Sr. No.	Course	Course title	Total credits	Total hours
1	Course-1 (any one)	1. Lab skills in Biochemistry 2. Animal Behaviour and Biodiversity	3 (100 marks)	45
2	Course-2	Review of Literature A. Review evaluation DRAC members: 35 marks Guide: 35 marks B. Review presentation DRAC members: 30 marks		

PG Department of Biosciences
Sardar Patel University
Vallabh Vidyanagar

Syllabus of Pre-Ph.D. Optional Course

Name of the course: Lab skills in Biochemistry

Unit I **(6 hours)**

- Simple biochemical calculations
- Accuracy in biochemistry techniques
- Isolation of biologically important molecules
- Characterization of biologically important molecule
- Structure elucidation and molecular weight determination

Unit II **(8 hours)**

- Biochemical estimations
- Bioassay designing
- Proteomics, Analysis of proteomes. 2D-PAGE. Sample preparation, solubilization, reduction, resolution
- peptide isolation and sequencing
- experimental techniques for the study and analysis of enzyme kinetics

Unit III **(8 hours)**

- immunoassay methods
- the main techniques used in cell biology – Cell culture, Staining techniques, Apoptosis
- Simple Molecular Biology techniques – Isolation of DNA and electrophoresis
- Vectors used in Molecular Biology, DNA Cloning
- trouble shooting skills

Unit IV **(6 hours)**

- Purification methods: Chromatography – principles
- Adsorption, Reverse phase, ion-exchange, size exclusion, hydrophobic interaction, bio affinity and pseudo affinity chromatographic techniques.
- HPLC
- Liquid chromatography–mass spectrometry (LC–MS)

Lab Demostrations/Practicals and assignments (3 sessions X 4 hrs each) (12 hours)

Sardar Patel University

Pre-PhD Couse work for Zoology

Animal Behavior and Biodiversity

Unit 1: General aspect of Behaviour
Introduction of Behaviour
Heredity and Behaviour
Behavioural patterns:
Individual and Homing Behaviour, Instinct, imprinting, Mechanism of learning Behaviour
Behavioural Dispersal and Organization:
Circadian rhythm, Kin selection concept, its importance in hymenoptera and altruism

Unit 2: Behaviour Ecology:
Movements and migration, Modes of communication, Foraging and food habits, Predator avoidance, Reproduction.
Social behaviour of animals:
Costs and benefits of group-living, types of social acts, individual adjustments of group-living

Unit 3: Biodiversity:
Levels of Biodiversity, Value of Biodiversity, Regional, National and Global status of Biodiversity,
Threats to Biodiversity, Conservation and Management of Biodiversity,
Bio-geographical classification of India
Importance of Biodiversity

Unit 4: Management of Biodiversity
Methodologies for Execution: IUCN, UNEP, UNESCO, WWF, ICUU, GEF, WHF
CBD- Convention on Biological Diversity [Convention on Biological Diversity]
Wild Life protection act (1972), Biodiversity Act (2002)
India: Regulation of access to biological diversity,
National Biodiversity Authority: Functions and Powers

Sardar Patel University
Department of Business Studies

PhD Coursework Paper 2 & 3 (07.02.2022 to 17.02.2022)

Course Work Time Table – Ph.D.					
Date	**Day**	**Session**	**Time**	**Topics**	**Faculty name**
07.02.2022	Monday	1	10.30 – 12.00	Inauguration & Presidential Address Overview of Entire Course Work & Interaction with Participants	Prof. Shirish Kulkarni Prof. Sandip K. Bhatt
		2	12.00 – 1.30	Rules and Regulations for Ph. D. Programme (Effective from September-2021)	Prof. Sandip K. Bhatt
		3	2.15 – 3.45	Review of Literature in Commerce-Format for Review Writing-Research Gap	Kamini Shah
		4	4.00-5.30	Sampling	S R Ajmeri
08.02.2022	Tuesday	5	10.30 – 12.00	Research in Accountancy and Taxation	Prof. Y M Dalwadi
		6	12.00 – 1.30	Research in Finance & SWAYAM Courses in Research	Kamini Shah
		7	2.15 – 3.45	Research Design	Darshana Rohit
		8	4.00-5.30	Referencing Style	Ankur Amin
09.02.2022	Wednesday	7	10.30 – 12.00	Research Problem Research Hypothesis Formulation	Prof. Y M Dalwadi
		8	12.00 – 1.30	Use of "R" for Research	Dharmesh Raykundalia
			2.15 – 3.45	Use of Excel in Research	S P Machaar
			4.00-5.30		
10.02.2022	Thursday	10	10.30 – 12.00	Advances in Library & Plagiarism	Dr. Shishir Mandaliya
		11	12.00 – 1.30	Introduction of SPSS and how prepare code sheet in SPSS.	Prof. Y M Dalwadi
		12	2.15 – 3.45		
			4.00-5.30	Use of PowerPoint for Presentation	Prof. Priti Sajja
11.02.2022	Friday	13	10.30 – 12.00	Essentials of Research Methodology	Dr. Pratik Trivedi

