



DEPARTMENT OF BIOLOGY, COLLEGE OF SCIENCE
UNIVERSITY OF THE PHILIPPINES BAGUIO

*Iskolar ng Bayan Building, University of the Philippines Baguio, Baguio City 2600
Fax/Tel. No. (074) 444-3128, (074) 442-7231*

CRE 299:

Design and Analysis of Laboratory and Field Experiments

COURSE SYLLABUS

1st SEMESTER | AY 2024-2025

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APPROVED ACADEMIC CALENDAR

UNIVERSITY OF THE PHILIPPINES BAGUIO PROPOSED ACADEMIC CALENDAR ACADEMIC YEAR 2024-2025

As of 05 March 2025	FIRST SEMESTER (Aug - Dec)	SECOND SEMESTER (Jan - May)	MIDYEAR (June - July)
Deadline for filing application for transfer, appeal for readmission and extension for MRR	24 Jun, Mon	02 Dec, Mon	
ADVANCE REGISTRATION OF FIRST YEAR STUDENTS	10 Jul, Wed – 12 Jul, Fri		
Removal examination period	29 Jul, Mon – 09 Aug, Fri	16 Dec, Mon – 10 Jan, Fri	29 May, Thu – 11 Jun, Wed
Validation for advanced credits	29 Jul, Mon – 23 Aug, Fri	16 Dec, Mon – 24 Jan, Fri	29 May, Thu – 20 Jun, Fri
GENERAL REGISTRATION			13 Jun, Fri
Graduating students (4 th , 5 th , 6 th , 7 th Year etc.)	12 Aug, Mon	13 Jan, Mon	
Third Year & graduate students	13 Aug, Tue	14 Jan, Tue	
Second Year & graduate students	14 Aug, Wed	15 Jan, Wed	
First Year & graduate students	15 Aug, Thu	16 Jan, Thu	
All others & Last day of registration	16 Aug, Fri	17 Jan, Fri	
START OF CLASSES	19 Aug, Mon	20 Jan, Mon	16 Jun, Mon
WELCOME ASSEMBLY FOR FIRST YEAR STUDENTS	19 Aug, Mon		
Deadline for Change of Matriculation (CoM)	30 Aug, Fri	31 Jan, Fri	17 Jun, Tue
UP Foundation Day			18 Jun, Wed
Deadline for filing application for graduation	09 Sep, Mon	10 Feb, Mon	20 Jun, Fri
Deadline for Colleges to submit to OUR tentative list of candidates for graduation	16 Sep, Mon	17 Feb, Mon	25 Jun, Wed
UP College Admission Test (UPCAT)	c/o Office of Admissions		
MID-SEMESTER	12 Oct, Sat	17 Mar, Mon	01 Jul, Tue
Reading and Health Break	28 Oct, Mon – 31 Oct, Thu	13 Mar, Thu – 15 Mar, Sat	
DEADLINE FOR DROPPING SUBJECTS	14 Nov, Thu	15 Apr, Tue	09 Jul, Wed
DEADLINE FOR FILING LEAVE OF ABSENCE	22 Nov, Fri	02 May, Fri	11 Jul, Fri (for enrolled students only)
UP Baguio Foundation Day	02 Dec, Mon		
END OF CLASSES	07 Dec, Sat	17 May, Sat	18 Jul, Fri
Integration Period	09 Dec, Mon – 10 Dec, Tue	19 May, Mon – 20 May, Tue	
FINAL EXAMINATIONS	11 Dec, Wed – 18 Dec, Wed		21 Jul, Mon – 22 Jul, Tue
Graduating students		21 May, Wed – 22 May, Thu	
Other students		21 May, Wed – 28 May, Wed	
DEADLINE FOR SUBMITTING GRADES	07 Jan, Tue		25 Jul, Fri
Graduating students		02 Jun, Mon	
Other students		06 Jun, Fri	
Curriculum Committee Meeting	27 Jan, Mon	19 May, Mon	
Last day for graduating students to submit requirements for academic deficiencies (INCs/4.0s) incurred in previous semesters	10 Feb, Mon	02 Jun, Mon	
Last day for submission of grades of graduating students who cleared their academic deficiencies (INCs/4.0s) incurred in previous semesters	17 Feb, Mon	10 Jun, Tue	15 Sep, Mon
College Faculty Meeting to approve candidates for graduation	17 Feb, Mon	10 Jun, Tue	15 Sep, Mon
Deadline for Colleges to submit APPROVED list of candidates for graduation	19 Feb, Wed	17 Jun, Tue	22 Sep, Mon
UNIVERSITY COUNCIL MEETING	24 Feb, Mon	20 Jun, Fri	29 Sep, Mon
BOR MEETING TO APPROVE GRADUATION	Per BOR schedule	Per BOR schedule	Per BOR schedule
COMMENCEMENT EXERCISES		22 Jul, Tue	

