SRI KALISWARI COLLEGE (AUTONOMOUS)
Affiliated to Madurai Kamaraj University, Madurai
Re-accredited with 'A' grade (3rd cycle) by NAAC with CGPA 3.11
A.Meenakshipuram, Anaikuttam Post
SIVAKASI - 626 130. Tamilnadu

NAAC IV CYCLE

3.4.1 The Institution ensures implementation of its stated Code of Ethics for research

Syllabus of the Research Methodology Course Work with Research Ethics

S. No.	Programme Name	Course Code	Course Name
1.	B.Com. (CA)	21UCPO53	Research Methodology
2.	B.Com.	21UCMO51	Research Methodology
3.	BBA	15UBAO41	Research Methodology
4.	BBA(CA)	15UBPO41	Research Methodology
5.	M.A. (Tamil)	21PTAC33	Research Methodology
6.	M.A. (English)	21PENC34	Research Methodology
7.	M.Com. (Finance)	18PCFC32	Research Methodology
8.	M.Com.	21PCMC32	Research Methodology
9.	M.Com.(CA)	21PCPC32	Research Methodology
10.	M.Sc. (Mathematics)	21PMAC34	Research Methodology
11.	M.Sc. (Chemistry)	21PCHC43	Research Methodology
12.	M.Sc. (Computer Science)	21PCSC43	Research Methodology
13.	M.Sc. (Biotechnology)	21PBTC43	Research Methodology
14.	M.Sc. (Botany)	21PBYC21	Instrumentation Techniques and Biostatistics and Research Methodology

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMMERCE (CA)
UG Programme - B.Com. (Computer Applications)
SEMESTER – V
MAJOR ELECTIVE COURSE - I: RESEARCH METHODOLOGY (21UCP053)
(From 2021- 2022 Batch Onwards)

HOURS/ WEEK: 4   INT. MARKS : 40
CREDITS   : 3   EXT. MARKS : 60
DURATION   : 60 hrs   MAX.MARKS: 100

Preamble

This course introduces the students impact knowledge to organise, co-ordinate and focus the research aptitude with confidence.

Course Outcomes (CO)
on successful completion of the course, the learners will be able to
CO1[K1]: describe the concepts and approaches of social science research
CO2[K2]: demonstrate the techniques of research process
CO3[K3]: apply suitable methodologies to solve research problems
CO4[K4]: examine the factors affecting the social science research
CO5[K5]: assess the factors affecting the research methods in social science research

CO - PO Mapping table (Course Articulation Matrix)

PO \ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	1	-	1	-	-	-
CO2[K2]	3	2	-	1	1	1	1
CO3[K3]	3	2	-	2	1	1	1
CO4[K4]	3	2	1	2	1	1	1
CO5[K5]	3	3	1	2	1	2	1
Weightage of the course	15	10	2	8	4	5	4
Weighted percentage of Course contribution to POs	2.53	2.51	2.5	2.28	2.41	2.21	2.08

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No correlation)

UNIT I - INTRODUCTION
(12 hrs)

Meaning of Research – Definition of Research - Concept of Research – Objectives of Research - Significance of Research – Approaches and Types of Research – Research Process – Criteria of Good Research.

UNIT II – RESEARCH PROBLEM AND RESEARCH DESIGN
(12 hrs)

Research Problem: Defining the Research Problem - Selecting the Research Problem. **Research Design:** Meaning of Research Design – Need for Research design - Features of a Good Design – Important Concept Relating to Research Design – Types of Research Design.

UNIT III – SAMPLING DESIGN
(12 hrs)

Meaning of Census and Sample Survey – Steps in Sampling Design - Significance and Principle of Sampling – Essentials of a Good Sampling – Methods of Sampling – Determination of Sample Size.

UNIT IV – DATA COLLECTION
(12 hrs)

Meaning of Data - Types of Data – Methods of Collection of Primary Data – Observation Method – Interview Method- Questionnaire Method - Methods of Collection of Secondary Data – Limitations of Primary Data and Secondary Data.

UNIT V – RESEARCH REPORT
(12 hrs)

Meaning of Research Report – Qualities of Good Report – Steps in Report Writing – Layout of the Research Report – Types of Reports – -Technical Report – Popular Report - Oral Presentation.

TEXTBOOK

1. Kothari C.R. *Research Methodology.* New Delhi: New Age International (P) Limited, Publishers, 2017.

REFERENCES
Books

1. Cavery R, Sudha Nayak U.K. and Girija M. *Research Methodology.* New Delhi: S.Chand and Company Ltd., 2020.
2. Thanulingom N. *Research Methodology.* Mumbai: Himalaya Publishing House, 2019.
3. Borse M.N. *Research Methodology – Modern Methods and New Techniques.* Jaipur: Shree Niwas Publishers, 2012.

Web Sources

1. https://freebcomnotes.blogspot.com/2016/11/qualities-of-good-report.html
2. https://www.scribbr.com/methodology/sampling-methods/
3. https://www.youtube.com/watch?v=RKSld_j2m5U
4. https://www.youtube.com/watch?v=XJZIlTMKNXk

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SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMMERCE
UG Programme - B.Com.
SEMESTER - V
MAJOR ELECTIVE COURSE – I: RESEARCH METHODOLOGY(21UCMO51)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 4	INT. MARKS : 40
CREDITS : 3	EXT. MARKS : 60
DURATION : 60 hrs	MAX. MARKS: 100

Preamble

The course aims to inculcate research aptitude among the learners and to enable them to prepare project report.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1(K1): describe the methods of collecting data

CO2(K2): explain the significance of Research and Research Methodology

CO3(K3): select Research Problem and Research Design

CO4(K4): determine the sample size in consonance with the research problem and research design

CO5(K5): conclude the research report with right findings

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1(K1)	3	1	1	1	1	1	-
CO2(K2)	3	1	1	1	1	1	-
CO3(K3)	3	1	1	1	1	1	1
CO4(K4)	3	2	1	2	1	1	1
CO5(K5)	3	2	1	2	1	1	1
Weightage of the course	15	07	05	07	05	05	03
Weighted percentage of Course contribution to POs	2.39	2.34	2.96	2.17	2.37	2.31	1.65

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I – INTRODUCTION TO RESEARCH   (12 hrs)
Research: Meaning-Definition - Characteristics – Objectives - Types: Pure – Applied - Exploratory – Descriptive Study - Diagnostic Study – Evaluation Study – Action Research - Social Science Research: Functions – Objectivity - Ethics.

UNIT II - PLANNING OF RESEARCH   (12 hrs)
Planning Process: Introduction - Selection of Research Problem – Source - Process of Identification - Formulation Process - Hypotheses: Meaning –Types – Characteristics of Good Hypotheses.

UNIT III - SAMPLING DESIGN   (12 hrs)
Sampling: Introduction - Characteristics - Sample Size: Pretest – Pilot Study. Sampling Techniques: Probability and Non Probability - Sampling Design and Techniques –Sampling and Non Sampling Error

UNIT IV - DATA COLLECTION   (12 hrs)
Data: Meaning – Types of Data – Sources- Methods of Collection of Primary Data: Data Collection Instruments – Questionnaires – Interview Schedule. Collection of Secondary Data - Editing- Coding and Classification- Tabulation of Data for Analysis.

