Criterion – III Research, Innovations and Extension

3.4 Research Publications and Awards

3.4.1 Syllabus of the Research Methodology Course Work

SSR Cycle – 3

Since 1881

THE AMERICAN COLLEGE, MADURAI - 625002
(An Autonomous Institution affiliated to Madurai Kamaraj University)

Department of Religion, Philosophy and Sociology

Choice Based Credit System

Program for B.A. Degree in RPS

SEM	Part	Course No.	Course Title	Hr / Wk	Cr
I	I	XXX 0000	TAM / FRE / HIN	3	2
I	II	ENG 1201	Conversational Skills	3	2
I	III	RPS 1433	Study of Religion	4	4
I	III	RPS 1445	Philosophy: Introduction, Scope & Relevance	4	4
I	III	RPS 1521	General Introduction to Sociology	5	5
I	III S	RPS 1425	Social Anthropology	5	4
I	IV NME	RPS 1235	Analyzing Science through Philosophy	3	2
I	IV LS	RPS 1237	Social Skills	3	2
			Total	**30**	**25**
II	I	XXX 0000	TAM / FRE / HIN	3	2
II	II	ENG 1202	Reading and Writing Skills	3	2
II	III	RPS 1534	World Religions	5	5
II	III	RPS 1444	Introduction to Ethics	4	4
II	III	RPS 1424	Social Institutions	4	4
II	III S	RPS 1426	Introduction to Psychology	5	4
II	IV NME	RPS 1236	Science & Reality	3	2
II	IV LS	RPS 1242	Yoga for Healthy Living	3	2
II	Part V	XXXX 0000	NSS / NCC / SLP / P.Ed	2	1
			Total	**30+2**	**25+1**
III	I	XXX 0000	TAM / FRE / HIN	3	2
III	II	ENG 2201	Study Skills	3	2
III	III	RPS 2533	Saivism, Vaishnavism & Sakthism	5	5
III	III	RPS 2547	Classical Indian Philosophy - I	5	5
III	III	RPS 2433	Logic	4	4
III	III	RPS 2525	Study of Indian Society	5	5
III	III S	RPS 2435	Philosophy of Religion	5	4
			Total	**30**	**27**
IV	I	XXX 0000	TAM / FRE / HIN	3	2
IV	II	ENG 2202	Career Skills	3	2
IV	III	RPS 2444	Ancient and Medieval Philosophy	4	4
IV	III	RPS 2548	Classical Indian Philosophy - II	5	5
IV	III	RPS 2524	Social Structure in India	5	5
IV	III	RPS 2526	Research Methods in Sociology	5	5
IV	III S	RPS 2430	Social and Political Philosophy	5	4
IV	Part V	XXXX 0000	NSS / NCC / SLP	2	1
			Total	**30+2**	**27+1**

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RPS 2526 **5 hr / 5 cr**

Objective: The aim of this course is to learn in detail the research methodology in Sociology. This course gives an overview of basic concepts related to research methodology in Sociology including research design, data collection and ethical social research.

Unit - I Introduction to Social Research

Social Research -Definition – Aim– Types –Qualitative and Quantitative research –Steps of the research process- Importance of Social research

Unit - II Research design and Literature

Research design – Meaning - Definition – Types - Exploratory, Descriptive, Explanatory and Experimental research designs– review of literature – Meaning – Goals and types

Unit - III Sampling

Sampling: Definition – Meaning- Probability sampling – Simple Random sampling-stratified random sampling – systematic sampling – Cluster random sampling - Non probability Sampling – Purposive sampling – Convenience sampling – Quota sampling – Snowball sampling

Unit - IV Techniques of data collection

Data- Meaning – Primary data and Secondary data – Definition - Data collection techniques– Experiments – Content analysis - Interviewing –Tools – Questionnaire - Observation – Social survey - Types – Advantages and Disadvantages

Unit - V Ethical Social Research

Mechanics of writing a research report – Referencing – Footnote, Endnote, Bibliography – Plagiarism - Types– Ethical Social research – Basic Principles - Ethical issues involving research Subjects

Text:

1. "Research Methodology : Methods and Techniques", C.R. Kothari, New Age International Publishers

Books for Reference:

1. "Scientific Methods of Social Research", Gosh, B.N., Sterling Publishers, New York, 1983
2. "Handbook of Qualitative Research", Edited by Norman K. Denzin & Yvonna S. Lincoln, SAGE Publications, 1994
3. "Multi Method Research: A synthesis of Styles", Brewer J. & Hunker A., Newbury Park, CA: SAGE
4. "Social Research", S. Sarantakos, Macmillan Education Australia.

Course Outcome:

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On completion of the course, students should be able

CO1: To describe the relationship between Social Psychology and Sociology
CO2: To identify the basic concepts related to research methodology in sociology
CO3: To differentiate between Qualitative and Quantitative research
CO4: To develop data collection tool on their own
CO5: To apply the different techniques of data collection

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
Bloom's Taxonomy	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
K1: Remembering		1			
K2: Understanding	2				
K3: Applying					3
K4: Analyzing			4		
K5: Evaluating					
K6: Creating				5	

Mean = 3

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SOCIAL AND POLITICAL PHILOSOPHY

Department of Business Administration

COURSE FRAME

Semester	Part	Course Code	Course Title	Hours	Credit
I	I	TAS/FRS/HIS	Tamil/ French/ Hindi	3	2
	II	ENS1201	Conversational Skills	3	2
	IIIC	BBA1441	Principles of Management	4	4
	IIIC	BBA1425	Financial Accounting - I	4	4
	IIIC	BBA1525	Corporate Communication	5	5
	LS1	BBA1231	Personality Development	3	2
	NME	BBA1229	Banking Law and Practice	3	2
	SUPPO	BBA1423	Advertising and Salesmanship	5	4
II	I	TAS/FRS/HIS	Tamil/ French/ Hindi	3	2
	II	ENS1202	Reading & Writing Skills	3	2
	IIIC	BBA1430	Financial Accounting - II	4	4
	IIIC	BBA1432	Business Environment	4	4
	IIIC	BBA1554	Marketing Management	5	5
	LS2	BBA1226	Entrepreneurial Skills	3	2
	NME	BBA1224	Foundations of Management	3	2
	SUPPO	MAS1440	Business Statistics	5	4
	V	XXXxxxx	NSS/PED/SLP		1
III	I	TAS/FRS/HIS	Tamil/ French/ Hindi	3	2
	II	ENS2201	Study Skills	3	2
	IIIC	BBA2447	Organizational Behaviour	4	4
	IIIC	BBA2543	Human Resource Management	5	5
	IIIC	BBA2545	Quantitative Techniques	5	5
	IIIC	BBA2539	Portfolio Management	5	5
	SUPPO	BBA2451	Business Law	5	4
IV	I	TAS/FRS/HIS	Tamil/ French/ Hindi	3	2
	II	ENS2202	Career Skills	3	2
	IIIC	BBA2428	Production Management	4	4
	IIIC	BBA2552	Industrial Relations	5	5
	IIIC	BBA2554	Entrepreneurial Development	5	5
	IIIC	BBA2556	Financial Services	5	5
	SUPPO	BBA2430	Total Quality Management	5	4
	V	XXXxxxx	NSS/PED/SLP		1
V	LS3	BBA3223	Business Organisation	3	2
	HVS	HVS3200	Human Value Development	4	2
	IIIC	BBA3635	Management Information System	6	6
	IIIC	BBA3627	Cost Accounting	6	6
	IIIC	BBA3631	Marketing Research	6	6
	IIIC	BBA3535	International Marketing	5	5
VI	LS4	BBA3260	Organisational Leadership	3	2
	EVS	BBA3200	Environmental Studies	4	2
	IIIC	BBA3650	Strategic Management	6	6
	IIIC	BBA3644	Management Accounting	6	6
	IIIC	BBA3638	Logistics Management	6	6
	IIIC	BBA3550	Retail Management	5	5

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BBA 3631	Marketing Research	6Hrs / 6Cr
Course Objective	Application of theoretical knowledge in real life situations and advancement of knowledge in any field of study are not possible without research. Therefore this paper has been introduced with the objective of making the students understand the basic concept of research in the field of Marketing	
Course Outcomes	On completion of the course, students should be able to	
	i	Predict the scope of Marketing Research.
	ii	Illustrate the process of Marketing Research.
	iii	Experiment the methods of Sampling.
	iv	Analyze various data collection methods.
	v	Summarize Research report.
Unit	**Content**	
I	**Marketing Research:**Definition – Features – Objectives – Nature -Scope – Role of Marketing Research – Limitations – Internal Marketing Research Organisation – External Research Organisation – Merits and Demerits – Criteria for Selecting the Outside Agency.	
II	**Marketing Research Process**: Characteristics of Sound Marketing Research –Research Design – Benefits – Types - Exploratory - Descriptive – Experimental; Attitude Measurement– Characteristics of Scientific Measurement – Levels of Measurements and the Scales - Scaling Techniques.	
III	**Sampling**: Definition – Reasons– Objectives of Sampling – Characteristics of an Ideal Sample – Factors to be Considered in Sample Size – Sampling Process - Merits and demerits of Sampling - Methods of Sampling – Probability Sampling and Non-Probability Sampling – Problems in Sampling Process.	
IV	**Collection of Data:** Primary Data – Methods of Collection – Communication - Observation and Interview – Methods of Interview – Merits and Demerits – Designing a Questionnaire - Secondary Data – Merits and Limitations –Sources of Secondary Data.	
V	**Classification and Tabulation of Data:** Data Analysis – Techniques of Data Analysis – Testing of Hypotheses – Types of Errors - Interpretation and Presentation of Data; Research Report – Purposes – Steps in Report Writing – Research Report Layout – Reference Note – Bibliography.	
References		
Text Book:	C.N.Sontakki , Marketing Research, Himalaya Publishing House, New Delhi 2013.	
Reference Books:	1.	G.C.Beri, Marketing Research, Tata McGraw – Hill Publishing Company Ltd. New Delhi. 2008

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SEM	PART	CODE	TITLE	Hr/Wk	Cr	Marks
IV	Part I	Lang	Tamil/Hindi/French	3	2	30
	Part II	Lang	English	3	2	30
	Part III Major	PSY 2502	Social Psychology - II	5	5	75
		PSY 2404	Research Methods in Psychology	4	4	60
		PSY 2506	Abnormal Psychology - II	5	5	75
		PSY 2508	Experimental Psychology - II	5	5	75
	Supportive Course	PSY 2410	Industrial Psychology	5	4	60
	Part V	Extension	NSS, SLP, PED	2	1	
			TOTAL	**30 + 2**	**27+1**	**405**
V	Part III Major	PSY 3601	Cognitive Psychology	6	6	90
		PSY 3603	Health Psychology	6	6	90
		PSY 3605	Principles of Counselling	6	6	90
		PSY 3507	Disaster Management	5	5	75
	Part IV	LS XXXX	XXX	3	2	30
		EVS	Understanding our Environment	4	2	30
			TOTAL	**30**	**27**	**405**
VI	Part III Major	PSY 3602	Positive Psychology	6	6	90
		PSY 3604	Organizational Behaviour	6	6	90
		PSY 3606	Research Project	6	6	90
		PSY 3509	Sports Psychology	5	5	75
	Part IV	LS XXXX	XXX	3	2	30
		HVS		4	2	30
			TOTAL	**30**	**27**	**405**
GRAND TOTAL FOR SEMESTER (1 TO 6)				**180+4**	**158+2**	**2370**

SUPPORTIVE COURSES

SEM	PART	CODE	TITLE	Hr/Wk	Cr	Marks
I	III	PSY 1407	Introduction to Sociology	5	4	60
II	III	PSY 1408	Educational Psychology	5	4	60
III	III	PSY 2409	Geriatric Psychology	5	4	60
IV	III	PSY 2410	Industrial Psychology	5	4	60

NON-MAJOR ELECTIVE COURSES

SEM	PART	CODE	TITLE	Hr/Wk	Cr	Marks
I	IV	PSY 1201	Psychology in Daily Life	3	2	30
II	IV	PSY 1202	Counselling & Guidance	3	2	30

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B.Sc. PSYCHOLOGY	PART III MAJOR: CORE PAPER-2	4 Hrs Per week
Semester – IV	RESEARCH METHODS IN PSYCHOLOGY	Credit 4: MARKS:60
Code: PSY 2404		

Course Description:

This course aims to develop the skill of psychological research and report writing among the learners. This course will develop the knowledge about various research components among the budding psychological researchers.

Course Outcome:

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

CO1: State the meaning of research and different types of research.

CO2: Identify random and non-random sampling techniques with suitable example

CO3: Employ suitable hypothesis for their future research works

CO4: Distinguish different methods of data collection procedure in Psychology.

CO5: Follow suitable writing style in different research reports.

Unit - I Introduction to research

Research: Meaning, Definition and types. Paradigms of research: Qualitative and Quantitative. Introduction to Psychological research – Objectives and goals, ethical problems and principles. Research process. Research Problem: meaning, types and selection. Review of literature.

Unit – II Sampling and Research Design

Sampling: definition, Probability & Non-Probability. Research design: Definition, Purpose, types and selection. Randomized experimental and quasi-experimental approaches, Group vs. single-subject designs.

Unit – III Variables and Hypothesis

Variables: Meaning and Classification, Levels of Measurement. Hypothesis: Definition, Characteristics, Functions, and types. Nature of data, testing the normality and hypothesis testing.

Unit – IV Methods of data collection

Observation, Interview, Questionnaire and Case study: Definition, Characteristics and types.

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Unit – V Psychological testing and report writing

Test construction: Steps in test development and standardization, Types and uses of psychological testing. Applications of psychological testing in various settings: (Clinical, Organizational and business, Education, Counseling, Military and Career guidance); Ethical issues in psychological testing. Report writing: purpose, format for report in psychology and citations methods as per APA.

Pedagogical Method:

Lecture, PPT, Group discussion, activity and exposure visits.

TEXT BOOK:

1. Kerlinger, F. N. (1973). Foundations of behavioural research. USA: Holt, Rinehart & Winston.

REFERENCE BOOK:

2. Methodology of Research in Social Sciences by O. R. Krishnaswamy and M. RangnathamHimalaya publication House, 2005, ISBN: 8184880936
3. Research Methodology: Methods and Techniques by C. R. Kothari, New Age InternationalPublishers, ISBN:81-224-1522-9
4. Concise Rules of APA Style, Sixth Edition (Concise Rules of the American Psychological Association (APA) Style) 6 Spi Edition, by American Psychological Association
5. A.K.Singh, (2017), Tests, Measurements and Research Methods in Behavioural Sciences, BharatiBhawan Publishers & Distributors; Fifth edition,New Delhi.

Mapping of Course Outcomes (Cos) with Bloom's Taxonomy (K1 to K6)

CO/K	K1 Knowledge	K2 Understand	K3 Apply	K4 Analyze	K5 Evaluate	K6 Create
CO1	1					
CO2		2				
CO3			3			
CO4				4		
CO5					5	

Mean score – 1+2+3+4+5=15/5

$\bar{x} = 3$

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Program of Courses for the M.A Degree in Economics under CBCS
(With effect from 2019-20)

M.AEconomics program highlights practical applications of economic theory. It is organized to provide students with analytical tools by which they can use to solve many economic problems existing in the real world. The program provides students with practical econometric skills that are popularly used in both private and public sectors. Students will be able to apply critical thinking, quantitative reasoning skills, problem-solving skills and communication skills

Course Code	Course Title	Contact Hours	Credits	Max Marks
	I SEMESTER			
PEC 4431	Price Theory I	6	4	080
PEC 4433	Macro Economic Analysis I	6	4	080
PEC 4435	Public Economics	6	4	080
PEC 4337	Mathematical Methods and Applications	4	3	060
PEC 4339	Statistical Methods and Applications	4	3	060
PEC 4341 PEC 4343	Globalization and Economic Reforms Buffer course : Human Development	4	3	060
	Total	30	21	
	II SEMESTER			
PEC 4432	Price Theory II	6	4	080
PEC 4434	Macro Economic Analysis II	6	4	080
PEC 4436	Econometric Theory and Applications	6	4	080
PEC 4338	Research Methodology	4	3	060
PEC 4340	Agriculture and Rural Development	4	3	060
PEC 4342 PEC 4344	China and Global Economy Buffer course : Small Business Management	4	3	060
	Total	30	21	
	III SEMESTER			
PEC 5431	Environmental Economics	6	4	080
PEC 5433	Financial Markets and Services	6	4	080
PEC 5435	Advanced Econometrics	4	4	080
PEC 5437	Actuarial Economics	4	4	080
PEC 5439	Computer Applications in Economics (Lab)	4	4	080
PEC 5400	Special Area Study	6	4	--
	Total	30	24	
	IV SEMESTER			
PEC 5632	International Economics	7	6	120
PEC 5634	Indian Economy	7	6	120

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1. Johnston (1985), Econometrics, McGraw Hill, New York.
2. Koutsoyiannis, A. (2003), Theory of Econometrics, Harper and Row Publishers, Inc.,
3. Kements (2003), Elements of Econometrics, Harper and Row Publishers, New York.

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
Bloom's Taxonomy	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
K1: Remembering					
K2: Understanding	**2**				
K3: Applying					
K4: Analyzing		**4**			**4**
K5: Evaluating			**5**		
K6: Creating				**6**	

Mean: 4.2

PEC 4338 RESEARCH METHODOLOGY 4 Hrs/3Cr

Students can get training in scientific thinking and helps to develop socially concerned and competent researchers, administrators and activists. Students also acquaints with the identification of researchable problem, hypothesis formulation, research methods and techniques and ultimately the method of report writing

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

i. Understand the basic skill of social science research and its relevance in addressing socio economic issues
ii. Identify researchable issues and developing a suitable research methodology
iii. Corroborate and formulating testable hypotheses
iv. Validate sources of data in relation to workable hypotheses
v. Apply qualitative and quantitative techniques to test hypotheses and arrive at statistical inferences for the chosen research

Unit- I:Introduction

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Meaning – criteria for good research – assumptions, objectives and difficulties of social research – qualities of a good research

Unit- II: Dimensionsof Research

Classification of research - fundamental – applied – descriptive – historical –exploratory-experimental - case study – characteristics of case study- sources -utility and limitations of case study method - survey research - evaluation – comparative method –precautions used in comparative method and inter disciplinary research

Unit- III:Hypothesis and Research problem

Selection of the research problem - types of research problem – sources-criteria of good research problem – justification of the problem evaluating the problem. Definition of hypothesis – types - functions, sources of hypothesis - criteria of usable hypothesis-utility - difficulties in formulation of hypothesis

Unit -IV: Sources of Data and Research Design

Meaning of research design - concepts relating to research design - major steps in preparing a research design - factors affecting research design - evaluation and advantages of research design-Sources of data – primary and secondary data - census and sampling method – essentials of a good sample - methods of sampling – observation - types of observation –merits and limitations

Unit -V: Scaling Techniques and Report Writting

Statistical applications in research-scaling techniques - criteria of validity of a scale - difficulties in scaling - kinds of scales - point scales - Bogardus scale - intensity scale, ranking scale - Scale and Likert scale - Processing, analysis and interpretation of data meaning of research report - purpose and structure of research report

Text Books

1. Thanulingam, N., (2012), Research Methodology, Himalaya Publishing House, Mumbai.
2. Kothari, C.R, (2013), Research Methodology: Methods and Techniques, Wiley Eastern Limited, New Delhi.