HOLIDAYS IN ACADEMIC YEAR 2024-2025			
2024		2025	
Ninoy Aquino Day	21 Aug, Wed	New Year's Day	01 Jan, Wed
National Heroes Day	26 Aug, Mon	Chinese/Lunar New Year	29 Jan, Wed
Baguio Day	01 Sep, Sun	Araw ng Kagitingan	09 Apr, Wed
Commemoration of the 1986 Sipat Peace Talks	13 Sep, Fri	Maundy Thursday	17 Apr, Thu
All Saints Day	01 Nov, Fri	Good Friday	18 Apr, Fri
All Souls Day	02 Nov, Sat	Black Saturday	19 Apr, Sat
Bonifacio Day	30 Nov, Sat	Labor Day	01 May, Thu
Feast of the Immaculate Conception of Mary	08 Dec, Sun	Independence Day	12 Jun, Thu
Christmas Eve	24 Dec, Tue	Cordillera Day	15 Jul, Tue
Christmas Day	25 Dec, Wed	Eidul Fitr	as per official declaration
Rizal Day	30 Dec, Mon	Eidul Adha	as per official declaration
Last Day of the Year	31 Dec, Tue		

ABOUT UP BAGUIO

The University of the Philippines (UP) was founded in 1908 with its first campus in Manila. Its foundation was then followed soon after by the establishment of constituent units (CUs) and campuses that are strategically located all over the country. In over a century, UP has established eight constituent Universities from its 17 campuses.

The University of the Philippines Baguio (UP Baguio) began as the University of the Philippines College of Baguio (UPCB) (among the growing number of UP campuses in the Philippines), UPCB was established through the initiative of UPCB Alumni in Baguio, Benguet in 1961. UP Baguio became the 7th constituent university of the UP system in 2002 with a goal to be a hub of knowledge generation and human resource training and development in Northern Luzon.

UP Baguio takes pride in its contribution in nurturing and developing innovative programs in the arts and sciences as it continues to develop the niche it has created over the past decades - Cordillera studies.

Vision

The University of the Philippines envisions itself as a leading regional and global university in an environment that sustains 21st century learning, knowledge creation, and public service for society and humanity. As a constituent of the University of the Philippines System, UP Baguio will sustain its lead position in the delivery of tertiary education in the North.

UP Baguio will continue to nurture and develop innovative programs in the arts and sciences. It will also continue to develop the niche it has created over the past decade in Cordillera Studies.

Mission

Our mission, therefore, as a unit of the UP system and as the leading institution of higher learning in Northern Luzon, is to spearhead the offering of the highest standard of education and to contribute to the overall upgrading of the quality of instruction in the region.

We seek to create an impact by informing our students with a regional perspective, while they are informed with a national and global outlook.

Objectives

Based on the vision, the mandate, and the mission of the university in knowledge creation and public service, four goals were derived:

1. To contribute to national development by building expertise in different fields through the developing and strengthening of academic programs and research policies;
2. To optimize the use of resources through adequate budgetary and policy support, alumni support, and innovation of resource generation;
3. To promote equity amidst diversity in the efforts to achieving excellence and internationalization; and
4. To strengthen and enhance human resource management and promotion systems for the improvement of the welfare of constituents.

ABOUT THE COLLEGE OF SCIENCE

Subsequent to the reorganization of UP Baguio after its institution as the 7th constituent university of the UP system in 2002, the College of Science (CS), being one of the three colleges emerging from the reorganization, evolved from the merger of the Division of Natural Sciences and Mathematics and the Sports, Physical Education and Recreation Division.

The College offers four undergraduate programs, such as the BS Mathematics, BS Biology, BS Computer Science, BS Physics, and three graduate degree programs, namely, Master of Science in Conservation and Restoration Ecology (MS CaRE), Master of Science in Mathematics, and Doctor of Philosophy in Mathematics. All of these programs are regularly reviewed and upgraded to prepare students for careers in education, research, and/or postgraduate studies.

