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Semester 7 (Honours)

Sl.	Subject Type	Code	Subject Name	Credits			Total Credits
				L	T	P	
1.	DSC	BENVS 701	NATURAL HAZARDS AND DISASTER MANAGEMENT	3	2	0	5
2.		BENVS 703	Research Methodology	3	2	0	5
3.							
	DSE	MIM701	Consumer Behavior	4	-	0	4
4.		MIM702	Strategic Management	4		0	4
5.							
6	SEC	SEC781	Dissertation work [evaluation in Eight semester	-	-	-	
7.		SEC782	Summer Internship –II (refer Appendix -6.1)	0	0	8	4
TOTAL							22

Semester 8 (Honours)

Sl.	Subject Type	Code	Subject Name	Credits			Total Credits
				L	T	P	
1.	DSC	BENVS 801	ENVIRONMENTAL STATISTICS & ECONOMICS	3	2	0	5
		BENVS 802	ENVIRONMENTAL LEGISLATION & POLICY	3	1	0	4
2.		BENVS 803	ORGANISMAL & EVOLUTIONARY BIOLOGY	3	2	0	5
3.	SEC	SEC881	Dissertation work [Started in Seventh semester]	0	0	16	8
Total Credit							22

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Semester 7 (Honours with Research)

Sl.	Subject Type	Code	Subject Name	Credits			Total Credits
				L	T	P	
1.	DSC	BENVS 701	NATURAL HAZARDS AND DISASTER MANAGEMENT	3	2	0	5
2		BENVS 702	Research Methodology	3	2		5
3	DSE	MIM701	Consumer Behavior	4	-	0	4
4		MIM702	Strategic Management	4	-	0	4
5	SEC701	SECR781	Research Internship Report and Viva – Voce(Appendix -6.2)	-	-	8	4
TOTAL							22

Semester 8 (Honours with Research)

Sl.	Subject Type	Code	Subject Name	Credits			Total Credits
				L	T	P	
1.	DSC	BENVS 801	ENVIRONMENTAL STATISTICS & ECONOMICS	3	2	0	5
		BENVS 802	ENVIRONMENTAL LEGISLATION & POLICY	3	1	0	4
2.		BENVS 803	ORGANISMAL & EVOLUTIONARY BIOLOGY	3	2	0	5
3.	SEC	SECR881	Dissertation (For Research Track) (refer Appendix -7)	0	0	16	8
Total Credit							22

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Appendix – 6.1

Summer Internship

B.Sc in Environment Science VII (Honours)
Course Title: Summer Internship

Course Code	:	SEC 782
Course Title	:	Summer Internship –II
Number of Credits	:	4
Course Category	:	SEC

Course Objective(s):

The summer internship aims to provide students with an integrative learning experience that combines professional work in a real-world organisation with rigorous academic research. Through an action research project, students will develop and apply theoretical knowledge to practical challenges, enhancing their problem-solving, critical thinking, and communication skills. This course aims to bridge the gap between academic study and professional practice, preparing students for successful careers in their chosen fields.

Summer Internship Student Engagement Process:

An internship/capstone project is a structured, hands-on learning experience integrating academic knowledge with pre-professional work activities. It mutually benefits both the student-intern and the host organisation. Interns apply foundational skills from their studies to real-world tasks, enhancing their practical experience. Placement sites outline clear expectations, duties, and performance goals for the interns. They also offer regular supervision and feedback to guide the interns' development. This experiential learning helps students build valuable industry-specific skills, gain insights into their chosen field, and improve their employability upon graduation.

Step 1.
Orientation Session: The orientation session for the internship/capstone project is designed to provide students with a comprehensive overview of what to expect and how

to succeed in their upcoming professional experience. The session aims to bridge the gap between academic learning and practical application in a real-world setting.

Step 2.

Identify an internship: Students research opportunities that align with their career goals and academic background. They explore various platforms, such as online job boards, networking events, and professional associations, to find positions that offer relevant hands-on experience and skills in their chosen field.

Step 3.

Internship agreement Form: The Student, Mentor, and internship Coordinator in the Industry will complete the internship agreement form.

Step 4.

Start of Internship: The internship lasts eight weeks. Interns are expected to commit to 20 hours per week, allowing for a balanced integration of work and learning. The internship mentor will arrange specific schedules. This structure ensures that interns gain substantial experience while accommodating any academic commitments. Regular check-ins and progress reviews will be conducted to support intern development and address any challenges, ensuring a productive and enriching internship experience.

Step 5.