References

1. Kurein, C.T., (1973), A Guide to Research in Economics, Sangam Books, Madras.
2. Wilkinson and Pandarkar, (1984), Methodology and Techniques of Social Research, Himalaya Publishing House, Bombay.
3. Goode, William J. and Hatt, Paul K (1987), Methods in Social Research, Mc Graw Hill, London.
4. Sonachalam, K.S., (1988), Research Methodology of Social Sciences, Emerald Publication, Madras.

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MA English
Programme Grid

Sem	Course Code	Course Titles	Hour	Credit	Mark
I	PGE/PSE4341	ACADEMIC WRITING	5	3	60
	PGE/PSE 4343	PROSE	5	3	60
	PGE/PSE 4445	BRITISH POETRY I: CHAUCER TO HOPKINS	5	4	80
	PGE/PSE 4447	BRITISH FICTION I: VICTIORIAN TO EARLY MODERN	5	4	80
	PGE/PSE 4449	BRITISH DRAMA-I: ELIZABETHAN TO VICTORIAN	6	4	60
	PGE/PSE 4351	ENGLISH FOR CAREER	4	3	60
	Total		**30**	**21**	**420**
II	PGE/PSE 4342	STRUCTURE OF MODERN ENGLISH	5	3	60
	PGE/PSE 4444	BRITISH POETRY II: YEATS TO THE PRESENT TIMES	5	4	80
	PGE/PSE 4446	BRITISH FICTION II: LATE MODERN TO POST-MODERN	5	4	80
	PGE/PSE 4448	AMERICAN AND AFRICAN-AMERICAN LITERATURE	6	4	80
	PGE/PSE 4350	SHAKESPEARE	5	3	60
	PGE/PSE 4352	FILM STUDIES	4	3	60
	Total		**30**	**21**	**420**
III	PGE/PSE 5453	LITERARY CRITICISM & THEORY I	6	4	80
	PGE/PSE 5455	BRITISH DRAMA II: MODERN & POSTMODERN	5	4	80
	PGE/PSE 5457	INDIAN LITERATURE IN ENGLISH	5	4	80
	PGE/PSE 5459	CULTURAL STUDIES	5	4	80
	PGE/PSE 5461	TRANSLATION STUDIES	4	4	80
	PGE/PSE 5463	HISTORY OF THE ENGLISH LANGUAGE	5	4	80
	Total		**30**	**24**	**480**
IV	PGE/PSE 5454	LITERARY CRITICISM & THEORY II	6	4	80
	PGE/PSE 5456	NEW LITERATURES IN ENGLISH	5	4	80
	PGE/PSE 5458	INDIAN LITERATURE IN TRANSLATION	5	4	80
	PGE/PSE 5460	EUROPEAN LITERATURES IN TRANSLATION	5	4	80
	PGE/PSE 5462	TEACHING ENGLISH AS SECOND LANGUAGE	5	4	80
	PGE/PSE 5264	RESEARCH METHODOLOGY	4	2	80
	PGE/PSE 5266	PROJECT	**(3)**	**2**	
	Total		**30+3**	**24**	**480**
	Grand Total		**120+3**	**90**	**1800**

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References

Anderson, N.J. 1999. *Exploring Second Language Reading: Issues and Strategies*. Heinle & Heinle.

Bailey, KM. and L. Savage (eds) 1994. *New Ways in Teaching Speaking*. TESOL.

Beatty, K. (2003). *Applied Linguistics in Action*: CALL. Pearson

Benson, P. 2001. *Teaching and Researching Autonomy in Language Learning*. Longman.

Campbell, C. 1998. *Teaching Second Language Writing*: Interacting with text. Heinle & Heinle

McCarthy, M.1991. *Discourse Analysis for Language Teachers*. CUP.

Mendelsohn, D. and J.Rubin (eds) 1995. *A Guide for the Teaching of Second Language Listening*. Dominie Press.

Nunan,D. 1999. *Second Language Teaching and Learning*. Heinle & Heinle

Richards J. and W. Renandaya (eds) 2002. *Methodology in Language Teaching*. CUP.

Mapping Course Outcomes with Bloom's Taxonomy

	K1	K2	K3	K4	K5	K6
CO1					5	
CO2					5	
CO3						6
CO4				4		
CO5						6

Mean: 5.2

The course intends to familiarizing students with the research traditions of language and literature research according to Modern Language Association (MLA) and American Psychological Association (APA).

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

i. devise research writing,
ii. formulating research papers,
iii. devise mechanics of writing,
iv. produce MLA documentation & citation traditions, and
v. produce APA documentation & citation traditions.

Unit 1 Research & Writing
Unit 2 Formatting Research Paper

Unit 3 Mechanics of Writing

Unit 4 Documentation of Works Cited & Cited in the Text (MLA)

Unit 5 Documentation of Works Cited & Cited in the Text (APA)

References

American Psychological Association. 2013. *Publication Manual of the American Psychological Association*. 6th ed.
Modern Language Association. *MLA Handbook*. 8th ed. 2016.

Mapping of the Course Outcomes (COs) with Bloom's Taxonomy

	K1	K2	K3	K4	K5	K6
CO1						6
CO2						6
CO3						6
CO4						6
CO5						6

Mean: 6

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PGE/PSE 5266 **PROJECT** **3Hrs./2Cr.**

DEPARTMENT OF TAMIL (PG)

Choice Based Credit System 2017 -2018

(Outcome Based Education adopted from 2017-2018 series onwards)

Programme for M.A. Degree in Tamil

Semester	Code	Title	Hours	Credits	Marks
I	PGT 4541	தொல்காப்பியம் - எழுத்ததிகாரம்	7	5	100
	PGT 4443	வாசிப்புக் கோட்பாடுகளின் அறிமுகம்	6	4	80
	PGT 4545	இக்கால இலக்கியம் - தொடக்கம்	7	5	100
	PGT 4447	இக்கால மொழியியல்	6	4	80
	PGT 4349*	காட்சி ஊடகங்களும் சமூக மாற்றங்களும்	4	3	60
			30	**21**	**420**
II	PGT 4542	தொல்காப்பியம் - சொல்லதிகாரம்	7	5	100
	PGT 4544	சிலப்பதிகாரம்	7	5	100
	PGT 4446	சமய இலக்கியம்	6	4	80
	PGT 4448	இக்கால இலக்கியம் - மேதமை	6	4	80
	PGT 4300*	அரங்கக்கலை	4	3	60
			30	**21**	**420**
III	PGT 5541	தொல்காப்பியம் - பொருள் (அகம்)	6	5	100
	PGT 5543	சங்க இலக்கியம் - அகம்	6	5	100
	PGT 5545	சமயக் காப்பியம்	6	5	100
	PGT 5547	நாட்டுப்புறவியல்	6	5	100
	PGT 5449	புலம்பெயர் இலக்கியம்	6	4	80
			30	**24**	**480**
IV	PGT 5452	தொல்காப்பியம் - பொருள் (புறம்)	6	4	80
	PGT 5444	சங்க இலக்கியம் - புறம்	6	4	80
	PGT 5446	அறமும் இலக்கியமும்	4	4	80
	PGT 5448	இக்கால இலக்கியம் - அண்மை போக்குகள்	6	4	80
	PGT 5400	தொல்லியலும் தமிழகமும்	4	4	80
	PGT 5402	ஆய்வு நெறியும் ஆய்வேடும்	4	4	80
			30	**24**	**480**

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கூறு:3

ஆராய்ச்சி முறைகள்: ஒப்பீட்டுமுறை, வரலாற்றுமுறை, சோதனை ஆய்வுமுறை, உய்த்துணர் ஆய்வுமுறை, செலுத்துநிலை ஆய்வுமுறை, மாதிரி ஆய்வுமுறை, புள்ளி விவர ஆய்வுமுறை, விளக்கவியல் ஆய்வுமுறை, தாக்கக் கோட்பாட்டு ஆய்வுமுறை, நாட்டுப்புறவியல் ஆய்வு முறை, நடையியல் ஆய்வுமுறை ஆகியன குறித்த விளக்கங்கள்.

கூறு:4

கோட்பாட்டு ஆய்வு. மொழியியல் ஆய்வு முறை. மார்க்சிய ஆய்வுக் கோட்பாடுகள், அமைப்பியல் மற்றும் பின்னை அமைப்பியல் கோட்பாடுகள். பெண்ணிய ஆய்வுக் கோட்பாடுகள். காலனியம் மற்றும் பின்னைக் காலனியக் கோட்பாடுகள், நவீனத்துவ மற்றும் பின்னை நவீனத்துவக் கோட்பாடுகள். விளிம்புநிலை கோட்பாடுகள்.

கூறு:5

ஆய்வேட்டைத் தயார் செய்தல்: ஆய்வேட்டின் கட்டமைப்பு, முன்னுரை தொடங்கி முடிவுரை வரை ஆய்வேடு அமையும் முறை. இயல் பிரித்தல், பின்னிணைப்பு அமைக்கும் முறை. சுருக்கக் குறியீட்டு விளக்கங்கள், மேற்கோள் காட்டுதல், அடிக்குறிப்புக் கொடுத்தல் ஆகியவை குறித்த தெளிவை உருவாக்குதல். முதன்மை ஆதாரங்கள் மற்றும் துணைமை ஆதாரங்கள் பற்றிய விளக்கங்கள். துணைநூற்பட்டியல் அமைக்கும் முறை. ஆய்வேடு எழுதுதல்.

ஆய்வேடு உருவாக்கம் மற்றும் ஒப்படைப்புக் குறித்த வழிகாட்டுதல் குறிப்புகள்

1. ஆய்வேடு ஐம்பது பக்கங்களுக்குக் குறையாமல் இருத்தல் வேண்டும்.
2. மூன்றாம் பருவ முடிவில் தலைப்பினை முடிவு செய்து கொள்ளுதல் வேண்டும்.
3. கல்லூரி வேலை நாளின் இறுதி நாளுக்குள் ஆய்வேடு தரப்படவேண்டும்
4. ஆய்வேட்டினைத் துறையாசிரியர்கள் குழுவாக அமர்ந்து மதிப்பிடுவர். புறத்தேர்வாளரின் முன்னிலையில் 'வாய்மொழித்தேர்வு' நடைபெறும்.
5. மதிப்பெண்கள்: அகமதிப்பீடு – 100/ புறமதிப்பீடு – (பருவத்தேர்வு – 50+ஆய்வேடு – 50) – 100. ஆய்வேடு மதிப்பெண்கள் – 50 (ஆய்வேடு சமர்ப்பித்தல் - 30 + வாய்மொழித் தேர்வு – 20) எனப் பிரிக்கப்படும்.

பாடநூல்கள்:

1. பாலசுப்பிரமணியன், கு. வெ. *ஆய்வியல் நெறிகள்*, Anuradha Publications. Kumbakonam: 2015.
2. முத்துச்சண்முகன், சு. வேங்கடராமன். இலக்கிய ஆராய்ச்சி நெறிமுறைகள். NCBH, சென்னை, 2017.

பார்வை நூல்கள்:

1. ஞானசம்பந்தன், அ. ச. *இலக்கியக் கலை*, தென்னிந்திய சைவ சித்தாந்த நூற்பதிப்புக் கழகம், சென்னை: 1993.

2. தமிழண்ணல். *தொல்காப்பியரின் இலக்கியக் கொள்கைகள் - பாகம் - 1.* மீனாட்சி புத்தக நிலையம், மதுரை: 2004.
3. திட்டக் குழு. *தமிழ் நடைக் கையேடு.* அடையாளம் புத்தாநத்தம்: 2013.
4. _____. *தொல்காப்பியரின் இலக்கியக் கொள்கைகள் - பாகம் - 2.* செல்லப்பா பதிப்பகம், மதுரை: 2012.
5. நடராசன், தி. சு. *திறனாய்வுக் கலை: கொள்கைகளும் அணுகுமுறைகளும்,* NCBH, சென்னை: 2016.
6. நாராயணன், க. *ஆய்வு எது? ஏன்? எப்படி?* மாரிப் பதிப்பகம். புதுச்சேரி: 2008.
7. நு.'.மான், எம். ஏ. *திறனாய்வுக் கட்டுரைகள்,* அன்னம் வெளியீடு, சிவகங்கை: 1985.
8. _____. *மொழியும் இலக்கியமும்,* காலச்சுவடு, சென்னை: 2006.
9. பொற்கோ, *ஆராய்ச்சி நெறிமுறைகள்.* ஐந்திணைப் பதிப்பகம், சென்னை: 2012.
10. ரகுநாதன், தொ. மு. சி. *இலக்கிய விமரிசனம்,* மீனாட்சி புத்தக நிலையம், மதுரை: 1980.
11. Barry, Peter. *Beginning Theory: An introduction to literary and cultural theory*, Third edition, Manchester University Press, Manchester and New York: 2009
12. Dobie, Ann B. *Theory into Practice: An introduction to literary criticism*, Wadsworth, USA: 2012.
13. Loomba, Ania. *Colonialism/Postcolonialism*, Second edition, Routledge, London and New York: 2005.
14. McLeod, John. *Beginning Postcolonialism*, Manchester University Press, Manchester and New York: 2000.
15. Tapan Basu et.al. *Listen to the flames: Texts and Readings from the Margins*. Oxford University Press. 2016.

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	**1**					
CO2		**2**				
CO3			**3**			
CO4						**6**
CO5						**6**

MEAN : 3.6

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DEPARTMENT OF MANAGEMENT STUDIES, THE AMERICAN COLLEGE, MADURAI

COURSE STRUCTURE FOR MBA PROGRAMME

SEMESTER	COURSE NO.	COURSE TITLE	HOURS / WEEK	Marks
Semester I	MBA 4513	Essentials of Management	5	100
	MBA 4503	Organisational Behaviour	5	100
	MBA 4505	Economics for Managers	5	100
	MBA 4507	Marketing Management	5	100
	MBA 4509	Managerial Accounting	5	100
	MBA 4511	IT for Managerial Decisions	5	100
Semester II	MBA 4514	Operations Management and Information Systems	5	100
	MBA 4516	Research Methodology	5	100
	MBA 4506	Business Environment	5	100
	MBA 4508	Corporate Finance	5	100
	MBA 4510	Human Resource Management	5	100
	MBA 4512	Entrepreneurship	5	100
Summer	MBA 4500	Summer Internship	-	100
Semester III	MBA 5501	Strategic Management	5	100
	MBA 5503	E-Commerce	5	100
	MBA 5505	Quantitative Techniques	5	100
	Electives	Finance / HR / Marketing / B & I / Entrepreneurship – Elective I	5	100
	Electives	Finance / HR / Marketing / B & I / Entrepreneurship – Elective II	5	100
	Electives	Finance / HR / Marketing / B & I / Entrepreneurship – Elective III	5	100
		Finance / HR / Marketing / B & I /		100

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MBA 4516 **RESEARCH METHODOLOGY** **5 Hours/ 5 Credits**

Objective: This course aims at imparting working knowledge in carrying out independent scientific inquiry and giving emphasis to report writing and presentation.

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

i. Demonstrate and apply the Research Process

ii. Formulate the Research design and sample design

iii. Compare different data collection methods and devise the steps in data preparation

iv. Demonstrate proficiency in hypothesis testing using different statistical methods

v. Design and organize a research report using appropriate manuscript writing procedures

SYLLABUS

Unit I INTRODUCTION TO BUSINESS RESEARCH: Introduction to Business Research – Managers as Researchers – Emerging Hierarchy of Information Based Decision makers – Research Process – Research problem identification/Formulation – its Approaches – Research proposal – Writing a research proposal –Requirements of the Sponsor and Funding agencies – Ethics in Research

Unit II RESEARCH DESIGN AND SAMPLING: Research Design – Types of Research Design – Research Design for data acquisition (measurement scales) – Sample Design – Sampling Process – Sampling Methods – Determination of Sample size.

Unit III DATA COLLECTION AND PREPARATION: Acquisition of Research data – Sources of secondary data – Primary Data collection methods – Validity and Reliability of data collection procedures - Data Preparation - Data Entry and Preliminary Data Analysis

Unit IV HYPOTHESIS TESTING: Hypothesis Testing – Univariate Analysis - Bivariate Analysis and Hypothesis Testing - Analysis of Experimental Data - Multivariate Analysis of Data: Dependence Analysis - Multivariate Analysis of Data: Interdependence Analysis

Unit V REPORT WRITING AND PRESENTATION: Presenting Insights and Findings Style and Composition of the report – Format of reporting – Pre writing concerns – Oral Presentation - Briefing – Delivery – Audio visuals.

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REFERENCES

1. Kothari C.R., Research Methodology, Methods & Techniques, New Age International., 2004
2. Krishnaswamy K.N., Management Research Methodology, Integration of Principles Methods and Technique, Pearson Education, 2006
3. Donnald R.Cooper & Pamala Schindler, Business Research Methods McGraw Hill Publication, 2004
4. Krishnaswamy O.R., Research Methodology for Social Science Himalaya Publication, 1998

Mapping Course Outcomes (COs) with Programme Specific Outcomes (PSOs)

Course Outcomes	Program Specific outcome PSOs									
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	X									
CO2				X						
CO3									X	
CO4			X					X		
CO5										X

Revised Blooms Taxonomy

Course Outcome (Cos)	Skill Levels					
	K 1	K 2	K 3	K4	K 5	K 6
CO1					5	
CO2			3			
CO3					5	
CO4				4		
CO5			3			

Mean : 4.0

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PROGRAM OF COURSES FOR POST GRADUATE DEGREE IN COMMERCE UNDER CHOICE BASED CREDIT SYSTEM

(To come into effect from 2018 - 2019)

Course Code	Course Title	Hours	Credit	Max Marks
	I Semester			
PCO 4421	Organizational Behaviour	6	4	80
PCO 4323	Managerial Economics	4	3	60
PCO 4425	Marketing Management	4	4	80
PCO 4427	Corporate Accounting	6	4	80
PCO 4329	Quantitative Techniques	6	3	60
***PCO 4331**	Digital Marketing	4	3	60
	TOTAL	30	21	420
	II Semester			
PCO 4422	Human Resource Management	6	4	80
PCO 4324	Customer Relationship Management	4	3	60
PCO 4426	International Marketing	4	4	80
PCO 4428	Advanced Corporate Accounting	6	4	80
PCO 4330	Security Analysis & Portfolio Management	6	3	60
***PCO 4332**	Basis of Taxation	4	3	60
	TOTAL	30	21	420
	III Semester			
PCO 5421	Management Accounting	6	4	80
PCO 5423	Business Taxation I	6	4	80
PCO 5425	Insurance and Risk Management	4	4	80
PCO 5427	Research Methodology	4	4	80
PCO 5429	Advanced Cost Accounting	6	4	80
PCO 5431	Services Marketing	4	4	80
	TOTAL	30	24	480
	IV Semester			
PCO 5422	Financial Management	6	4	80
PCO 5424	Business Taxation II	4	4	80
PCO 5426	Business Ethics and Corporate Governance	6	4	80
PCO 5428	Small Business Management	4	4	80
PCO 5430	Project	6	4	80
PCO 5432	ERP Applications	4	4	80
	TOTAL	30	24	480

*** CBCS Courses**

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UNIT IV

Risk Management Applications – Loss of Life – Loss of Health – Retirement Planning and annuities – Employee Benefits – Financial and Estate Planning.