			12.00 – 1.30	Synopsis Writing	Dr. Jayendrasinh Jadav
		14	2.15 – 3.45	Basic Concept of Research & Research Process	Dr. Rupal Patel
		15	4.00-5.30	PhD – a Pleasurable Journey	Deep Vaghela & Dr. Parth Bhatt
12.02.2022	Saturday	16	10.30 – 12.00	Hypothesis Testing – Parametric Tests	Dr. S. S. Kalamkar
		17	12.00 – 1.30	Hypothesis Testing – Non-Parametric Tests	Hitesh Parmar
		18	2.15 – 3.45	Jamovi	Ankur Amin
		19	4.00-5.30	PhD – a Pleasurable Journey	CA Viraj Dhakan & Dr. Tejas Gandhi
13.02.2021	Monday		10.30 – 12.00	Use of MS Word for Report Writing	S P Machaar
		16	12.00 – 1.30	Publication in CARE journals	Lavji Zala
		17	2.15 – 3.45	JASP	Ankur Amin
		18	4.00-5.30	Recent Trends and Research Areas in Commerce	Prin.V M Vanar
14.02.2021	Tuesday	19	10.30 – 12.00	Use of MS office tools in Research	S P Machaar
		20	12.00 – 1.30		
		21	2.15 – 3.45	Use of Online Resources for Research	Bharat Patel
			4.00-5.30	Publication of Research work	Kamini Shah
15.02.2021	Wednesday	22	10.30 – 12.00	Evaluation of Thesis	Prof. Sandip K. Bhatt
		23	12.00 – 1.30	Questionnaire Designing	Kapil Dave
			2.15 – 3.45	Ethical Issues in Data Collection	Prin. V J Dwivedi
		24	4.00-5.30	Research Methodology in Commerce	K V Solanki
16.02.2021	Thursday	25	10. to 11.30	Presentation	
		26	11.30 to 1		
		27	2.00-3.30		
			3.30 – 5.00		
17.02.2021	Friday	28	10. to 11.30	Examination	
		29	11.30 to 1		
		30	2.00-3.30		
			3.30 – 5.00		

P G Department of Business Studies
Sardar Patel University
Vallabh Vidyanagar

Syllabus for PhD Coursework: Paper II and III

2020-21

Paper II
Review of Literature and Research methodology in Commerce

Credits: 3

Sr. No.	Particulars	Weightage
1	**Literature Review:** Meaning, Importance, Sources of Literature for Review, Methods of Review, Review Writing, Format for review wriring,Research Gap, Documentation of Sources used Referencing style. **Research Methodology in Commerce:** Recent trends and research areas in Commerce, Research Problem formulation, Use of Primary and Secondary Data Sources, Questionnaire Design, Sampling, Data Interpretation in Commerce.	50%

Paper III
Use of Information and Communication Technology (ICT) in Research

Credits: 3

Sr. No.	Particulars	Weightage
1	Meaning of ICT, Applications of ICT in Research, Use of MS office tools, Use of MS Word for Report Writing, Use of MS Excel for Data, Use of MS PowerPoint for presentation, Use of online resources for research,	50%

Methods of Teaching – Learning and Evaluation: Direct Teaching, Library Work/Assignments, Presentations and Examination.

Note:

1. Credits assigned as per R.PhD. 9.1.2. (September 2021), Teaching for each credit is 15 hours.
2. Methods of teaching, learning and evaluation are as per Appendix 1 of prevalent PhD Norms as given by Sardar Patel University.
3. Syllabus is not exhaustive of relevant topics to be taught.