Submission of Report:

Front Page: Student Name, Course, Internship Company, Duration, Mentor

Internship Agreement Form

Internship Certificate

Introduction & background of the Company

Roles & responsibilities as an Intern

Weekly work allotment & completion report

Challenges & Solutions

Learning from the internship

Conclusion

Step 6.

Internship Evaluation: The Viva Voce for internship evaluation is an oral exam where interns present their experiences, learning, and contributions. It involves summarising their role, key projects, and applied skills. Interns discuss the knowledge gained, application of academic theories, and challenges faced, including how they were addressed. They reflect on their professional development and how the internship influenced their career goals. Feedback from supervisors and industry insights are also shared. Examiners ask questions to delve deeper into the intern's understanding and experiences. This evaluation assesses the intern's ability to articulate their growth and readiness for professional work. The review of the work done by students will be carried out after two weeks of report submission. The internal examiner will evaluate the student's submission.

Course Outcome:

After the course, the outcomes are as follows under

1. Application of theoretical knowledge to real-world scenarios.
2. Development of professional skills and networking opportunities.
3. I understand workplace culture and dynamics.
4. Hands-on experience in a chosen field.

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Appendix – 6.2

Research Internship Report and Viva-Voce

B.Sc in Environment Science VII (Honours with Research)

Course Title: Research Internship Report and Viva-Voce

Course Code	SEC701
Course Title	Research Internship Report and Viva-Voce
Number of Credits	4
Course Category	SEC

Course Objective(s):

The course aims to provide students with an integrative learning experience that combines professional work in a real-world organisation with rigorous academic research. Students will develop and apply theoretical knowledge to practical challenges through an action research project, enhancing their problem-solving, critical thinking, and communication skills. This course aims to bridge the gap between academic study and professional practice, preparing students for successful careers in their chosen fields.

Research Internship:

The research internship is a structured, hands-on learning experience integrating academic knowledge with pre-professional work activities. It mutually benefits both the student-intern and the host organisation. Interns apply foundational skills from their studies to real-world tasks, enhancing their practical experience. Placement sites outline clear expectations, duties, and performance goals for the interns. They also offer regular supervision and feedback to guide the interns' development. This experiential learning helps students build valuable industry-specific skills, gain insights into their chosen field, and improve their employability upon graduation.

Step 1.

Orientation Session: The orientation session for the research internship is designed to provide students with a comprehensive overview of what to expect and how to succeed in their upcoming professional experience. The session aims to bridge the gap between academic learning and practical application in a real-world

setting. It will also impart knowledge about the research methodology for implementing research in the internship project work.

Step 2.

Identify an internship: Students research opportunities that align with their career goals and academic background. They explore various platforms, such as online job boards, networking events, and professional associations, to find positions that offer relevant hands-on experience and skills in their chosen field.

Step 3.

Internship agreement Form: The Student, Mentor, and internship Coordinator in the Industry will complete the internship agreement form.

Step 4.

Start of Internship: The internship lasts eight weeks. Interns are expected to commit to 20 hours per week, allowing for a balanced integration of work and learning. The internship mentor will arrange specific schedules. This structure ensures that interns gain substantial experience while accommodating any academic commitments. Regular check-ins and progress reviews will be conducted to support intern development and address any challenges, providing a productive and enriching internship experience.

Step 5.

Submission of Report:
Part 1. (About Internship)

- Front Page: Student Name, Course, Internship Company, Duration, Mentor
- Internship Agreement Form
- Internship Certificate
- Introduction & background of the Company
- Roles & responsibilities as an Intern
- Weekly work allotment & completion report
- Learning from the internship

Part 2. (Research Conducted at Internship Organization)

- Research Agenda
- Literature Review
- Research Methodology
- Data Analysis & Interpretation
- Challenges & Solutions
- Conclusion

Step 6.

Research Internship Evaluation: The Viva Voce for internship evaluation is an oral exam where interns present their experiences, learning, and contributions. It involves summarising their role, key projects, and applied skills. Interns discuss the knowledge gained, application of academic theories, and challenges faced, including how they were addressed. They reflect on their professional development and how the internship influenced their career goals. Feedback from supervisors and industry insights are also shared. Examiners ask questions to delve deeper into the intern's understanding and experiences. This evaluation assesses the intern's ability to articulate their growth and readiness for professional work. The review of the work done by students will be carried out after two weeks by the internal and external examiner. The external examiner will evaluate for 80 marks, and the internal examiner will evaluate for 20.

