GOVT. HOLKAR (MODEL AUTONOMOUS) SCIENCE COLLEGE, INDORE

(An ISO 9001:2015 & ISO 14001:2015 Certified Instituion)

SSR DOCUMENT

2017-18 TO 2021-22

CRITERION – 3

Research , Innovations and Extension

Metric No. : 3.4.1

Implementation of Code of Ethics for research

SURESH T SILAWAT

Digitally signed by SURESH T SILAWAT
Date: 2023.08.16 19:20:02 +05'30'

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3.4.1 implementation of Code of Ethics for research

S. No.	List of Documents
1.	Research Methodology Course work
2	Constitution of the ethic committee and proceedings
3	Constitution of the research advisory committee and proceedings
6	Plagiarism Check Software invoice

SCHOOL OF LIFE SCIENCES,D.A.V.V.,INDORE.

SYLLABUS FOR Ph.D.COURSE WORK [ZOOLOGY]

COURSE	TITLE	CREDITS
COURSE-I	**Research Methodology**	**4**
COURSE-II	**Research Methodology in Zoology**	**3**
COURSE-III	**Computer Application**	**3**
COURSE-IV	**Research and Publication Ethics**	**2**
COURSE-V	**Review of Literature**	**3**
	Comprehensive Viva	**3**
	Total Credits	**18**

COURSE - I- RESEARCH METHODOLOGY **4 Credits**	
Objective: To gain knowledge in general about research and its methodologies and common tools and techniques adopted for pursuing research.	
Unit I Introduction to research	Introduction to Research, Formal Science and Empirical Science, Scientific Research, Research Types, Research Design Process, Errors in Research. Formulation of research problem.
Unit II Hypothesis and data collection	Hypothesis, hypothesis generation, null and alternate hypothesis, Hypothesis testing,sample size and Power calculation. Data types: Scalar and Categorical, Data collection: Primary and secondary data, , Sampling
Unit III Data Analysis	Measures of Central tendency and Dispersion, Parametric and Non-parametric tests, Confidence interval, Errors, Levels of significance, Regression and Correlation coefficient. Probability distribution- Normal, Binomial and Poisson distribution.
Unit IV Statistical Techniques	Independent T Test, Mann Whitney Test, Paired T Test, Wilcoxon Signed rank test, One-way ANOVA, Kruskal-Wallis test, Two-way ANOVA, Multivariate Analysis, Chi-squared test, Odds and Relative Risk. ..
Unit V Research Paper Writing	Introduction to publications. Research Journals (types), Peer review process, Paper submission (Offline and online submission). Research paper writing steps and process. IMRAD system, Paper presentations, Report writing (Including pre-writing considerations and Thesis writing).

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(Dr Divisha Verma)

COURSE-IIRESEARCH METHODOLOGY IN ZOOLOGY 3 credits Objective: To gain theoretical knowledge and practical experience about various methodologies commonly employed in research field of Zoology.	
Unit-I	Concept of research, scope and importance, Scientific Writing. Animal house Management, laboratory and field experimental data collection and analysis, Rules and regulations for animal experiments.
Unit-II	Chromatography: Principle, design and application of TLC, GC and HPLC Electrophoresis: Agarose and Polyacrylamide Gel Electrophoresis (PAGE, SDS PAGES). Centrifugation: Types of rotors, Ultracentrifugation. Spectroscopy: UV-Visible spectrophotometry, Atomic Absorption Spectroscopy.
Unit-III	Microscopy – Simple, compound, Phase Contrast and Electron Microscope. Microtome and microtomy.
Unit-IV	Staining techniques:Histological (Single, double and triple Staining) and Histochemical techniques (Basic: Protein, Lipids and Carbohydrates- PAS). Biochemical Techniques – Protein, nucleic acid, SGOT, SGPT, Blood Glucose estimation.
Unit-V	Water Sampling & Water analysis- Chloride, DO, BOD, COD, Turbidity Alkalinity, PO_4, SO_4, pH and Nitrate.

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(Dr Dinesh Verma)

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COURSE-III COMPUTER APPLICATIONS. 3 credits Objective: To gain theoretical knowledge and practical experience about the use of various Computer software and statistical tools for application in research work.	
Unit-I MS Word	Features and applications related to presentation of text in suitable format and saving the data for future applications.
Unit-II MS Excel	Construction of power point presentation from the experimental data. Design and application of formulae for calculation and their application to the experimental data. Use of Statistical tools, in preparation of graphs, histograms, charts and diagrams. Use of various presentation techniques.
Unit-III MS Power Point	Preparation of power point presentation based on the topic of research. Insertion of figures, graphs, charts in presentation. Preparation of scientific posters for presentation Use of various presentation techniques.
Unit-IV Use of SPSS & Internet Applications.	Methods of preparation of data sheets and entering the data according to its characteristics. Use of various statistical tools on SPSS. Overview of networking, Internet and its applications. Exploring various websites and search engines for collecting quality literature and secondary data related to research work.
Unit-V Bioinformatics	What is bioinformatics and its relation with molecular biology. Examples of related tools(FASTA, BLAST, RASMOL), Databases(GENBANK, Pubmed, PDB) and software(RASMOL, Ligand Explorer). Introduction to Sequences and alignments; Local alignment and Global alignment, Phylogenetic analysis.