DRAC Chairman

P.G. DEPTT. OF BUSINESS STUDIES ★ SPU V. V. NAGAR

P G Department of Business Studies
Sardar Patel University
Vallabh Vidyanagar

Proposed Syllabus for PhD Coursework: Paper II and III

Paper II
Review of Literature and Research methodology in Commerce

Credits: 3

Sr. No.	Particulars	Weightage
1	**Literature Review:** Meaning, Importance, Sources of Literature for Review, Methods of Review, Review Writing, Format for review wriring,Research Gap, Documentation of Sources used Referencing style. **Research Methodology in Commerce:** Recent trends and research areas in Commerce, Research Problem formulation, Use of Primary and Secondary Data Sources, Questionnaire Design, Sampling, Data Interpretation in Commerce.	50%

Paper III
Use of Information and Communication Technology (ICT) in Research

Credits: 3

Sr. No.	Particulars	Weightage
1	Meaning of ICT, Applications of ICT in Research, Use of MS office tools, Use of MS Word for Report Writing, Use of MS Excel for Data, Use of MS PowerPoint for presentation, Use of online resources for research,	50%

Methods of Teaching – Learning and Evaluation: Direct Teaching, Library Work/Assignments, Presentations and Examination.

Note:

1. Credits assigned as per R.PhD. 9.1.2. (September 2021), Teaching for each credit is 15 hours.
2. Methods of teaching, learning and evaluation are as per Appendix 1 of prevalent PhD Norms as given by Sardar Patel University.
3. Syllabus is not exhaustive of relevant topics to be taught.

P.G. DEPTT. OF BUSINESS STUDIES ★ SPU V. V. NAGAR

Subject Specific Pre. Ph.D. Course Work in Chemistry Syllabus with Effect from the Academic Year 2021-22.

To Pass	At least 50% Marks in the Written Examination/ Written Assignment Submission in each paper and 55% Marks in aggregate of Written and Review Presentation in Each Course.

Sr. No.	Course Name	T/P	Credit	Exam duration	Component of Marks		
					Written Exam/ Written Assignment	Review Presentation	Total
1.	Techniques in Chemistry-PPHDCHEM51	T	03	03 Hours	50/25	50/25	100/55
2.	Research Review and Presentation-PPHDCHEM52	T	03		50/25	50/25	100/55
			06				**200**

Date: 29-12-2021

Dr. D. K. Raval
(Chairman, DRAC)

Professor & Head
Department of Chemistry
Sardar Patel University
Vallabh Vidyanagar-388120
Gujarat

Department of Chemistry
Sardar Patel University
Pre- Ph.D. (Course)

Paper-II (PPHDCHEM51 - Techniques in Chemistry)

1. **Purification / Crystallization:** 11

   Isolation and purification of organic compounds (solids and liquids) with special emphasis on chromatographic techniques TLC column chromatography and HPLC. Drying and dehydration agents.

2. **X-ray diffraction and Voltametry:** 11

   Single crystal and power pattern Basic principle, application with some typical examples, Energy Dispersive X-ray Methods. Voltametric methods

3. **Thermal techniques:** 12

   Thermogravimetry (TG): Instrumentation and balances, X - Y recorder, thermogram, factors affecting thermogram, correlation of DTA and TGA data. VSP and HDT. Differential Thermal Analysis (DTA): Theories of DTA factors affecting DTA curver, instrumentation and application of DTA. DSC principle, technique and applications.

4. **Molecular weight determination techniques:** 11

   Osmomety Membrene and vapor pressure, Light Scattering. Viscometry. Size exclusion chromatography, Ultracentrifugate

Books suggested:

1. Instrumental Analysis by Skoog and Hollar.
2. Instrumental Methods of Analysis by H. H. Willard. L.L Merritt, J. A. Dean and F. A. Settle
3. Qualitative Analysis by R. A. Day and A. L. Underwood
4. X-Ray Methods by Clive Whiston
5. Energy Dispersive X-Ray Analysis in the Electron Microscope, BIOS 5. Scientific Publication Ltd. (2003)
6. Electro Chemical Methods Fundamentals and Applications by A J 6 Bard and L.R.Faulkner.
7. Laboratory Techniques in Electroanalytical Chemistry by P. T. Kissinger and W. R. Heineman.
8. Organic Specrtoscopy, William Kemp, John Wiley
9. Principles of Polymer Chemistry, A Revve, Springer, 2000 (2 edition)
10. Carrahers Polymer Chemistry, Charles E Carraher Jr., CRC Press
11. Thermal methods of analysis, principles, applications, & problems, By P.J. Hains, 1995 Blackie academic & Professional

Professor & Head
Department of Chemistry
Sardar Patel University
Vallabh Vidyanagar-388120
Gujarat

Department of Chemistry
Sardar Patel University
Pre-Ph.D. (Course)

Paper-III (PPHDCHEM52 - Research Review And Presentation)

Each student will submit a literature review report on his chosen research topic and student will give a presentation/seminar.