UNIT V

Risk Management Environment – Industry – Functions and organisation of Insurers – Government Regulation of Insurance Sector – IRA – Privatization of Insurance – Changes in Insurance Acts – Insurance Intermediaries – Insurance Product pricing and Claim valuation – Financial Analysis – Bank Assurance – Foreign Insurers in India.

Text Books:

1. Rejda, George E., "Principles of risk management and insurance", Addison Wesley Longman, 12th Edition, 2013.
2. M.N. Mishra, Insurance: Principles and Practice, S. Chand Publishing, 2008

References:

1. Dorfman, "Introduction to risk management and insurance", Prentice Hall, 1998
2. K. R. Reddy, Risk management, Tamil Nadu Book House,2003
3. McNamara principles of Risk Management and Insurance, Addison, Wesley,
4. Anand Ganguly Insurance Management PHI, New Delhi,2005

Bloom's Taxonomy	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
	CO1	CO2	CO3	CO4	CO5
K1: Remembering					
K2: Understanding	2				2
K3: Applying		3			
K4: Analyzing			4	4	
K5: Evaluating					
K6: Creating					

Mean : 3.2

PCO 5427 **RESEARCH METHODOLOGY** **4 Hrs / 4 Cr**

This paper will help the students to understand the relevance and role of research methodology and the significance of the research tools in all functional areas of commerce. It will also help to distinguish between the different kinds of research available, based on the purpose and nature of problem. The course will emphasize on the types of research, data collection methods, analysis and inferences and conclusions.

Course outcomes

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

1. Familiar with meaning and purpose of research, types of research and case study
2. Outline the planning process and design a hypothesis for the Research.
3. Prepare the Research design, questionnaire and Describe the inductive nature of qualitative and scaling technique.

4. Explain sampling design, steps and types of sampling
5. Describe the data processing and Report writing

UNIT I

Introduction to Research – Meaning – Objectives – Characteristics – Qualities of a good research, Types of research, Survey Method: Social survey, Definition – Stages – Types of survey – Uses – Limitations, Case study – Meaning – Characteristics – Sources of Case Study – Uses – Limitations – Review of Literature.

UNIT II

Research Planning process – Selection of a research problem – Sources – Identification – Criteria of Selection of research problem, Formulation of research problem – Formulation of Hypothesis – Meaning – Types, Sources – Role of Hypothesis – Characteristics, Process of setting of hypothesis.

UNIT III

Research design – Meaning – Essentials of a good research design – Nature – Types – Importance – Preparation, Contents of research design. Methods of Collection of Data – Types of data, Importance, Sources of data – Primary – Secondary – Uses – Methods of collecting data - Survey method – Personal interviewing – Telephone interviewing – Mail survey – Observation methods – Experimental method – Construction of Questionnaire – Scaling Technique.

UNIT IV

Sample – Universe/ Population – Sampling Frame, Sampling Size, Steps in Sampling – Sampling and Non – Sampling Errors, Sampling Design – Probability and Non-probability Sampling Techniques.

UNIT V

Data Processing – Editing – Coding – Tabulation – Construction of Frequency Table – Graphs/Charts/Diagrams – Uses of Statistical Tools, Use of Excel and SPSS package. Report writing – Significance of writing report – Steps in drafting reports – Layout – Types, Contents of research report – Footnotes and Bibliography.

Text Books:

1. C.R. Kothari and Gaurav Garg, Research Methodology – Methods and Techniques, New Age International Publishers, 2018.
2. O.R. Krishnaswami and M. Ranganatham, Methodology of Research in Social Sciences, Himalaya Publishing House, 2018.

References:

1. R.Cauvery, U.K.Sudha Nayak M.Girija, R. Meenakshi, Research Methodology, S. Chand & Company Ltd. 2003.
2. N. Thanulingam, Research Methodology, Himalaya Publishing House, 2012.

CURRICULUM FOR M.PHIL PROGRAM IN BOTANY

Course Code	Subject	Hrs/ Week	Total Hours	Max Mark CA	Max Marks ESE	TOTAL	CREDITS
MPB6601	Research Methodology	6	90	100	100	200	6
MPB6603	Trends In Botany	6	90	100	100	200	6
MPB6605	SPECIAL PAPER (Any one)	6	90	100	100	200	6
MPB6600	Project	12	-	-	-	-	
MPB6600	Dissertation Studies			50	100	200	6
	Viva - voce			-	50		

Special Paper 1. Plant Tissue Culture
Special Paper 2. Bioprocess Engineering
Special Paper 3. Mycology
Special Paper 4. Plant Pathology

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MPB6601 **RESEARCH METHODOLOGY** 6Hrs/Week

Learning objectives

- Defending the use of Research Methodology
- Judging the reliability and validity of experiments
- Being able to perform exploratory data analysis
- Using parametric and non-parametric hypothesis tests (and interpreting their results).
- Being able to draw conclusions from categorical data
- Using computer-intensive methods for data analysis
- Drawing conclusions from statistical test results
- Being able to compare statistical models
- Being able to argue when to use Bayesian vs Frequentist statistics

These objectives will be achieved by means of lectures, discussions in the lectures, assignments and blogs.

UNIT: 1 HOW DOES RESEARCH WORK?

Concept of research- the role of research, research process overview-importance of research- types of research- sources- attitude of a researcher- selection of research problem- evaluation of the problem- defining the problem.

UNIT: 2 METHODS OF RESEARCH

Science and its functions, What is theory?, and The meaning of methodology Experimental- Historical- Case study- Survey- Focus Group Discussion- Ethanography- Participatory Rural Apprasial- Methods of literary research- Econometric methods.

UNIT: 3 RESEARCH DESIGN

Understanding Concepts, Constructs, Variables, and Definitions- components of research- hypothesis and its value- Sampling- the nature of sampling, Probability sampling design, Nonprobability sampling design, Determination of sample size.

UNIT: 4 DATA INTERPRETATION

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1. ***COLLECTION OF DATA***- Source (primary and secondary, electronic, library, note cards)- techniques in data collection (observation- interview- questionare- schedule- scales)
2. ***QUANTIFICATION OF DATA***- Classification of data- tabulation- diagrams- one dimensional- two dimensional- pictogram- cartogram- graphs- charts.
3. ***DATA ANALYSIS***- Statistics-Summarizing and describing a collection of data - Univariate and bivariate analysis- Mean, mode and standard deviation- Percentages and Ratios- Histograms- Identifying randomness and- uncertainty in data.

UNIT: 5 REPORT WRITING

Guidelines- stages- preliminaries- main body- reference material- foot notes- abbreviation- bibliography- Publication. Structure and Content, Presentation, Referencing and Appendices

References

- Adèr, H. J., & Mellenbergh, G. J. (Eds.). (1999). *Research Methodology in the Social, Behavioural and Life Sciences: Designs, Models and Methods*. Sage.
- Sahu, P. K. (2013). *Research methodology: A guide for researchers in agricultural science, social science and other related fields* (p. 432). New Delhi: Springer.
- Laake, P., Benestad, H. B., & Olsen, B. R. (Eds.). (2007). *Research methodology in the medical and biological sciences*. Academic Press.
- Walliman, N. (2017). *Research methods: The basics*. Routledge.
- Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Age International.
- O'Leary, Z. (2017). *The essential guide to doing your research project*. Sage.

MPB6603 **TRENDS IN PLANT SCIENCES** 6Hrs/Week

Preamble

This common course for all scholars focuses on providing a glimpse of the ongoing research at least in certain selected frontiers of botanical sciences. Topics and concepts touched here are by no means claimed complete. The intent is to inform learners about the trends in the domains where the research supervisors suggest candidates the topics for investigation. Besides the general glimpse on how botanical enquiries have progressed over time, ideas on metabolic

M.Phil Programme in Chemistry

PROGRAMME OBJECTIVES

The M.Phil program is focused to equip scholars with skills to understand and appreciate chemistry. It is also aimed at helping the students to realize the importance of research work, develop skills to interpret. This programme can also be extended to PhD studies by the addition of one year's worth of research.

PROGRAMME STRUCTURE

Semester	Course code	Title of the course	Credits	Total Marks
I	MPC 6600	Dissertation	6	-
	MPC 6611	Research Methodology	6	120
	MPC 6613	Advanced topics in Chemistry	6	120
	MPC 6615	Indepth study	6	120
II	MPC 6600	Dissertation	6	240
			30	**600**

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MPC 6611 **RESEARCH METHODOLOGY** **6hrs/6cr**

Course Objectives:

- To learn the computer application skill for teaching and research
- To understand the principles of research, literature survey and writing research paper and thesis writing
- To create the awareness on laboratory hygiene and safety
- To gain some knowledge about the statistical analysis of data which will be highly helpful for research
- To expose them in nano sample analysis

Course outcome:

At the end of the course, scholars will be able to:

1. explain different routes to carry out literature survey and apply digital platform for the same.
2. illustrate various terminology involved in scientific publication and design a scientific publication
3. illustrate data collection and presentation. Assess error and suggest solution for its minimization.
4. prescribed safe laboratory practices in handling glassware and chemicals
5. apply techniques for sample analysis

UNIT –I Literature survey

Print : Sources of information – Primary, Secondary, Tertiary sources – Journals – Journal abbreviations – Abstracts – Current titles – Reviews – Monographs – Dictionaries – Textbooks – Current contents – patent- Introduction to Chemical Abstracts and Beilstein – Subject Index, Substance Index, Author Index, Formula Index and other Indices with examples.

Digital : Web resources – E–Journal – Journal access – TOC alerts – Hot articles – Citation index – Impact factor – H–Index – E–Consortium – UGC infonet – E–Books – Internet discussion groups and communities – Blogs – Preprint server – Search engines, Scirus, Google Scholar, ChemIndustry, Wiki – Databases, ChemSpider, ScienceDirect, SciFinder, Scopus

UNIT II: Methods of writing scientific papers

On writing scientific papers – justification for scientific contributions, bibliography, justice and courtesy in decisions, description of methods, conclusions, the need for illustration, style, publications of scientific works,

Writing methods – Writing the first draft, revising the first draft on content and structure, revising the second draft on style, writing a thesis, writing review article and book reviews, preparing research proposals for grants– funding agencies

UNIT III: Data Analysis

Types of Error – Accuracy, precision, significant figures, use of calculation in the estimation of errors – Frequency distribution, the binomial distribution, the Poisson distribution and normal distribution – describing Data, population and sample, mean, variance, standard deviation, way of quoting uncertainty, robust estimators, repeatability and reproducibility of measurements –

UNIT IV: Chemical Safety, Ethical Handling of Chemicals

Safe working procedure and protective environment, protective apparel, emergency procedure and first aid, laboratory ventilation, Safe storage and use of hazardous chemicals, procedure for working with substances that pose hazards, flammable or explosive hazards, procedures for working with gases at above or below atmospheric pressures – safe storage and disposal of waste chemicals , recovery , recycling and reuse of laboratory chemicals, procedure for laboratory disposal of explosives , identification , verification and segregation of laboratory waste , disposal of chemicals in the sanitary sewage system , incineration and transportation of hazardous chemicals

UNIT V : Instrumentation techniques and computer packages

Scanning electron microscopy (SEM) – instrumentation – applications – surface area analysis, particle size determination – Scanning Probe Microscopes – Scanning Tunnelling microscope (STM) and Atomic Force Microscope (AFM) – Principles and applications. Diffraction techniques – single crystal - powder XRD, Neutron and electron diffraction – principles and applications. Emission spectrography and flame spectroscopy – Atomic absorption, atomic emission and atomic fluorescence spectroscopy

Applications of some computer packages like MS–Excel, Origin, ChemDraw, Sciplot, ISIS draw, ChemSketch and SPSS.

References:

1. http://www.pubs.acs.org
2. http://www.inflibnet.ac.in
3. http://rsc.org
4. http://spingerlink.com
5. J. March, 'Advanced Organic Chemistry; Reactions, Mechanisms and Structure', 6th Ed., Wiley– Interscience, 2016.
6. Maeve O'Connor, 'Writing successfully in science' Chapman and Hall, London, 1995.
7. D. B. Hibbert and J. J. Gooding, 'Data Analysis for Chemistry', Oxford University press, 2006.
8. J. Topping, 'Errors of Observation and Their Treatment', Fourth Edn., Chapman Hall, London, 1984
9. S. C. Gupta, 'Fundamentals of Statistics', Sixth Edn., Himalaya publ. House', Delhi, 2006
10. H. E. Solbers, 'Inaccuracies in Computer Calculation in Standard Deviation', Anal. Chem. 55, 1611 (1983)
11. P. M. Wanek et al., 'Inaccuracies in the Calculation of Standard Deviation with Electronic Calculators', Anal. Chem. 54, 1877 (1982)
12. Chemical safety matters–IUPAC –IPCS, Cambridge Univ. Press, 1992.
13. For computer applications any commonly available books as well as common materials available in the web.
14. D.A. Skoog and J.J. Leary, Principles of Instrumental Analysis, 4th Edn., Saunders College Publishing, 1992.
15. D.A. Skoog, F.S.Holler, S.R.Crouch, Principles of Instrumental Analysis, 6th Edn.

M. Phil Programme in Commerce

Course Code	Course Title	Credits	Total
	I Semester		
MCO 6600	Dissertation	6	-
MCO 6601	Research Methodology	6	100
MCO 6603*	Financial Management and Control/		
MCO 6605*	Marketing Management	6	100
	II Semester		
MCO 6600	Dissertation	6	200
MCO 6602	Business Management	6	100

*** Optional Courses- Either MCO 6603 or MCO 6605 can be opted**

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MCO 6601 **RESEARCH METHODOLOGY** **6 Credits**

Course Objective

The objective of this course is to impart knowledge on research methods and techniques in commerce. This course deals with planning of research, identifying the research problem, designing the research problem, method of data collection, applying various statistical tools and techniques and preparing research report. This paper also makes a penetrating insight into the various dimensions and facets of research and acquaints the students with analytical, scientific and rational attitude, skills and queries.

Course Outcomes

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

i. Describe social research and its types with importance and limitations.
ii. Predict and formulate research problems, hypothesis and sampling.
iii. Analyze the data collected for the selected research problem.
iv. Appraise the analytical knowledge of using SPSS.
v. Compile the research report.

UNIT I

Introduction to Research: Definition – Objectives – social research – meaning and characteristics, types – pure vs. applied research – descriptive vs. analytical research – quantitative and qualitative research – importance and limitations. Research Methods: historical methods- case study method – inductive and deductive methods – other methods - exploratory research – ex-post facto research – evaluation research - experimental research.

UNIT II

Selection, Identification and Formulation of Research Problem: Research problem – meaning – sources – theory and facts – criteria of good research problem. Research Design, Hypothesis and Sampling: Research design – meaning and nature – components - types. Hypothesis – meaning – importance – types – sources - characteristics – forms - formulations and verifications. Sample- sample size – methods - characteristics of good sample-probability - non-probability samples - sampling error

UNIT III

Collection of Data and Techniques: Construction of tools – questionnaire – interview

scaling – scale classification basis – types of scales – rating scales – rank order scales – attitude scales - scale construction techniques – construction of Likert and semantic differential scales – scaling errors – scale validation. Data Processing: Editing – coding – tabulation.

UNIT IV

Statistical Methods with SPSS Package: Measure of relationship – correlation – simple – partial – multiple – regression –simple and multiple – association of attributes – applications in research. Hypothesis testing and estimation: fundamentals of hypothesis testing – standard error – point and interval – estimates – important non – parametric tests: sign – Run Krusdal – Wallis tests and Mann – Whitney test. Parametric tests: Testing of Significance, mean proportion, variance and correlation coefficients – testing of significance of differences between means, proportions, variances and correlation coefficients. ANOVA and Chi-square test - one-way and two ways ANOVA – Latin Square test – Chi-square test for association and goodness of fit.

UNIT V

Report Writing: Steps in report writing – format of the research report – mechanics of report writing – referencing – use of quotations – bibliography – appendix – precautions for writing the report.

Books for Reference

1. Kothari C R., Research Methodology – Methods and Techniques, Second Edition, New Age International Publishers, New Delhi, 1990.
2. Young P.V., Scientific Surveys and Research, Asia Publishing House, New York, 1992.
3. Krishnasamy. O.R., Research Methodology, Himalayas Publications. 2002.
4. Young P.V., Scientific Surveys and Research, Asia Publishing House, New York, 1992.
5. Ghosh. B.N., Scientific Methods and Social Research, third edition, Sterling Publishers Pvt Ltd, New Delhi 1992.
6. Gupta S.C., Fundamentals of Statistics, Sultan Chand and Sons, 2001
7. Gupta S.P., Statistical Methods, Sultan Chand and Sons, 2002.
8. Jack Hevin, Elementary Statistics in Social Research, Pearson Education Pvt. Ltd, Delhi 2000.

Post Graduate and Research Department of Economics

M.Phil / PhD Programme in Economics
(With effect from 2019-20)

M. Phil/PhD programme in Economics emphasizes policy-focused, socially-relevant and empirically-rigorous applied research in economics, by giving emphasis on the thrust areas such as, Strong foundation in economic theory and recent developments, Pragmatic approach to development issues and problems of the Indian Economy, Development of analytical skills and critical thinking through capability building, Hands-on training in quantitative techniques, Professionalism onto life-long learning process through capacity building at competitive edge.