Course Outcome:

After the course, the outcomes are as follows under

1. Proficiency in research methodologies encompassing design, data collection, and analysis.
2. We have advanced critical thinking to identify and address research challenges effectively.
3. Competence in data analysis techniques and interpretation for meaningful insights.
4. Enhanced communication skills demonstrated through report writing and presentations.
5. Ethical awareness and adherence to research protocols ensure integrity in research practices.

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Appendix – 7

Dissertation (FOR RESEARCH TRACK)

B.Sc in Environment Science VIII (Honours with Research))

Course Code	SEC 801
Course Title	Dissertation (FOR RESEARCH TRACK)
Number of Credits	20
Course Category	Skill Enhancement Course

Course Objective: A dissertation is **a long-form piece of academic writing based on original research conducted by the student**. Hence, this course aims to provide students with the opportunity to apply the knowledge and skills acquired in their courses to a specific problem. This allows students to extend their academic experience into areas of interest and work with new ideas. This also addresses the issues inherent in selecting a research problem and discusses the techniques and tools to be employed in completing a research project. This will also enable the students to prepare report writing and framing Research proposals. This will give students knowledge, general competence, and analytical skills in Research Methodology. They can build their foundation for research in Business administration. It provides hands-on experience in carrying out research work on interdisciplinary topics, including management, economics, etc., and the process for publishing original work.

Course Content:

Unit I - Introduction to Research:

Fundamental of research, Scope of Research, Types of Research, Process of Research, Sources of research Problem, Qualities of good research problem, Identification of good problem, Scientific research characteristics and steps of scientific research, Scientific research problems

Unit II - Research Methods & Design:

Basic Principles; need for research Design; features of good design; essential concepts relating to research design**.** Traditional Methods like Historical, Institutional, and Legal. Modern Methods like surveys of Literature, Sampling

methods, Questionnaires, Schedules, Interview methods and Focus Group discussions. Observation Methods, Case Study Methods, Content Analysis, Statistical Methods, Experimental Methods, Brainstorming Techniques, etc.

Unit III: Tools & Techniques of Data Collection Analysis and Interpretations:

Meaning of Population and Sample; Sampling Methods- Random, Stratified, Purposive. Tool of Data Collection, Primary, Secondary and Tertiary Data, Schedule, Observation.Type of Data, Primary, Secondary and Tertiary Data, Tabulation of data, Data organisation in SPSS and Excel, Graphical representation of data. Analysis of Data, Measure of Central tendency, Standard Deviation & Standard error, Measure of variability, Correlation and its computation; ANOVA. Discussion and Interpretation of Results, Testing of Hypotheses, Logical and Statistical Techniques like chi Square test and Student t-test.

Unit IV: Reporting and Thesis Writing:

Type of report Technical Reports and thesis; Significance; Different steps in the preparation; Layout, structure and language of typical reports; Illustrations and tables; Bibliography, referencing and footnotes.Planning -Preparation - practice - Making Presentation; Use of visual aids; PowerPoint for effective Communication; Criteria for evaluating the research report.

Suggested readings:

1. Uwe Flick- Introducing Research Methodology
2. CR Kothari- Research Methodology Methods and Techniques
3. John W Cresswell: Research Design: Qualitative, Quantitative, and Mixed Methods Approaches
4. Wayne C Booth: The Craft of Research
5. R Paneerselvam: Research Methodology
6. Ranjit Kumar: Research Methodology, a step-by-step guide for beginners.
7. Robert K Yin: Case Study Research: Design and Methods (Applied Social Research Methods)

Course outcomes:

At the end of the course, students will be able to

- Equip themselves with tools for data collection and analysis
- Understand research in-depth and acquire knowledge to undertake a research project independently.
- Equip themselves with ethical issues related to Research and Publication.
- Build a strong foundation for future research work systematically by applying notions of Research Methodology.
- Gain ability to apply knowledge of Business Administration to research in real-world issues

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Semester-VII

Major Paper Code: BENVS-701	SEM-VII
Paper Name: Natural Hazards and Disaster Management	Maximum Marks: 100
Teaching Scheme	Examination Scheme
Lecture hour: 45	End semester exam: 70
Tutorial hour: 30	Continuous Assessment: 30
Practical hour: 0	Practical/Seasonal internal continuous evaluation:0
Total hours: 75	Practical/Seasonal external examination: 0
Credit: 5	Mode of Exam: Offline

Course Objective:

- To understand the nature, causes, and effects of natural hazards.
- To learn strategies and frameworks for disaster risk reduction and management.
- To develop skills for disaster preparedness and resilience building.

