assessment)	Minimum Passing Marks
Ph.D. 201	Research Methodology	4	100 (80+20)	55
Ph.D. 102	Review of Published Research in the Relevant Field	3	100 (80+20)	55
Ph.D. 103	Computer Application	3	100 (80+20)	55
Ph.D. 104	Data Warehouse and Data Mining Techniques/ Parallel Computing/Machine Learning	3	100 (80+20)	55
Ph.D. 105	Comprehensive Viva Voce	3	100 (80+20)	55
	<b>Total</b>	<b>16</b>		

*Abhishek*

**Ph.D. (Computer Science)**  
**Ph.D. 101 Research Methodology**

Time: 03 Hours

Theory Paper: Max. Marks-80  
 Internal Assessment: Max. Marks-20  
 Minimum Pass Marks-55

The paper setter is required to set in all Eight questions, out of which only four questions are to be attempted by the students. All questions will be of equal marks. Two questions are to be set from each unit. The students are required to attempt at least one question from each unit.

**Unit-I Introduction to Computer Science Research:** What is Research, Types of Research, Why Research, and Significance & Status of Research in Computer Science, Steps in Research: Having grounding in Computer Science, Major Journals & Publication in Computer Science, Major Research areas of Computer Science, identification, selection & Formulation of research. The wider community-Resources and Tools, how engineering research differs from scientific research. The role of empirical studies.

**Unit-II Qualitative Reasoning:** Qualitative Representations, Representing Quality, Representing Mathematical Relationship, Ontology, State, Time and Behaviours, Space and Shape, Compositional Modelling, Domain Theories, and Modelling Assumptions, Qualitative Analysis, Teleological Reasoning, Data Interpretation, Planning, Spatial Reasoning, Applications of Qualitative Physics, Simulations, Applications of simulation.

**Unit-III Literature Survey:** Finding out about your research area, Literature search strategy, Writing critical reviews, Identifying venues for publishing your research, Research Data: What is data, mathematical statistics and computer science views on data analysis, Methods for finding associations: regression and pattern recognition, Method for aggregation and visualization: principal components and clustering, Hypothesis testing.

**Unit-IV Basis of Computer Science Research:** Introduction to Formal Models and Computability: Turing Machine & Computability, Undecidability, Diagonalization and Self-Reference, Reductions, Thesis Writing: Planning the thesis, Writing the thesis, Thesis structure, Writing up schedule, The Oral examination and Viva Voce. Writing Papers and the Review Process: preparing and presenting your paper. The conference review process. Making use of the referees reports, the Journal review process.

**Research Ethics :** An overview of philosophy of research ethics, Scientific Conduct, Publication Ethics, Open Access Publishing, Publication Misconduct, Databases and Research Metrics.

**Text Books References:**

1. Research Methods By Francis C. Dane, Brooks/Cole publishing Company, California.
2. Basic of Qualitative Research (3<sup>rd</sup> Edition) By Juliet Corbin & Anselm Strauss Sage Publications (2008)
3. The Nature of Research: Inquiry in Academic Context By Angela Brew, Routledge Falmer (2001).
4. Research Methods By Ram Abuja, Rawat Publications (2001).
5. The Computer Science and Engineering Handbook by (Editor-in-Chief) By Allen B. Tucker, Jr. CRC Press, A CRC handbook Published in co-operation with A (only relevant parts of chapters of Chapter-2, Chapter-3, Chapter-4, Chapter-9, Chapter-10 & Chapter-32).

*Arvind*

**A.P.S. university, Rewa**  
**Syllabus for Ph.D. Course work 2019-20**  
**Subject: Computer Science**  
**Paper II (PH.D. 102)**  
**Review of published research in the 4relevant field**

Objective: To learn the preparation of research proposal through review of literature in chosen field of research, will be under-taken under the supervisor or the regular teacher of the centre of course work. at the end of course work the candidate has to submit a brief report on the literature review for evaluation, which will be done by two examiners.





**P.H.D. COMPUTER SCIENCE**  
**P.H.D. 103: COMPUTER APPLICATION**

Theory Paper	: Max. Marks	80
Internal Assessment	: Max Marks	20
Min Pass Marks	:	55

Time : 3Hrs.

The paper setter is required to set in all eight question, out of which only four question are to be attempted by the students. All questions will be of equal marks. Two questions are to be set from each unit. The students are required to attempt at least one questions from each unit.