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(Dr Dinesh Verma)

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COURSE-IV RESEARCH AND PUBLICATION ETHICS. **2 credits** Objective: Course for awareness about the publication ethics and publication misconducts.	
Unit –I Philosophy and Ethics	1. Introduction to Philosophy: definition, nature and scope, concept, branches 2. Ethics: definition, moral philosophy, nature of moral judgements and reactions
Unit-II Scientific Conduct	1. Ethics with respect to science and research 2. Intellectual honesty and research integrity 3. Scientific misconduct: Falsification, Fabrication, and Plagiarism (FFP) 4. Redundant Publications: duplicate and overlapping publications, salami slicing 5. Selective Reporting and misrepresentation of data.
Unit-III Publication Ethics	1. Publication Ethics: definition, introduction and importance 2. Best Practices/ standards setting initiatives and guidelines: COPE, WAME, etc. 3. Conflicts of interest 4. Publication misconduct: definition, concept, problems that lead to unethical; behavior and vice-versa, types. 5. Violation of Publication ethics, authorship and contributorship 6. Identification of publication misconduct, complaints and appeals 7. Predatory publishers and Journals
Unit- IV Open Access Publishing	1. Open access Publications and initiatives 2. SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies 3. Software tool to identify predatory publications developed by SPPU 4. Journal Finder/ Journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.
Unit-V Publication Misconduct	A. Group Discussion 1. Subject specific ethical issues, FFP, authorship 2. Conflicts of interest 3. Complaints and appeals: examples and fraud from India and abroad B. Software tools Use of Plagiarism Software like Turnitin, Urkund and other open source software tools
Unit-VI Databases and Research Metrics	A. Databases 1. Indexing databases 2. Citation databases: Web of Science, Scopus, etc. B. Research Metrics 1. Impact factor of Journals as per Journal Citation Report, SNIP. SJR, IPP, Cite Score 2. Metrics: h-index, g index, i10 index, altmetrics

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(Dr Dinesh Verma)

COURSE-V REVIEW OF LITERATURE **3 credits**

Objectives : To collect the available literature in the chosen field of research, preparation of chronological order about the development of various sub-topics in the field, identification of gaps in the knowledge and preparation of objectives to bridge those gaps.

Sources of research material, literature survey, compiling records.
Kinds of scientific documents-research paper, review paper, book review, theses and conference and project reports.
Components of a research paper-IMRAD system, title, author and addresses, abstracts.
Dealing with publishers-submission of manuscripts and ordering reprints.
Oral and poster presentation of research papers in conference/symposia.
Preparation and submission of research projects proposal to funding agencies.
To develop communication skills for presentation of research findings.
To understand and follow ethical issues in research.

Respective supervisors will evaluate literature reviews submitted by the student and recommend the topic for registration. The supervisor will also help in developing communication skill and address ethical issues in research.

Comprehensive Viva: As per the provision of Ordinance-11, a student will appear for comprehensive viva.

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(Dr Dinesh Verma)

School of Physics

Devi Ahilya Vishwavidyalaya

Vigyan Bhavan, Khandwa Road Campus,

Indore-452001,M. P. INDIA

Syllabus
Ph.D. Course Work
PHYSICS

2021-2022

Syllabus for Ph.D. Course Work inPhysics (2020-21)

S. No.	Name of Subject	Credits
1.	Review of related literature	03
2.	Research Methodology	04
3.	Computer applications	03
4.	Subject Specific-I	03
5.	Research and publication ethics	02
6.	Comprehensive viva Voce	03
	Total Credits	18

Paper I: Review of related literature Credits: 03

1.Selection of topic for literature.

2.Chronological development of the topic.

3.Current trends and Future scope.

Paper II: Research Methodology **Credits:04**

Unit I- Structural studies 15Lectures

Basic Materials Characterization Techniques: Principle, instrumentation and applications of the following techniques- X ray based techniques: X-ray diffraction (XRD) and X-ray absorption fine structure (XAFS), Optical Spectroscopy: UV-VIS and FTIR Spectroscopy, Photoelectron spectroscopy: X-ray photoelectron spectroscopy.

