

University of Mumbai



No. AAMS_UGS/ICC/2022-23/166

CIRCULAR:-

The Principals of the Affiliated Colleges, the Head of the University Departments and Directors of the Recognized Institutions in Faculty of Inter-disciplinary Studies are hereby informed that the recommendations made by the Board of Studies in **Environmental Science** at its meeting held on 19th January, 2022 and subsequently passed by the Board of Deans at its meeting held on 02nd May, 2022 **vide** item No. 8.10 (R) have been accepted by the Academic Council at its meeting held on 17th May, 2022 **vide** item No. 8.10 (R) and that in accordance therewith, the revised syllabus of **Ph.D. Course work in Environmental Science**, has been brought into force with effect from the academic year 2022-23. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
17th November, 2022


(Prof. Sunil Bhirud)
I/c. REGISTRAR

To

The Principals of the Affiliated Colleges, the Head of the University Departments and Directors of the Recognized Institutions in Faculty of Inter-disciplinary Studies.

A.C/8.10(R) /17/05/2022

Copy forwarded with Compliments for information to:-

- 1) The Dean, Faculty of Humanities,
- 2) The Chairman, Board of Studies Inter-disciplinary Studies,
- 3) The Director, Board of Examinations and Evaluation,
- 4) The Director, Board of Students Development,
- 5) The Director, Department of Information & Communication Technology,
- 6) The Co-ordinator, MKCL.

Copy for information and necessary action :-

1. The Deputy Registrar, College Affiliations & Development Department (CAD),
2. College Teachers Approval Unit (CTA),
3. The Deputy Registrar, (Admissions, Enrolment, Eligibility and Migration Department (AEM),
4. The Deputy Registrar, Academic Appointments & Quality Assurance (AAQA)
5. The Deputy Registrar, Research Administration & Promotion Cell (RAPC),
6. The Deputy Registrar, Executive Authorities Section (EA)
He is requested to treat this as action taken report on the conce resolution adopted by the Academic Council referred to the a circular.
7. The Deputy Registrar, PRO, Fort, (Publication Section),
8. The Deputy Registrar, Special Cell,
9. The Deputy Registrar, Fort Administration Department (FAD) Record Section,
10. The Deputy Registrar, Vidyanagari Administration Department (VAD),

Copy for information :-

1. The Director, Dept. of Information and Communication Technology (DICT), Vidyanagari,
He is requested to upload the Circular University Website
2. The Director of Department of Student Development (DSD),
3. The Director, Institute of Distance and Open Learning (IDOL Administration Vidyanagari,
4. All Deputy Registrar, Examination House,
5. The Deputy Registrars, Finance & Accounts Section,
6. The Assistant Registrar, Administrative sub-Campus Thane,
7. The Assistant Registrar, School of Engg. & Applied Sciences, Kaly
8. The Assistant Registrar, Ratnagiri sub-centre, Ratnagiri,
9. P.A to Hon'ble Vice-Chancellor,
10. P.A to Pro-Vice-Chancellor,
11. P.A to Registrar,
12. P.A to All Deans of all Faculties,
13. P.A to Finance & Account Officers, (F & A.O),
14. P.A to Director, Board of Examinations and Evaluation,
15. P.A to Director, Innovation, Incubation and Linkages,
16. P.A to Director, Department of Lifelong Learning and Extension (DLLE),
17. The Receptionist,
18. The Telephone Operator,

Copy with compliments for information to :-

19. The Secretary, MUASA
20. The Secretary, BUCTU.

AC – 17/05/2022
Item No. – 8.10 (R)

UNIVERSITY OF MUMBAI



Revised Ph.D. Course work in Environmental Science

(With effect from the academic year 2022 - 2023)

UNIVERSITY OF MUMBAI



Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	Ph.D. Course work in Environmental Science
2	Eligibility for Admission	As per VCD - No. Exam. / Thesis/ Univ. /VCD947 of 2018.
3	Passing Marks	As per VCD - No. Exam. / Thesis/ Univ. /VCD947 of 2018.
4	Ordinances / Regulations (if any)	Nil/-
5	No. of Years / Semesters	Nil
6	Level	P.G. (Ph. D)
7	Pattern	Nil
8	Status	Revised
9	To be implemented from Academic Year	From Academic Year 2022 – 2023.