- Unit I** Overview Of Programming Languages, Brief History, Programming Paradigms And Application Domain, Programming Qualities, Imperative Language : Principles, Naming Variables, Elements, Types, Values And Expression, Syntax And Semantics Of Statements, Syntax And Semantics Of Statements In Real Languages, Scope Visibility And Life Time, Examples Of Imperative Languages.
- Unit II** Object Oriented Languages : Principles, Classes, Inheritance, Class, Hierarchies, Polymorphism, Dynamic Binding, Reference Semantics And Their Implementation, Abstract, Class, Interface. Functional Languages : Principles, Functions, Lists, Types And Polymorphism, High Order Function, Lazy Evaluation, Equation And Pattern Matching.
- Unit III** Logic Programming : Logic Predicate And Horn Clause, Prolog : Fact, Variables And Queries, Lists, Practical Aspects Of Prolog, Prolog Applications, Event Driven Programming : The Event Model Event Driven Programming Paradigm, Applets, Event Handling, Example Of A Simple Gui Interface And Interactive Games other Programming.
- Unit IV** Concurrent Programming : Concepts, Communication and Synchronization, Deadlock and Unfairness, Semaphores, Monitors, Java threads, Synchronization In Java, Example Of Bouncing Ball. Exception Handling : Traditional Techniques, Model and Exceptions In Java, Some Examples.

**Text Books/REFERENCES:**

1. Programming Language Principal And Paradigms By Allentucker And Robert Noonam, Tata McGraw Hill Edition.
2. Concept Of Programming Languages, 4th Edition, Robert W. Seesta, Addison-Wesley, 1999

*Shrivastava*

Theory Paper	Max Marks	80
Internal Assessment	Max Marks	20
Min Pass Marks		55

is required to set in all eight question, out of which only four question are to be attempted  
All questions will be of equal marks. Two questions are to be set from each unit. The  
is required to attempt at least one questions from each unit.

**Unit I** Data Warehousing: Introduction -Definition-Architecture-Warehouse Schema-Warehouse server-OL AP operations. Data Warehouse technology -Hardware and operating system- Warehousing Software -Extraction tools -Transformation tools -Data quality tools -Data loaders -Data Access and retrieval tools -Data Modeling tools -Fact tables and dimensions. Data warehousing case studies : Data warehousing in Government , Tourism, Industry , Genomics data

**Unit II** Data Mining definition -DM Techniques -current trends in data mining -Different forms of Knowledge -Data selection, cleaning, Integration, Transformation, Reduction and Enrichment. Data: Types of data -Data Quality -Data Preprocessing -Measures of similarity and dissimilarity. Exploration: Summary statistics -Visualization.

**Unit III** Association rules: Introduction -Methods to discover association rule -Apriori algorithm Partition Algorithm -Pincher search algorithm -Dynamic Item set algorithm -FP Tree growth algorithm. Classification: Decision Tree classification -Bayesian Classification - Classification by Back Propagation.

**Unit IV** Clustering Techniques: Introduction -Clustering Paradigms -Partitioning Algorithms -K means & K Mediod algorithms -CLARA -CLARANS -Hierarchical clustering -DBSCAN -BIRCH -Categorical Clustering algorithms -STIRR -ROCK -CACTUS. Introduction to machine learning -Supervised learning -Unsupervised learning -Machine learning and data mining. Neural Networks: Introduction -Use of NN -Working of NN Genetic Algorithm: Introduction -Working of GA.

**Unit V** Web Mining: Introduction ,Web content mining ,Web structure mining ,Web usage mining ,Text mining ,Text clustering, Temporal mining, Spatial mining ,Visual data mining, Knowledge mining, Various tools and techniques for implementation using (Weka / R / Matlab).

**Text Books/ References:**

1. Paulraj Ponniah, "Data Warehousing Fundamentals", John Wile.
2. M. H. Dunham, "Data Mining Introductory and Advanced Topics", Pearson Education.
3. Han, Kamber, " Dta Mining Concepts and Techniques", Morgan Kaufmann.
4. Ralph Kimball, "The Data Warehouse Lifecycle toolkit", John Wiley.
5. M Berry and G. Linoff, "Mastering Data Mining", John Willey.