Unit II Electrical measurements 15Lectures

Transport measurements: Metal, Superconductors, Insulators and Semiconductors, Four probe and Van der Pauw techniques, Magnetoresistance, Hall measurements, Thermoelectric power, Thermal conductivity, Differential scanning calorimetry, Dielectric measurement.

Unit III Magnetic measurements 15Lectures

Magnetic and structural characterization using - Mössbauer spectroscopy, magnetic hysteresis measurements making use of conventional induction technique and vibrating sample magnetometer technique, determination of magnetic anisotropy using torque magnetometer and, magnetostriction measurements using stress dependence of hysteresis loop and small angle magnetization rotation method.

Books Recommended:

1. C. Kittel, "Introduction to Solid State Physics" Wiley Eastern Ltd, 2005. 4.
2. A.J. Dekker, "Solid State Physics", Macmillan & Co, 2000.
3. Sam Zhang, Lin Li and Ashok Kumar, Materials Characterization Techniques, CRC Press, (2008)
4. Yang Leng, Materials Characterization: Introduction to Microscopic and Spectroscopic Methods, Wiley & Sons (2008)
5. Elton N. Kaufmann, Characterization of Materials, Vol.1, Wiley & Sons (2003)
6. W. D. Callister, "Materials Science and Engineering: An Introduction", John Wiley & Sons, 2007.
7. Michael Shur, "Physics of Semiconductor Devices", Prentice Hall of India, 1995.
8. Charles P Poole Jr., and Frank J. Ownes, Introduction to Nanotechnology, John Wiley Sons, Inc., 2003
9. V.R.Gowariker, "Polymer science ",New age international Publishers, 1986

Paper III: Computer Applications **Credits: 03**

35Lectures

Unit I

Programming using C++.Numeric data type expression input /output, logical expression, selection control structure, loops, if, for, while and do-while.

Unit II

A. Matlab / Scilab.The basic features of Matlab / Scilab, viz., variables, function & arrays, scripts, and operations. Visualization, programming, interpolation and integration.

B. Microsoft Excel /OpenOffice Calc The basic features of spreadsheets, arithmetic operations on grid cells, inbuilt mathematical and statistical functions, display of data as line graphs, histograms and charts. Applications in using numerical methods.

Unit III

Application of various software's including-graphics software, such origin etc. Data analysis software's and their application in research, linear and polynomial regression.

Books Recommended:

1. Turbo C++, Robert Lafore, Galgotia Publications Pvt. Ltd, ISBN 81-85623-22-8.
2. Programming and Problem Solving with C++, N. Dale and C. Weems, Jones and Bartlett Publication, ISBN 978-93-80108-50-6.
3. Numerical mathematical analysis: J. B. Scarborough.
4. First course in numerical analysis: A Raltson.
5. Numerical methods in Science and Engg: S Rajsekharan.
6. Numerical methods for Physics, Science and Engineering: J. H. Mathews, Tata McGraw Hill Publishers 1984.
7. Numerical Methods for Engineers, Steven C. Chapra and Raymond P. Canale, McGraw-Hill Book Company, ISBN-0-07-100412
8. Matlab by Rudra Pratap.

Paper IV: Subject Specific- I **Credits:03**

35Lectures

Chose any one stream.

Stream A

Advanced characterization techniques

Stream B

Electromagnetics, plasmas and Laser Applications

Stream A

ADVANCED CHARACTERIZATION TECHNIQUES :

X-ray diffraction. Diffraction under non-ideal conditions. Atomic scattering and Geometrical structure factors. Factors influencing the intensities of diffracted beams. Powder X-ray diffractometer. Applications of XRD in ceramic materials.

Study of the morphology, aggregation, size and microstructure of ceramic materials using. Optical microscope, quantitative phase analysis. Principle of electron microscopy.

Atomic Force Microscope. Mechanism of image formation in SEM and its processing. Electron microprobe analysis (EDAX and WDS). Preparation of samples for electron microscopic studies. ESCA and PES.

Spectrophotometric analysis of materials: Basic laws of spectrophotometry and its application in micro analysis in UV/ Visible range, effect of reflectance factor on optical analysis, construction and working principle of spectrophotometer, importance of additive absorbances in multiple analysis of materials. Infrared spectrophotometry: General aspects of IR spectroscopy and its application in structural analysis of systems, sources of IR radiations, Optical systems and operation of FTIR spectrophotometers. Samples preparation, IR analysis and structural co-relations.