Course Outcome:

- Knowledge: Recognize the types and impacts of natural hazards and disasters.
- Scientific Skills: Analyze hazard data and interpret risk scenarios.
- Environmental Problem-Solving: Design and recommend disaster management strategies.
- Policy and Regulation: Understand national and international disaster management frameworks.
- Sustainable Practices: Promote community-based disaster preparedness and climate resilience.

MODULE I: 10 Hours

Introduction to Natural Hazards: Definition, types and global distribution. Natural vs. man-made hazards. Concept of risk, vulnerability and disaster.

MODULE II: 10 Hours

Geological Hazards: Earthquakes, volcanoes, landslides – causes, effects and mitigation strategies.

MODULE III: 10 Hours

Hydro-meteorological Hazards: Floods, cyclones, droughts, cloud bursts. Meteorological forecasting and early warning systems.

MODULE IV: 10 Hours

Disaster Management: Disaster cycle, institutional framework (NDMA, SDMA), disaster preparedness, response and recovery.

MODULE V: 5 Hours

Climate change and disaster risk. Community-based disaster management. Role of media and NGOs in disaster response.

Reference

- *Disaster Management. S.C. Sharma, Khanna Publishing House (AICTE Recommended Textbook)*
- *Disaster Management: Future Challenges and Opportunities, Jagbir Singh, K W Publishers Pvt Ltd*
- *Natural Hazards and Disaster Management, R. B. Singh, Rawat Publications*
- *Introduction to International Disaster Management, Damon P. Coppola, Butterworth-Heinemann*
- *Disaster Science and Management, Tushar Bhattacharya, McGraw Hill Education*

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Major Paper Code: BENVS-702	SEM-VII
Paper Name: Research Methodology	Maximum Marks: 100
Teaching Scheme	Examination Scheme
Lecture hour: 45	End semester exam: 70
Tutorial hour: 30	Continuous Assessment: 30
Practical hour: 0	Practical/Seasonal internal continuous evaluation:0
Total hours: 75	Practical/Seasonal external examination: 0
Credit: 5	Mode of Exam: Offline

Course Objective:

- To introduce research design, methods, and tools for scientific inquiry.
- To develop competence in conducting and analyzing environmental research.
- To enable students to write and present scientific reports and dissertations.

Course Outcome:

- Knowledge: Understand research types, processes and ethics.
- Scientific Skills: Conduct field-based and experimental research with statistical analysis.
- Problem-Solving: Frame research questions, hypotheses, and methodologies.
- Policy and Regulation: Interpret the importance of evidence-based research in policymaking.

MODULE I: 10 Hours

Research fundamentals – definitions, objectives, types of research.

MODULE II: 10 Hours

Research design – sampling techniques, data collection tools and methods.

MODULE III: 10 Hours

Data analysis – statistical techniques, SPSS basics, hypothesis testing.

MODULE IV: 15 Hours

Report writing – thesis structure, citations, plagiarism, publishing process.

Reference

- *Research Methodology: Methods and Techniques, C.R. Kothari, New Age International*
- *Research Methodology: A Step-by-Step Guide for Beginners, Ranjit Kumar, SAGE Publications*

Semester-VIII

Major Paper Code: BENVS-801	SEM-VIII
Paper Name: Environmental Statistics & Economics	Maximum Marks: 100
Teaching Scheme	Examination Scheme
Lecture hour: 45	End semester exam: 70
Tutorial hour: 30	Continuous Assessment: 30
Practical hour: 0	Practical/Seasonal internal continuous evaluation:0
Total hours: 75	Practical/Seasonal external examination: 0
Credit:5	Mode of Exam: Offline

Course Objective:

- To provide fundamental understanding of statistical tools in environmental studies.
- To introduce economic concepts related to natural resource use and sustainability.
- To equip students with the ability to analyze environmental data and economic policies.

- **Course Outcome:**
- Knowledge: Understand the role of statistics and economics in environmental management.
- Scientific Skills: Apply statistical methods to analyze environmental data.
- Environmental Problem-Solving: Evaluate economic trade-offs in environmental decisions.
- Policy and Regulation: Interpret environmental valuation and cost-benefit analyses.
- Sustainable Practices: Support evidence-based policymaking for sustainable development.

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MODULE I: 10 Hours
Basics of Statistics: Data types, frequency distribution, central tendency, measures of dispersion.

MODULE II: 10 Hours
Probability and Hypothesis Testing: Probability distributions, t-test, chi-square test, ANOVA.

MODULE III: 10 Hours
Environmental Economics: Scope and principles, market failure, externalities, public goods.

MODULE IV: 15 Hours
Valuation of Environment: Methods of environmental valuation, cost-benefit analysis, sustainable development.