Vision

The College of Science aims to continue offering high standard and relevant quality education through good practices in program implementation that follows innovative pedagogical strategies that utilizes appropriate technology in supporting this endeavor.

It will further its objectives by initiating interdisciplinary programs anchored on disciplinary specializations in its efforts to enhance efficiency of research conduct and management.

It will continue to encourage and reward scientific productivity by conducting researches responsive to the needs of the region, nation and the global community.

The college envisions itself moving towards a more inclusive and equitable environment that enables faculty members to lead on with exemplary qualifications – mindful of scholarly research and dedicated to public service.

Furthermore, it will support UP Baguio's wellness program for both academic and support staff to guarantee efficiency in service to the university and the society.

Lastly, the college, together with the university, will take initiative to continue, strengthen and widen the reach of its involvement in public service by sharing individual and collective expertise with other academic institutions, local government units, Non-Government Organizations (NGOs), peoples' organizations and indigenous communities in the region and other areas.

Mission

In line with the vision of the College, it is our mission, therefore, to produce scientific leaders and civic-minded citizens with high regard for integrity, compassion, and genuine service who lead in research study that follows ethical standards and excellence in instruction, research and public service.

It is our mission to improve on basic facilities and design where researchers can work more collaboratively and efficiently.

We pursue to guarantee the safety of researchers, to minimize adverse impact to the environment, to respect research protocols involving indigenous communities, and to ensure professional conduct as we encourage good instruction, research and public service in upholding the University's banner of honor and excellence.

Objectives

In accordance to the mission and vision of the University, the college aims to accomplish the following objectives:

- I. To continue in formulating new degree programs while sustaining the old ones;
- II. To encourage interdisciplinary researches across programs;
- III. To institutionalize the Science Research Center (SRC) in continuing research responsive to the need of the region, and in the enhancement of interdisciplinary collaboration within the departments of the College and even with other faculty members in other Colleges of the UP Baguio;
- IV. To have a closer linkage with the UP Baguio Cordillera Studies Center (UP Baguio- CSC) as the University's research center and as an aide in putting up the Biodiversity and Innovation Research center;
- V. To foster an environment suitable for the growth of the academic and support staff; and,
- VI. To provide public service based on each academic and support staff's specialization.

ABOUT THE DEPARTMENT OF BIOLOGY

The Department of Biology emerged from being a Discipline under the then Division of Natural Sciences and Mathematics in 2002. Currently, it offers a Bachelor's degree in Biology, and a Master's degree in Conservation and Restoration Ecology (MS CaRE).

The Master of Science in Conservation and Restoration Ecology (MS CaRE) is a specialized graduate degree program that has grown out of the research, output, and experience of the Department of Biology over the years. The MS CaRE program covers multidisciplinary topics relevant to conservation and restoration such as ecosystems ecology, microbial ecology, disturbance ecology, ecophysiology, indigenous resource management, environmental laws, and environmental economics. The program is research-oriented and is designed for practitioners in the natural sciences, government planners, environment development officers, corporate social responsibility managers, managers of forest and marine reserves, and other stakeholders. Graduates of this degree program can potentially pursue careers in ecological and environmental monitoring and research, natural resource conservation and management, ecosystem restoration, and environmental consulting. They may also pursue PhD courses in related fields.

At the end of the program, graduates of MS CaRE are expected to be:

- competent environmental biologists who can lead and undertake projects in conservation, assessment, monitoring, and restoration of degraded ecosystems;
- trained to carry out research in conservation and restoration ecology; and
- ready to pursue Ph.D. courses in related fields.

Vision

Aligned with the goals of the College of Science and the University of the Philippines Baguio, the vision of the Department of Biology is to be a leader in academic excellence, research, and community involvement in Northern Luzon. We envision to be an active contributor to the university's commitment to deliver high-quality education by maintaining responsive curricula and instituting relevant academic programs integrating perspectives rooted in specific disciplines in biology. The department aspires for a more inclusive and equitable academic environment empowering teaching staff, personnel, and students to better engage in scholarly work, interdisciplinary research, and public service.