REFERENCES:

1. Sam Zhang, Lin Li and Ashok Kumar, Materials Characterization Techniques, CRC Press, (2008)

2. Yang Leng, Materials Characterization: Introduction to Microscopic and Spectroscopic Methods, Wiley & Sons (2008)

3. Elton N. Kaufmann, Characterization of Materials, Vol.1, Wiley & Sons (2003)

Stream B

Electromagnetics of plasmas and Lasers.

Unit I: Introduction to Electromagnetics

Electromagnetic waves: E. M. waves in vacuum, polarization, Poynting vector, refraction and reflection of EM waves at interface between two dielectrics.

Boundary value problems in presence of metallic interface: reflection and refraction from metallic surface, waveguides and resonator**.**

Unit II: Introduction to Lasers and Laser application

Special laser characteristics: Brightness, coherence and directionality, Laser amplification and Oscillations, three level and four level lasers, optical resonators ,laser rate equations and specific laser systems. Laser applications .

Unit III: Introduction to plasma physics

Plasma Parameter, Debye Shielding, Plasma Oscillations, Single Particle Motion- Adiabatic Constants, Trapping in Mirrors, Plasma Models- Kinetic Descriptions, Two Fluid Equations, Waves and Instabilities- Electro-magnetic Waves, Alfven Waves, Ion Acoustic Waves, Kinetic Treatment of Waves, Landau Damping.

Books Recommended:

1. Photonic Crystals: Physics, Fabrication & Applications, K. Inoue & K. Ohtaka (Eds.), Springer-Verlag Berlin Heidelberg New York, 2004.
2. Practical fiber optics by bailey and wright, An imprint of Elsevier, Jordan Hill, Oxford in 2003.
3. G.Dattoli,L.Giannessi,M.Richeta,A.Torre,Phys.Rev.A, Vol. 45, (1992), 4023.
4. Y. Li, B. Faatz and J. Pflueger, Magnet sorting for the XFEL hybrid undulator comparative study, DESY Report, TESLA-FEL, August 2007.
5. Lectures on the Free Electron Laser Theory and Related Topics, by G. Dattoli.
6. Introduction to Plasma Physics and Controlled Fusion: F. F. Chen
7. Introduction to Plasma Theory: D.R. Nicholson
8. Laser Plasma Interaction by Willian L. Kruer, Addison-Wesley Publishing Company.

Paper V: Research and publication ethics **Credits: 02**
22Lectures

THEORY

PHILOSOPHY AND ETHICS: Introduction to philosophy- definition, nature and scope, concept, branches. Ethics- definition, moral philosophy, nature of moral judgements and reactions

SCIENTIFIC CONDUCT: Ethics with respect to science and research, Intellectual honesty and research integrity, Scientific misconducts -Falsification, Fabrication, and Plagiarism, Redundant publications- duplicate and overlapping publications, salami slicing, Selective reporting and misrepresentation of data.

PUBLICATION ETHICS: definition, introduction and importance. Best practices / standards setting initiatives and guidelines: COPE, WAME, etc. Conflicts of interest. Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa, types. Violation of publication ethics, authorship and contributorship. Identification of publication misconduct, complaints and appeals. Predatory publishers and journals

PRACTICE

OPEN ACCESS PUBLISHING: Open access publications and initiatives. SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies. Software tool to identify predatory publications developed by SPPU.
Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.

PUBLICATION MISCONDUCT
Group Discussions on Subject specific ethical issues, FFP, authorship. Conflicts of interest
Complaints and appeals: examples and fraud from India and abroad.

Software tools: Use of plagiarism software like Tumitin, Urkund and other open source software tools.

DATABASES AND RESEARCH METRICS
Databases: Indexing databases. Citation databases: Web of Science, Scopus, etc.
Research Metrics: Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score. Metrics: h-index, g index, i10 index, altmetrics

References

Bird, A. (2006). *Philosophy of science.* Routledge.
MacIntyre, Alasdair (1967) *A Short History of Ethics.* London.
P. Chaddah, (2018) Ethics in Competitive Research: Do not get scooped; do not get plagiarized, ISBN:978- 9387480865
National Academy of Sciences, National Academy of Engineering and Institute of Medicine. (2009). On *Being a Scientist.' A Guide to Responsible Conduct in Research: Third EditfOn.* National Academies Press.
Resnik, D. B. (2011). What is ethics in research & why is it important. *National Institute of Environmental Health Sciences,* 1-10. Retrieved from
httos://www.nieiys.nih.gov/research/resources/bioethics/whatis/index.cfm Beall, J. (2012). Predatory publishers are corrupting open access. Nature, 489(7415), 179—179. https://doi.org/10.1038/489179a
Indian National Science Academy (INSA), Ethics in Science Education, Research and Governance(2019), ISBN:978-81-939482-1-7. http://www.insaindia res.in/pdf/Ethics Book.pdf

SCHOOL OF LIFE SCIENCES,D.A.V.V. INDORE.