Course code	Title of the course	Credits	Max Marks
	I SEMESTER		
MEC 6601	Economic Theory and Policy (ETP)	6	120
MEC 6603	Research Methodology and Quantitative Techniques (RMQT)	6	120
	II SEMESTER		
MEC 6402	Computer Applications in Social Science Research (CASSR)	4	120
MEC 6600	Dissertation Work	12	240

Programme Specific Outcomes (PSOs) for M.Phil/Ph.D Economics

On completion of the programme, postgraduates will be able to

1. Develop critical and quantitative thinking skills specific to business and accounting.
2. Evaluate economic issues and public policy by using economic models or data analysis while identifying underlying assumptions of the model(s) and limitations
3. Demonstrate the ability to frame and solve problems in economics, using concepts such as optimization, equilibrium, and the incentives faced by economic agents. They should demonstrate an understanding of the theoretical tools used to solve economic problems
4. Ability to solve problems that have clear solutions and to address problems that do not have clear answers and explain conditions under which these solutions may be correct.
5. Understanding how to use empirical evidence to evaluate the validity of an economic argument, use statistical methodology, interpret statistical results and conduct appropriate statistical analysis of data.

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MEC 6603 Research Methodology and Quantitative Techniques 6Hr/6 Cr

The objective is to comprehend the process of research, through exposure to scientific methods, techniques of enquiry and tools. This course includes various research methods, design of study, formulation of hypothesis and verification using different quantitative tools and report writing.

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

i. Comprehensive different approaches in research methodology
ii. Design research methodology suited to economic problems under consideration
iii. Identify appropriate data and validating data sources
iv. Formulate econometric models for exploratory approach and confirmatory approach to economic analysis
v. Prepare full-fledged research report with its all essentials

Unit I: Methods of Research: Nature of economic research – pure, applied and action research – fact finding and marketing research – utility of research – quality and ethics of research and problems encountered – case study method and census – survey method and sampling – types and uses – secondary and tertiary data based meta research – qualitative methods.

Unit II: Techniques of Research: Research design – components of research proposal and the format of research report – statement of problem and objectives – translating objectives into questions – formulation of questionnaire – opinionnaire and scaling technique – SWOT analysis – interview techniques – observation; systematic observation and participant observation, participatory rapid appraisal.

Unit III: Tools of Research – I: Characteristics of usable hypothesis – sources and functions of hypothesis – testing hypothesis – data interpretation methods – small sample test and large sample test – ANOVA – non parametric tests – common test X^2, F, t

Unit IV: Tools of Research-II: SLR & MLR models – violations of assumptions – distributed lag models, dummy variables – identification – simultaneous systems – data reductions – principal component analysis – factor analysis – discriminant analysis.-Data generating process – stationary and non-stationary – Dicky Filler Test – Augmented Dicky Filler Test – properties of time series – integration and co-integration – causality – Granger Causality – Sims test – lag length, selection and criteria – Error Correction models – Panel Data Models

Unit V: Report Writing: Hands on experience in writing assignments, term papers, articles for publication and presentation in seminar – footnote, citation, bibliography and related formalities.

References:

1. Aigner, D.J. (1971) Econometrics, Prentice Hall Inc, Englewood Cliffs, New Jersey.

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2. Jonston, J. (1972), Econometric methods, Mc-Graw Hill Book Company, New York
3. Kurien, C T, (1973) A guide to research in Economics, Sangam Books, Madras
4. Koutsoyiannis, A, (1973), Theory of Econometrics, Harper and Row Publishers, Inc, New York.
5. Wilkinson and Panarkar (1984) Methodology and Techniques of social reaearch, Himalayan Publishers, Bombay.
6. Goode and Hatt, (1987) Methods in social: Research, Mc-Graw hill, London.
7. Enders.W (1995), Applied Econometrics Time Series, John Willey & sons INC, New
8. York Kalirajan (1995), Applied Econometrics, Oxford & I BH, New Delhi.
9. Sonachalam, K.S., (1999), Research Methodology, methods and techniques, Wiely Eastern Limited, New Delhi.
10. Thanulingam, N. (2000), Research Methodology, Himalayan Publishers, Bombay.
11. Patterson, Kerry (2002), An Introduction to Applied Econometrics: A Time Series Approach, Palgrave, New Delhi.
12. Dniel T. Seymour, (2004), Marketing Research-Quantitative methods, S, Chand and company, New Delhi.

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
Bloom's Taxonomy	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
K1: Remembering					
K2: Understanding					
K3: Applying					
K4: Analyzing			**4**		
K5: Evaluating	**5**				**5**
K6: Creating		**6**		6	

Mean: 5.2

MEC 6402 Computer Applications in Social Science Research 4Hr/4 Cr

It is aimed at providing an exposure to fundamentals of computer and advanced statistical packages. It will enable the scholar to acquire and use the skill imminently. This course throws light upon various operating systems, spread sheet analysis-statistical packages and their practical applications in social science research, word processing and power point presentations.

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MPhil English

Programme Grid

Sem	Course Code	Course Titles	Hour	Credit	Mark
I	MPE 6613	Rhetoric and Research Methodology	6	6	120
	MPE 6615	Modern Criticism &Theories	6	6	120
II	MPE 6612	Contemporary English Fiction	6	6	120
II	MPE 6614	English Language Teaching	6	6	120
I & II	MPE 6610 & 6611	Dissertation	12	12	240
	Total		**30**	**30**	**720**

Programme Specific Outcomes for MPhil/PhD in English

On completion of the research programmes, scholars will be able to

1. define a clear research objective and break it down effectively into smaller objectives;
2. formulate research questions & problems, and hypotheses;
3. design research experiment and critically deconstruct texts;
4. synthesize language/literary theories with the issues of investigation;
5. adopt diligently MLA/APA Style sheets;
6. structure academic research articles and theses;
7. think logically, write coherently, and reorganize intellectually textual properties;
8. problematize English language teaching methods and approaches, language policies, and language assessment methods;
9. employ research and statistical tools and activity resources in both qualitative and quantitative research; and
10. report fluently and flawlessly research findings in international journals and conferences.

Mapping of Course Outcomes (COs) with Programme Specific Outcomes (PSOs)

Courses	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10
MPE 6613	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MPE 6615				✓		✓	✓	✓		
MPE 6612			✓	✓			✓	✓		
MPE 6614			✓	✓	✓	✓	✓	✓		
MPE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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MPE 6613 **RHETORIC & RESEARCH METHODOLOGY** **6Hrs./6Cr.**

This course aims at introducing research scholars to four aims of language and literary research: a) advancement of knowledge, b) sharpening the critical acumen, c) creation of a genuine and intelligent interest in language and literature, and d) inculcation of the sense that researcher is a member of a collaborative community.

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

i. adapt to the different kinds of literary research: bibliography, textual criticism, biographical, theoretical and interpretive,
ii. integrate the basic principles of literary theories with methods of textual analysis,
iii. compile and process the art of research work,
iv. produce MLA documentation & citation skills, and
v. evaluate the ELT issues in the Indian context for action research appropriately applying the APA style

Unit 1 **Research and Research Methods**
Research and Literary Research, Types of Research, Types of Research methods

Unit 2 **Research Design and Conduct of Research**
Research Design, Problems, Questions, Hypothesis, Research Proposal, Conducting Research, Review of Literature

Unit 3 **Crafting the Thesis**
Thesis Structure, Thesis Writing, Drafts, Editing and proof reading

Unit 4 **Documentation Style – MLA**
Background History of the MLA handbook, Documentation styles, Mechanics of Writing, Works Cites

Unit 5 **Documentation Style: APA**
Overview of the History of the APA, APA Citation Rules,

References

Allen, J.P.B. & Corder, S. Pit. 1975. *Papers in Applied Linguistics*. Vol.2. London: OUP.
Altick, Richard D. 1963. *The Art of Literary Research*. New York: W. W. Norton.
American Psychological Association. 2009. *Publication Manual of the APA*. 6th Ed.
Anderson, Jonathan, Durston, Berry H. & Poole, Millert. 1985. *Thesis and Assignment Writing*. New Deldi: Wiley Eastern.
Berry, Ralph. 1985. *The Research Project; How to Write it*. London & New York: Routledge.
Modern language Association of America. 2009. *MLA handbook for Writers of Research Papers*. 8th Ed. New Delhi: East-West.
Mohamed, Syed HD. 2010.*The Craft of Language and Literary Research*. Delhi: Atlantic.
Sinha, MP. 2007. *Research Methods in English*. Delhi: Atlantic.

Mapping of Course Outcomes with Bloom's Taxonomy

THE AMERICAN COLLEGE, MADURAI

DEGREE OF MASTER OF PHILOSOPHY (M.Phil) IN MATHEMATICS

Eligibility: As per Madurai Kamaraj University norms.

Duration: One year consisting of two semesters.

Course of Study: I Semester: Papers: 1. Research Methodology
2. Core Paper- I
3. Core Paper- II
4. Elective Paper

II Semester: Dissertation

	Course	Title	Lect.	Self/Lib.	credits	Internal	External	Total
I Sem.	MPM 6500	Research Methodology	5	3	5	50	50	100
	MPM XXXX	Core Paper- I	4	3	4	50	50	100
	MPM XXXX	Core Paper- II	4	3	4	50	50	100
	MPM XXXX	Elective Paper	5	3	5	50	50	100
II Sem.	MPM 6800	Dissertation			8	100	100	200
		Seminars (2)			4	100		100
		Viva-voce			6		100	100
	Total				36			800

Core Papers: MPM 6401- ALGEBRA
MPM 6403- ANALYSIS
MPM 6405- ALGEBRAIC TOPOLOGY

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MPM 6500 **RESEARCH METHODOLOGY** **5 Hrs/5 Crs**

The aim of the course is to get prior idea on preparing research articles and dissertation in Mathematics. Also develop enough skills in LATEX so that students themselves able to prepare articles and dissertation in Mathematics.

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

i. provide the overview of research methodology.
ii. define and analyze the problem chosen by the students and know how to do the literature survey work and write the dissertation.
iii. use LATEX type -setting to frame the dissertation.
iv. analyze the topological concepts.
v. present the research works through PowerPoint presentation.

UNIT- 1: Meaning of research – objectives of research – Motivation of research – Types of research – Research approaches – Significance of research – Research methods versus Research methodology – Research and Scientific method – Importance of knowing how research is done – research process – criteria of Good research.

UNIT- 2: Theses and Dissertations-Defining the Problem-Limiting the problem – Consulting source material – preparing a working bibliography – Selecting a topic - Mathematical Journals – AMS subject classification (primary and secondary. Main subjects only) - Impact factor-citation index-search engines.

UNIT-3: Contents of LATEX source file – Document Class – Page style – Parts of the document – Changing font – Centering and indenting texts – Bibliography – Anatomy of and articles.

Drawing tools: Texcad/ Flash 5.0 / Concept draw.

UNIT-4: Problems and Theorems of Closed sets – Limit points – Continuity - Connectedness . Problems and Theorems of Compactness – Countability - T_0 , T_1, T_2 and regular spaces.

UNIT-5: Study of any research article in Topology – Named theorems in Separation Axioms (PPT Presentations by the Students).

TEXT BOOKS:

1. Research Methodology: Methods and Techniques by C.R. Kothari, New age international publishers, (1990).

2. Charting a Course for a Successful Research career by Prof.Alan M Johnson AM, Elsevier, Second Edition (2011).
3. A guide to LATEX- Fourth Edition by H. Kopha and P.W. Daly, Addision-Wesley, London.
4. Theory and problems of general Topology by Seymour Lipschutz, Mc Graw Hill, International Edition (2010).
5. Topology (Second Edition) by James R. Munkres, Prentice – Hall of India, Private Ltd, New Delhi, 2006.

Bloom's Taxonomy	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
K1: Remembering	X				
K2: Understanding			X		
K3: Applying		X			X
K4: Analyzing	X			X	
K5: Evaluating					
K6: Creating			X		

MPM 6401 **ALGEBRA** **4 Hrs/4 Crs**

This course will provide a strong foundation in the abstract approach for the budding Mathematician. One of the amazing features of twentieth century Mathematics has been its recognition of the power of abstract approach. Also it enable students to acquire research idea in Algebra and create awareness to do research work.

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

i. discuss fundamental group and covering spaces.
ii. define modules and discuss its characteristics.
iii. explain the structure of modules
iv. outline the structure of rings
v. analyze prime and primary ideals and demonstrate Noetherian Rings with examples .
vi. understand the properties of different types of ideals; • recognize the concept of a module and their constructions;

THE AMERICAN COLLEGE- MADURAI (AUTONOMOUS)
DEPARTMENT OF MANAGEMENT STUDIES

M.Phil. (Management) One- year full time programme
(OBE syllabus for candidates admitted from the academic year 2019-20 onwards)
Course Structure

SEMESTER	COURSE NO.	TITLE OF THE PAPER	HOURS WEEK	MARKS
Semester I	MMB6501	Functional Management Decision	5	100
	MMB6503	Research Methods in Management	5	100
		Advanced Elective Paper (The Scholar should choose any **ONE PAPER** from the following streams of the elective)		
	MMB6505	Marketing Management	5	100
	MMB6507	Human Resource Management	5	100
	MMB6509	Financial Management	5	100
	MMB6511	Banking and Insurance Management	5	100
	MMB6513	Trade and Logistics Management	5	100
	MMB6515	Operations Management	5	100
	MMB6517	Entrepreneurship Development	5	100
	MMB6519	Information Technology	5	100

SEMESTER	COURSE NO.	TITLE OF THE PAPER	HOURS WEEK	MARKS
Semester II	MMB6600	M. Phil Dissertation and Viva-Voce	-	200

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MMB6503 RESEARCH METHODS IN MANAGEMENT

5Hrs& 5 credits

Objective:

To enable the research scholars understand the advanced concepts of research methods. To expose the research scholars have a thorough knowledge on Research.

Outcome: At the end of the course, scholars would be able to

i. Demonstrate and apply the Research Process

ii. Formulate the Research design and sample design

iii. Compare different data collection methods and devise the steps in data preparation

iv. Demonstrate proficiency in hypothesis testing using different statistical methods

v. Design and organize a research report using appropriate manuscript writing procedures

UNIT I: RESEARCH IN MANAGEMENT

Research: Meaning – Purpose – Types of research- Significance of research – Research in Management – Steps in research – Identification- selection and formulation of research problem – Research Design – Hypothesis; concepts- sources and types – Formulation of hypothesis – Review of literature: Nature and Purpose.

UNIT II: SAMPLING METHODS AND DATA COLLECTION

Meaning of sample – Sampling theory – Sampling techniques – Probability sampling – Non probability sampling – Advantages and disadvantages of sampling – Sampling and Non-Sampling errors – Estimation of sample size -Sources of Research data: Primary and secondary sources. Primary data collection methods: Questionnaire and testing of questionnaire. Attitude measurement: Scales of measurement (Nominal- Ordinal- Interval- Ratio). Rating scales: Attitudes scales (Likert scale- semantic differential scale). Observation- Interview- Schedule.

UNIT III: STATISTICAL ANALYSIS I

Univariate analysis with the help of descriptive statistics. Investigation of association(Bivariate data).Pearson's correlation coefficient (Interval and ratio scales). Spearman's rank correlation coefficient (ordinal data). Contingency coefficient (Nominal data).Simple regression analysis – Testing of hypothesis: Framing null and alternate hypothesis. Critical region- test statistic- standard error and its role Parametric Test: Tests based on normal- t- f- Chi-square distributions.

UNIT IV: STATISTICAL ANALYSIS II

Non-parametric test; Kolomogrov – Smirnov one and two sample test- run test-MannWhitney U test- Will Coxson signed rank test – Kruskal – Wallish test – Fried mann test and Kendall's W test. Overview of some advanced statistical tools: Principle component analysis– Measures of association of minimal data: Lamda- Phi coefficient.

Unit V: REPORT WRITING

Chapter Format – Pagination –Indentation – Using Quotations – Presenting Footnotes – Abbreviations- Presentation of tables and figures – Referencing – Documentation – Use and format of Appendices – Indexing – Technique- style and linguistic aspects of Report Writing.

TEXT BOOKS

1. Kurtz- R. Norman- 1983. Introduction to Social Statistics- New Delhi- McGraw-Hill International.

2. Donald R.Cooper and Pamela S.Schindler- 2000- 6th Ed.-Business Research Methods-Tata McGraw Hill Publishing Company Limited.

REFERENCES

1. Sullivan-Monette and Dejong- 2001.Applied Social Research (Tools For The Human Services)- Harcourt Brace College Publishers.

2. Baker- T.L.- 1999. Doing Social Research- III edition- New York- McGraw Hill.

THE AMERICAN COLLEGE
RESEARCH DEPARTMENT OF PHYSICS
Programme for M. Phil. PHYSICS (w. e. f. 2019-20 onwards)

Semester	Course No.	Course Title	Hours/Wk	Credits	Marks
I	MPP 6613	Research Methodology	6	6	100
	MPP 6615	Advanced Topics in Physics	6	6	100
	MPP 6617	Vacuum Technology & Thin Films	6	6	100
II	MPP 6600	Dissertation		6	200
				24	500

Programme Specific Outcome

On completion of the programme, students will be able to

PSO1 : Demonstrate a coherent understanding of the academic field of Physics, and its linkage with related disciplinary subjects;

PSO2 : Demonstrate the ability to use Physics skills such as formulating, identifying, and applying appropriate methodologies to solve and interpret a wide range of problems associated with Physics;

PSO3 : Extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge and apply one's learning to real life situations;

PSO4 : Design and execute projects to experience the aspects of research and to provide lucid summation of the scientific literature on a chosen topic;

PSO5 : Analyse and interpret data collected using appropriate methods, including the use of suitable software and customized worksheets, and relating the conclusions to relevant theories of Physics;

PSO6 : Demonstrate professional behaviour such as (i) being objective, unbiased and truthful in all aspects of work; and (ii) appreciation of intellectual property, environmental and sustainability issues;

PSO7 : Develop communication skills, both written and oral, for specialized and non-specialized audience;

PSO8 :Acquire subject knowledge and skills of the calibre sought by industry, professional career and public service, as well as providing academic teachers and researchers of the future;

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PSO9 : Demonstrate relevant generic skills and global competencies such as (i)skills of independent investigation of physics-related issues and problems; (ii)ability to construct logical arguments using correct technical language related to physics;

PSO10 : Acquire knowledge and skills, including, "learning how to learn", that are necessary for participating in learning activities throughout life.

PSO to PO Mapping for MPhil - Physics

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
PSO1	X	X	X		X		X		X	
PSO2	X	X		X		X	X		X	
PSO3	X	X		X	X	X		X		
PSO4	X	X		X		X		X		X
PSO5	X	X	X		X		X		X	
PSO6	X	X		X			X		X	X
PSO7	X	X	X		X			X	X	
PSO8	X	X		X	X		X	X		
PSO9	X	X		X		X		X	X	
PSO10	X	X		X		X		X		X

Mapping of Courses with Programme Specific Outcomes (PSOs)

Courses	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10
MPP 6613	X	X				X		X	X	X
MPP 6615	X	X				X		X	X	X
MPP 6617	X	X				X		X	X	X
MPP 6600	X	X	X	X	X	X	X			

MPP 6613 **RESEARCH METHODOLOGY** **6 hrs/6Cr.**

This course provides technical computational skills to synthesis and simulates research level physics problems. It also gives hands on training to pursue research in physics through case studies.

