



Copy of the syllabus of the research methodology course work to indicate if research ethics is included

Content

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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).	

Shivanshu
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Kishor
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Banshi
27/7/2021

Dr. Dinesh Verma
27.7.21

(Dr. Dinesh Verma)

COURSE-II RESEARCH 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.

S. Shrivastava
27.7.21

Dr. Anurag
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Dr. L.
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(Dr. Dinesh Verma)

Kishor
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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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Ramesh
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DML
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(Dr. Dinesh Verma)

Kuldeep
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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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> A. Group Discussion <ol style="list-style-type: none"> 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 <p>Use of Plagiarism Software like Turnitin, Urkund and other open source software tools</p> 	
Unit-VI Databases and Research Metrics	<ol style="list-style-type: none"> A. Databases <ol style="list-style-type: none"> 1. Indexing databases 2. Citation databases: Web of Science, Scopus, etc. B. Research Metrics <ol style="list-style-type: none"> 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. L.
17.7.21
(Dr. Disha Verma)

Dr. Anurag
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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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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
in Physics (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 correlations.

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.

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 Turnitin, iThenticate 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 Edition'*. 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

<https://www.niehs.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-II RESEARCH METHODOLOGY IN LIFE SCIENCES 3 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.

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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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COURSE-IV RESEARCH AND PUBLICATION ETHICS.		2 credits
Objective: Course for awareness about the publication ethics and publication misconducts.		
Unit –I Philosophy and Ethics	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> A. Group Discussion <ol style="list-style-type: none"> 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 <p>Use of Plagiarism Software like Turnitin, Urkund and other open source software tools</p> 	
Unit-VI Databases and Research Metrics	<ol style="list-style-type: none"> A. Databases <ol style="list-style-type: none"> 1. Indexing databases 2. Citation databases: Web of Science, Scopus, etc. B. Research Metrics <ol style="list-style-type: none"> 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.

Khopikar
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