SYLLABUS FOR Ph.D.COURSE WORK [LIFE SCIENCES]

COURSE	TITLE	CREDITS
COURSE-I	**Research Methodology**	**4**
COURSE-II	**Research Methodology in Life Sciences**	**3**
COURSE-III	**Computer Application**	**3**
COURSE-IV	**Research and Publication Ethics**	**2**
COURSE-V	**Review of Literature**	**3**
	Comprehensive Viva	**3**
	Total Credits	**18**

COURSE - I- RESEARCH METHODOLOGY **4 Credits**	
Objective: To gain knowledge in general about research and its methodologies and common tools and techniques adopted for pursuing research.	
Unit I Introduction to research	Introduction to Research, Formal Science and Empirical Science, Scientific Research, Research Types, Research Design Process, Errors in Research. Formulation of research problem.
Unit II Hypothesis and data collection	Hypothesis, hypothesis generation, null and alternate hypothesis, Hypothesis testing,sample size and Power calculation. Data types: Scalar and Categorical, Data collection: Primary and secondary data, , Sampling
Unit III Data Analysis	Measures of Central tendency and Dispersion, Parametric and Non-parametric tests, Confidence interval, Errors, Levels of significance, Regression and Correlation coefficient. Probability distribution- Normal, Binomial and Poisson distribution.
Unit IV Statistical Techniques	Independent T Test, Mann Whitney Test, Paired T Test, Wilcoxon Signed rank test, One-way ANOVA, Kruskal-Wallis test, Two-way ANOVA, Multivariate Analysis, Chi-squared test, Odds and Relative Risk. ..
Unit V Research Paper Writing	Introduction to publications. Research Journals (types), Peer review process, Paper submission (Offline and online submission). Research paper writing steps and process. IMRAD system, Paper presentations, Report writing (Including pre-writing considerations and Thesis writing).

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COURSE-IIRESEARCH METHODOLOGY IN LIFE SCIENCES3 credits Objective: To gain theoretical knowledge and practical experience about various methodologies commonly employed in research field of Life Sciences.	
Unit-I Microbiological Methods	Solid and liquid culture media. Sources of types strains of microorganisms. Revival of culture from lyophilized ampoules. Preservation and maintenance of microbial cultures.
Unit-II Analytical Methods	Chromatography: Principle, design and application of TLC, GC and HPLC. Electrophoresis: Agarose and Polyacrylamide Gel Electrophoresis (PAGE,SDS,PAGE) Centrifugation: Types of rotors, Ultracentrifugation. Spectroscopy : Basic principles and applications of UV-Visible Spectrophotometry
Unit-III Methods in Physiology	Various assay procedures: Bioassay, hormones assay by RIA and ELISA. Safety evaluation of drug/compound. Basic principles of Management of laboratory animals. Plant hormone assays Methods to study photosynthesis in plants
Unit-IV	Production of antibodies from laboratory animals. Monoclonal antibodies. Western blot methods of band detection. Isolation of various immune cells and their functional assays. Proteomics, methods and applications.
Unit-V Methods in Molecular Biology.	Isolation, purification and separation of nucleic acids. Hybridization techniques-Southern and Northern Blotting. Polymerase chain reaction and its applications. Microarray, RT PCR.

COURSE-III COMPUTER APPLICATIONS. 3 credits Objective: To gain theoretical knowledge and practical experience about the use of various Computer software and statistical tools for application in research work.	
Unit-I MS Word	Features and applications related to presentation of text in suitable format and saving the data for future applications.
Unit-II MS Excel	Construction of power point presentation from the experimental data. Design and application of formulae for calculation and their application to the experimental data. Use of Statistical tools, in preparation of graphs, histograms, charts and diagrams. Use of various presentation techniques.
Unit-III MS Power Point	Preparation of power point presentation based on the topic of research. Insertion of figures, graphs, charts in presentation. Preparation of scientific posters for presentation Use of various presentation techniques.
Unit-IV Use of SPSS & Internet Applications.	Methods of preparation of data sheets and entering the data according to its characteristics. Use of various statistical tools on SPSS. Overview of networking, Internet and its applications. Exploring various websites and search engines for collecting quality literature and secondary data related to research work.
Unit-V Bioinformatics	What is bioinformatics and its relation with molecular biology. Examples of related tools(FASTA, BLAST, RASMOL), Databases(GENBANK, Pubmed, PDB) and software(RASMOL, Ligand Explorer). Introduction to Sequences and alignments; Local alignment and Global alignment, Phylogenetic analysis.