Name & Signature of BOS Chairperson :

Name & Signature of Dean :

Dr. Anita Swami



Preamble:

The syllabus for the PhD course work has been refined in accordance to the UGC Regulations (Minimum Standards and Procedure for the Award of M. Phil and Ph. D degrees) published in the Gazette of India on 5th July 2016 and the subsequent VCD - No. Exam. / Thesis/ Univ. /VCD947 of 2018.

It can be appreciated that the learner would now move from the comfort zone of the known to an exploration of the discipline at its limits. A comprehensive literature review would allow the learner to articulate the current knowledge and detect the lacunae therein.

This syllabus endeavors to sensitize the learner to the importance of a focused study, formulation of queries, and design of unbiased experimental sets that would lead to an efficient and economical investigation.

It also retains the scope to enhance the skill sets required to execute the experimental programmes. The programme aims to train the young researcher to analyze and interpret the results obtained considering the variations expected in a biological system using bio-statistical methods, reducing the tedium with the correct application of computer based tools and techniques.

The programme also endeavors to impart communication skills and inspire an entrepreneurial attitude firmly based on sound scientific facts, upheld by ethics and values of society.

Programme Outcomes:

The learner would be able to:

1. Identify areas of research that could be addressed and formulate research questions.
2. Hypothesize and design experiments
3. Develop sustainable, robust and ethical protocols or methodology to test and validate the results.
4. Organize information and write a thesis, reports, articles and apply for grants.
5. Present, communicate and publish research findings effectively.

SYLLABUS

Sr. No.	Course No.	Course Title	Lectures (Hours)	Credits
1	PhD_EVS101	Research Methodology & Computer Applications	60	4
2	PhD_EVS102	Research Publication Ethics (RPE)	30	2
3	PhD_EVS103	Core Subject	30	2
4	PhD_EVS104	Active Participation, Academic Development Publication of research paper, etc.	60	4

Detailed Syllabus

Paper I (PhD_EVS101): Research Methodology & Computer Applications (Credits: 4)

Course Outcome:

The learner would be able to:

1. Hypothesize and develop non-biased methodology to test the hypotheses.
2. Organize and analyse the data integrating computer tools and techniques.
3. Get acquainted with principles of scientific research and experimentation

Unit I: Scientific Research: (10 Hrs.)

Research: Definition, Characteristics, types, need of research. Identification of the problem, assessing the status of the problem, formulating the objectives, preparing design (experimental or otherwise), Actual investigation, determining the mode of attack.

Unit II: Literature survey: (10 Hrs.)

References, Abstraction of a research paper, possible ways of getting oneself abreast of current literature.

Unit III: Documentation and scientific writing: (10 Hrs.)

Results and Conclusions, Preparation of manuscript for Publication of Research paper, Presenting a paper in scientific seminar, Thesis writing.

Structure and Components of Research Report, Types of Report: research papers, thesis, Research Project Reports, Pictures and Graphs, citation styles, writing a review of paper, Bibliography.

Unit IV: (10 Hrs.)

Use of word processing, spreadsheet and database software. Plotting of graphs. Internet and its application: E-mail, WWW, Web browsing, acquiring technical skills, drawing inferences from data.

Unit V: Statistical analysis and fitting of data (10 Hrs.)

Introduction to Statistics – Probability Theories - Conditional Probability, Poisson Distribution, Binomial Distribution and Properties of Normal Distributions, Estimates of Means and Proportions; Chi-Square Test, Association of Attributes - t-Test –Anova- Standard deviation - Co-efficient of variations. Co-relation and Regression Analysis.

Unit VI: Data Analysis (10 Hrs.)

Mathematical and statistical analysis using software tools like MAT Lab, SPSS, PsiLAB or free ware tools.

Main References:

1. Thesis & Assignment Writing–J Anderson, B.H.Dursten & M.Poole, Wiley Eastern, 1977
2. A Hand Book of Methodology of Research – P. Rajammal and P. Devadoss, R. M. M. Vidya Press, 1976.
3. The Craft of Scientific Writing by Michael Alley, (Springer).
4. Research Methodology by R. Panneerselvam, PHI, New Delhi 2005
5. Practical Research Methods, by Dawson, Catherine, 2002, UBS Publishers' Distributors New Delhi.
6. Research Methodology- A step by step Guide for Beginners, (2nd ed.) Kumar Ranjit, 2005, Pearson Education.
7. How to write and publish by Robert A. Day and Barbara Gastel, (Cambridge University Press).
8. Survival skills for Scientists by Federico Rosei and Tudor Johnson, (Imperial College Press).
9. How to Research by Loraine Blaxter, Christina Hughes and Malcolm Tight, (Viva Books).
10. The Craft of Scientific Writing by Michael Alley, (Springer).
11. A Student's Guide to Methodology by Peter Clough and Cathy Nutbrown, (Sage Publications).
12. Probability and Statistics for Engineers and Scientists" by Sheldon Ross, (Elsevier Academic Press).
13. Research methodology techniques and methods by C L Kothari, New age International publishers.