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

i. Solve simultaneous equations using Gauss elimination and Gauss Jordon equation and determine the values of integration by trapezoidal and Simpson's rules.
ii. Compute the interpolated values using various methods.
iii. Write programmes in C++ to elucidate physics problems in electromagnetism and quantum mechanics.

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iv. Use Math CAD and MATLAB softwares for carrying out mathematical computations.
v. Disseminate the packages like Ms Excel, power point, Corel draw, LaTeXetc and apply them for documentation.
vi. Interpret the results and write a research article from various characterization techniques like XRD, Raman and SEM.

Unit I: Numerical Methods

Methods of solving algebraic and transcendental equations – Newton-Raphson methods; Method of solving set of simultaneous equations – Gauss Elimination and Gauss Jordan method; Numerical integration- Simpson's rule, Gaussian quadrature; Solving differential equation – Runge-kutta method; Solving Eigen value equation – Jacobi method, Power method.

Unit II: Statistical Methods

Interpolation -- Lagrange's interpolation, Finite differences, Newton's forwards, central and backward interpolation, divided difference, Curve fitting – Linear least square fit, non linear fit, parabola, exponential and logarithmic; hypothesis testing; t-test, F-test, analysis of variance.

Unit III: Technical computing – programming

Develop programs and simulations in C++ to solve problems of mechanics, electromagnetism, quantum mechanics, statistical mechanics and electronics.

Unit IV: Technical computing – package

Usage of MATHCAD and MATLAB to solve physics problems, Interactive and iterative computations, Vectors and matrices, Mathematical and statistical functions, differential equations, integrations, symbolic computations, Graphs, Fourier analysis and FFT, interpolation, minimization.

Unit V: Presentation packages

Usage of MS Excel, MS Power point, Corel Draw, LaTex to prepare presentation of technical report, Type setting text, Special characters and symbols, cross references, footnotes, type setting mathematical formulae, creating bibliography, indexing, presentation with pdfscreens, producing mathematical graphics, page layout of document classes; Scientific articles, long report, book, slides.

Unit: 6 Case studies

Interpretation of characteristics Spectrums(XRD, SEM, IR, RAMAN, UV); Literature on recent topics – preparing report on recent development of a specific field of research- study and analysis of selected published research papers using cross reference.

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References:

1. Demidovich B. P., Maron I. A., Computational Mathematics, MIR Publishers(1981)(unit I and II)

2. Steve Bain, Nick Wilkinson, corel DRAW 12, Osborne/McGraw Hill(2004)(Unit V)

3.WilliamH.Pressetal, Numerical Recipes in C++, 2Ed, Cambridge University press(2002)(Unit III)

4. MATHCAD User's Guide, Mathsoft, Inc., Cambridge,USA(1997)(Unit IV)

5. Using MATLAB, The Math works, Inc., USA(1996)(Unit IV)

6. R. Rajaram, Object Oriented programming and C++, New Age international(1997)(Unit III)

7. The Not so short introduction to LaTex 2E, Tobias Oetiker et al, The Free software foundation, Inc., Cambridge USA (2004)(UnitV)

8. A.R. Varma and srivastava, Crystallography applied to solid state physics, New Age publication (2005)(Unit IV)

Bloom's Taxonomy	CO1	CO2	CO3	CO4	CO5
K1: Remembering					
K2: Understanding	2				
K3: Applying	3	3		3	3
K4: Analyzing		4	4	4	
K5: Evaluating	5	5		5	5
K6: Creating	6		6		
Mean					4.0

MPP 6615 **ADVANCED TOPICS IN PHYSICS** **6 hrs/6Cr.**

The frontier areas of Physics are highlighted here so that the student will get experience in the up to date knowledge in Physics. A variety of topics such as Astrophysics, Solid-state Theory, Advanced Quantum Mechanics and Nonlinear dynamics are dealt with.

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

i. ascertain the evolution of universe using various models
ii. discuss the approximations in solid state theory and superconductivity
iii. explain canonical formation and quantization of fields
iv. elucidate the symmetry in quantum mechanics
v. classify the types of oscillators and equilibrium points

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CURRICULUM FOR M.PHIL PROGRAM IN BOTANY

Course Code	Subject	Hrs/ Week	Total Hours	Max Mark CA	Max Marks ESE	TOTAL	CREDITS
MPB6601	Research Methodology	6	90	100	100	200	6
MPB6603	Trends In Botany	6	90	100	100	200	6
MPB6605	SPECIAL PAPER (Any one)	6	90	100	100	200	6
MPB6600	Project	12	-	-	-	-	
MPB6600	Dissertation Studies			50	100	200	6
	Viva - voce			-	50		

Special Paper 1. Plant Tissue Culture
Special Paper 2. Bioprocess Engineering
Special Paper 3. Mycology
Special Paper 4. Plant Pathology

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MPB6601 RESEARCH METHODOLOGY 6Hrs/Week

Learning objectives

- Defending the use of Research Methodology
- Judging the reliability and validity of experiments
- Being able to perform exploratory data analysis
- Using parametric and non-parametric hypothesis tests (and interpreting their results).
- Being able to draw conclusions from categorical data
- Using computer-intensive methods for data analysis
- Drawing conclusions from statistical test results
- Being able to compare statistical models
- Being able to argue when to use Bayesian vs Frequentist statistics

These objectives will be achieved by means of lectures, discussions in the lectures, assignments and blogs.

UNIT: 1 HOW DOES RESEARCH WORK?

Concept of research- the role of research, research process overview-importance of research- types of research- sources- attitude of a researcher- selection of research problem- evaluation of the problem- defining the problem.

UNIT: 2 METHODS OF RESEARCH

Science and its functions, What is theory?, and The meaning of methodology Experimental- Historical- Case study- Survey- Focus Group Discussion- Ethanography- Participatory Rural Apprasial- Methods of literary research- Econometric methods.

UNIT: 3 RESEARCH DESIGN

Understanding Concepts, Constructs, Variables, and Definitions- components of research- hypothesis and its value- Sampling- the nature of sampling, Probability sampling design, Nonprobability sampling design, Determination of sample size.

UNIT: 4 DATA INTERPRETATION

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1. ***COLLECTION OF DATA***- Source (primary and secondary, electronic, library, note cards)- techniques in data collection (observation- interview- questionare- schedule- scales)
2. ***QUANTIFICATION OF DATA***- Classification of data- tabulation- diagrams- one dimensional- two dimensional- pictogram- cartogram- graphs- charts.
3. ***DATA ANALYSIS***- Statistics-Summarizing and describing a collection of data - Univariate and bivariate analysis- Mean, mode and standard deviation- Percentages and Ratios- Histograms- Identifying randomness and- uncertainty in data.

UNIT: 5 REPORT WRITING

Guidelines- stages- preliminaries- main body- reference material- foot notes- abbreviation- bibliography- Publication. Structure and Content, Presentation, Referencing and Appendices

References

- Adèr, H. J., & Mellenbergh, G. J. (Eds.). (1999). *Research Methodology in the Social, Behavioural and Life Sciences: Designs, Models and Methods*. Sage.
- Sahu, P. K. (2013). *Research methodology: A guide for researchers in agricultural science, social science and other related fields* (p. 432). New Delhi: Springer.
- Laake, P., Benestad, H. B., & Olsen, B. R. (Eds.). (2007). *Research methodology in the medical and biological sciences*. Academic Press.
- Walliman, N. (2017). *Research methods: The basics*. Routledge.
- Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Age International.
- O'Leary, Z. (2017). *The essential guide to doing your research project*. Sage.

MPB6603 **TRENDS IN PLANT SCIENCES** 6Hrs/Week

Preamble

This common course for all scholars focuses on providing a glimpse of the ongoing research at least in certain selected frontiers of botanical sciences. Topics and concepts touched here are by no means claimed complete. The intent is to inform learners about the trends in the domains where the research supervisors suggest candidates the topics for investigation. Besides the general glimpse on how botanical enquiries have progressed over time, ideas on metabolic

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M.Phil Programme in Chemistry

PROGRAMME OBJECTIVES

The M.Phil program is focused to equip scholars with skills to understand and appreciate chemistry. It is also aimed at helping the students to realize the importance of research work, develop skills to interpret. This programme can also be extended to PhD studies by the addition of one year's worth of research.

PROGRAMME STRUCTURE

Semester	Course code	Title of the course	Credits	Total Marks
I	MPC 6600	Dissertation	6	-
	MPC 6611	Research Methodology	6	120
	MPC 6613	Advanced topics in Chemistry	6	120
	MPC 6615	Indepth study	6	120
II	MPC 6600	Dissertation	6	240
			30	**600**

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MPC 6611 **RESEARCH METHODOLOGY** **6hrs/6cr**

Course Objectives:

- To learn the computer application skill for teaching and research
- To understand the principles of research, literature survey and writing research paper and thesis writing
- To create the awareness on laboratory hygiene and safety
- To gain some knowledge about the statistical analysis of data which will be highly helpful for research
- To expose them in nano sample analysis

Course outcome:

At the end of the course, scholars will be able to:

1. explain different routes to carry out literature survey and apply digital platform for the same.
2. illustrate various terminology involved in scientific publication and design a scientific publication
3. illustrate data collection and presentation. Assess error and suggest solution for its minimization.
4. prescribed safe laboratory practices in handling glassware and chemicals
5. apply techniques for sample analysis

UNIT –I Literature survey

Print : Sources of information – Primary, Secondary, Tertiary sources – Journals – Journal abbreviations – Abstracts – Current titles – Reviews – Monographs – Dictionaries – Textbooks – Current contents – patent- Introduction to Chemical Abstracts and Beilstein – Subject Index, Substance Index, Author Index, Formula Index and other Indices with examples.

Digital : Web resources – E–Journal – Journal access – TOC alerts – Hot articles – Citation index – Impact factor – H–Index – E–Consortium – UGC infonet – E–Books – Internet discussion groups and communities – Blogs – Preprint server – Search engines, Scirus, Google Scholar, ChemIndustry, Wiki – Databases, ChemSpider, ScienceDirect, SciFinder, Scopus

UNIT II: Methods of writing scientific papers

On writing scientific papers – justification for scientific contributions, bibliography, justice and courtesy in decisions, description of methods, conclusions, the need for illustration, style, publications of scientific works,

Writing methods – Writing the first draft, revising the first draft on content and structure, revising the second draft on style, writing a thesis, writing review article and book reviews, preparing research proposals for grants– funding agencies

UNIT III: Data Analysis

Types of Error – Accuracy, precision, significant figures, use of calculators in the estimation of errors – Frequency distribution, the binomial distribution, the Poisson distribution and normal distribution – describing Data, population and sample, mean, variance, standard deviation, way of quoting uncertainty, robust estimators, repeatability and reproducibility of measurements –

UNIT IV: Chemical Safety, Ethical Handling of Chemicals

Safe working procedure and protective environment, protective apparel, emergency procedure and first aid, laboratory ventilation, Safe storage and use of hazardous chemicals, procedure for working with substances that pose hazards, flammable or explosive hazards, procedures for working with gases at above or below atmospheric pressures – safe storage and disposal of waste chemicals , recovery , recycling and reuse of laboratory chemicals, procedure for laboratory disposal of explosives , identification , verification and segregation of laboratory waste , disposal of chemicals in the sanitary sewage system , incineration and transportation of hazardous chemicals

UNIT V : Instrumentation techniques and computer packages

Scanning electron microscopy (SEM) – instrumentation – applications – surface area analysis, particle size determination – Scanning Probe Microscopes – Scanning Tunnelling microscope (STM) and Atomic Force Microscope (AFM) – Principles and applications. Diffraction techniques – single crystal - powder XRD, Neutron and electron diffraction – principles and applications. Emission spectrography and flame spectroscopy – Atomic absorption, atomic emission and atomic fluorescence spectroscopy

Applications of some computer packages like MS–Excel, Origin, ChemDraw, Sciplot, ISIS draw, ChemSketch and SPSS.

References:

1. http://www.pubs.acs.org
2. http://www.inflibnet.ac.in
3. http://rsc.org
4. http://spingerlink.com
5. J. March, 'Advanced Organic Chemistry; Reactions, Mechanisms and Structure', 6th Ed., Wiley– Interscience, 2016.
6. Maeve O'Connor, 'Writing successfully in science' Chapman and Hall, London, 1995.
7. D. B. Hibbert and J. J. Gooding, 'Data Analysis for Chemistry', Oxford University press, 2006.
8. J. Topping, 'Errors of Observation and Their Treatment', Fourth Edn., Chapman Hall, London, 1984
9. S. C. Gupta, 'Fundamentals of Statistics', Sixth Edn., Himalaya publ. House', Delhi, 2006
10. H. E. Solbers, 'Inaccuracies in Computer Calculation in Standard Deviation', Anal. Chem. 55, 1611 (1983)
11. P. M. Wanek et al., 'Inaccuracies in the Calculation of Standard Deviation with Electronic Calculators', Anal. Chem. 54, 1877 (1982)
12. Chemical safety matters–IUPAC –IPCS, Cambridge Univ. Press, 1992.
13. For computer applications any commonly available books as well as common materials available in the web.
14. D.A. Skoog and J.J. Leary, Principles of Instrumental Analysis, 4th Edn., Saunders College Publishing, 1992.
15. D.A. Skoog, F.S.Holler, S.R.Crouch, Principles of Instrumental Analysis, 6th Edn.

M. Phil Programme in Commerce

Course Code	Course Title	Credits	Total
	I Semester		
MCO 6600	Dissertation	6	-
MCO 6601	Research Methodology	6	100
MCO 6603*	Financial Management and Control/		
MCO 6605*	Marketing Management	6	100
	II Semester		
MCO 6600	Dissertation	6	200
MCO 6602	Business Management	6	100

*** Optional Courses- Either MCO 6603 or MCO 6605 can be opted**

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MCO 6601 **RESEARCH METHODOLOGY** **6 Credits**

Course Objective

The objective of this course is to impart knowledge on research methods and techniques in commerce. This course deals with planning of research, identifying the research problem, designing the research problem, method of data collection, applying various statistical tools and techniques and preparing research report. This paper also makes a penetrating insight into the various dimensions and facets of research and acquaints the students with analytical, scientific and rational attitude, skills and queries.

Course Outcomes

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

i. Describe social research and its types with importance and limitations.
ii. Predict and formulate research problems, hypothesis and sampling.
iii. Analyze the data collected for the selected research problem.
iv. Appraise the analytical knowledge of using SPSS.
v. Compile the research report.

UNIT I

Introduction to Research: Definition – Objectives – social research – meaning and characteristics, types – pure vs. applied research – descriptive vs. analytical research – quantitative and qualitative research – importance and limitations. Research Methods: historical methods- case study method – inductive and deductive methods – other methods - exploratory research – ex-post facto research – evaluation research - experimental research.

UNIT II

Selection, Identification and Formulation of Research Problem: Research problem – meaning – sources – theory and facts – criteria of good research problem. Research Design, Hypothesis and Sampling: Research design – meaning and nature – components - types. Hypothesis – meaning – importance – types – sources - characteristics – forms - formulations and verifications. Sample- sample size – methods - characteristics of good sample-probability - non-probability samples - sampling error

UNIT III

Collection of Data and Techniques: Construction of tools – questionnaire – interview

scaling – scale classification basis – types of scales – rating scales – rank order scales – attitude scales - scale construction techniques – construction of Likert and semantic differential scales – scaling errors – scale validation. Data Processing: Editing – coding – tabulation.

UNIT IV

Statistical Methods with SPSS Package: Measure of relationship – correlation – simple – partial – multiple – regression –simple and multiple – association of attributes – applications in research. Hypothesis testing and estimation: fundamentals of hypothesis testing – standard error – point and interval – estimates – important non – parametric tests: sign – Run Krusdal – Wallis tests and Mann – Whitney test. Parametric tests: Testing of Significance, mean proportion, variance and correlation coefficients – testing of significance of differences between means, proportions, variances and correlation coefficients. ANOVA and Chi-square test - one-way and two ways ANOVA – Latin Square test – Chi-square test for association and goodness of fit.

UNIT V

Report Writing: Steps in report writing – format of the research report – mechanics of report writing – referencing – use of quotations – bibliography – appendix – precautions for writing the report.

Books for Reference

1. Kothari C R., Research Methodology – Methods and Techniques, Second Edition, New Age International Publishers, New Delhi, 1990.
2. Young P.V., Scientific Surveys and Research, Asia Publishing House, New York, 1992.
3. Krishnasamy. O.R., Research Methodology, Himalayas Publications. 2002.
4. Young P.V., Scientific Surveys and Research, Asia Publishing House, New York, 1992.
5. Ghosh. B.N., Scientific Methods and Social Research, third edition, Sterling Publishers Pvt Ltd, New Delhi 1992.
6. Gupta S.C., Fundamentals of Statistics, Sultan Chand and Sons, 2001
7. Gupta S.P., Statistical Methods, Sultan Chand and Sons, 2002.
8. Jack Hevin, Elementary Statistics in Social Research, Pearson Education Pvt. Ltd, Delhi 2000.

Post Graduate and Research Department of Economics

M.Phil / PhD Programme in Economics
(With effect from 2019-20)

M. Phil/PhD programme in Economics emphasizes policy-focused, socially-relevant and empirically-rigorous applied research in economics, by giving emphasis on the thrust areas such as, Strong foundation in economic theory and recent developments, Pragmatic approach to development issues and problems of the Indian Economy, Development of analytical skills and critical thinking through capability building, Hands-on training in quantitative techniques, Professionalism onto life-long learning process through capacity building at competitive edge.

Course code	Title of the course	Credits	Max Marks
	I SEMESTER		
MEC 6601	Economic Theory and Policy (ETP)	6	120
MEC 6603	Research Methodology and Quantitative Techniques (RMQT)	6	120
	II SEMESTER		
MEC 6402	Computer Applications in Social Science Research (CASSR)	4	120
MEC 6600	Dissertation Work	12	240

Programme Specific Outcomes (PSOs) for M.Phil/Ph.D Economics

On completion of the programme, postgraduates will be able to

1. Develop critical and quantitative thinking skills specific to business and accounting.
2. Evaluate economic issues and public policy by using economic models or data analysis while identifying underlying assumptions of the model(s) and limitations
3. Demonstrate the ability to frame and solve problems in economics, using concepts such as optimization, equilibrium, and the incentives faced by economic agents. They should demonstrate an understanding of the theoretical tools used to solve economic problems
4. Ability to solve problems that have clear solutions and to address problems that do not have clear answers and explain conditions under which these solutions may be correct.
5. Understanding how to use empirical evidence to evaluate the validity of an economic argument, use statistical methodology, interpret statistical results and conduct appropriate statistical analysis of data.