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COURSE-IV RESEARCH AND PUBLICATION ETHICS. **2 credits** Objective: Course for awareness about the publication ethics and publication misconducts.	
Unit –I Philosophy and Ethics	1. Introduction to Philosophy: definition, nature and scope, concept, branches 2. Ethics: definition, moral philosophy, nature of moral judgements and reactions
Unit-II Scientific Conduct	1. Ethics with respect to science and research 2. Intellectual honesty and research integrity 3. Scientific misconduct: Falsification, Fabrication, and Plagiarism (FFP) 4. Redundant Publications: duplicate and overlapping publications, salami slicing 5. Selective Reporting and misrepresentation of data.
Unit-III Publication Ethics	1. Publication Ethics: definition, introduction and importance 2. Best Practices/ standards setting initiatives and guidelines: COPE, WAME, etc. 3. Conflicts of interest 4. Publication misconduct: definition, concept, problems that lead to unethical; behavior and vice-versa, types. 5. Violation of Publication ethics, authorship and contributorship 6. Identification of publication misconduct, complaints and appeals 7. Predatory publishers and Journals
Unit- IV Open Access Publishing	1. Open access Publications and initiatives 2. SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies 3. Software tool to identify predatory publications developed by SPPU 4. Journal Finder/ Journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.
Unit-V Publication Misconduct	A. Group Discussion 1. Subject specific ethical issues, FFP, authorship 2. Conflicts of interest 3. Complaints and appeals: examples and fraud from India and abroad B. Software tools Use of Plagiarism Software like Turnitin, Urkund and other open source software tools
Unit-VI Databases and Research Metrics	A. Databases 1. Indexing databases 2. Citation databases: Web of Science, Scopus, etc. B. Research Metrics 1. Impact factor of Journals as per Journal Citation Report, SNIP. SJR, IPP, Cite Score 2. Metrics: h-index, g index, i10 index, altmetrics

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COURSE-V REVIEW OF LITERATURE **3 credits**

Objectives : To collect the available literature in the chosen field of research, preparation of chronological order about the development of various sub-topics in the field, identification of gaps in the knowledge and preparation of objectives to bridge those gaps.

Sources of research material, literature survey, compiling records.
Kinds of scientific documents-research paper, review paper, book review, theses and conference and project reports.
Components of a research paper-IMRAD system, title, author and addresses, abstracts.
Dealing with publishers-submission of manuscripts and ordering reprints.
Oral and poster presentation of research papers in conference/symposia.
Preparation and submission of research projects proposal to funding agencies.
To develop communication skills for presentation of research findings.
To understand and follow ethical issues in research.

Respective supervisors will evaluate literature reviews submitted by the student and recommend the topic for registration. The supervisor will also help in developing communication skill and address ethical issues in research.

Comprehensive Viva: As per the provision of Ordinance-11, a student will appear for comprehensive viva.

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Office of the Principal
Government Holkar (Model Autonomous) Science College, Indore (M.P.)
Contact No. 0731-2464074, 2446806, 2764027 (Exam)
E-mail: principalhsc@rediffmail.com, Web Address: www.collegeholkar.org
(Re-accredited 'A' Grade by NAAC)

CORRIGENDUM

We would like to bring to your attention an important addition to the previous notice regarding the formation of the Research Development cell at Holkar College. In addition to its primary role in research development, the committee will also be assigned the crucial responsibility

1)As the Research Ethics Committee (REC). As the Research Ethics Committee, the RDEC will play a pivotal role in ensuring the promotion and adherence to ethical research practices within our academic community.

2) As The research Advisory committee: Research Advisory Committee will look after research ecosystem within the college, ensuring that research activities align with the institution's goals, values, and standards.

To ensure transparency and accountability, these Committee, will submit an annual report to the Principal through the Internal Quality Assurance Cell (IQAC). These reports will provide a comprehensive overview of the committee's activities, achievements, challenges, and recommendations related to research ethics during the academic year.

Government Holkar (Model Autonomous) Science College INDORE

Principal
Government Holkar (Model Autonomous)
Science College, Indore

Office of the Principal
Government Holkar (Model Autonomous) Science College, Indore (M.P.)
Contact No. 0731-2464074, 2446806, 2764027 (Exam)
E-mail: principalhsc@rediffmail.com, Web Address: www.collegeholkar.org
(Re-accredited 'A' Grade by NAAC)

Report of the Research Ethics Committee

Year 2020-21

The Research Ethics Committee (REC) presents this annual report summarizing its activities and achievements during the academic year 2020-21. The REC plays a crucial role in safeguarding the rights and welfare of research participants, ensuring compliance with ethical guidelines, and promoting responsible research practices.

