SCHOOL OF LIFE SCIENCES

DEVI AHILYA VISHWAVIDYALAYA, INDORE

Minutes of the meeting organized with regards to the University Grants Commission notification No. D.O.No.F.1-1/2018 (Journal/CARE) Dec 2019

As per the University Grants Commission notification No. D.O.No.F.1-1/2018 (Journal/CARE) Dec 2019, an additional paper on Research and Publication Ethics for two credits needs to be added in the revised syllabus for the Ph.D. course work in Life Sciences.

Hence, with reference to the above mentioned UGC notification, the University, as per the letter no. Acad./course/2020/413 dated.22/1/2021, has instructed the UTDs to approve the required changes in the PhD Coursework Syllabus.

The Board of Studies meeting for PhD Coursework in Life Sciences was conducted on ...25.8.21.... at ..11.30. AM in .....D.A.V.V., Indore.

The following members were present in the meeting

1. Dr. K. Hajela
2. Dr. A. Kar
3. Ms. Preetibala Adatiya
4. Ms. Barsa Kohli
5. .....

The members reviewed the UGC notification No. D.O.No.F.1-1/2018 (Journal/CARE) Dec 2019 and suggested the following changes

1. In accordance with the letter, the course titled "Research and Publication Ethics" for 2 credits has to be added in the ongoing syllabus of the Ph.D. Coursework in Life Sciences (Jan 2021 – Jun 2021). Henceforth, the total credits of the course will change from 16 credits to 18 credits.
2. After adding the above "Research and Publication Ethics" paper in the syllabus, the order of the courses in Ph.D. Coursework in Life Sciences will be as under:

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

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3. Accordingly required modifications has been incorporated in the syllabus of Research Methodology (Course I) to avoid the overlapping of topics. The modified course I syllabus is as under:

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).

4. The following recommendations of the members are hereby approved to be incorporated in the existing Ordinance 11 for Ph.D. Course work.

Provisions in current Ordinance		Provision after amendment in the Ordinance		Justification
The Ph.D. Course work shall contain following courses		The Ph.D. Course work shall contain following courses		The Research and Publication Ethics Paper has to be added mandatorily from the current session as per the UGC notification No. D.O.No.F.1-1/2018 (Journal/CARE) Dec 2019.
Course	Credit	Course	Credit	
Research Methodology	4	Research Methodology	4	
Review of Published Research in the relevant field	3	Review of Published Research in the relevant field	3	
Computer Application	3	Computer Application	3	
Advance Course in relevant field	3	Advance Course in relevant field	3	
Comprehensive Viva-Voce	3	Research and Publication Ethics	2	
		Comprehensive Viva-Voce	3	

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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.
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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.
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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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