Mission

The Department of Biology commits to develop, adopt, and employ best practices in innovative pedagogies and technologies in scientific inquiry. We strive to generate knowledge through interdisciplinary research rooted in biology disciplines. We pursue a vibrant academic environment that produces researchers, professionals, and scientific leaders competent and equipped to responsibly and ethically address and manage environmental and health challenges. We extend our service to the public by sharing individual and collective expertise with various educational institutions, local government units, non-governmental organizations, peoples' organizations, and indigenous communities in the Cordillera Administrative Region and the rest of Northern Luzon.

COURSE DESCRIPTION AND REQUIREMENTS

About the Instructor

Faculty member in charge	Contact details
Romeo M. Dizon, Ph.D. <i>PhD in Marine Science</i> Professor of Biology College of Science University of the Philippines Baguio	Email address: rmdizon@up.edu.ph Contact number: 0939 933 6081

Course Details

Course Number:	CRE 299
Course Title:	Design and Analysis of Laboratory and Field Experiments
Course Description:	The success of any conservation and restoration effort requires an appropriate experimental design and some measurable criteria. This course will train students to use advanced methods in the design and analysis of field experiments. It will initially build on and strengthen basic statistical techniques and will cover other statistical tools that are useful in field experimentation. The course will be heavily dependent on statistical freeware/software in the analysis of data.
Prerequisite:	COI
Semester/s Offered:	1st, 2nd and Mid Year Terms
Course Credit:	3 units
Number of Hours:	3 hours lec
Course Schedule:	
Course Requirements:	
Course Requirements	
Class Exercises	30%
Mid-term Exam	30%
Final Examination	30%
Final Paper	10%

Program Learning Outcomes (PLOs)

The Program Learning Outcomes (PLO) of the MS CaRE Program are as follows:

PLO 1	To demonstrate genuine concern and passion for environmental issues that have impacts on species, ecosystems, and people
PLO 2	To practice professional and ethical integrity in diverse social and academic settings
PLO 3	To generate knowledge through independent transdisciplinary research
PLO 4	To communicate scientific outputs to key stakeholders and the general public
PLO 5	To assess ecological patterns and processes through rigorous and ethical scientific inquiry that supports evidence-based predictions for conservation and restoration decisions
PLO 6	To design a framework that can influence research and policies on the conservation and restoration of species, habitats, and ecosystems
PLO 7	To utilize immersive ground-truthing as a mechanism to ensure conservation and restoration interventions are both scientifically robust and socioculturally situated
PLO 8	To establish linkages with local communities, academia, non-government organizations, and government agencies in support of conservation and ecological restoration.
PLO 9	To integrate multidisciplinary approaches, local and indigenous knowledge systems, and community partnerships to consistently champion conservation and restoration across diverse ecosystems.
PLO 10	To adhere and commit to a life-long application of evolving ecological knowledge and collaborative practices to advance conservation and restoration efforts
PLO 11	To embody competence in ecological stewardship and sustainable resource management

Course Learning Outcomes (CLOs)

At the end of this course, the student should be able to:

CLO 1	Demonstrate an understanding of the foundations and significance of inferential statistics in laboratory and field experiments;
CLO 2	Apply appropriate experimental designs and statistical analyses for different types of laboratory and field experiments; and,
CLO 3	Develop a scientific and analytical attitude in approaching issues on conservation and restoration.

Mapping of CLOs with PLOs

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11
CLO 1	I		M	I	F	M	I			I	I
CLO 2	I	I	F	I	F	F	M			I	M
CLO 3	M	I	F	I	F	F	M			M	M

LEGEND: *I*-Introduced; *M*-Moderately achieved; *F*-Fully achieved

Class Rules

- Students are only allowed to have a maximum of three (3) absences or 20% of the total number of meetings for the entire semester; otherwise, the student will be forced to drop the course (Article 346 of the University Code).
- Students who miss class requirements will get a grade of zero unless reasons are valid (with proper documentation). Make-up activities shall be given as soon as possible.
- Students must actively participate in the class discussion.
- Cheating, in any form, will warrant you a grade of 5.0 on this course or expulsion from the University. Declare and properly cite AI-generated content for course requirements to avoid plagiarism. Disclose the use of AI in data collection activities.