Introduction:

The Research Ethics Committee (REC) presents this annual report summarizing its activities and achievements during the academic year 2020-21. The REC plays a crucial role in safeguarding the rights and welfare of research participants, ensuring compliance with ethical guidelines, and promoting responsible research practices.

Overview of Activities:

1. Protocol Review and Approval:

The REC received 12research proposals for review during the year 2020-21. Each proposal underwent a rigorous and thorough evaluation to ensure compliance with ethical principles. The committee paid particular attention to the protection of human subjects, data privacy, and research integrity. Out of the12, 9 were approved, and 3 were not approved due to ethical concerns.

2. Continuing Reviews and Amendments:

The REC conducted periodic continuing reviews for approved projects to ensure that ethical standards were maintained throughout the research process. Researchers were also required to submit amendments for any changes to the approved protocols.

3. Training and Education:

To promote a culture of research ethics and enhance the understanding of ethical principles among researchers, the REC organized 2 workshops and seminars on research ethics during the academic year. These events covered topics such as informed consent, confidentiality, data handling, and the responsible conduct of research.

4. Monitoring and Compliance:

The REC monitored ongoing research projects to ensure adherence to the approved protocols and ethical guidelines. The committee also investigated any reports of non-compliance or ethical concerns promptly. Fortunately, no major instances of non-compliance were reported during the reporting period.

Future Plans:

Moving forward, the REC aims to further strengthen its processes and ensure effective dissemination of ethical principles across the research community. Committee proposed to purchase a pilgrims check software.

Conclusion:

The Research Ethics Committee remains committed to upholding ethical standards in research. Through robust review processes, educational initiatives, and ongoing monitoring, the committee strives to protect the rights and welfare of research participants and uphold the reputation of the institution as a responsible and ethical research hub.

We extend our gratitude to the committee members, researchers, and all stakeholders for their valuable contributions to the ethical conduct of research.

Sincerely,

Chairperson/Designation of the REC

IQAC Coordinator
Government Holkar (Model Autonomous)
Science College, Indore

Approved

Member Secretary, Academic Council
Govt. Holkar (Model Autonomous)
Science College, Indore

Office of the Principal
Government Holkar (Model Autonomous) Science College, Indore (M.P.)
Contact No. 0731-2464074, 2446806, 2764027 (Exam)
E-mail: principalhsc@rediffmail.com, Web Address: www.collegeholkar.org
(Re-accredited 'A' Grade by NAAC)

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1)As the Research Ethics Committee (REC). As the Research Ethics Committee, the RDEC will play a pivotal role in ensuring the promotion and adherence to ethical research practices within our academic community.

2) As The research Advisory committee: Research Advisory Committee will look after research ecosystem within the college, ensuring that research activities align with the institution's goals, values, and standards.

To ensure transparency and accountability, these Committee, will submit an annual report to the Principal through the Internal Quality Assurance Cell (IQAC). These reports will provide a comprehensive overview of the committee's activities, achievements, challenges, and recommendations related to research ethics during the academic year.

Government Holkar (Model Autonomous) Science College INDORE

Principal
Government Holkar (Model Autonomous)
Science College, Indore

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Government Holkar (Model Autonomous) Science College, Indore (M.P.)
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(Re-accredited 'A' Grade by NAAC)

Research Advisory Committee Annual Report

2021-22

Introduction:

The Research Advisory Committee (RAC) is pleased to present its annual report for the year 2021-22 This report highlights the committee's efforts, achievements, and contributions in guiding and supporting research activities within the institution.

Committee Overview:

The RAC is entrusted with several key responsibilities aimed at fostering a robust research environment that aligns with the college's mission and values. Throughout the year, the committee diligently carried out its duties, ensuring the ethical conduct of research and the promotion of innovative scholarly endeavors.

Main Duties and Achievements:

1. Research Oversight:

The committee meticulously monitored ongoing research projects, evaluating their quality, ethics, and relevance to maintain academic and ethical standards.

2. Strategic Planning:

The RAC actively participated in shaping the college's research strategy, setting priorities, identifying emerging research areas, and aligning research goals with the institution's mission.

3. Proposal Review:

A comprehensive assessment of research proposals was conducted, considering factors like feasibility, methodology, potential impact, and ethical considerations. This ensured the selection of projects with the most potential.

4. Resource Allocation:

The committee played a crucial role in allocating resources, including funding, laboratory space, equipment, and personnel, thus providing crucial support for research initiatives.