UNIT V - REPORT WRITING   (12 hrs)
Report: Meaning- Significance - Types of Research Report - Research report format - Steps in writing report - Precautions for writing research report.

TEXTBOOK
1. Krishnaswami O.R. and Ranganathan M. *Methodology of Research in Social Sciences*. Delhi: Himalaya Publishing House, 2007.

REFERENCES
Books
1. Kothari. B. L. *Research Methodology: Tools and Techniques*. Jaipur: ABD Publishers, 2016.
2. Rao.K.V. *Research Methodology in Commerce and Management*. Noida. Uttar Pradesh: Sterling Publishers Private Limited, 1994.

Web Sources
1. https://drive.google.com/file/d/0Bwk5FIsI0ctxMkxxLVNPeU0wNWM/view.
2. https://drive.google.com/file/d/0Bwk5FIsI0ctxRTRVRkk3dVYzUTA/view.
3. https://drive.google.com/file/d/0Bwk5FIsI0ctxNXBvU2dGVlJhSTg/view.

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21UCM100   SIVAKASI - 626 130

Optional /Elective Course-I Research Methodology - 15UBAO41   **Duration: 60Hrs**
                                                                    Credits : 3

Objectives
- To familiarize the learners with methodology of research and its application in managerial decision making.
- To study and understand sampling techniques along with hypothesis.

Course Outcome:
- Understand the different types of research and its usefulness in solving business problems
- Understand the sampling techniques and analyse the data for interpretation
- Understand some basic concepts of research and its methodologies
- Identify appropriate research topics, select and define appropriate research problems and parameters
- Prepare a project proposal to undertake a project
- Induce to get an idea about the literature review
- Desire to get intellectual way of doing some creative work
- Get an idea of report writing

Unit I   **(12 Hrs)**
Research Planning: Research – meaning- objectives – importance – types of research (pure, applied, historical, case study, experimental, analytical, descriptive, comparative, ex post facto – research planning – selection and formation of research problem – selection of the topic – preparation of research design.

Unit II   **(12 Hrs)**
Data collection: Methods of collection of data – sources of data – primary Vs secondary data – drafting schedule and questionnaire – check list – pre-test – pilot study – interview and observation techniques.

Unit III   **(12 Hrs)**
Sampling Techniques: Sampling – meaning – importance – census method and sampling methods – types of sampling – factors affecting the size of the sample – sampling and non-sampling errors – biased and unbiased errors.

Unit IV   **(12 Hrs)**
Analysis and Interpretation of Data: Processing of data – classification – editing – coding – tabulation – interpretation – need – techniques of interpretation – graphical representation – rules for constructing a diagram – types of diagram – importance of computer in data processing.

Unit V   **(12 Hrs)**
Report Writing: Steps in writing a report – layout of a research report – types of report – precautions for writing a research report – foot noting and referencing – bibliography.

Text book:

- C.R. Kothari, Research Methodology Methods and Techniques, New Age International Publishers, 2nd Edition

Reference books:

- Donald R Cooper, Pamela S Schindler, Tata Mc Graw Hill Co., Ltd., 9th Edition
- P.P. Arya, Yesh Pal, Research Methodology in Management, Deep & Deep Publications Pvt., Ltd
- O.R. Krishnaswami, M. Ranganathan, Methodology of research in Social Sciences, Himalaya Publishing House,

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SIVAKASI - 626 130

Optional /Elective Course-I Research Methodology - 15UBPO41   Duration: 60 Hrs
                                                                Credits : 3

Objectives

- To familiarize the learners with methodology of research and its application in managerial decision making.
- To study and understand sampling techniques along with hypothesis.

Course Outcome:

- Understand the different types of research and its usefulness in solving business problems
- Understand the sampling techniques and analyse the data for interpretation
- Understand some basic concepts of research and its methodologies
- Identify appropriate research topics
- Select and define appropriate research problems and parameters
- Prepare a project proposal to undertake a project
- Organize and conduct research in a more appropriate way
- Induce to get an idea about the literature review
- Desire to get intellectual way of doing some creative work
- Get an idea of report writing

Unit I   (12 Hrs)

Research Planning: Research – meaning- objectives – importance – types of research (pure, applied, historical, case study, experimental, analytical, descriptive, comparative, ex post facto – research planning – selection and formation of research problem – selection of the topic – preparation of research design.

Unit II   (12 Hrs)

Data collection: Methods of collection of data – sources of data – primary Vs secondary data – drafting schedule and questionnaire – check list – pre-test – pilot study – interview and observation techniques.

Unit III   (12 Hrs)

Sampling Techniques: Sampling – meaning – importance – census method and sampling methods – types of sampling – factors affecting the size of the sample – sampling and non-sampling errors – biased and unbiased errors.

Unit IV   (12 Hrs)

Analysis and Interpretation of Data: Processing of data – classification – editing – coding – tabulation – interpretation – need – techniques of interpretation – graphical representation – rules for constructing a diagram – types of diagram – importance of computer in data processing.

Unit V-(12 Hours)

Report Writing: Steps in writing a report – layout of a research report – types of report – precautions for writing a research report – foot noting and referencing – bibliography.

Text book:

- C.R. Kothari, Research Methodology Methods and Techniques, New Age International Publishers, 2nd Edition

Reference books:

- Donald R Cooper, Pamela S Schindler, Tata Mc Graw Hill Co., Ltd., 9th Edition
- P.P. Arya, Yesh Pal, Research Methodology in Management, Deep & Deep Publications Pvt., Ltd
- O.R. Krishnaswami, M. Ranganathan, Methodology of research in Social Sciences, Himalaya Publishing House,

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SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF TAMIL
PG Programme - M.A. Tamil
SEMESTER - III
CORE COURSE - XI: திறனாய்வு அணுகுமுறைகளும் ஆய்வு நெறிமுறைகளும்
(21PTAC33)
(From 2021-2022 Batch onwards)

HOURS/WEEK : 6	**INT.MARKS : 40**
CREDITS : 4	**EXT.MARKS : 60**
DURATION : 90 hrs	**MAX.MARKS: 100**

நோக்கம்

மாணவர்கள் ஆய்வு அணுகுமுறைகளை அறிந்து கொள்ளும் நோக்கிலும் திறனாய்வு குறித்த செய்திகளை அவர்களுக்கு அறிமுகப்படுத்தும் வகையிலும் இத்தாள் வடிவமைக்கப்பட்டுள்ளது.

கற்றலின் பயன்கள்

இத்தாளை வெற்றிகரமாக முடித்தவுடன் மாணவர்கள்,

CO1[K1]: ஆய்வு நெறிமுறைகளை அடையாளம் காண்பர்.
CO2[K3]: ஆய்வேடு உருவாகும் நிலையைக் கட்டுரைப்பர்.
CO3[K4]: கருத்துக்களை விவாதிக்கும் திறன் பெறுவர்.
CO4[K5]: படைப்பாளரின் படைப்பு அணுகுமுறைகளை மதிப்பிடுவர்.
CO5[K6]: ஆய்வேடு உருவாக்கும் திறன் பெறுவர்.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	1	1	1	2
CO2[K3]	2	2	2	2	2	1	1
CO3[K4]	2	2	1	2	1	1	1
CO4[K5]	2	2	1	2	-	2	1
CO5[K6]	2	2	1	2	2	1	1
Weightage of the course	11	10	6	9	6	6	6
Weighted percentage of Course contribution to POs	4.62	4.83	5	5	6	4.72	6

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

கூறு I   **(18 hrs)**

திறனாய்வு: விளக்கம் - வரையறைகள் - தமிழ்த்திறனாய்வு வரலாறு - இலக்கியக் கொள்கையும் திறனாய்வும் - தொல்காப்பியத்தின் இலக்கியக் கொள்கை - சங்க இலக்கியத் தொகுப்பு நெறியில் திறனாய்வு - உரையாசிரியர்களும் திறனாய்வும் - தற்காலத் திறனாய்வு வளர்ச்சி.

