JIWAJI UNIVERSITY, GWALIOR
CBCS Scheme of Examination
M.Phil. (Physics) First Semester December 2019

Course Code	Course Name	Total Marks	Min pass Marks	Credit C(i)	End Semester Examination Marks			Internal Assessment Marks			Total Obtained Marks	Grade Points G(i)	Letter grade	SGPA S(1)= $\frac{\sum C(i).G(i)}{\sum C(i)}$
					Max	Min	Obtained	Max	Min	Obtained				
101	Research Methodology	100	55	4	60	21		40	14					
102	Computer applications	100	55	4	60	21		40	14					
103	Advance topic in physics	100	55	4	60	21		40	14					
104	Review of published research in the relevant field	100	55	4	x	x	x	100	55					
105	Synopsis submission	100	55	4	x	x	x	100	55					
106	Comprehensive viva-voce	100	55	4	x	x	x	100	55					
$\sum_{i=0}^{6}()_i$				24										

JIWAJI UNIVERSITY, GWALIOR
CBCS Scheme of Examination
M.Phil. (Physics) Second Semester June 2020

Course Code	Course Name	Total Marks	Min pass Marks	Credit C(i)	Internal Assessment Marks			Total Obtained Marks	Grade Points G(i)	Letter grade	SGPA S(2)= $\frac{\sum C(i).G(i)}{\sum C(i)}$
					Max	Min	Obtained				
201	Seminar	100	55	4	100	55					
202	Term paper/ Assignment	100	55	4	100	55					
20	Final Dissertation/Project Presentation	300	55	12	300	Pass/Fail					
	Comprehensive viva-voce	100	55	4	100	55					
$\sum_{i=0}^{6}()_i$				24							

Sem. I		Sem. II		Result
SC(1)	S(1)	SC(2)	S(2)	
24		24		

$$SC(j)=\Sigma C(i),\ SGPA=S(i),\ j=j^{th}\ Semester;\quad SGPA = \text{Semester Grade Point Average}.\quad CGPA = \text{CumulativeGrade Point Average}$$

$$CGPA=\frac{\sum SC(i).S(i)}{\sum SC(i)}$$

NB :

A student has to acquire minimum 55% marks. In end semester examination minimum 21 out of 60 and in internal assessmentminimum 14 out of 40. But Sum of both should be 55 or more.

Grades will be decided by the marks obtained out of 100.

Description of grade letter and grade points:

Letter Grade	Grade Points	Description	Range of Marks (%)
O	10	Outstanding	90-100
A+	9	Excellent	80-89
A	8	Very good	70-79
B+	7	Good	60-69
B	6	Above Average	50-59
C	5	Average	40-49
P	4	Pass	35-39
F	0	Fail	0-34
Ab	0	Absent	Absent

M.Phil. Ist Sem 2019
Subject: PHYSICS
PAPER 101 : RESEARCH METHODOLOGY(4 credits 100 marks)

Note: Each course shall be of 100 Marks out of which 40 marks are allotted to internal assessment and 60 marks for University examination. Minimum pass marks are 14 for the internal assessment and 21 for the University examination.

Introduction to Research Methodology:

Meaning of Research, Objectives of Research, Motivations in Research, Types of Research, Research Approaches: qualitative and quantitative research, deductive and inductive theory, Significance of Research, Research Methods v/s Methodology, Research and Scientific Methods, Research Process, Criteria of Good Research

Defining the Research Problem:

What is Research Problem? Selecting the Problem, necessity of selecting the problem, techniques in defining the problem. Meaning and need of research design, features of good research design, types of research design, principle of experimental research design, concept of independent & dependent variables, development of a research plan.

Scientific Communication:

Meaning and significance of report writing, types of reports, steps in report writing, layout of the research report, precautions in writing research report, writing of thesis report. Importance of publishing a research paper. Concepts and differences between references and bibliography. Impact factor of Journals, When and where to publish?

Writing of research paper and thesis

Layout of a Research Paper, Writing Introduction of a paper, review of literature, Describing method and methodology, Presenting Result, Discussion of the results, Conclusions of the work done, writing references of the research paper, Writing abstract of the research paper,

Layout of a thesis, top page, contents, certificate and declarations, preface to the thesis, Introduction to the work done, Describing methods/ techniques used in research classification of the whole work done in the form of chapter, concluding chapter, future plans and scope of the work done, Arranging Bibliography and references, list of research papers.

Use of tools / techniques for Research:

Use of Encyclopedias, Research Guides, Handbook etc., Academic Databases for different Discipline. Methods to search required information effectively, Reference Management Software like Zotero/ Mendeley, Software for paper formatting like LaTeX/MS Office, Ethical issues related to publishing, Plagiarism and Self-Plagiarism, Software for detection of Plagiarism, Patent filing, Language testing.