5. Collaboration Facilitation:

Encouraging interdisciplinary collaboration and partnerships both within and beyond the college enhanced the research environment, promoting diverse and productive interactions.

6. Ethical Oversight:

Upholding ethical standards was a priority. The RAC thoroughly reviewed research involving human subjects, animals, sensitive data, and contentious subjects to ensure adherence to ethical guidelines.

7. Progress Monitoring:

Regular progress reviews of ongoing research projects enabled timely feedback, troubleshooting, and guidance to keep projects on track towards their goals.

8. Dissemination Support:

Guidance was offered to researchers on effectively communicating their findings through various channels such as publications, presentations, and conferences.

9. **Policy Development:**

Collaborating with the administration, the committee helped establish research-related policies, procedures, and guidelines that promote transparency, accountability, and a supportive research culture.

10. External Relations:

Establishing connections with external stakeholders, including funding agencies, industry partners, and research institutions, expanded opportunities for funding and collaboration.

11. Professional Development:

The RAC provided valuable mentorship, training, and workshops to faculty and students, nurturing their growth as researchers.

Conclusion:

The Research Advisory Committee's dedication and commitment have significantly contributed to the advancement of research at Institution. By fulfilling its diverse responsibilities, the committee has played a pivotal role in fostering a thriving research ecosystem that upholds the college's objectives, values, and standards.

We look forward to continuing our efforts in the coming year and further elevating the research culture at Institution.

Approved

Member Secretary, Academic Council
Govt. Holkar (Model Autonomous)
Science College, Indore

IQAC Coordinator
Government Holkar (Model Autonomous)
Science College, Indore

Research Advisory Committee

Government Holkar (Model Autonomous) Science College ★GOVT.★INDORE★

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Research Development and Ethics Committee Annual Report

(Year 2021-22)

I. Introduction:

The Research Development and Ethics Committee (RDEC) is pleased to present its annual report for the academic year 2021-22. The RDEC is committed to promoting and ensuring ethical research practices among students, supervisors, researchers, and staff members.

II. Ethical Attribution and Source Acknowledgment:

During the reporting period, the RDEC played a pivotal role in guiding students, supervisors, researchers, and staff members on correct attribution of resources and obtaining author permissions as required. The committee emphasized the importance of acknowledging sources in alignment with the needs, specificities of disciplines, and relevant agreements and regulations governing the sources.

III. Ethical Approval for Studies Involving Human and Animal Subjects:

The RDEC strictly adheres to ethical principles concerning research involving human or animal study subjects. All experiments conducted on animals or human participants required ethical approval and permission. The Institutional Animal Ethics Committee (IAEC) closely monitored animal experiments, ensuring compliance with the CPCSEA criteria (Committee for the Purpose of Control and Supervision of Experiments on Animals).

IV. Researchers' Accountability:

Throughout the year, the RDEC emphasized that researchers are responsible and accountable for the accuracy and thoroughness of their reports. No incidents of research misconduct were reported, demonstrating the commitment of our researchers to uphold ethical standards.

V. Research Misconduct and Plagiarism Awareness:

The RDEC actively promoted awareness about research misconduct and plagiarism within the academic community. The committee highlighted the following areas to avoid:

Paraphrasing without proper acknowledgment and citation.

Presenting others' work as one's own.

Reproducing another person's work without appropriate citation, including graphs, experimental data, laboratory reports, proofs, or problem solutions.

Fabrication of data or references in papers, publications, or presentations.

VI. Research Proposal Review:

During the academic session 2021-22, a total of 10 research proposals were submitted for review by the RDEC. Out of these, 8 proposals were found to be suitable and aligned with

ethical standards. The RDEC provided valuable feedback and support to researchers, enabling them to meet the required ethical criteria.

VII. Collaborative Efforts:

The RDEC fostered collaborative efforts between our institution and Malwalchal University to enhance research integrity and ethical practices. A memorandum of understanding (MOU) proposal was initiated to strengthen research collaborations and uphold ethical standards in joint research projects.

VIII. Conclusion:

The Research Development and Ethics Committee's dedication and efforts in promoting ethical research practices have contributed to maintaining the integrity and reputation of research at Holkar College. The committee acknowledges the commitment and responsibility exhibited by researchers, faculty, and staff members throughout the year.

The RDEC looks forward to continuing its endeavours in the upcoming year, advocating for ethical research, and fostering a culture of integrity, transparency, and accountability in all research activities at our institution.

Respectfully submitted,

Chairperson REC

forwarded

IQAC Coordinator
Government Holkar (Model Autonomous)
Science College, Indore

Approved

Member Secretary (Academic Council)
Govt. Holkar (Model Autonomous)
Science College, Indore

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