கூறு II (18 hrs)

திறனாய்வு வகைகள் - விளக்கமுறைத் திறனாய்வு - விதிமுறைத் திறனாய்வு - மதிப்பீட்டுமுறைத் திறனாய்வு - அழகியல் திறனாய்வு - பகுப்புமுறைத் திறனாய்வு - பாராட்டுமுறைத் திறனாய்வு - ஒப்பீட்டுமுறைத் திறனாய்வு - மார்க்சியத் திறனாய்வு முறைகளும் விளக்கமும்.

கூறு III (18 hrs)

திறனாய்வு அணுகுமுறைகளும் இலக்கிய வாசிப்பும் - சமூகவியல், உளவியல், திறனாய்வுகளும் சங்க இலக்கிய வழி விளக்கமும் - தொல் படிவத் திறனாய்வு - சிலப்பதிகாரம் வழி விளக்குதல் - அமைப்பியல் - பின் அமைப்பியல் - நவீனத்துவம் - பின்நவீனத்துவம் - பெண்ணியம் - தலித்தியம் - அணுகுமுறைகளும் தற்கால இலக்கியங்களும்.

கூறு IV (18 hrs)

ஆய்வு: சொற்பொருள் விளக்கம் - ஆய்வு வகைகள் - அடிப்படை ஆய்வு, பயன்பாட்டாய்வு - கள ஆய்வு, இருக்கை ஆய்வு - ஆய்வாளரின் தகுதிகள் - பொதுத்தகுதிகள் - சிறப்புத் தகுதிகள் - ஆய்வுச்சிக்கல் - சிக்கலைத் தேர்ந்தெடுக்கும் முறை - சிக்கலிலிருந்து தலைப்பைத் தேர்ந்தெடுத்தல் - ஆய்வுத்தலைப்பை உறுதி செய்தல் - கருதுகோள் - ஆய்வு முடிவு - வேறுபாடு.

கூறு V (18 hrs)

உற்றுநோக்கல் - ஆய்வுச் சான்றாதாரங்கள் - முதன்மைச் சான்றுகள் - துணைமைச் சான்றுகள் - சார்புச் சான்றுகள் - கருவிநூல் பட்டியல் விளக்கமும் தயாரிப்பும் - துணைநூல் பட்டியல் தயாரித்தல் - கருவிநூல் பட்டியல், துணைநூல் பட்டியல் வேறுபாடு - ஆய்வேட்டின் கட்டமைப்பு - அகக்கட்டமைப்பு - முன்னுரை - ஆய்வேட்டின் உட்பகுதி - துணைநூற்பட்டியல் - பின்னிணைப்புகள் - புறக்கட்டமைப்பு - முகப்புப் பக்கம் - நெறியாளர் சான்றிதழ் - ஆய்வாளர் உறுதி மொழி - பொருளடக்கம் - சுருக்கக் குறியீட்டு விளக்கம்.

பாடநூல்கள்

1. நடராசன்,தி.சு. *திறனாய்வுக்கலை*, நியூ செஞ்சுரி புக் ஹவுஸ் (பி), லிட், சென்னை, முதல் பதிப்பு: 2008.
2. பாலசுப்பிரமணியன்,கு.வெ. *ஆய்வியல் நெறிகள்*, உமா நூல் வெளியீட்டகம், தஞ்சாவூர், முதல் பதிப்பு: 2011.

பார்வை நூல்கள்

1. சுப்பிரமணியன், ச.வே. *ஆராய்ச்சி நெறிமுறைகள்*, உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை, முதல் பதிப்பு: 1995.
2. தமிழண்ணல் & இலக்குமணன், *ஆய்வியல் அறிமுகம்*, ஏரக வெளியீடு, மதுரை, முதல் பதிப்பு: 2012.
3. பஞ்சாங்கம், க. *தமிழ் இலக்கியத் திறனாய்வு வரலாறு*, அகரம், தஞ்சாவூர், முதல் பதிப்பு: 2004.

வலைப்பதிவுகள் (Web Sources)

1. https://youtu.be/RNOZsWlb 4Y
2. https://youtu.be/87vpuoDD0pk
3. https://youtu.be/ux3kQcA9kjM

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SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
PG Programme - M.A. English
SEMESTER- III
CORE COURSE- XII: RESEARCH METHODOLOGY (21PENC34)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 6
CREDITS   : 4
DURATION   : 90 hrs

INT. MARKS: 40
EXT. MARKS: 60
MAX. MARKS: 100

Preamble
This course enables the learners to identify the different stages of Research Methodology employed in executing Research project.

Course Outcomes (CO)
On successful completion of the course, the learners will be able to

CO1[K1]: state the fundamental mechanism in writing a research paper

CO2[K2]: explain the process of compiling and the evaluating sources for the research project

CO3[K3]: apply the mechanics of writing in writing the research paper

CO4[K4]: analyze the various stages in outlining and writing drafts

CO5[K5]: assess the importance of documenting the literary and e-sources

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	1	2	1	1	1
CO2[K2]	3	2	1	2	1	1	1
CO3[K3]	3	2	2	2	1	1	1
CO4[K4]	3	2	1	2	2	1	1
CO5[K5]	3	2	3	2	2	2	1
Weightage of the course	15	11	08	10	07	06	05
Weighted percentage of Course contribution to POs	4.97	5.02	5.59	5.1	7.95	4.76	4.59

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I – RESEARCH AND WRITING   (18 hrs)

The Research Paper as a Form of Exploration-The Research Paper as a Form of Communication-Selecting Topic-Conducting Research-Compiling a Working Bibliography- Evaluating Sources-Taking Notes-Outlining-Writing Drafts-Language and Style-Definition of Plagiarism-Consequences of Plagiarism

UNIT II – THE MECHANICS OF WRITING   (18 hrs)

Spelling-Punctuation-Italics -Underlining-Names of Persons-Numbers-Titles of the Works in the Research Paper-Quotations-Capitalization and Personal Names in Languages

UNIT III – THE FORMAT OF RESEARCH PAPER   (18 hrs)

Paper and Printing-Margin-Spacing-Heading and Title-Page Numbers-Tables and Illustrations-Corrections and Insertions-Binding-Electronic Submission

UNIT IV – DOCUMENTATION: PREPARING THE LIST OF WORKS   (18 hrs)

Documenting Sources- MLA Style- APA Style -The list of Works Cited and Other Source Lists- Citing Periodical Print Publications- Citing Non-Periodical Print Publications- Citing Web Publications- Citing Additional Common sources- A Work in more than one publication medium

UNIT V – DOCUMENTATION (CITING SOURCES IN THE TEXT)   (18 hrs)

Parenthetical Documentation and the list of works Cited- Information Required in Parenthetical Documentation- Readability- Sample References- Using Notes with parenthetical Documentation-Abbreviations -Symbols and Abbreviations Used in Proofreading

TEXTBOOK

1. Gibaldi, Joseph. *MLA Handbook Ninth Edition.* New York: *The Modern Language Association of America.* 2021.

REFERENCES
Books

1. Kothari C. R. *Research Methodology: Methods & Techniques.* New Delhi: New Age International P. Ltd Publishers, 2004.
2. Rengachari S. and S. Sulochna Rengachari Prakash. *Research Methodology for English Literature*: Bareily: Books Depot, 2008.