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MEC 6603 Research Methodology and Quantitative Techniques 6Hr/6 Cr

The objective is to comprehend the process of research, through exposure to scientific methods, techniques of enquiry and tools. This course includes various research methods, design of study, formulation of hypothesis and verification using different quantitative tools and report writing.

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

i. Comprehensive different approaches in research methodology
ii. Design research methodology suited to economic problems under consideration
iii. Identify appropriate data and validating data sources
iv. Formulate econometric models for exploratory approach and confirmatory approach to economic analysis
v. Prepare full-fledged research report with its all essentials

Unit I: Methods of Research: Nature of economic research – pure, applied and action research – fact finding and marketing research – utility of research – quality and ethics of research and problems encountered – case study method and census – survey method and sampling – types and uses – secondary and tertiary data based meta research – qualitative methods.

Unit II: Techniques of Research: Research design – components of research proposal and the format of research report – statement of problem and objectives – translating objectives into questions – formulation of questionnaire – opinionnaire and scaling technique – SWOT analysis – interview techniques – observation; systematic observation and participant observation, participatory rapid appraisal.

Unit III: Tools of Research – I: Characteristics of usable hypothesis – sources and functions of hypothesis – testing hypothesis – data interpretation methods – small sample test and large sample test – ANOVA – non parametric tests – common test $X^{2,}$ F, t

Unit IV: Tools of Research-II: SLR & MLR models – violations of assumptions – distributed lag models, dummy variables – identification – simultaneous systems – data reductions – principal component analysis – factor analysis – discriminant analysis.-Data generating process – stationary and non-stationary – Dicky Filler Test – Augmented Dicky Filler Test – properties of time series – integration and co-integration – causality – Granger Causality – Sims test – lag length, selection and criteria – Error Correction models – Panel Data Models

Unit V: Report Writing: Hands on experience in writing assignments, term papers, articles for publication and presentation in seminar – footnote, citation, bibliography and related formalities.

References:

1. Aigner, D.J. (1971) Econometrics, Prentice Hall Inc, Englewood Cliffs, New Jersey.

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2. Jonston, J. (1972), Econometric methods, Mc-Graw Hill Book Company, New York
3. Kurien, C T, (1973) A guide to research in Economics, Sangam Books, Madras
4. Koutsoyiannis, A, (1973), Theory of Econometrics, Harper and Row Publishers, Inc, New York.
5. Wilkinson and Panarkar (1984) Methodology and Techniques of social reaearch, Himalayan Publishers, Bombay.
6. Goode and Hatt, (1987) Methods in social: Research, Mc-Graw hill, London.
7. Enders.W (1995), Applied Econometrics Time Series, John Willey & sons INC, New
8. York Kalirajan (1995), Applied Econometrics, Oxford & I BH, New Delhi.
9. Sonachalam, K.S., (1999), Research Methodology, methods and techniques, Wiely Eastern Limited, New Delhi.
10. Thanulingam, N. (2000), Research Methodology, Himalayan Publishers, Bombay.
11. Patterson, Kerry (2002), An Introduction to Applied Econometrics: A Time Series Approach, Palgrave, New Delhi.
12. Dniel T. Seymour, (2004), Marketing Research-Quantitative methods, S, Chand and company, New Delhi.

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
Bloom's Taxonomy	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
K1: Remembering					
K2: Understanding					
K3: Applying					
K4: Analyzing			4		
K5: Evaluating	5				5
K6: Creating		6		6	

Mean: 5.2

MEC 6402 Computer Applications in Social Science Research 4Hr/4 Cr

It is aimed at providing an exposure to fundamentals of computer and advanced statistical packages. It will enable the scholar to acquire and use the skill imminently. This course throws light upon various operating systems, spread sheet analysis-statistical packages and their practical applications in social science research, word processing and power point presentations.

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MPhil English

Programme Grid

Sem	Course Code	Course Titles	Hour	Credit	Mark
I	MPE 6613	Rhetoric and Research Methodology	6	6	120
	MPE 6615	Modern Criticism &Theories	6	6	120
II	MPE 6612	Contemporary English Fiction	6	6	120
II	MPE 6614	English Language Teaching	6	6	120
I & II	MPE 6610 & 6611	Dissertation	12	12	240
	Total		**30**	**30**	**720**

Programme Specific Outcomes for MPhil/PhD in English

On completion of the research programmes, scholars will be able to

1. define a clear research objective and break it down effectively into smaller objectives;
2. formulate research questions & problems, and hypotheses;
3. design research experiment and critically deconstruct texts;
4. synthesize language/literary theories with the issues of investigation;
5. adopt diligently MLA/APA Style sheets;
6. structure academic research articles and theses;
7. think logically, write coherently, and reorganize intellectually textual properties;
8. problematize English language teaching methods and approaches, language policies, and language assessment methods;
9. employ research and statistical tools and activity resources in both qualitative and quantitative research; and
10. report fluently and flawlessly research findings in international journals and conferences.

Mapping of Course Outcomes (COs) with Programme Specific Outcomes (PSOs)

Courses	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10
MPE 6613	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MPE 6615				✓		✓	✓	✓		
MPE 6612			✓	✓			✓	✓		
MPE 6614			✓	✓	✓	✓	✓	✓		
MPE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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MPE 6613 RHETORIC & RESEARCH METHODOLOGY 6Hrs./6Cr.

This course aims at introducing research scholars to four aims of language and literary research: a) advancement of knowledge, b) sharpening the critical acumen, c) creation of a genuine and intelligent interest in language and literature, and d) inculcation of the sense that researcher is a member of a collaborative community.

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

i. adapt to the different kinds of literary research: bibliography, textual criticism, biographical, theoretical and interpretive,
ii. integrate the basic principles of literary theories with methods of textual analysis,
iii. compile and process the art of research work,
iv. produce MLA documentation & citation skills, and
v. evaluate the ELT issues in the Indian context for action research

appropriately applying the APA style

Unit 1 **Research and Research Methods**
Research and Literary Research, Types of Research, Types of Research methods

Unit 2 **Research Design and Conduct of Research**
Research Design, Problems, Questions, Hypothesis, Research Proposal, Conducting Research, Review of Literature

Unit 3 **Crafting the Thesis**
Thesis Structure, Thesis Writing, Drafts, Editing and proof reading

Unit 4 **Documentation Style – MLA**
Background History of the MLA handbook, Documentation styles, Mechanics of Writing, Works Cites

Unit 5 **Documentation Style: APA**
Overview of the History of the APA, APA Citation Rules,

References

Allen, J.P.B. & Corder, S. Pit. 1975. *Papers in Applied Linguistics*. Vol.2. London: OUP.
Altick, Richard D. 1963. *The Art of Literary Research*. New York: W. W. Norton.
American Psychological Association. 2009. *Publication Manual of the APA*. 6th Ed.
Anderson, Jonathan, Durston, Berry H. & Poole, Millert. 1985. *Thesis and Assignment Writing*. New Deldi: Wiley Eastern.
Berry, Ralph. 1985. *The Research Project; How to Write it*. London & New York: Routledge.
Modern language Association of America. 2009. *MLA handbook for Writers of Research Papers*. 8th Ed. New Delhi: East-West.
Mohamed, Syed HD. 2010.*The Craft of Language and Literary Research*. Delhi: Atlantic.
Sinha, MP. 2007. *Research Methods in English*. Delhi: Atlantic.

Mapping of Course Outcomes with Bloom's Taxonomy

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THE AMERICAN COLLEGE, MADURAI

DEGREE OF MASTER OF PHILOSOPHY (M.Phil) IN MATHEMATICS

Eligibility: As per Madurai Kamaraj University norms.

Duration: One year consisting of two semesters.

Course of Study: I Semester: Papers: 1. Research Methodology
2. Core Paper- I
3. Core Paper- II
4. Elective Paper

II Semester: Dissertation

	Course	Title	Lect.	Self/Lib.	credits	Internal	External	Total
I Sem.	MPM 6500	Research Methodology	5	3	5	50	50	100
	MPM XXXX	Core Paper- I	4	3	4	50	50	100
	MPM XXXX	Core Paper- II	4	3	4	50	50	100
	MPM XXXX	Elective Paper	5	3	5	50	50	100
II Sem.	MPM 6800	Dissertation			8	100	100	200
		Seminars (2)			4	100		100
		Viva-voce			6		100	100
	Total				36			800

Core Papers: MPM 6401- ALGEBRA
MPM 6403- ANALYSIS
MPM 6405- ALGEBRAIC TOPOLOGY

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MPM 6500 **RESEARCH METHODOLOGY** **5 Hrs/5 Crs**

The aim of the course is to get prior idea on preparing research articles and dissertation in Mathematics. Also develop enough skills in LATEX so that students themselves able to prepare articles and dissertation in Mathematics.

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

i. provide the overview of research methodology.
ii. define and analyze the problem chosen by the students and know how to do the literature survey work and write the dissertation.
iii. use LATEX type -setting to frame the dissertation.
iv. analyze the topological concepts.
v. present the research works through PowerPoint presentation.

UNIT- 1: Meaning of research – objectives of research – Motivation of research – Types of research – Research approaches – Significance of research – Research methods versus Research methodology – Research and Scientific method – Importance of knowing how research is done – research process – criteria of Good research.

UNIT- 2: Theses and Dissertations-Defining the Problem-Limiting the problem – Consulting source material – preparing a working bibliography – Selecting a topic - Mathematical Journals – AMS subject classification (primary and secondary. Main subjects only) - Impact factor-citation index-search engines.

UNIT-3: Contents of LATEX source file – Document Class – Page style – Parts of the document – Changing font – Centering and indenting texts – Bibliography – Anatomy of and articles.

Drawing tools: Texcad/ Flash 5.0 / Concept draw.

UNIT-4: Problems and Theorems of Closed sets – Limit points – Continuity - Connectedness . Problems and Theorems of Compactness – Countability - T_0 , T_1, T_2 and regular spaces.

UNIT-5: Study of any research article in Topology – Named theorems in Separation Axioms (PPT Presentations by the Students).

TEXT BOOKS:

1. Research Methodology: Methods and Techniques by C.R. Kothari, New age international publishers, (1990).

2. Charting a Course for a Successful Research career by Prof.Alan M Johnson AM, Elsevier, Second Edition (2011).
3. A guide to LATEX- Fourth Edition by H. Kopha and P.W. Daly, Addision-Wesley, London.
4. Theory and problems of general Topology by Seymour Lipschutz, Mc Graw Hill, International Edition (2010).
5. Topology (Second Edition) by James R. Munkres, Prentice – Hall of India, Private Ltd, New Delhi, 2006.

Bloom's Taxonomy	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
K1: Remembering	X				
K2: Understanding			X		
K3: Applying		X			X
K4: Analyzing	X			X	
K5: Evaluating					
K6: Creating			X		

MPM 6401 **ALGEBRA** **4 Hrs/4 Crs**

This course will provide a strong foundation in the abstract approach for the budding Mathematician. One of the amazing features of twentieth century Mathematics has been its recognition of the power of abstract approach. Also it enable students to acquire research idea in Algebra and create awareness to do research work.

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

i. discuss fundamental group and covering spaces.
ii. define modules and discuss its characteristics.
iii. explain the structure of modules
iv. outline the structure of rings
v. analyze prime and primary ideals and demonstrate Noetherian Rings with examples .
vi. understand the properties of different types of ideals; • recognize the concept of a module and their constructions;

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THE AMERICAN COLLEGE- MADURAI (AUTONOMOUS)
DEPARTMENT OF MANAGEMENT STUDIES

M.Phil. (Management) One- year full time programme
(OBE syllabus for candidates admitted from the academic year 2019-20 onwards)
Course Structure

SEMESTER	COURSE NO.	TITLE OF THE PAPER	HOURS WEEK	MARKS
Semester I	MMB6501	Functional Management Decision	5	100
	MMB6503	Research Methods in Management	5	100
		Advanced Elective Paper (The Scholar should choose any **ONE PAPER** from the following streams of the elective)		
	MMB6505	Marketing Management	5	100
	MMB6507	Human Resource Management	5	100
	MMB6509	Financial Management	5	100
	MMB6511	Banking and Insurance Management	5	100
	MMB6513	Trade and Logistics Management	5	100
	MMB6515	Operations Management	5	100
	MMB6517	Entrepreneurship Development	5	100
	MMB6519	Information Technology	5	100

SEMESTER	COURSE NO.	TITLE OF THE PAPER	HOURS WEEK	MARKS
Semester II	MMB6600	M. Phil Dissertation and Viva-Voce	-	200

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MMB6503 RESEARCH METHODS IN MANAGEMENT

5Hrs& 5 credits

Objective:

To enable the research scholars understand the advanced concepts of research methods. To expose the research scholars have a thorough knowledge on Research.

Outcome: At the end of the course, scholars would be able to

i. Demonstrate and apply the Research Process

ii. Formulate the Research design and sample design

iii. Compare different data collection methods and devise the steps in data preparation

iv. Demonstrate proficiency in hypothesis testing using different statistical methods

v. Design and organize a research report using appropriate manuscript writing procedures

UNIT I: RESEARCH IN MANAGEMENT

Research: Meaning – Purpose – Types of research- Significance of research – Research in Management – Steps in research – Identification- selection and formulation of research problem – Research Design – Hypothesis; concepts- sources and types – Formulation of hypothesis – Review of literature: Nature and Purpose.

UNIT II: SAMPLING METHODS AND DATA COLLECTION

Meaning of sample – Sampling theory – Sampling techniques – Probability sampling – Non probability sampling – Advantages and disadvantages of sampling – Sampling and Non-Sampling errors – Estimation of sample size -Sources of Research data: Primary and secondary sources. Primary data collection methods: Questionnaire and testing of questionnaire. Attitude measurement: Scales of measurement (Nominal- Ordinal- Interval- Ratio). Rating scales: Attitudes scales (Likert scale- semantic differential scale). Observation- Interview- Schedule.

UNIT III: STATISTICAL ANALYSIS I

Univariate analysis with the help of descriptive statistics. Investigation of association(Bivariate data).Pearson's correlation coefficient (Interval and ratio scales). Spearman's rank correlation coefficient (ordinal data). Contingency coefficient (Nominal data).Simple regression analysis – Testing of hypothesis: Framing null and alternate hypothesis. Critical region- test statistic- standard error and its role Parametric Test: Tests based on normal- t- f- Chi-square distributions.

UNIT IV: STATISTICAL ANALYSIS II

Non-parametric test; Kolomogrov – Smirnov one and two sample test- run test-MannWhitney U test- Will Coxson signed rank test – Kruskal – Wallish test – Fried mann test and Kendall's W test. Overview of some advanced statistical tools: Principle component analysis– Measures of association of minimal data: Lamda- Phi coefficient.

Unit V: REPORT WRITING

Chapter Format – Pagination –Indentation – Using Quotations – Presenting Footnotes – Abbreviations- Presentation of tables and figures – Referencing – Documentation – Use and format of Appendices – Indexing – Technique- style and linguistic aspects of Report Writing.

TEXT BOOKS

1. Kurtz- R. Norman- 1983. Introduction to Social Statistics- New Delhi- McGraw-Hill International.

2. Donald R.Cooper and Pamela S.Schindler- 2000- 6th Ed.-Business Research Methods-Tata McGraw Hill Publishing Company Limited.

REFERENCES

1. Sullivan-Monette and Dejong- 2001.Applied Social Research (Tools For The Human Services)- Harcourt Brace College Publishers.

2. Baker- T.L.- 1999. Doing Social Research- III edition- New York- McGraw Hill.

THE AMERICAN COLLEGE
RESEARCH DEPARTMENT OF PHYSICS
Programme for M. Phil. PHYSICS (w. e. f. 2019-20 onwards)

Semester	Course No.	Course Title	Hours/Wk	Credits	Marks
I	MPP 6613	Research Methodology	6	6	100
	MPP 6615	Advanced Topics in Physics	6	6	100
	MPP 6617	Vacuum Technology & Thin Films	6	6	100
II	MPP 6600	Dissertation		6	200
				24	500

Programme Specific Outcome

On completion of the programme, students will be able to

PSO1 : Demonstrate a coherent understanding of the academic field of Physics, and its linkage with related disciplinary subjects;

PSO2 : Demonstrate the ability to use Physics skills such as formulating, identifying, and applying appropriate methodologies to solve and interpret a wide range of problems associated with Physics;

PSO3 : Extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge and apply one's learning to real life situations;

PSO4 : Design and execute projects to experience the aspects of research and to provide lucid summation of the scientific literature on a chosen topic;

PSO5 : Analyse and interpret data collected using appropriate methods, including the use of suitable software and customized worksheets, and relating the conclusions to relevant theories of Physics;

PSO6 : Demonstrate professional behaviour such as (i) being objective, unbiased and truthful in all aspects of work; and (ii) appreciation of intellectual property, environmental and sustainability issues;

PSO7 : Develop communication skills, both written and oral, for specialized and non-specialized audience;

PSO8 :Acquire subject knowledge and skills of the calibre sought by industry, professional career and public service, as well as providing academic teachers and researchers of the future;

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PSO9 : Demonstrate relevant generic skills and global competencies such as (i)skills of independent investigation of physics-related issues and problems; (ii)ability to construct logical arguments using correct technical language related to physics;

PSO10 : Acquire knowledge and skills, including, "learning how to learn", that are necessary for participating in learning activities throughout life.

PSO to PO Mapping for MPhil - Physics

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
PSO1	X	X	X		X		X		X	
PSO2	X	X		X		X	X		X	
PSO3	X	X		X	X	X		X		
PSO4	X	X		X		X		X		X
PSO5	X	X	X		X		X		X	
PSO6	X	X		X			X		X	X
PSO7	X	X	X		X			X	X	
PSO8	X	X		X	X		X	X		
PSO9	X	X		X		X		X	X	
PSO10	X	X		X		X		X		X

Mapping of Courses with Programme Specific Outcomes (PSOs)

Courses	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10
MPP 6613	X	X				X		X	X	X
MPP 6615	X	X				X		X	X	X
MPP 6617	X	X				X		X	X	X
MPP 6600	X	X	X	X	X	X	X			

MPP 6613 **RESEARCH METHODOLOGY** **6 hrs/6Cr.**

This course provides technical computational skills to synthesis and simulates research level physics problems. It also gives hands on training to pursue research in physics through case studies.

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

i. Solve simultaneous equations using Gauss elimination and Gauss Jordon equation and determine the values of integration by trapezoidal and Simpson's rules.
ii. Compute the interpolated values using various methods.
iii. Write programmes in C++ to elucidate physics problems in electromagnetism and quantum mechanics.

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iv. Use Math CAD and MATLAB softwares for carrying out mathematical computations.
v. Disseminate the packages like Ms Excel, power point, Corel draw, LaTeXetc and apply them for documentation.
vi. Interpret the results and write a research article from various characterization techniques like XRD, Raman and SEM.