Reference

- *Environmental Economics: An Introduction, Barry C. Field & Martha K. Field, McGraw-Hill*
- *Introduction to Environmental Data Analysis and Modeling, Moses Eterigho Emetere & M. A. Adebayo, Springer*
- *Statistics for Environmental Science and Management, Bryan F.J. Manly,Chapman & Hall/CRC*
- *Elements of Environmental Pollution Control, O.P. Gupta, Khanna Publishing House (AICTE Recommended Textbook).*
- *Objective Type Questions and Answers in Environmental Engineering, O.P. Gupta, Khanna Publishing House.*

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Major Paper Code: BENVS-802	SEM-VIII
Paper Name: Environmental Legislation & Poli	Maximum Marks: 100
Teaching Scheme	Examination Scheme
Lecture hour: 45	End semester exam: 70
Tutorial hour: 15	Continuous Assessment: 30
Practical hour: 0	Practical/Seasonal internal continuous evaluation:0
Total hours: 60	Practical/Seasonal external examination: 0
Credit: 4	Mode of Exam: Offline

Course Objective:

- To introduce environmental policies and legislative frameworks in India and globally.
- To examine the legal instruments for environmental protection and enforcement.
- To evaluate the role of policy in sustainable development and governance.

Course Outcome:

- Knowledge: Understand the framework and principles of environmental laws.
- Scientific Skills: Analyze the implications of environmental legislation on practices and projects.
- Environmental Problem-Solving: Apply legal tools to address pollution and conservation challenges.
- Policy and Regulation: Interpret the objectives of key environmental acts.
- Sustainable Practices: Support compliance and ethical standards for sustainable development.

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MODULE I: 10 Hours

Introduction to Environmental Law: Concept, need, and scope. Legal definitions and principles.

MODULE II: 10 Hours

National Environmental Policies: Forest Policy, Wildlife Protection Act, Environmental Protection Act.

MODULE III: 10 Hours

Water Act, Air Act, Hazardous Waste Rules. Role of CPCB and SPCBs.

MODULE IV: 15 Hours

International Environmental Conventions: Stockholm, Rio, Kyoto Protocol, Paris Agreement.

Reference

- *Environmental Law, S.C. Shastri, Eastern Book Company*
- *Environmental Law and Policy in India, Shyam Divan & Armin Rosencranz, Oxford University Press.*
- *Environmental Law and Policy, N.S. Nandan, Himalaya Publishing House*
- *Environmental Policies in India: A Framework for Sustainable Development, A. D. Vidya Sagar Reddy*
- *Elements of Environmental Pollution Control, O.P. Gupta, Khanna Publishing House (AICTE Recommended Textbook).*

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Major Paper Code: BENVS-803	SEM-VIII
Paper Name: Organismal & Evolutionary Biology	Maximum Marks: 100
Teaching Scheme	Examination Scheme
Lecture hour: 45	End semester exam: 70
Tutorial hour: 30	Continuous Assessment: 30
Practical hour: 0	Practical/Seasonal internal continuous evaluation:0
Total hours: 75	Practical/Seasonal external examination: 0
Credit: 5	Mode of Exam: Offline

Course Objective:

- To introduce students to the structure, function, and evolution of organisms.
- To understand the mechanisms of evolution and adaptation.
- To explore the evolutionary basis of biodiversity.

Course Outcome:

- Knowledge: Comprehend principles of organismal biology and evolution.
- Scientific Skills: Analyze biological adaptations and phylogenetic relationships.
- Environmental Problem-Solving: Explain evolutionary responses to environmental changes.
- Policy and Regulation: Relate evolutionary insights to biodiversity conservation.
- Sustainable Practices: Understand evolutionary principles underlying ecosystem sustainability.

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MODULE I: 10 Hours
Animal and plant diversity, structural adaptations, physiological functions.

MODULE II: 10 Hours
Evolutionary theories: Darwin, Lamarck, Modern synthesis. Natural and sexual selection.

MODULE III: 10 Hours
Speciation, adaptation, and co-evolution. Phylogenetics and evolutionary history.

MODULE IV: 15 Hours
Molecular evolution, genetic drift, gene flow. Evolution and environment interaction.

Reference

- *Integrated Principles of Zoology, Cleveland P. Hickman, Larry S. Roberts, Allan Larson,McGraw-Hill*
- *Evolutionary Analysis, Scott Freeman & Jon C. Herron, Pearson*
- *Textbook of Evolutionary Biology, Vishwajeet S. Sinha, Anmol Publications*
- *General Biology, Uma Devi Koduru, Khanna Publishing House (AICTE Recommended Textbook).*