Web Sources

1. https://www.youtube.com/watch?v=pANlDaCYA_M
2. https://www.youtube.com/watch?v=B4O0EZpRClI&feature=youtu.be

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Sri Kaliswari College (Autonomous), Sivakasi
Department of PG Commerce
PG Programme - M.Com (Finance)
Semester – III
(2018-2020)
Core Course – X : Research Methodology (18PCFC32)
(For those who join from June 2018 and afterwards)

Credit : 5	Int.Mark:25
Hours/Week : 6	Ext.Mark:75
Duration: 90 Hours	Max.Mark:100

Course Objectives:

- To enhance the abilities of learners to undertake research in Business and Social Sciences.
- To make the students to equip with the basic knowledge in making research.
- To build the learners familiar with the basic statistical tools and techniques applicable for research.

Course Outcomes:

1. Students could understand the objectives of research and the steps involved in research process.
2. They can use different data collection methods and sampling design techniques in their own research.
3. Analyze the collected and processed data with the help of statistical tools.
4. Interpret the data and prepare a research report.
5. Students can have understanding of the various approaches and tools required for special decision situations.
6. They can understand the challenges while implementing successful projects and also the project review process.

UNIT I (18 hrs)

Research: Meaning – Objectives – Importance of social science research. **Types of Research:** Pure – Applied – Historical – Case Study – Experimental – Analytical – Descriptive – Comparative – Ex-post facto. **Research Planning:** Selection and Formulation Of Research Problem –Preparation of Research Design.

UNIT II (18 Hrs)

Methods of collection of data: Meaning – Importance – Sources of data – Methods of Collecting Primary Data – Drafting Schedule and Questionnaire – Check list – Pre-test – Pilot study – Interview and Observation Techniques. Secondary data – Sources of Secondary Data.

UNIT III   (18 Hrs)

Sampling: Meaning – Importance – Census Methods and Sampling Methods – Types of Sampling – Factors affecting the size of the Sample – Sampling and Non-Sampling Errors – Biased and Unbiased errors.

UNIT IV   (18 Hrs)

Processing of data: Classification – Editing – Coding – Tabulation – **Interpretation:** Need – Techniques of Interpretation – Precautions in Interpretation. Diagrammatic and Graphical Representation – Rules for Constructing a Diagram – Types of Diagrams. Importance of Computer in Data Processing.

UNIT V   (18 Hrs)

Reports: Introduction – Types of Reports– Steps in writing a Research Report – Layout of a Research Report – Precautions for writing a Research Report. Foot Note, Reference and Bibliography.

Text Books:

1. Krishnaswami, O.R "Methodology of Research in Social Sciences", Himalaya Publishing House, New Delhi, 2007.

2. Kothari, C.R. "Research Methodology", Wiley Eastern Ltd., New Delhi, 2006.

Unit	Text Books	Chapter	Section	Page No.
I	T1	1,2,3,5	-	1 – 62, 72 – 117
II	T1	7,8,9	-	163 – 270
III	T1	6	-	118 – 162
IV	T1	10	-	271 – 294
V	T1	12	-	386 – 433

Reference Books:

1. Research Methods in Commerce, Amarchand, D., Emerald Publications, Chennai, 2005.

2. Methods for Social Survey and Research, Bajpai, S.R, Kitab Ghar, Kanpur, 2005.

3. Anderson, J., Durson, B.H., and Poole, M., 2005, Thesis and Assignment Writing, Wiley Eastern Ltd., New Delhi.

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SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
PG DEPARTMENT OF COMMERCE
PG Programme - M.Com.
SEMESTER - III
CORE COURSE X: BUSINESS RESEARCH METHODS (21PCMC32)
(From 2021-2022 Batch onwards)

HOURS/WEEK : 6   INT.MARKS : 40
CREDITS   : 4   EXT.MARKS : 60
DURATION   : 90 hrs   MAX.MARKS : 100

Preamble
        This course introduces the learn the steps in research process and interpret the research report.

Course Outcomes (CO)
On successful completion of the course, the learners will be able to
CO1[K1]: identify the research problem with the draw the research design
CO2[K2]: explain the methods of data collection
CO3[K3]: apply the sampling techniques in data collection
CO4[K4]: analyse the different types of diagrams used in the research report
CO5[K5]: conclude the research work with proper interpretation

CO-PO Mapping Table (Course Articulation Matrix)

PO \ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	1	1	-
CO2[K2]	3	2	3	2	-	1	-
CO3[K3]	3	2	3	2	1	1	1
CO4[K4]	2	2	2	1	-	1	1
CO5[K5]	2	2	2	1	1	1	1
Weightage of the Course	13	10	12	7	3	5	3
Weighted percentage of Course contribution to POs	4.73	4.17	6.15	4.83	6.82	4.85	4.55

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I   (18 hrs)

Research: Meaning - Objectives - Importance of Social Science Research. **Types of Research:** Pure - Applied - Historical - Case Study - Experimental - Analytical - Descriptive - Comparative - Ex Post facto. **Research Planning:** Selection and Formulation of Research Problem - Selection of the Topic - Preparation of Research Design.

UNIT II   (18 hrs)

Methods of Collection of Data: Meaning - Importance - Sources of Data - Primary Data - Methods of Collecting Primary Data - Drafting Schedule and Questionnaire - Check List - Pre-Test - Pilot Study - Interview and Observation Techniques - Secondary Data - Sources of Secondary Data.

UNIT III   (18 hrs)

Sampling: Meaning - Importance - Census Methods and Sampling Methods - Types of Sampling - Factors Affecting the Size of the Sample - Sampling and Non-Sampling Errors - Biased and Unbiased Errors.

UNIT IV   (18 hrs)

Processing of Data: Classification - Editing - Coding - Tabulation - Interpretation - Need - Techniques of Interpretation - Precautions in Interpretation - Diagrammatic and Graphical Representation - Rules for Constructing a Diagram - Types of Diagrams - Importance of Computer in Data Processing.

UNIT V   (18 hrs)

Reports: Introduction - Types of Reports - Steps in Writing a Research Report - Layout of a Research Report - Precautions for Writing a Research Report - Foot noting and Referencing - Bibliography.

TEXTBOOK
1. Krishnaswami O.R. *Methodology of Research in Social Sciences.* New Delhi: Himalaya Publishing House, 2017.

REFERENCES
Books
1. Kothari C.R. *Research Methodology.* New Delhi: Wiley Eastern Ltd, 2016.
2. Amarchand D. *Research Methods in Commerce.* Chennai: Emerald Publications, 2015.
3. Anderson J, Durson B.H. and Poole M. *Thesis and Assignment Writing.* New Delhi: Wiley Eastern Ltd, 2005.

