Gyanmanjari Innovative University

Course Syllabus
Gyanmanjari Science College
Semester-3 (M. Sc.)

Subject: Research methodology and IPR– MSCFS13516

Type of course: Major

Prerequisite: Students should have a basic knowledge of research.

Rationale: The Prerequisite provides the foundation for understanding the concepts of IPR and different research methods.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				Theory Marks		Practical Marks		CA	
CI	T	P	C	ESE	MSE	V	P	ALA	
4	0	0	4	60	30	10	00	50	150

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

4 Credits * 25 Marks = 100 Marks (each credit carries 25 Marks) Theory
SEE 100 Marks will be converted in to 50 Marks
CCE 100 Marks will be converted in to 50 Marks

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Course Content:

Unit No.	Course content	Hrs	% Weightage
1	**Introduction to Research Methodology** • Research Methodology: An Introduction to the Objectives of Research • Types of Research • Defining a Research Problem, Techniques involved in Defining a Problem, • Research Design • Technical Writing • Ethics in Research • Software for Plagiarism.	15	25
2	**Hypothesis and Research Methodology** • Basic Principles of Experimental Designs and Sampling • Methods of Data Collection and Analysis • Collection of Primary and Secondary Data • Selection of appropriate method • Data Processing Operations • Elements of Analysis • Statistics in Research, • Regression Analysis • Correlation Techniques of Hypotheses, • Parametric or Standard Tests	15	25
3	**Intellectual Property Rights (IPR)** • Introduction • Terminology involved in IPR • Legislation • IPR in India • Patent: Criteria, Patent for Polymorph, case studies	15	25
4.	**Advanced Techniques** • Trasoscan, autopsy tools • X-ways forensics • Forensic Bullet Comparison Visualizer • NMR,FT-IR, UV-visible, Mass spectroscopy GC,HPLC,SEM, TEM	15	25

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1.	**Case Study Analysis**: Divide the students into small groups (3 per group) and provide them with different case studies related to research methodology, such as unethical research practices, plagiarism cases, or ambiguous research problems. Have each group analyze the case study, identify the research problem, and submit it to GMIU portal.	10
2.	**Plagiarism Detection Challenge**: Introduce students to plagiarism detection software tools, such as Turnitin or Grammarly. Provide them with sample texts or research papers containing plagiarized passages or citations. Assign work must be submitted on GMIU portal.	10
3.	**Research and Planning** Each group researches their assign role, including understanding the relevant laws, and regulations.	10
4.	**Picture Analysis Survey** Faculty will assign picture and students will analyze whether it is copyright, patent, trademark, or industrial design and will put forward their opinions in form of a report and will upload it to GMIU web Portal.	10
5.	**Summary report** Faculty will assign one research paper and students will make a summary and upload it to GMIU web Portal.	10
Total		**50**

Suggested Specification table with Marks (Theory):60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20%	30%	30%	20%	00	00

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course the students should be able to:	
CO1	Explain the application of research methodology
CO2	Rephrase the different methods of hypothesis and research methodology.
CO3	Restate about patent and its application.
CO4	Review computational chemistry.

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

[1] The Craft of Research Wayne C. Booth.

[2] Research Design: Qualitative, Quantitative, and Mixed Methods Approaches John W. Creswell.

[3] Research Methodology R. Panneerselvam.

[4] "Intellectual Property: Patents, Trademarks, and Copyrights" Richard Stim