*Shivslax*

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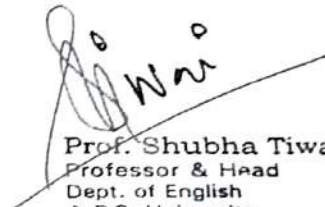
**AWADHESH PRATAP SINGH UNIVERSITY, REWA (M.P.) 486003**

**Pre-Ph.D. Course Work**

**Syllabus**

**ENGLISH**

Paper Code	Name of the Paper	Credit	MM	Min.
Ph.D. 101	Research Methodology	04	100	55
Ph.D. 102	Review of Literature	03	100	55
Ph.D. 103	Computer Application	03	100	55
Ph.D. 104	An Overview of Literature in English	03	100	55
Ph.D. 105	Comprehensive Viva-Voce	03	100	55
	Total Credits	16	600	275

  
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**Pre-Ph.D. Course Work**

**Syllabus**

**ENGLISH**

**PAPER - I [RESEARCH METHODOLOGY]**

**M.M.-100**

**Passing Marks – 55**

**Credits– 04**

**UNIT- I : BASICS OF RESEARCH**

**25**

- a] Research : Definition, Meaning, Objectives and Types
- b] The Philosophy of Research: Nature of Inquiry in Physical Sciences, Social Sciences and Humanities.
- c] Research Procedure in Literature and Linguistics
- d] Broad Principles of Research

**UNIT – II: PREPARATION FOR RESEARCH**

**25**

- a] Choice of a Subject : Identification of a Topic
- b] Survey of Relevant Literature and Critical Material.
- c] Preparation and Presentation of a Research Project/Proposal.
- d] Consulting Libraries, Collecting Material, Preparing Bibliographies, Primary and Secondary Sources.
- e] Preparation of a Research Paper/Term Paper/Dissertation/ Thesis from first to the final draft.

**UNIT-III : THE MECHANICS OF RESEARCH WRITING**

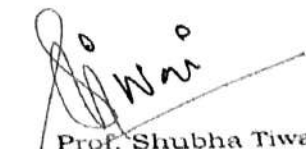
**25**

- a] The Mechanics of Research Writing
- b] Norms, Conventions and Formats of Research Writing.
- c] Suitable Style for a Literary Thesis : Narration, Argumentation, Exposition and Description.
- d] Task for the Participants to Prepare a Research Proposal

**UNIT-IV : ETHICS OF RESEARCH**

**25**

- a] Ethics of Research
- b] Challenges faced by the Research Scholar
- c] Specific Problems and Solutions Keeping the Indian Research Scene in Mind.

  
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## **PAPER - II [REVIEW OF LITERATURE]**

**M.M.-100**

**Passing Marks – 55**

**Credits– 03**

The participants will be asked to prepare a review of the specific topic and critical material related to that topic in about 2000 words. The Supervisor will allot marks in Review of Literature in Consultation with the Department keeping in view the attendance of the participant.

## **PAPER - III [COMPUTER APPLICATION]**

**M.M.-100**

**Passing Marks – 55**

**Credits– 03**

- |             |  |    |
|-------------|--|----|
| Unit – I:   | Learning and Research in Literature  | 25 |
| Unit – II:  | Correct and Fruitful use of Internet in Material Collection.   | 25 |
| Unit – III: | Proper use of different Software's.  | 25 |
| Unit – IV:  | Consultation and Access to Web Resources-e-journals, Research sites, payment modes, web indexcs, mail discussion groups, virtual libraries and web search engines. |    |

## **PAPER - IV [AN OVERVIEW OF LITERATURE IN ENGLISH]**

**M.M.-100**

**Passing Marks – 55**

**Credits– 03**

- |    |  |    |
|----|--|----|
| a] | Literatures in English : British, America, Indian, Australian, Canadian and others.      | 25 |
| b] | Critical Theories.   | 25 |
| c] | Literary Movements.  | 25 |
| d] | Literary Ages with special reference to British, American and Indian Writing in English. | 25 |

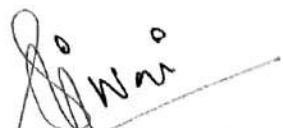
## **PAPER - V [COMPREHENSIVE VICA-VOCE]**

**M.M.-100**

**Passing Marks – 55**

**Credits– 03**

Each candidate will appear in a comprehensive vica-voce before a panel of the faculty of the Department headed by the H.O.D. and will be allotted marks.

  
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