Web sources
1. https://www.questionpro.com/blog/business-research/#:~:text
2. https://gent.uab.cat/diego_prior/sites/gent.uab.cat.diego_prior/files/02_e_01_introduction-to-research-methods.pdf
3. https://www.sscasc.in/wp-content/uploads/downloads/MCOM/Business-Research-Methods.pdf

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SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
PG DEPARTMENT OF COMMERCE
PG Programme - M.Com. (Computer Application)
SEMESTER - III
CORE COURSE X: BUSINESS RESEARCH METHODS (21PCPC32)
(From 2021-2022 Batch onwards)

HOURS/WEEK : 6		INT.MARKS : 40
CREDITS : 4		EXT.MARKS : 60
DURATION : 90 hrs		MAX.MARKS : 100

Preamble
This course introduces the learn the steps in research process and interpret the research report.

Course Outcomes (CO)
On successful completion of the course, the learners will be able to
CO1[K1]: identify the research problem with the draw the research design
CO2[K2]: explain the methods of data collection
CO3[K3]: apply the sampling techniques in data collection
CO4[K4]: analyse the different types of diagrams used in the research report
CO5[K5]: conclude the research work with proper interpretation

CO-PO Mapping Table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	1	1	-
CO2[K2]	3	2	3	2	-	1	-
CO3[K3]	3	2	3	2	1	1	1
CO4[K4]	2	2	2	1	-	1	1
CO5[K5]	2	2	2	1	1	1	1
Weightage of the Course	13	10	12	7	3	5	3
Weighted percentage of Course contribution to POs	4.73	4.48	6.67	4.14	7.5	4.72	4.48

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I   (18 hrs)

Research: Meaning - Objectives - Importance of Social Science Research. **Types of Research:** Pure - Applied - Historical - Case Study - Experimental - Analytical - Descriptive - Comparative - Ex Post facto. **Research Planning:** Selection and Formulation of Research Problem - Selection of the Topic - Preparation of Research Design.

UNIT II   (18 hrs)

Methods of Collection of Data: Meaning - Importance - Sources of Data - Primary Data - Methods of Collecting Primary Data - Drafting Schedule and Questionnaire - Check List - Pre-Test - Pilot Study - Interview and Observation Techniques - Secondary Data - Sources of Secondary Data.

UNIT III   (18 hrs)

Sampling: Meaning - Importance - Census Methods and Sampling Methods - Types of Sampling - Factors Affecting the Size of the Sample - Sampling and Non-Sampling Errors - Biased and Unbiased Errors.

UNIT IV   (18 hrs)

Processing of Data: Classification - Editing - Coding - Tabulation - Interpretation - Need - Techniques of Interpretation - Precautions in Interpretation - Diagrammatic and Graphical Representation - Rules for Constructing a Diagram - Types of Diagrams - Importance of Computer in Data Processing.

UNIT V   (18 hrs)

Reports: Introduction - Types of Reports - Steps in Writing a Research Report - Layout of a Research Report - Precautions for Writing a Research Report - Foot noting and Referencing - Bibliography.

TEXTBOOK
1. Krishnaswami O.R. *Methodology of Research in Social Sciences.* New Delhi: Himalaya Publishing House, 2017.

REFERENCES
Books
1. Kothari C.R. *Research Methodology.* New Delhi: Wiley Eastern Ltd, 2016.
2. Amarchand D. *Research Methods in Commerce.* Chennai: Emerald Publications, 2015.
3. Anderson J, Durson B.H and Poole M. *Thesis and Assignment Writing.* New Delhi: Wiley Eastern Ltd, 2005.

Web sources

1. https://www.questionpro.com/blog/business-research/#:~:text
2. https://gent.uab.cat/diego_prior/sites/gent.uab.cat.diego_prior/files/
02_e_01_introduction-to-research-methods.pdf
3. https://www.sscasc.in/wp-content/uploads/downloads/MCOM/Business-Research-Methods.pdf

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SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF MATHEMATICS
PG Programme - M.Sc. Mathematics
SEMESTER - III
CORE COURSE - XII: RESEARCH METHODOLOGY (21PMAC34)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 6   INT. MARKS: 40
CREDITS   : 4   EXT. MARKS: 60
DURATION   : 90hrs   MAX.MARKS: 100

Preamble

This course introduces the students to the different essential elements in writing a research paper and the essential LaTex techniques needed for documentations.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K2]: explain the essential components in writing a research paper

CO2[K3]: apply the LaTex techniques in preparing a research document

CO3[K4]: analyse the different elements in writing a research paper

CO4[K5]: assess the method of preparing the list of works cited and sources in the text

CO5[K1]: identify the research ethics in documentations

CO-PO Mapping table (Course Articulation Matrix)

PO \ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	2	-	2	1	2	1	1
CO2[K3]	2	-	2	1	-	1	1
CO3[K4]	3	2	3	1	2	1	1
CO4[K5]	3	2	3	1	2	1	1
CO5[K1]	3	-	2	1	3	1	1
Weightage of the course	13	04	12	05	09	05	05
Weighted percentage of Course contribution to POs	4.29	1.69	6.82	2.94	34.62	6.33	7.04

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I   **(18 hrs)**

Research Methodology: An Introduction: Meaning of Research – Objectives of Research – Motivation in Research – Types of Research – Research

Approaches – Significance of Research - Research Methods versus Methodology – Research and Scientific Method – Importance of Knowing How Research is Done - Research Process – Criteria of Good Research.

UNIT II   (18 hrs)

Research Ethics, Plagiarism and Impact of Research: Research Ethics - Codes and Policies for Research Ethics – Responsibilities as a researcher – Plagiarism – Plagiarism Detection Softwares. **Funding Agencies and Research Grants:** Research Funding – Department of Science and Technology (DST) –All India Council for Technical Education (AICTE) – University Grants Commission (UGC) – Council of Scientific and Industrial Research (CSIR). **Citations : An Overview:** Why Cite? - The Basics of Citation.

UNIT III   (18 hrs)

Creating Tables and Inserting Pictures: Writing in columns – Typesetting Tables – Drawing Lines in Tables – Understanding Formatting Arguments – Increasing Row Height – Beautifying Tables – Spanning Entries over Multiple Columns – Inserting Code Column-Wise – Spanning Entries over Multiple Rows – Adding Captions to Tables – Placing Captions Above – Auto-Fitting Columns to the Table Width – Generating Multi-Page Tables – Coloring Tables – Using Landscape Orientation – Aligning Columns at the Decimal Point – Handling Narrow Columns – Inserting Pictures – Scaling Pictures – Choosing the Optimal File Type – Including Whole Pages – Putting Images behind the Text – Managing Floating Environment – Understanding Float Placement Options – Forcing the Output of Floats – Limiting Floating – Avoiding Floating at All – Spanning Figures and Tables over Text Columns – Letting Text Flow around Figures– Breaking Figures and Tables into Pieces.