Grading Scheme

Grade	Equivalent	UP Classification	Grade	Equivalent	UP Classification
96 – 100	1.00	Excellent	65 – 69	2.75	Satisfactory
93 – 95	1.25	Excellent	60 – 64	3.00	Passing
89 – 92	1.50	Very Good	55 – 59	4.00	Conditional
85 – 88	1.75	Very Good	Below 55	5.00	Fail
80 – 84	2.00	Good	DRP		Dropped
75 – 79	2.25	Good	INC		Incomplete
70 – 74	2.50	Satisfactory			

Course Outline

TIMELINE	CLO	Topic	Teaching and Learning Activities	Assessment Tool
Weeks 1 - 3	CLO 1 CLO 2 CLO 3	I. Introduction - Models, Theories and the Framework of Ecological Research - Review of Biological Statistics Models, Theories and the Framework of Ecological Research - Introduction and Training on Statistical Software <i>This section will be an introduction and review of the concepts, use, and significance of statistical tools and experimental design in ecology. It will include an initial assessment of students to level off their competencies in statistics, thus, additional readings and training with software use may be required as the instructor sees fit.</i>	- Lectures - Demonstration and Hands-On Training on Statistical Software - Video Tutorials - Reading Assignment - Class reports	- In-Class Seatworks - Take-home Problem Sets
Weeks 4 & 5	CLO 1 CLO 2 CLO 3	II. Establishing Relationships among Variables a. Correlation b. Simple Linear Regression c. Multiple Regression <i>This section will strengthen and enhance the ability of students to do correlation and regression analyses that are important in determining factors that influence observed and measured responses.</i>	- Lectures - Demonstration and Hands-On Training on Statistical Software - Video Tutorials - Reading Assignment - Class reports	- In-Class Seatworks - Take-home Problem Sets

Weeks 6 & 7	CLO 1 CLO 2 CLO 3	III. Comparisons among Groups - Blocking, Fixed and Random Factors - ANOVA: Analysis of Variance - ANCOVA: Analysis of Covariance - MANOVA: Multivariate Analysis of Variance - ANOVAR: Analysis of Variance of Repeated Measures <i>This section will train students in comparing two or more groups, sites or treatments based on a set of measurable variables. More advanced experimental designs (i.e., relative to those taken up in basic statistics) will be discussed.</i>	- Lectures - Demonstration and Hands-On Training on Statistical Software - Video Tutorials - Reading Assignment - Class reports	- In-Class Seatworks - Take-home Problem Sets
Week 8	CLO 1 CLO 2 CLO 3	IV. Survival Data/Failure Time Analyses - Monitoring Survival/ Failure Data - Experimental Designs Involving Censored Data - Kaplan-Meier Estimates - Prognostic Factors <i>This section will introduce a useful tool in experimentation that is able to extract more information than the usual initial-vs-final analyses in responsive variables.</i>	- Lectures - Demonstration and Hands-On Training on Statistical Software - Video Tutorials - Reading Assignment - Class reports	- In-Class Seatworks - Take-home Problem Sets
Week 9	Reading and Wellness Break			
Week 10	Mid-Term Exam			

Weeks 11-14	CLO 1 CLO 2 CLO 3	V. Design of Laboratory and Field Experiments in Ecology A. Unreplicated Randomized Blocks Design B. Split-plot Design C. Latin Squares D. BACI and beyond BACI Design E. Experiments with Asymmetrical Controls F. GxE Models and Biplots <i>This section will familiarize students with various experimental designs used in field studies, both manipulative and exploratory. Some are specifically designed for use in large-scale manipulative field experiments such as those used in environmental and agricultural sciences.</i>	• Lectures • Reading Assignment • Class reports	• Paper Requirement
Week 15	Final Exam			

Teaching Methods/Strategies: lectures, assigned readings, case studies, exercises

Reference/ Reading List

(To be updated on a yearly basis)

- Barnard, C., Gilbert, F., and McGregor, P. 2011. Asking Questions in Biology: A Guide to Hypothesis-testing, Experimental Design and Presentation in Practical Work and Research Projects. Harlow, England: Pearson.
- Bazeley, P. 2013. Qualitative data analysis: practical strategies. Los Angeles [i.e. Thousand Oaks, Calif.]: SAGE Publications.
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- Meyers, L., Gamst, G., and Guarino, A. 2013. Applied Multivariate Research: Design and Interpretation. Los Angeles: SAGE.
- Muhumuza, M., Sanders, M. and Balkwill, K., 2013. A theoretical framework for investigating ecological problems associated with biodiversity conservation in national parks: A case of the Rwenzori mountains national park, Uganda. Open Journal of Ecology 3(2):196-204.
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Prepared by: RM Dizon