Paper II (PhD_EVS101): Research Publication and Ethics (RPE) (Credits: 2)

Course Outcome:

The learner would be able to:

1. Assess and improve the skills required for the publication and ethics.
2. Design and execute well planned, sustainable, and ethical and legally correct experiments and documentation.
3. Publish and present the generated results in scientific journals and conferences.

Unit 1: Philosophy and Ethics (3 Hrs.)

1. Introduction to philosophy: definition, nature and scope, concept, branches
2. Ethics: definition, moral philosophy, nature of moral judgements and reactions

Unit 2: Scientific Conduct (5 Hrs.)

1. Ethics with respect to science and research
2. Intellectual honesty and research integrity
3. Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP)
4. Redundant publications: duplicate and overlapping publications, salami slicing
5. Selective reporting and misrepresentation of data

Unit 3: Publication Ethics (7 Hrs.)

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 contributor ship
6. Identification of publication misconduct, complaints and appeals
7. Predatory publishers and journals

PRACTICE

Unit 4: Open Access Publishing (4 Hrs.)

Open access publications and initiatives

1. SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies
2. Software tool to identify predatory publications developed by SPPU
3. Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, SpringerJournal Suggester, etc.

Unit 5: Publication Misconduct (4 Hrs.)

A. Group Discussions

1. Subject specific ethical issues, FFP, authorship
2. Conflicts of interest
4. 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 6: Database and Research Materials (4 Hrs.)

A. Databases

1. Indexing databases
2. Citation databases: Web of Science, Scopus, etc.

B. Research Metrics

1. Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, CiteScore
2. Metrics: h-index, g index, i10 index, altmetrics

References

1. Bird, A. (2006). Philosophy of science. Routledge.
2. MacIntyre, Alasdair (1967) A Short History of Ethics. London.
3. P. Chaddah, (2018) Ethics in Competitive Research: Do not get scooped; do not get plagiarized, ISBN:978- 9387480865
4. National Academy of Sciences, National Academy of Engineering and Institute of Medicine. (2009). On Being
5. Scientist.' A Guide to Responsible Conduct in Research: Third Edition. National Academies Press.
6. 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 competing open access. Nature, 489(7415), 179—179. <https://doi.org/10.1038/489179a>
7. 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/EthicsBook.pdf>

Paper III (PhD_EVS103): Core Subject (Credits: 2)

Course Outcome:

1. To develop the ability according to laboratory work and its allied problems.
2. To provide students with knowledge, general competence, and analytical skills and built their foundation for research in core subject.

This course is to be suggested by guide/supervisor/through recommendation of RAC in specific domain area of research undertaken by the research candidate in line with any of the following: (2 Credits)

Head

- A. Descriptive Examination
- B. Presentation on sub-topic under the topic of PhD
- C. Seminal on sub-topic under the topic of PhD

Paper IV (PhD_EVS104): Active Participation, Academic Development, Publication of research paper, etc. (Credits: 4)

Course Outcome:

The learner would be able to:

1. Collate and review the literature relevant to the research topic
2. Develop soft skills required for effective presentation and research publication in reputed journals.
3. Engage in scientific discussion.

Head

- A. Research paper presentation in national conference & publication.
- B. Research paper presentation in international conference & publication.
- C. Laboratory/ Field work related with the topic of PhD for not less than 7 days.
- D. Training for advanced techniques in reputed institute for not less than 7 days.

Evaluation and Assessment Methods for Course Work:

Paper I (PhD_EVS101): Research Methodology & Computer Applications

The descriptive examination of duration 2.30 hrs for 60 maximum marks would be conducted. The six assignments on various sub-topics each carrying 10 marks, would be asked to submit. The group discussion on chosen sub-topics for 40 marks, would be conducted. The marks obtained by PhD scholar out of 100 marks for Assignment/Group Discussion would be conducted to the base of maximum marks 40 and then subsequently added to the marks obtained in above descriptive examination.