UNIT IV   (18 hrs)

Typing Math Formulas: Writing basic formulas - Embedding Math Expressions within Text – Displaying Formulas – Numbering Equations – Adding Subscripts and Superscripts – Extracting Roots – Writing Fractions – Greek Letters – Script Letters – Producing an Ellipsis – Comparing in-line Formulas to Displayed Formulas – Changing the Font, Style, and Size – Customizing Displayed Formulas – Aligning Multi-Line Equations – Numbering Rows in Multi-Line Formulas – Inserting Text into Formulas – Fine-Tuning Formulas – Using Operators – Exploring the Wealth of Math Symbols – Writing Units – Building Math Structures –Stacking Expressions – Writing Theorems and Definitions. **Using Fonts:** Preparing the encoding – Installing Additional Fonts – Choosing the Main Font – Loading Font Packages – Serif Fonts – Sans-Serif Fonts – Typewriter Fonts Exploring the World of LaTex Fonts.

UNIT V
(18 hrs)

Technical Writing and Reporting of Research: Research Report – Types of Reports – Technical Report – Popular Report – Dissertation and Thesis – Research Paper – Review Articles – Short Communication – Conference – Meeting Report – Structure of a Research Paper – Reference Management Software – Impact Factor – Calculation of Impact Factor – Journal Citation Report – Indexing of Journal.

TEXTBOOKS

1. Kothari, C.R. *Research Methodology (Methods and Techniques).* New Delhi: New Age International (P) Ltd Publishers, 2006. **(UNITS I & V)**
2. Shanti Phushan Mishra and Shashi Alok. *Handbook of Research Methodology (A Compendium for Scholars and Researchers).* New Delhi: Educreation Publishing, 2019. **(UNIT II)**
3. Charles Lipson. *Cite Right.* London: The University of Chicago Press, Ltd, 2006. **(UNIT II)**
4. Stefan Kottwitz. *LaTeX (Beginner's Guide).* UK: Packt Publishing Ltd, 2011. **(UNITS III & IV)**

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1. Bindrawan Lal. *Research Methodology.* Jaipur: ABD Publishers, 2002.
2. George Gratzer. *More Math into LATEX.* Springer Science + Business Media LLC, 4th Edition, 2007.
3. Wilkins, David R. *Getting Started with LATEX.* Canada: The University of Manitoba, 1995.

Web Sources

1. https://www.modares.ac.ir/uploads/Agr.Oth.Lib.17.pdf
2. https://www.researchgate.net/publication/319207471_HANDBOOK_OF_RESEARCH_METHODOLOGY
3. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjJmM65g6rvAhXOWisKHcyNCi8QFjAAegQIAhAD&url=https%3A%2F%2Fpress.uchicago.edu%2Fdam%2Fucp%2Fbooks%2Fpdf%2Fcourse_intro%2F978-0-226-43110-9-chapter_one.pdf&usg=AOvVaw0NEMRB-7A0NsTQQnv0koQN
4. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiXlr3jg6rvAhXTbn0KHTrtDVYQFjAAegQIARAD&url=http%3A%2F%2Fstatic.latexstudio.net%2Fwp-content%2Fuploads%2F2015%2F03%2FLaTeX_Beginners_Guide.pdf&usg=AOvVaw2hZD3u5i6wWdHkkdcO5emI
5. https://libguides.tru.ca/mathstats/citation

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21PMA62

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
PG Programme – M.Sc. Chemistry
SEMESTER - IV
CORE COURSE - XV: RESEARCH METHODOLOGY (21PCHC43)
(From 2021 – 2022 Batch onwards)

HOURS/WEEK: 5   INT. MARKS : 40
CREDITS   : 4   EXT. MARKS : 60
DURATION   : 75 hrs   MAX. MARKS : 100

Preamble

    This course enables the students to gain research knowledge in chemistry related to literature survey, chemistry softwares, and writing skills on thesis and research proposal.

Course Outcomes (CO)

    On successful completion of the course, the learners will be able to

CO1[K1]: recognize the basic research ideas related to recent research, techniques and their methodologies

CO2[K2]: outline the basic concepts of research, literature survey and computer techniques in chemistry

CO3[K3]: apply the knowledge of fundamental concepts of chemistry in advanced research

CO4[K4]: simplify the outcome of instrumental method of analysis with the aid of chemistry softwares

CO5[K5]: appraise the ethics and art of science communication by developing the skill of effective thesis writing, paper writing and presentation in seminars and conferences.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	1	1	1	1
CO2 [K2]	3	2	1	1	1	1	-
CO3 [K3]	3	2	2	1	1	1	1
CO4 [K4]	3	3	2	1	1	1	1
CO5 [K5]	3	3	2	2	1	1	1
Weightage of the course	15	12	8	6	5	5	4
Weighted percentage of Course contribution to POs	5.05	5.02	5.19	5.5	6.49	6.41	6.35

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I - BASIC CONCEPTS OF RESEARCH (15 hrs)

Research-Definition and Types of Research (Descriptive vs Analytical; Applied vs Fundamental; Quantitative vs Qualitative; Conceptual vs Empirical). Research Methods vs Methodology. Literature Review and its Consolidation - Library Research - Field Research - Laboratory Research.

UNIT II - LITERATURE SURVEY (15 hrs)

Sources of Information - Primary Sources and Secondary Sources of Literature Survey – Journals Abbreviations - Importance of Journals - Impact Factor - h-Index - i-Index – ISSN – ISBN – Science Citation Index - Chemistry Journal Index. Computers in Literature Search Using Internet websites - American Chemical Society - Royal Society of Chemistry – Springer - Science Direct - Wiley – Interscience. Internet Search Engines – Google – Yahoo etc.,

UNIT III - COMPUTER TECHNIQUES IN CHEMISTRY (15 hrs)

Chemistry Software – Chemoffice – Chemdraw - Chem 3D & Chem Finder - Linear Regression - Multi Regression. MS Excel - Graph Drawing and Calculations. Origin – Rasmol - Visualization of Protein Molecules – Highlighting Amino Acids – Helices - Beta Sheets - Non-Hydrogen, Hydrogen and Sulphur Bonds - Identification of Metal Atoms and Active Sites. SHELX: Structure Solving and Refinement Using Shelxs and Shelxl. Key Chemistry Research Areas - Chemoinformatics.

UNIT IV - EFFECTIVE THESIS / RESEARCH REPORT WRITING (15 hrs)

Format of Research Report and Research Proposal - Style of Writing Report - Reports and Bibliography. Art of Writing a Thesis.

UNIT V - ETHICS AND ART OF SCIENTIFIC COMMUNICATION (15 hrs)

General Aspects of Scientific Writing - Reporting Practical and Project Work - Writing Literature Surveys and Reviews - Paper Writing for International Journals - Power Point Presentation - Poster Presentation – in Seminars & Conferences - Scientific Writing – Ethics - Plagiarism.

TEXTBOOKS
1. Barbara Kasser. *Using the Internet.* New Delhi: 4th Ed., 1998.
2. Abdul Rahim F. *Thesis Writing, A Manual Researcher.* New Delhi: New Age International Ltd, 1996.
3. Peter C Jurs. *Computer Software Applications in Chemistry.* Wiley Interscience, 2nd Edition, 1996.

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1. Dawson C. *Practical Research Methods*. New Delhi: UBS Publishers, 2002.
2. Geffery G. H, Basselt J., Mendhan and Denney R. C. *Vogel's Text Book of Quantitative Chemical Analysis*. UK: Longman Scientific and Industrial, 5th Edition, 1989.
3. Anderson J., Durston B. H. and Poole M. *Thesis and Assignment Writing*. New Delhi: Wiley Eastern Ltd, 1997.