Unit I: Numerical Methods

Methods of solving algebraic and transcendental equations – Newton-Raphson methods; Method of solving set of simultaneous equations – Gauss Elimination and Gauss Jordan method; Numerical integration- Simpson's rule, Gaussian quadrature; Solving differential equation – Runge-kutta method; Solving Eigen value equation – Jacobi method, Power method.

Unit II: Statistical Methods

Interpolation – Lagrange's interpolation, Finite differences, Newton's forwards, central and backward interpolation, divided difference, Curve fitting – Linear least square fit, non linear fit, parabola, exponential and logarithmic; hypothesis testing; t-test, F-test, analysis of variance.

Unit III: Technical computing – programming

Develop programs and simulations in C++ to solve problems of mechanics, electromagnetism, quantum mechanics, statistical mechanics and electronics.

Unit IV: Technical computing – package

Usage of MATHCAD and MATLAB to solve physics problems, Interactive and iterative computations, Vectors and matrices, Mathematical and statistical functions, differential equations, integrations, symbolic computations, Graphs, Fourier analysis and FFT, interpolation, minimization.

Unit V: Presentation packages

Usage of MS Excel, MS Power point, Corel Draw, LaTex to prepare presentation of technical report, Type setting text, Special characters and symbols, cross references, footnotes, type setting mathematical formulae, creating bibliography, indexing, presentation with pdfscreens, producing mathematical graphics, page layout of document classes; Scientific articles, long report, book, slides.

Unit: 6 Case studies

Interpretation of characteristics Spectrums(XRD, SEM, IR, RAMAN, UV); Literature on recent topics – preparing report on recent development of a specific field of research- study and analysis of selected published research papers using cross reference.

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References:

1. Demidovich B. P., Maron I. A., Computational Mathematics, MIR Publishers(1981)(unit I and II)

2. Steve Bain, Nick Wilkinson, corel DRAW 12, Osborne/McGraw Hill(2004)(Unit V)

3.WilliamH.Pressetal, Numerical Recipes in C++, 2Ed, Cambridge University press(2002)(Unit III)

4. MATHCAD User's Guide, Mathsoft, Inc., Cambridge,USA(1997)(Unit IV)

5. Using MATLAB, The Math works, Inc., USA(1996)(Unit IV)

6. R. Rajaram, Object Oriented programming and C++, New Age international(1997)(Unit III)

7. The Not so short introduction to LaTex 2E, Tobias Oetiker et al, The Free software foundation, Inc., Cambridge USA (2004)(UnitV)

8. A.R. Varma and srivastava, Crystallography applied to solid state physics, New Age publication (2005)(Unit IV)

Bloom's Taxonomy	CO1	CO2	CO3	CO4	CO5
K1: Remembering					
K2: Understanding	2				
K3: Applying	3	3		3	3
K4: Analyzing		4	4	4	
K5: Evaluating	5	5		5	5
K6: Creating	6		6		
Mean					4.0

MPP 6615 **ADVANCED TOPICS IN PHYSICS** **6 hrs/6Cr.**

The frontier areas of Physics are highlighted here so that the student will get experience in the up to date knowledge in Physics. A variety of topics such as Astrophysics, Solid-state Theory, Advanced Quantum Mechanics and Nonlinear dynamics are dealt with.

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

i. ascertain the evolution of universe using various models
ii. discuss the approximations in solid state theory and superconductivity
iii. explain canonical formation and quantization of fields
iv. elucidate the symmetry in quantum mechanics
v. classify the types of oscillators and equilibrium points

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Proposed Curriculum Plan for Research programmes
Tamil For the Academic year 2019-20

Semester	Code	Title	Hours	Credits	Marks
I	MPT 6607	ஆய்வு நெறிமுறைகளும் ஆய்வுப் பயிற்சியும்	6	6	120
	MPT 6609	தமிழ் இலக்கண - இலக்கியப் போக்குகள்	6	6	120
II	MPT 6608	இயக்கங்களும் இலக்கியமும்	6	6	120
	MPT 6610 & MPT 6611	ஆய்வேடு	-	12	240

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MPT 6607 ஆய்வு நெறிமுறைகளும் ஆய்வுப் பயிற்சியும் 6Hrs/6Cr

நோக்கம்:

ஆய்வு நெறிமுறைகள் பற்றிய அறிமுகத்தைப் பெறுவதோடு, தெரிவு செய்த தலைப்பில் ஆய்வேட்டினை உருவாக்குதல் இப்பாடத்தின் நோக்கங்களாக அமைகின்றன.

கற்றலின் பயன்:

1. ஆய்வைப் பற்றி வரையறுக்கவும் விவரிக்கவும் பேசவுமான திறன்களைப் பெற்றிருப்பர்.

2. ஆய்வு எது? ஏன், எப்படி? என்று அடையாளங்கண்டு ஆராயும் திறனைப் பெற்றிருப்பர்.

3. ஆய்வை எழுதுவதற்கான முறையைத் திட்டமிட்டு, முடிவு செய்து எழுதும் திறனைப் பெற்றிருப்பர்.

4. ஆய்வைப் பல்வேறு துறைகளோடு இணைத்து எழுதும் திறனைப் பெற்றிருப்பர்.

5. ஆய்வுத் தலைப்பைத் தெரிவு செய்த பின்னர், அதனைத் திட்டமிட்டு வடிவமைப்புச் செய்து, முழுமையாக எழுதும் திறனைப் பெற்றிருப்பர்.

கூறு:1

ஆய்வின் தேவையும் நோக்கமும்: ஆய்வு விளக்கம் - ஆய்வு நாகரிகம் - ஆய்வுக் கள அறிமுகம் - தமிழின் ஆய்வு மரபு - உரையாசிரியர்களின் ஆய்வு முறை - ஆய்வாளரின் பண்புகள்.

கூறு:2

ஆய்வேட்டின் அமைப்பு: ஆய்வு நோக்கில் நூலை வாசிக்கும் முறை - தலைப்புத் தெரிவு - கருதுகோள் - தகவல் சேகரிப்பு - கள ஆய்வு - தகவல் திரட்டல் - குறிப்பெடுத்தல் - அறிக்கை தயாரித்தல். - அடிக்குறிப்பு - மேற்கோளாட்சி - துணை நூற்பட்டியல் - பின்னிணைப்பு - படங்கள் அட்டவணைகள்.

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கூறு:3

ஆய்வு அணுகுமுறைகள்: விளக்க முறை ஆய்வு - சமூகவியல் ஆய்வு - ஒப்பீட்டியல் ஆய்வு - வரலாற்று முறை ஆய்வு - அமைப்பியல் ஆய்வு - மொழியியல் ஆய்வு - உளவியல் ஆய்வு, பெண்ணிய, தலித்திய ஆய்வுகள், நவீனத்துவ, பின்நவீனத்துவ, பின்காலனிய ஆய்வு முறைகள் குறித்த விளக்கங்கள்.

கூறு:4

ஆய்வும் பிறதுறைகளும்: இலக்கியவியல் - நாட்டுப்புறவியல் - மானிடவியல்- தொல்லியல் முதலியன குறித்து விளக்குதல்.

கூறு:5

ஆய்வேட்டை உருவாக்குதல்: ஆய்வுக்கட்டுரை மற்றும் ஆய்வேடு எழுதப் பயிற்சி அளித்தல் - சிற்றிதழ்கள் சார்ந்த ஆய்வுமுறையியலை அறிமுகப்படுத்தி நிறுவனம்சார் ஆய்வுகளுடன் பொருத்திக்காட்டுதல்.

பார்வை நூல்கள்:

1. தமிழண்ணல், எம்.எஸ்.இலக்குமணன் - ஆய்வியல் அறிமுகம், பாரிநிலையம், சென்னை-18, பதினேழாம் பதிப்பு -2016.
2. பாலசுப்பிரமணியன், கு. வெ. *ஆய்வியல் நெறிகள்*, அணுராத பப்ளிக்கேசன், கும்பகோணம், 2015.
3. முத்துச்சண்முகன், சு. வேங்கடராமன். இலக்கிய ஆராய்ச்சி நெறிமுறைகள். நியூசெஞ்சுரி புக் ஹவுஸ், சென்னை, 2017.

பார்வை நூல்கள்:

1. ஞானசம்பந்தன், அ. ச. *இலக்கியக் கலை*, தென்னிந்திய சைவ சித்தாந்த நூற்பதிப்புக் கழகம், சென்னை: 1993.
2. தமிழண்ணல். *தொல்காப்பியரின் இலக்கியக் கொள்கைகள் - பாகம் - 1*. மீனாட்சி புத்தக நிலையம், மதுரை: 2004.
3. திட்டக் குழு. *தமிழ் நடைக் கையேடு*. அடையாளம் புத்தாநத்தம்: 2013.
4. _____. *தொல்காப்பியரின் இலக்கியக் கொள்கைகள் - பாகம் - 2*. செல்லப்பா பதிப்பகம், மதுரை: 2012.
5. நடராசன், தி. சு. *திறனாய்வுக் கலை: கொள்கைகளும் அணுகுமுறைகளும்*, NCBH, சென்னை: 2016.
6. நாராயணன், க. *ஆய்வு எது? ஏன்? எப்படி?* மாரிப் பதிப்பகம். புதுச்சேரி: 2008.
7. நு.ஃமான், எம். ஏ. *திறனாய்வுக் கட்டுரைகள்*, அன்னம் வெளியீடு, சிவகங்கை: 1985.
8. _____. *மொழியும் இலக்கியமும்*, காலச்சுவடு, சென்னை: 2006.

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THE AMERICAN COLLEGE, MADURAI
(An Autonomous Institution affiliated to Madurai Kamaraj University)
POSTGRADUATE & RESEARCH DEPARTMENT OF ZOOLOGY

PROGRAMME FOR M. Phil. ZOOLOGY (2019-2020 onwards)

Mission statement: The M. Phil. program is focused to equip students with skills to understand and appreciate Zoology. It is also aimed at helping the student to realize the importance of research work, develop skills to interpret and present results pertaining to research.

SEM	S. No.	Course code	Course Title	Hours	Credits	Max marks
I	1	MPZ 6621	Research Methods	4	6	120
I	2	MPZ 6623	Biological techniques	4	6	120
Project paper						
I	3	MPZ 6625	Environmental Science & Biotechnology	4	6	120
I	4	MPZ 6627	Immunology			
I	5	MPZ 6629	Insect Diversity			
I	6	MPZ 6631	Applied Microbiology			
I	7	MPZ 6633	Probiotics			
I	8	MPZ 6671	Research Project-I	18	6	**
			Total	30	22	360
II	9	MPZ 6672	Research Project-II	30	6	240
			Grand Total	60	28	600

**Valued continuously till the end of Second Semester

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MPZ 6621 **Research Methods** **(4hrs/wk) (6cr)**

This course gives an overall view on the techniques in modern biology. It gives a comprehensive understanding of the methodology involved in biochemical, radiolabelling, biophysical, immunotechniques and statistical methods.

Course Outcomes

Upon completion of this course, students will be able to:

i. Compare and analyze the various biophysical methods.
ii. Assess the principle and methodology in biochemical methods.
iii. Explain the importance and applications of radiolabelling techniques.
iv. Rate the applications of immunotechniques in the field of biology.
v. Compute biological data using statistical methods.

I. **Biophysical methods:** pH metry & colorimetry, ultra and density gradient centrifugation, UV/ visible spectrophotometer, IR, mass spectroscopy, UV/visible fluorescence, NMR & ESR , ICP, AAS, X-ray diffraction, flame photometer.

II. **Biochemical methods:** Quantification of carbohydrates, proteins, amino acids, and lipids. Pharmacological testing – Paper, TLC, column, ion exchange, affinity chromatography, GC-MS and HPLC.

III. **Radiolabelling techniques:** Radiation dosimetry, radioactive isotopes, autoradiography, GM & scintillation counter, molecular image of radioactive material - safety guidelines.

IV. **Immunotechniques:** Antibody generation, ELISA, RIA, immunopreciptation,immunodiffusion, immunoelectrophoresis. Flow cytometry, immunofluorescence microscopy, immunoblotting, FISH, GISH.

V. **Statistical methods:** Sampling, data collection, measures of central tendency & dispersion, probability, Binomial, Poisson and Normal distributions. Regression & correlation, ANOVA, t-test, Chi-square test- confidence levels, errors and levels of significance.

References

Own JA, Puntt J and Starnford S (2013) Kuby Immunology. 7th Edition, Freeman Company, New York

Sheehan C (1999) Clinical Immunology. 2nd Edition, Lippincott Raven Publications, Philadelphia.

Srivatsava SC and Srivatsava S (2003) Fundamental Statistics, Anmol Publications. New Delhi

Upadhyay A, Upadhyay K and Nath N (1998) Biophysical Chemistry Principles & Techniques. 2nd Edition, Himalaya Publishing house, New Delhi.

Wilson K and Walker J (1994) Principles and Techniques of Biochemistry & Molecular Biology. 7th Edition Cambridge University Press, London.

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Zar JH (2006) Biostatistical Analysis, 4th Edition, Pearson Education, New Delhi.

	K1: Remembering	K2: Understanding	K3: Applying	K4: Analyzing	K5: Evaluating	K6: Creating
CO1				4		
CO2					5	
CO3			3			
CO4					5	
CO5			3			

Mean = 4

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Proposed Curriculum Plan for Research programmes
Tamil For the Academic year 2019-20

Semester	Code	Title	Hours	Credits	Marks
I	MPT 6607	ஆய்வு நெறிமுறைகளும் ஆய்வுப் பயிற்சியும்	6	6	120
	MPT 6609	தமிழ் இலக்கண - இலக்கியப் போக்குகள்	6	6	120
II	MPT 6608	இயக்கங்களும் இலக்கியமும்	6	6	120
	MPT 6610 & MPT 6611	ஆய்வேடு	-	12	240

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MPT 6607 ஆய்வு நெறிமுறைகளும் ஆய்வுப் பயிற்சியும் 6Hrs/6Cr

நோக்கம்:

ஆய்வு நெறிமுறைகள் பற்றிய அறிமுகத்தைப் பெறுவதோடு, தெரிவு செய்த தலைப்பில் ஆய்வேட்டினை உருவாக்குதல் இப்பாடத்தின் நோக்கங்களாக அமைகின்றன.

கற்றலின் பயன்:

1. ஆய்வைப் பற்றி வரையறுக்கவும் விவரிக்கவும் பேசவுமான திறன்களைப் பெற்றிருப்பர்.
2. ஆய்வு எது? ஏன், எப்படி? என்று அடையாளங்கண்டு ஆராயும் திறனைப் பெற்றிருப்பர்.
3. ஆய்வை எழுதுவதற்கான முறையைத் திட்டமிட்டு, முடிவு செய்து எழுதும் திறனைப் பெற்றிருப்பர்.
4. ஆய்வைப் பல்வேறு துறைகளோடு இணைத்து எழுதும் திறனைப் பெற்றிருப்பர்.
5. ஆய்வுத் தலைப்பைத் தெரிவு செய்த பின்னர், அதனைத் திட்டமிட்டு வடிவமைப்புச் செய்து, முழுமையாக எழுதும் திறனைப் பெற்றிருப்பர்.

கூறு:1

ஆய்வின் தேவையும் நோக்கமும்: ஆய்வு விளக்கம் - ஆய்வு நாகரிகம் - ஆய்வுக் கள அறிமுகம் - தமிழின் ஆய்வு மரபு - உரையாசிரியர்களின் ஆய்வு முறை - ஆய்வாளரின் பண்புகள்.

கூறு:2

ஆய்வேட்டின் அமைப்பு: ஆய்வு நோக்கில் நூலை வாசிக்கும் முறை - தலைப்புத் தெரிவு - கருதுகோள் - தகவல் சேகரிப்பு - கள ஆய்வு - தகவல் திரட்டல் - குறிப்பெடுத்தல் - அறிக்கை தயாரித்தல். - அடிக்குறிப்பு - மேற்கோளாட்சி - துணை நூற்பட்டியல் - பின்னிணைப்பு - படங்கள் அட்டவணைகள்.

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கூறு:3

ஆய்வு அணுகுமுறைகள்: விளக்க முறை ஆய்வு - சமூகவியல் ஆய்வு - ஒப்பீட்டியல் ஆய்வு - வரலாற்று முறை ஆய்வு - அமைப்பியல் ஆய்வு - மொழியியல் ஆய்வு - உளவியல் ஆய்வு, பெண்ணிய, தலித்திய ஆய்வுகள், நவீனத்துவ, பின்நவீனத்துவ, பின்காலனிய ஆய்வு முறைகள் குறித்த விளக்கங்கள்.

கூறு:4

ஆய்வும் பிறதுறைகளும்: இலக்கியவியல் - நாட்டுப்புறவியல் - மானிடவியல்- தொல்லியல் முதலியன குறித்து விளக்குதல்.

கூறு:5

ஆய்வேட்டை உருவாக்குதல்: ஆய்வுக்கட்டுரை மற்றும் ஆய்வேடு எழுதப் பயிற்சி அளித்தல் - சிற்றிதழ்கள் சார்ந்த ஆய்வுமுறையியலை அறிமுகப்படுத்தி நிறுவனம்சார் ஆய்வுகளுடன் பொருத்திக்காட்டுதல்.

பார்வை நூல்கள்:

1. தமிழண்ணல், எம்.எஸ்.இலக்குமணன் - ஆய்வியல் அறிமுகம், பாரிநிலையம், சென்னை-18, பதினேழாம் பதிப்பு -2016.
2. பாலசுப்பிரமணியன், கு. வெ. *ஆய்வியல் நெறிகள்*, அணுராத பப்ளிக்கேசன், கும்பகோணம், 2015.
3. முத்துச்சண்முகன், சு. வேங்கடராமன். இலக்கிய ஆராய்ச்சி நெறிமுறைகள். நியூசெஞ்சுரி புக் ஹவுஸ், சென்னை, 2017.

பார்வை நூல்கள்:

1. ஞானசம்பந்தன், அ. ச. *இலக்கியக் கலை*, தென்னிந்திய சைவ சித்தாந்த நூற்பதிப்புக் கழகம், சென்னை: 1993.
2. தமிழண்ணல். *தொல்காப்பியரின் இலக்கியக் கொள்கைகள் - பாகம் - 1.* மீனாட்சி புத்தக நிலையம், மதுரை: 2004.
3. திட்டக் குழு. *தமிழ் நடைக் கையேடு.* அடையாளம் புத்தாநத்தம்: 2013.
4. _____. *தொல்காப்பியரின் இலக்கியக் கொள்கைகள் - பாகம் - 2.* செல்லப்பா பதிப்பகம், மதுரை: 2012.
5. நடராசன், தி. சு. *திறனாய்வுக் கலை: கொள்கைகளும் அணுகுமுறைகளும்*, NCBH, சென்னை: 2016.
6. நாராயணன், க. *ஆய்வு எது? ஏன்? எப்படி?* மாரிப் பதிப்பகம். புதுச்சேரி: 2008.
7. நு.ான், எம். ஏ. *திறனாய்வுக் கட்டுரைகள்*, அன்னம் வெளியீடு, சிவகங்கை: 1985.
8. _____. *மொழியும் இலக்கியமும்*, காலச்சுவடு, சென்னை: 2006.