24-6-19

M.Phil. Ist Sem 2019
Subject: PHYSICS
PAPER 102: COMPUTER APPLICATIONS (4 credits 100 marks)

Note: Each course shall be of 100 Marks out of which 40 marks are allotted to internal assessment and 60 marks for University examination. Minimum pass marks are 14 for the internal assessment and 21 for the University examination.

INTRODUCTION TO COMPUTER

Computer terminology and Basics: Computer hardware and software, firmware, Block diagram of computers: input devices- Keyboard, mouse, touch screen: output devices- printers & its type, Scanner. Computer memories, Central processing unit, types of computer, types of software: system software and application software, some basic terms related to Windows Operating system

Exploring various websites and search engines for collecting quality literature and secondary data related to research work.

MS WORD

Some basic terms-toolbar, format bar, status Bar, Features and applications related to presentation of text in suitable format and saving the data for future applications. Practical knowledge of MS Word to type the script, insert tables, figures and graphs to prepare thesis and research papers in presentable format.

Research publishing tool- MSWORD: Creating. Editing and Saving a word document, creating a research paper,

Use of Auto-text, Autocorrect, Spelling and Grammar Tool, creating a cover letter, table related operation, adding graphics, Mail Merge.

MS EXCEL

Introduction to fields, records and data base file.

Construction of spreadsheets from the data. Design and application of formulae for calculations and their applications to the experimental data. Use of statistical tools, preparation of graphs, histograms, charts and diagrams.

MS POWER POINTSLIDES AND POSTER PREPARATION

Preparation of power point presentations based on the topic of research. What to include and what not to include in slides. How to begin preparing slides. Master slide, Insertion of figures, graphs, charts in presentation. Uses of various presentation techniques, inserting new slide and deleting any slide, design, animation, slideshow.

Preparation of scientific posters using MS Publisher: fixing size of the poster, dividing area into different boxes. Inserting text, figure and table in different boxes.

24.6.19

M.Phil. Ist Sem 2019
Subject: PHYSICS
Paper 103 : Advanced Topics in Physics
(4 Credits 100 Marks)

Note: Each course shall be of 100 Marks out of which 40 marks are allotted to internal assessment and 60 marks for University examination. Minimum pass marks are 14 for the internal assessment and 21 for the University examination.

Polymerization, Quantum size effect, Electron-confinement in infinitely deep square-well, Confinement in one and two-dimensional well, Idea of quantum structure, Quantum dots and wires.

Growth of Crystals from the solutions and melts (Kyropolous, Czochralski, Bridgemann, float zone Methods), Gel method, Epitaxial growth, Idea of MBE, LPE and CVD techniques.

Evaporation theory : Kinetic energy of gases - mean free path and impingement rates of molecules, evaporation theory - evaporation rates, evaporation mechanisms, directionality of evaporating molecules, Nucleation and Growth: Condensation process and nucleation, Capillary theory of nucleation-various stages of growth (qualitative treatment).

X-ray spectrometers, Raman spectrometer, Mass spectrometer, IR and UV Spectrophotometer, ESCA and STEM microscopy, Environment, Pollution measuring instruments.

Interacting electron gas, concept of many electron system, Thomas-Fremi Theory, Hartree and Hartree-Fock approximation, Correlation energy, Hume-Rothery rule, Phase rule, Lever rule,

Periodic potentials, Bloch theorem and Born-von Kramer boundary conditions, General remarks about Bloch theorem, Fermi surface, Electron density of states, Kroning-Penny model, Equation for electron wave in a periodic potential : solution of central equation, approximate solution near zone boundary, Construction of Fermi surfaces, The tight binding approximation for band structure, Effective mass in solids

Books Recommended:
1.   Introduction to Plasma Physics by S.S. Chen
2.   Plasma Physics by Uman
3.   X-ray Structure Determination by M.M.Woolfson
4.   Crystal growth Process and Methods by P. Santhanaraghawan and Ramaswami
5.   Thin film Phenomenon by K.L.Chopra
6.   Solid State Physics by Kittel
7.   Solid State Physics by S.O. Pillai
8.   Elements of Solid State Physics by Omar
9.   Solid State Physics by Wahab
10.   Solid State Physics by Ashcroft and Mermin

Reference Books:

1. Kothari, C, R., Research Methodology (Methods and Techniques), New age publication
2. Donald R. Cooper. Pamela S. Schindler, Business Research Methods. Tata McGraw-hill Co. Ltd.
3. John W. Creswell. Research Design, SAGF publications, Inc.
4. Trivedi R N & Shukla D.P., Research Methodology, College Book Depo Jaipur
5. Bill Taylor, Gnutam Sinha & Taposh Ghoshal, Research Methodology. Prentice Hall of India private limited, New Delhi.