Web Sources

1. https://nptel.ac.in/courses/121/106/121106007/
2. https://www.youtube.com/watch?v=Yzfl3rtF0SM
3. https://www.youtube.com/watch?v=vHHtfO-Bu1M
4. https://nptel.ac.in/courses/102/104/102104061/
5. https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-bt05/

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SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme – M.Sc. Computer Science
SEMESTER- IV
CORE COURSE – XVIII: RESEARCH METHODOLOGY (21PCSC43)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5	INT. MARKS : 40
CREDITS : 5	EXT. MARKS : 60
DURATION : 75 hrs	MAX. MARKS: 100

Preamble

This course gives an outline of the procedures and techniques adopted by the researcher while conducting the study and the method of data accumulation.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: describe research, research problem, research design, sampling design, measurement and scaling techniques, methods of data collection, processing and analysis of data and plagiarism.

CO2[K2]: explain types of research, research process, research problem, research design, steps in sampling, measurement and scaling techniques, interpretation, research reports and plagiarism

CO3[K3]: choose the appropriate research problem, research design, method of data collection, sampling design, measurement and scaling technique

CO4[K4]: examine research methods and methodologies, research process, research problem, research design, research reports.

CO5[K6]: design a data collection method for their research problem & create plagiarism free research reports.

CO-PO Mapping table (Course Articulation Matrix)

PO \ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	-	2	1	2	1	1
CO2[K2]	2	1	2	1	2	1	1
CO3[K3]	1	1	2	1	2	2	1
CO4[K4]	1	2	2	1	2	2	1
CO5[K6]	1	3	3	1	2	2	2
Weightage of the course	07	07	11	05	10	08	06
Weighted percentage of Course contribution to POs	2.14	2.94	5.26	3.42	15.15	5.76	4.96

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I (15 hrs)

Introduction: Meaning of Research – Objectives of Research – Motivations in Research – Types of Research – Research Approaches – Significance of Research – Research Methods Versus Methodology - Research and Scientific Method – Importance of Knowing How Research is done – Research Process – Criteria of Good Research – Problems Encountered by Researchers in India. **Research Problem:** What is a Research Problem? – Selecting the problem – Necessity of Defining the Problem – Technique Involved in Defining a Problem. **Research Design:** - Meaning of Research Design – Need for Research Design – Features of a Good Design – Important Concepts Relating to Research Design – Different Research Design – Basic Principles of Experimental Designs.

UNIT II (15 hrs)

Sampling Design: Steps in Sampling Design – Criteria of Selecting a Sampling Procedure – Characteristics of a Good sample design – Different Types of Sample Designs – How to Select Random Sample? – Random Sample from an Infinite Universe – Complex Random Sampling Designs. **Measurement and Scaling Techniques:** Measurement in Research – Measurement Scales – Sources of Error in Measurement – Test of Sound Measurement – Technique of Developing Measurement Tools – Scaling – Meaning of Scaling – Scale Classification Bases – Important Scaling Techniques – Scale Construction Techniques.

UNIT III (15 hrs)

Methods of Data Collection: Collection of Primary Data – Observation Method – Interview Method – Collection of Data through Questionnaires – Collection Data Through Schedules – Difference between Questionnaires and Schedules – Some other methods of Data Collection – Collection of Secondary Data. **Processing and Analysis of Data:** Processing Operations – Some Problems in Processing – Elements/Types of Analysis – Statistics in Research – Measures of Central Tendency – Measures of Dispersion – Measures of Asymmetry – Measure of Relationship – Simple Regression Analysis – Multiple Correlation and Regression – Partial Correlation – Association in Case of Attributes- other Measures.

UNIT IV (15 hrs)

Interpretation and Research Report: Meaning of Interpretation – Why Interpretation? – Technique of Interpretation – Precaution in Interpretation – Significance of Report Writing – Different Steps in Writing Report – Layout of the Research Report – Layout of the Research Report – Types of Reports – Oral Presentation – Mechanics of Writing a Research Report – Precautions for Writing Research Reports.

UNIT V (15 hrs)

==Plagiarism:== The Plagiarism Continuum – The Birth of Plagiarism – The Six Elements of Plagiarism – Plagiarism-A Global Issue – The Plagiarism and the Internet.

TEXTBOOKS

1. C.R. Kothari. *Research Methodology Methods and Techniques. New Age International(P) Ltd*, Second Edition, 2004.
   UNIT I : 1,2,3
   UNIT II: 4,5

   UNIT III: 6,7
   UNIT IV : 14
2. Wendy Sutherland-Smith. *Plagiarism the internet and Student Learning.* Routledge, 2008.
   UNIT V : 1,2,3,4,5

REFERENCES
Books

1. Ranjit Kumar. *Research Methodology: A Step-by-Step Guide for Beginners.* SAGE Publication Ltd, 2014.
2. John W. Creswell, J. David Creswell. *Research Design*, SAGE Publication Ltd, 2017.
3. Geoffrey R. Marczyk, David DeMatteo, David Festinger. *Essentials of Research Design and Mehodology*, WILEY, 2005.

Web Sources

1. https://www.intechopen.com/books/cyberspace/research-design-and-methodology
2. https://gradcoach.com/what-is-research-methodology/
3. https://www.guide2research.com/research/how-to-write-research-methodology
4. https://www.scribbr.com/dissertation/methodology/

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SRI KALISWARI COLLEGE
(Autonomous)
SIVAKASI - 626 130

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BIOTECHNOLOGY
PG Programme – M.Sc. Biotechnology
SEMESTER - IV
CORE COURSE-XV: RESEARCH METHODOLOGY (21PBTC43)
(From 2021 – 2022 Batch onwards)

HOURS/WEEK: 5	INT. MARKS : 40
CREDITS : 4	EXT. MARKS : 60
DURATION : 75hrs	MAX. MARKS: 100

Preamble

This course provides an introduction to the basis and principles of research methodology and makes the students to plan and carry out research.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K2]:Illustrate the significance and types of research and its methodologies

CO2[K3]:determine issues and concepts salient to research process

CO3[K3]: apply theoretical aspects of research methodology for a proposed project

CO4[K4]:analyse the peer reviewed and indexed journals for publications

CO5[K5]: appraise the application of electronic tools for checking plagiarisms

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	3	2	1	2	1
CO2[K3]	3	2	3	2	1	-	1
CO3[K3]	3	2	3	2	1	-	-
CO4[K4]	3	2	3	2	-	-	-
CO5[K5]	3	2	3	2	1	2	-
Weightage of the course	15	10	15	10	04	4	02
Weighted percentage of Course contribution to POs	5.77	4.44	7.58	7.46	4.65	3.88	1.85

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' no correlation)

UNIT I   (15 hrs)

Research Definition- Motivation and Objectives-Types of Research - Descriptive, Analytical, Applied, Fundamental, Quantitative, Qualitative, Conceptual and Empirical - Significance of Research - Methods vs Methodology.Essential Steps in Research-Literature collection- Literature citation – Different systems of citing References – Citation Index and Impact Factor-Journal Abbreviations.