Paper II (PhD_EVS101): Research Publication and Ethics (RPE)

The descriptive examination of duration 1.15 hrs for 30 maximum marks would be conducted. The six assignments on various sub-topics each carrying 10 marks, would be asked to submit. The group discussion on chosen sub-topics for 40 marks, would be conducted. The marks obtained by PhD scholar out of 100 marks for Assignment/Group Discussion would be conducted to the base of maximum marks 20 and then subsequently added to the marks obtained in above descriptive examination.

Paper III (PhD_EVS103): Core Subject

The descriptive examination of duration 1.15 hrs for 30 maximum marks would be conducted. The presentation /the seminar on two different sub-topics under the concerned topic of the PhD will have to be presented/delivered by PhD scholar, each carrying 10 marks.

Paper IV (PhD_EVS104): Active Participation, Academic Development, Publication of research paper, etc.

The presentation of research paper in National and International Conferences, each carrying 30 marks, and their subsequent publication in Proceeding Volume or Journal is essential. The laboratory/field work related with the topic of PhD for not less than 7 days, will carry 20 marks. The training for advanced techniques in reputed institute for not less than 7 days, will carry 20 marks.

Kindly Note:

1. The record of the evaluation is to be maintained till the candidate is awarded his/her Ph.D. degree by the University.
2. After completion of the course-work, the certificate of completion of course work shall be submitted to the University as per the prescribed format.

Specimen of Grade Card
(For PhD Scholars registered in this Research Centre)

Sr. No.	Course Title	Head	Maximum Marks	Minimum Marks	Marks Obtained	Credits (C)	Grade
1	Research Methodology and Computer Applications	Examination	60	24		4	
		Assignment/Group Discussion	40	16			
		Total	100	40			
2	Research & Publication Ethics	Examination	30	12		2	
		Assignment/Group Discussion	20	08			
		Total	50	20			
3	Core Subject	Examination	30	12		2	
		Presentation/Seminar	20	08			
		Total	50	20			
4	Active Participation, Academic Development, Publication of Research Paper	Research Paper Presentation & Publication in National and International Conference	60	24		4	
		Laboratory/Field Work Training	40	16			
		Total	100	40			
Grand Total			300			12	

Specimen of Grade Card

(For PhD Scholars registered elsewhere)

(For Research Methodology & Computer Applications and Research & Publication Ethics)

Sr. No.	Course Title	Head	Maximum Marks	Minimum Marks	Marks Obtained	Credits (C)	Grade
1	Research Methodology and Computer Applications	Examination	60	24		4	
		Assignment/Group Discussion	40	16			
		Total	100	40			
2	Research & Publication Ethics	Examination	30	12		2	
		Assignment/Group Discussion	20	08			
		Total	50	20			
Grand Total			150			6	

Only for Research Methodology and Computer Applications:

Sr. No.	Course Title	Head	Maximum Marks	Minimum Marks	Marks Obtained	Credits (C)	Grade
1	Research Methodology and Computer Applications	Examination	60	24		4	
		Assignment/Group Discussion	40	16			
		Total	100	40			
Grand Total			100			4	

Only for Research & Publication Ethics:

Sr. No.	Course Title	Head	Maximum Marks	Minimum Marks	Marks Obtained	Credits (C)	Grade
1	Research & Publication Ethics	Examination	30	12		2	
		Assignment/Group Discussion	20	08			
		Total	50	20			
Grand Total			50			2	

Grand Total :-

Percentage :-

Grade :-

Remark :-

7-Point Scale
Percentage/Grade Point, Grade

Sr. No.	Percentage of Marks Obtained	Grade Point	Grade
1	70.00 and above	7	O
2	60 - 69.99	6	A
3	55 - 59.99	5	B
4	50 – 54.99	4	C
5	45 – 49.99	3	D
6	40 – 44.99	2	E
7	Below 39.99	0	F

Minimum of 55% of marks or its equivalent grade in order to be eligible to submit the synopsis of dissertation/thesis.

University of Mumbai
Ratnagiri Sub-Campus
(Research Centre for PhD in Environmental Science)

Certificate

This is to certify that Mr./Ms./Mrs. (Surname)(First name)..... (Second name)..... has been a regular student of Ph.D. He/She has attended the course work on conducted at the recognized research centre/department from..... to during the year He/She has successfully completed this course as part of the pre-registration course work prescribed by the University of Mumbai. He/She secured grade in point scale.

Date:

Seal

Director (I/C)

Ratnagiri

Date: 05/03/2022

Director (I/C)

Assistant Registrar