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SEM	S. No.	Course code	Course Title	Hours	Credits	Max marks
I	1	MPZ 6621	Research Methods	4	6	120
I	2	MPZ 6623	Biological techniques	4	6	120
Project paper						
I	3	MPZ 6625	Environmental Science & Biotechnology	4	6	120
I	4	MPZ 6627	Immunology			
I	5	MPZ 6629	Insect Diversity			
I	6	MPZ 6631	Applied Microbiology			
I	7	MPZ 6633	Probiotics			
I	8	MPZ 6671	Research Project-I	18	6	**
			Total	30	22	360
II	9	MPZ 6672	Research Project-II	30	6	240
			Grand Total	60	28	600

**Valued continuously till the end of Second Semester

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MPZ 6621 **Research Methods** **(4hrs/wk) (6cr)**

This course gives an overall view on the techniques in modern biology. It gives a comprehensive understanding of the methodology involved in biochemical, radiolabelling, biophysical, immunotechniques and statistical methods.

Course Outcomes

Upon completion of this course, students will be able to:

i. Compare and analyze the various biophysical methods.
ii. Assess the principle and methodology in biochemical methods.
iii. Explain the importance and applications of radiolabelling techniques.
iv. Rate the applications of immunotechniques in the field of biology.
v. Compute biological data using statistical methods.

I. **Biophysical methods:** pH metry & colorimetry, ultra and density gradient centrifugation, UV/ visible spectrophotometer, IR, mass spectroscopy, UV/visible fluorescence, NMR & ESR , ICP, AAS, X-ray diffraction, flame photometer.

II. **Biochemical methods:** Quantification of carbohydrates, proteins, amino acids, and lipids. Pharmacological testing – Paper, TLC, column, ion exchange, affinity chromatography, GC-MS and HPLC.

III. **Radiolabelling techniques:** Radiation dosimetry, radioactive isotopes, autoradiography, GM & scintillation counter, molecular image of radioactive material - safety guidelines.

IV. **Immunotechniques:** Antibody generation, ELISA, RIA, immunopreciptation,immunodiffusion, immunoelectrophoresis. Flow cytometry, immunofluorescence microscopy, immunoblotting, FISH, GISH.

V. **Statistical methods:** Sampling, data collection, measures of central tendency & dispersion, probability, Binomial, Poisson and Normal distributions. Regression & correlation, ANOVA, t-test, Chi-square test- confidence levels, errors and levels of significance.

References

Own JA, Puntt J and Starnford S (2013) Kuby Immunology. 7th Edition, Freeman Company, New York

Sheehan C (1999) Clinical Immunology. 2nd Edition, Lippincott Raven Publications, Philadelphia.

Srivatsava SC and Srivatsava S (2003) Fundamental Statistics, Anmol Publications. New Delhi

Upadhyay A, Upadhyay K and Nath N (1998) Biophysical Chemistry Principles & Techniques. 2nd Edition, Himalaya Publishing house, New Delhi.

Wilson K and Walker J (1994) Principles and Techniques of Biochemistry & Molecular Biology. 7th Edition Cambridge University Press, London.

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Zar JH (2006) Biostatistical Analysis, 4th Edition, Pearson Education, New Delhi.

	K1: Remembering	K2: Understanding	K3: Applying	K4: Analyzing	K5: Evaluating	K6: Creating
CO1				4		
CO2					5	
CO3			3			
CO4					5	
CO5			3			

Mean = 4

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PG DEPARTMENT OF BOTANY (2019 ONWARDS)

S.no	COURSE TITLE	HOURS	CREDIT
	SEMESTER I		
PGB4441	Plant Diversity	6	4
PGB4443	Principles of Microbiology	6	4
PGB4445	Plant Diversity and Microbiology LAB	6(L)	4
PGB4447	Plant Cell Chemistry	5	4
PGB4249	Biochemistry LAB	3(L)	2
PGB4331/ PGB 4333	CBCS(**Campus Ecology/ Pl. based enterprises)**	4	3
	Total	**30**	**21**
	SEMESTER II		
PGB4542	Plant Systematics	7	5
PGB4544	Plant Physiology	7	5
PGB4446	Plant Systematics &Physiology LAB	6(L)	4
PGB4448	Mycology and Pathology	6	4
PGB4330/PGB 4332	CBCS(**Trends in Agriculture/ Plants and people)**	4	3
	Total	**30**	**21**
	SEMESTER III		
PGB5641	Morphogenesis	7	6
PGB5643	Genetics and Molecular Biology	7	6
PGB5445	Gen., Mol biol. and Morpho. LAB	6 L	4
PGB5547	Environment and Bio-Resource Management	6	5
PGB5349	Analytical and Research Methodology	4	3
	Total	**30**	**24**
	SEMESTER IV		
PGB5742	Biotechnology	8	7
PGB5444	Biotechnology and Plant Tissue Culture Lab	6(L)	4
PGB5346	Nanobiology	4	3
PGB5348	Systems Biology	4	3
PGB5750	Projects	8	7
	Total	**30**	**24**

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ANALYTICAL AND RESEARCH METHODOLOGY

PGB5349 **4Hr /3Cr**

PREAMBLE

In these days commoditization, marketization and globalization, education at tertiary level calls for personalized professional and skill development that can come only with a special emphasis on original research. This course has ingredients that would prepare the senior graduating students to get into the habit asking specific questions of exploration that would help in self-learning. The course content has emphasis on two components namely (1) ways and means to equip themselves with research methodology, and (2) to give a concise and comprehensive exposure for bioinstrumentation.

COURSE OUTCOME

The student will be able to

i. experiment using pH meter& centrifuge, know how to separate biomolecules and differentiate the various chromatography, construct the electrophoresis technique

ii. Use spectrophotometers, gain knowledge on advance techniques such as NMR & ESR, apply isotopes in various fields.

iii. Document the availability of plants in an area, monitor the weather condition prevailing in a locality, assess the topography, examine the characteristics of water.

iv. Effectively perform sampling techniques, retrieve data from web source-calculate using statistical formula and tabulate datas using computers, test the validation

v. review various types of research publication, develop their knowledge in writing thesis, summarize his work.

UNIT I: Analytical and Separation techniques : Concept and working principle of pH meter– principle and protocols of centrifugation (differential, density gradient and ultra); Chromatography (TLC, Column, GLC, HPLC) -Electrophoresis (PAGE, AGE).

UNIT II: Biophysical Methods: Spectroscopy (Visible/UV, IR, AAS) - Molecular structure analysis (mass spectrometry, X-ray diffraction, NMR) FTIR, MALDI-ToF, - detection using isotopes (measurement, radiolabelling, autoradiography).

UNIT III: Materials and methods in Field study : Qualitative and quantitative parameters: plant study – (Density, frequency, abundance, basal area, canopy cover, standing biomass,Quadrat, transect, point frame)- Meteorological studies (Rain gauge, anemometer, windpane, psychrometer barometer, altimeter, thermometer, Stoke's sunshine recorder)- Aquatic

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studies(Secchi's disc, turbidometer)- field photography(DLR, Aerial)and remote sensing(GPS,GIS, toposheet)-Phytosociological studies

UNIT IV: Data Handling: Proposal of research- Hypothesis validation- Sampling (nature, design, size). Data sources (primary and secondary, electronic, library, database)- techniques in data collection (observation- interview- questionnaire- feed back- opinion poll) - quantification- classification- tabulation- diagrams(pictogram- cartogram- graphs- charts)- measures of central tendency (Mean, mode and Standard Deviation) - Percentages and Ratios – *f-test* & *t-tests* ANOVA)-Data interpretation.

UNIT V: Research design and Validation : Types of research publication (article, dissertation, research paper, peer- reviewed publication) - standards in publications- impact factor (SCOPUS and h-index)– plagiarism- thesis guidelines (Title of the paper, declaration, certificates, acknowledgement, contents, abbreviations, measurements, introduction, review of literature, rationale, plan of work, methodology, results, discussion, conclusion , summary, bibliography and appendices)– Presentation (oral and poster).

TEXT BOOKS

1. Datta, A. K. 2006. Basic Biostatistics & Its Applications. New Central Book Agency. ISBN 8173815038
2. Habib, M. M., Pathik, B. B., & Maryam, H. 2014. Research methodology-contemporary practices: guidelines for academic researchers. Cambridge Scholars Publishing. ISBN 1443864617
3. Jeyaraman. J. 1998. Laboratory Manual in Biochemistry, New Age International Publishers Ltd, ISBN 0852264283.
4. Kothari, C. R. 2004. Research methodology: Methods and techniques. New Age International. ISBN 8122436234.
5. Mahajan, B. K. 2002. Methods in biostatistics. Jaypee Brothers Publishers. ISBN: 9351529096
6. Nautiyal, S., Bhaskar, K., & Khan, Y. D. (2016). Biodiversity of Semiarid Landscape. Springer International Publishing. ISBN 331915463X
7. Palanivelu, P. 2009. Analytical biochemistry and separation techniques –A laboratory manual for B.Sc and M.Sc students, 21st Century Publications. Madurai.

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PROGRAM / COURSE FRAME ,P.G. DEPARTMENT OF CHEMISTRY (AIDED)

Program for Choice Based Credit System - 2018 – 2019 onwards

S.N.	Sem	Course Code	Course Title	Hours	Credits	Marks
1	1	PGC 4431	Organic Chemistry – I	6	4	80
2	1	PGC 4433	Inorganic Chemistry – I	5	4	80
3	1	PGC 4435	Physical Chemistry – I	5	4	80
4	1	PGC 4301	Chemistry and Health	4	3	60
5	1	PGC 4303	Organic Qualitative Lab	5	3	60
6	1	PGC 4305	Physical Chemistry Lab – I	5	3	60
			Total	**30**	**21**	**420**
7	2	PGC 4432	Organic Chemistry – II	6	4	80
8	2	PGC 4434	Inorganic Chemistry – II	5	4	80
9	2	PGC 4436	Physical Chemistry – II	5	4	80
10	2	PGC 4302	Chemistry in Beauty and Health	4	3	60
11	2	PGC 4304	Organic Quantitative Lab	5	3	60
12	2	PGC 4306	Physical Chemistry Lab – II	5	3	60
			Total	**30**	**21**	**420**
13	3	PGC 5531	Organic Chemistry – III	5	5	100
14	3	PGC 5533	Inorganic Chemistry – III	5	5	100
15	3	PGC 5535	Physical Chemistry – III	5	5	100
16	3	PGC 5301	Inorganic Qualitative Lab	5	3	60
17	3	PGC 5601	Research Methodology Lab	10	6	120
			Total	**30**	**24**	**480**
18	4	PGC 5532	Organic Chemistry – IV	5	5	100
19	4	PGC 5534	Inorganic Chemistry – IV	5	5	100
20	4	PGC 5536	Physical Chemistry – IV	5	5	100
21	4	PGC 5302	Inorganic Quantitative Lab	5	3	60
22	4	PGC 5602	Project	10	6	120
			Total	**30**	**24**	**480**
			Grand Total	**120**	**90**	**1800**

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SEMESTER –III

PGC 5601 **Research Methodology Lab** **10 hr/ 6 cr**

Course Objectives:

This course will consider the application of a number of principles as applied to chemical research. This will be achieved by placing students in active research groups in the discipline of chemistry and providing them with the opportunity to carry out research activities.

Course Outcome:

Upon completion of this course, the students will be able to:

1. Assess the sources of information related to research
2. Utilize OHP and Power point presentation
3. Acquire the wide knowledge of instrumental analysis
4. Perform computer assisted analysis of data
5. Apply search engine and software tools in research

Students will do the experiments and project work on a title approved by the respective project supervisor. Students will maintain daily records and present oral reports while doing project preparation. All the above process will be duly assessed by the project supervisor. They will submit the collection of research article at the end of the semester.

Component I - Practical

1. Multistage organic synthesis
2. Purification &recrystallization techniques
3. Characterisation of compounds using UV-Vis, IR, fluorescence
4. Electrochemical study of inorganic compounds
5. Determination of the formula of a complex by spectrometry
6. Preparation and study of a super conductor
7. Thermodynamics of denaturation of bovine serum albumin (Fluorescence spectra)
8. Intermolecular H-bonding in benzyl alcohol using IR spectroscopy
9. Determination of the formation constant of iron(III)salicylate complex

Component II- Project

Evaluation

Presentation – seminar 25 marks (collective evaluation from all guides)

Project progress (includes 9 experiments) 75 marks from guide

Mapping of Bloom's Taxonomy with Course Outcome					
	CO1	CO2	CO3	CO4	CO5
K1: Remembering	X	X	X	X	X

Curriculum

for

Second Year M.Sc Chemistry (AIDED) Programme

(For those who were admitted from the academic year 2018-2019 onwards)

SEMESTER IV

Since 1881

Postgraduate Department of Chemistry

The American College

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

THE AMERICAN COLLEGE, MADURAI – 625 002

(An autonomous Institution affiliated to Madurai Kamaraj University)

Re-accredited (2nd Cycle) by NAAC with Grade "A" CGPA – 3.46 on a 4-point scale

DEPARTMENT OF FOOD SCIENCE & NUTRITION

M.Sc. FOOD SCIENCE & NUTRITION

Proposed Curriculum Plan (2020-2021)

Semester	Course Code	Course Title	Hours	Credits	Marks
I	PFN 4401	Advances in Food Science	5+1	4	80
	PFN 4403	Food Chemistry	5+1	4	80
	PFN 4305	Applied Physiology	4+1	3	60
	PFN 4401	Food Microbiology	5+1	4	80
	PFN 4309	Laboratory in Food Microbiology	3	3	60
	XXX 0000	Elective	4	3	60
		Total	**30**	**21**	**420**
II	PFN 4402	Nutrition through life cycle	5+1	4	80
	PFN 4404	Food Processing and Preservation	5+1	4	80
	PFN 4406	Food Analysis, Safety and Food Laws	5+1	4	80
	PFN 4308	Research methodology and biostatistics	4+1	3	60
	PFN 4310	Laboratory in Food Analysis	3	3	60
	XXX0000	Elective	4	3	60
		Total	**30**	**21**	**420**
		Summer Internship			
III	PFN 5501	Drug- Nutrient Interactions	5+1	5	100
	PFN 5503	Food Packaging	5+1	5	100
	PFN 5405	Functional foods and Nutraceuticals	5+1	4	80
	PFN 5407	Food Biotechnology	5+1	4	80
	PFN 5309	Laboratory in Food Biotechnology	3	3	60
	PFN 5311	Project work	3	3	60
		Total	**30**	**24**	**480**
IV*	PFN 5504	Clinical nutrition and diet therapy	5+1	5	100
	PFN 5302	Laboratory in Clinical nutrition and diet therapy	4	3	60
	PFN 5304	Scientific writing	4	3	60
	PFN 5506	Industrial visit & Report	5+1	5	100
	PFN 5810	Project report	10	8	160
		Total	**30**	**24**	**480**

* Electives (Any two)

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PFN 4308 RESEARCH METHODOLOGY AND BIOSTATISTICS (4+1=5h/wk) (3cr)

This course has two parts. First part deals with research methodology, research problem and methods of data collection. The second part deals with statistics and data analysis using statistical tools.

Course Outcomes

Upon completion of this course, the student will be able to:

i. outline various kinds of research, objectives of doing research, research process, research designs and sampling
ii. demonstrate qualitative, quantitative and mixed methods research, as well as relevant ethical and philosophical considerations
iii. apply measurement & scaling techniques as well as the quantitative data analysis in research
iv. analyse the criteria that can be used to select an appropriate statistical test to answer a research question or hypothesis
v. discuss the link between quantitative research questions and data collection and how research questions are operationalized in educational practice

Unit I (12 hrs)

Research Methodology: Meaning, objectives and Significance of research. Types of research, research approaches and scientific methods. Research process and criteria of good research. Definition and Identification of a Research Problem: Selection of research problem, Justification, development of hypothesis, basic assumptions. Limitations and delimitations of the problem.

Unit II (12 hrs)

Methods of Data Collection: Schedules and questionnaires; Interview, Case study, Home visits, scaling methods, Reliability and validity of measuring instruments, Statistical issues, Basic principles and regulations in humans and animal research, Analysis and reporting of data.

Unit III (10 hrs)

Introduction to statistics - meaning and scope, basic ideas, population sample parameter, variable, statistic, estimate and notation. Frequency distribution, histogram, frequency polygon and curve, ogives, symmetric and asymmetricdistributions.Concept of skewness and kurtosis. Measures of central tendency - mean, median, mode - calculations and applications. Finding combined mean, weighted mean. Finding median and mode graphically. Measures of variation - absolute and relative measure - use of range and standard deviation. Introduction to statistical package for social sciences (SPSS)

Unit IV (10 hrs)

Data Analysis: Hypothesis Testing, Paired Comparison Designs, Pairwise Ranking Test: Friedman Analysis—Comparing Several Sample, Multisample Difference Tests — Block Designs, Simple Ranking Test: Friedman Analysis — Randomized (Complete) Block Design, Parametric Tests: t-test, z-test, chi-squares test, ANOVA.

UNIT V **(16 hrs)**

Framing Proposal for acquiring grants: The question to be addressed – Rationale and importance of the question being addressed – Empirical and theoretical framework – Presenting pilot study / data or background information - Research proposal and time frame – Specificity of methodology – Organization of different phases of study – Expected outcome of study and its implications – Budgeting - Available infra-structure and resources - Executive summary

References:

1. Kothari C.R. (2014) Research Methodology Methods & Techniques, New age international publisher.
2. Myra L. Samuels, Jeffrey A. Witmer, Andrew Schaffner. (2012). Statistics for the Life Sciences, 4th edition. Prentice Hall.
3. John A. Rice. (2010). Mathematical Statistics and Data Analysis, Duxbury Press.
4. John M. Lachin. (2010). Biostatistical Methods: The Assessment of Relative Risks, 2nd Edition, Wiley-Blackwell Pub.
5. Snedecor, George, W.Cochran and William, G. (1967). Statistical Methods, Sixth edition, Oxford and IBH Publishing Co., Oxford.

Bloom's Taxonomy	K1 Remembering	K2 Understanding	K3 Applying	K4 Analyzing	K5 Evaluating	K6 Creating
CO 1	1	2	3	4		
CO 2	1	2	3	4		
CO 3				4	5	6
CO 4	1	2	3	4	5	6
CO 5		2	3	4	5	6

Mean = 3.45

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