UNIT II   (15 hrs)

Defining and Formulating the Research Problem -Selecting the Problem - Basic Principles of Research Design - Essential Steps in the Research Processes - Criteria for Good Research Data Collection – Classification of Data- Primary Data, Secondary Data.

UNIT III   (15 hrs)

Sampling - Sampling Methods- Essentials of the Scientific Report- Abstract, Introduction, Review of Literature, Materials and Methods, Results, Discussion, Reference, Cross-Referencing, Proof Reading.

UNIT IV   (15 hrs)

Preparing Manuscripts, Oral and Poster Presentation - Writing a Thesis- Project Proposal Writing, Grant Applicationand Funding Agencies for Project, Use of electronic tools for bibliographic formatting and checking Plagiarism. Research Guides, Handbook, Academic Databases for Biological Science Discipline. Methods to search required information effectively.

UNIT V   (15 hrs)

Applications of Computer in research -Input and output devices, classification of computers, CPU, Software and application, machine and assembly languages, compiler assembler and interpreter, flow charts, general knowledge of R programming.

TEXTBOOKS

1. Holmes, Debbie, Peter Moody, Diana Dine, and Laurence Trueman. *Research methods for the biosciences*. Oxford university press, 2017.
2. Kothari C.K. *Research Methodology: Methods and Techniques*. New Age International, 2013.
3. Krishnaswamy K.N, Mathiranjan M and Sivakumar A.I. *Management Research Methodology - Integration of Principles, Methods and Techniques*. Pearson Education, 2011.

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1. Kumar R. *Research Methodology: A Step-by-Step Guide for Beginners*. 2nd edition, Pearson Education, 2005.
2. Montgomery, Douglas C.*Design and Analysis of Experiments*. 8th edition. Wiley, 2013.
3. Rao S and Richard J. *Introduction to Biostatistics and Research Methods*. Prentice Hall India Learning Private Limited, 2012.
4. Gastel, Barbara, and Robert A. *How to write and publish a scientific paper*. ABCCLIO, 2016.

Web sources

1. https://explorable.com/
2. http://openwetware.org/wiki/Guide_to_Excel_for_statistics
3. http://www.biostathandbook.com/

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SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
PG Programme - M.Sc. Botany
SEMESTER - II
CORE COURSE - V: INSTRUMENTATION TECHNIQUES AND BIOSTATISTICS AND RESEARCH METHODOLOGY (21PBYC21)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 6
CREDITS   : 5
DURATION   : 90 hrs

INT. MARKS : 40
EXT. MARKS : 60
MAX. MARKS: 100

Preamble

This course introduces the learners to the working principles, construction and applications of the instruments used in biological sciences and the art of thesis and paper writing and publication.

Course Outcomes (CO)

On successful completion of the practical course, the learners will be able to

CO1[K2]: demonstrate general laboratory procedures and maintenance of research equipments, microscopy, pH meter and preparation of different buffers

CO2[K3]: determine the methods of writing scientific paper and methods of statistical tool to solve the problems and know the importance of impact factor & citation index

CO3[K4]: analyze scientific data, research proposals & identification of funding agencies

CO4[K5]: resolve the research problems quantitatively using appropriate statistical methods and publish the data

CO5[K5]: evaluate and interpret visual representations of quantitative research data from experiment, such as graphs or charts by using statistical tool

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	3	1	2	-	1	-
CO2[K3]	3	2	2	-	-	-	-
CO3[K4]	3	2	1	1	1	2	1
CO4[K5]	3	2	2	1	3	2	2
CO5[K5]	3	2	2	2	2	-	1
Weightage of the course	15	11	8	6	6	5	4
Weighted percentage of Course contribution to POs	5.68	5.12	4.12	4.08	6.45	6.1	4.3

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

Approved in the Academic Council-XIII held on 11/08/2021

21PBY 40

UNIT I   (18 hrs)

General Laboratory procedures and maintenance of research equipments. Microscopy: Principles of Light, Phase contrast, Fluorescent, Electron microscopy – SEM and TEM. pH basic principles and application of pH meter- Principles and application of buffers. Microtome - types and functions, Fixatives and Fixation for Histo-chemical study, Principles and practice of staining (single and double).

UNIT II   (18 hrs)

Chromatography-principle, types- Paper, TLC, Column, Adsorption & Affinity, HPLC, GC-MS. Electrophoresis- Principle, type- polyacrylamide & agarose. Centrifugation. Spectroscopic techniques- UV-Visible and FT-IR - Flame photometer, Principle and applications ELISA.

UNIT III   (18 hrs)

Statistical Methods: Data analysis,   Central measures (mean, medium, mode); Dispersion measures (range, standard deviation), Standard deviation, Standard error, Co-efficient of variation, Null Hypothesis, level of significance, probability, correlation and regression, and normal distribution, parametric and non parametric tests, t-test, f-test, chi-square test, ANOVA.

UNIT IV   (18 hrs)

Research: Definition, objectives, types- pure research, applied research, descriptive, experimental, historical, and importance. Research process, Identification and criteria of selecting a Research Problem (Hypothesis), literature collection and citation, Research Plan and its components, Methodology (Experimental design / Field data collection). Data presentation and interpretation. Drawing conclusions, Writing skills - Preparation of research report, presentations, writing grant proposals.

UNIT V   (18 hrs)

Thesis   and   Dissertation: components-title,   certificate,   declaration, acknowledgements, contents- list of tables, figures, plates & abbreviations, Introduction, Review of literature, Materials and methods- Results- Presentation of data-Tables, figures, maps, graphs, photographs-Discussion- Summary, Bibliography/References and Appendix. Research Ethics and Legal issues. Plagiarism checking and their impact on publications.

TEXTBOOKS

1. Biju Dharmapalan, *Scientific Research Methodology*. Narosa Publising House, New Delhi. 2012
2. Kannan,K. *Hand book of Laboratory culture media, reagents, stains and buffers* Panima publishing corporation, New Delhi, 2013.
3. Gurumani, N. *Research Methodology for Biological Sciences*. MJP Publishers, Chennai 2010
4. Arora P.N. Malhan P.K.. *Biostatistics*. Publishing House Delhi, 1996.
5. Kumar, P.S.G.. *Research methods and statistical techniques*. B.R. publishing Academy, Udaypur, 2004.
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1. Holmes, D, Mooley, P and Dine, D. *Research Methods for the Biosciences*. Oxford University Press, New York, 2006.
2. Kumar Ranjit. *Research Methodology. A step by step Guide for Beginners*. Singapore, Pearson Education, 20155.
3. Banerjee, P.B. *Introduction to Biostatistics*. S.Chand & Company Pvt. Ltd., 2014.
4. Bhattacharya, D.K. *Research Methodology*. Excel Books publication, New Delhi, 2013.
5. Harborne J.B. *Phytochemical Methods - A Guide to Modern Technique of Plant Analysis.*, Champan & Hall, UK, 1998.
6. Kothari, C.R. and Garg, G. *Research Methodology: Methods and Techniques*. New Age International Publishers, New Delhi, 2014.

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1. http://b-ok.xyz/book/674611/288bc3
2. https://iiscs.wssu.edu/drupal/node/4673
3. https://nu.libguides.com/biostatistics
4. https://newonline_courses.sciences.psu.edu/

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