Professor & Head
Department of Chemistry
Sardar Patel University
Vallabh Vidyanagar-388120
Gujarat

Department of Chemistry
Sardar Patel University
(NAAC Reaccredited 'A' Grade, CGPA-3.25)
Vallabh Vidyanagar - 388 120, GUJARAT

No. R/Chem/ Date :

MINUTES

1. The application for Ph.D. admission 2021-22 by Mr. Mohammad Ahmed Saad Abdullah Alsalehi Ahmed Alsalehi was received by the department through International Students Centre, Sardar Patel University. The candidate was advised earlier to contact the research guides available in the department to discuss the research problem of his interest. He personally contacted the research guides in the department and finally decided to work for Ph.D. degree in chemistry under the guidance of Dr. J. H. Trivedi. The candidate Mr. Mohammad Ahmed Saad Abdullah Alsalehi Ahmed Alsalehi has given his preference for the same.

   The application was considered by the DRAC, Department of Chemistry, Sardar Patel University on 29th December 2021 met at 12.30 p.m. Dr. J. H. Trivedi has also given his consent to DRAC in person. The committee therefore allot Mr. Mohammad Ahmed Saad Abdullah Alsalehi Ahmed Alsalehi to Dr. J. H. Trivedi for the Ph.D. registration 2021-22 without any reservation.

2. In reference to university letter no. D/E/10/4891 dated 21-12-2021, the committee constituted the structure and framed the syllabus for two (02) subject specific Pre Ph.D. Courses of three (03) credits each. The details structure and syllabus are attached herewith for university approval.

1. Prof. Dr. D. K. Raval
2. Prof. Dr. M. N. Patel
3. Prof. Dr. M. P. Patel
4. Prof. Dr. N. J. Parmar
5. Prof. Dr. H. M. Patel
6. Prof. Dr. S. S. Soni

Date: 29-12-2021

Z:\CHEMISTRY\1Department\1_Admission\Ph.D. Chemistry\Ph.D. Admission\21_Ph.D. Admission_2021-2022_First Session\23_Minutes of International Students_29_12_2021.docx

Office : Department of Chemistry, Sardar Patel University, Vallabh Vidyanagar - 388 120
Telephone : 02692-226855 / 56, Fax : 02692-237258, E-mail : head_chem@spuvvn.edu
www.spuvvn.edu/academics/departments/chemistry/faculty.php

Department of Chemistry, Sardar Patel University, Vallabh Vidyanagar.

Attendance:

Meeting: DRAC Committee.

Date: 12:30 P.m.

Place: Hod's chamber

Sr. No.	Name	Signature
1.	Dr. D. K. Raval	
2.	Dr. H. M. Patel	
3.	Dr. S. S. Soni	
4.	Dr. M. N. Patel	
5.	Dr. M. I. Desai	
6.	Dr. M. P. Patel	

DEPARTMENT OF CHEMISTRY, SARDAR PATEL UNIVERSITY, V. V. NAGAR

Notice

DRAC Committee

The Meeting of above committee is scheduled on 29th December, 2021

at 12.30 a.m., in room no. Hod's chamber Please make it convenient to attend the same.

Date: 29th Dec. 2021

Prof. & Head
Department of Chemistry
Sardar Patel University
Vallabh Vidyanagar-388120

To

Committee Members:

1. Dr. D.K. Raval
2. Dr. M.N. Patel
3. Dr. M.P. Patel
4. Dr. N.P. Parmar
5. Dr. H.M. Patel
6. Dr. S.S. Soni
7. Dr. J.P. Mehta, M.K. Bhavnagar University
8. Dr. H.S. Joshi, Saurashtra University
9. Dr. R.C. Tandel, M.S. Uni. of Baroda
10. Dr. K.H. Chikhaliya, VNSGU, Surat

SARDAR PATEL UNIVERSITY

Ph.D Course Work (Computer Science)

(Course – III) (W.E.F. January, 2022)

Course Name: Tools and Technologies in Computer Science

Learning Objectives:

- To learn the fundamentals of tools for data acquisition
- To learn and implement the tools for designing the models
- To learn implementation of models
- To learn to test the models and their implementations

Prerequisites:

- In depth Knowledge of System Development Life Cycle phases
- Basic knowledge of Object Oriented Programming Concepts

Outcome of the Course:

- Ability to find out most suitable data acquisition tools for research problem
- Knowledge of data preprocessing techniques
- Ability to design suitable model for research problem
- Knowledge of implementation and testing of models for research

Course Content:

Unit No.	Course Content
1	**Data Acquisition & Analysis Tools** – Source selection [Internal & External] – Data extraction and preprocessing – Query management – Online & offline tools for data collection – Structured, semi-structured, and un-structured data
2	**Modeling Tools** – Introduction to system modeling – Active model – Passive model – Architectural/Design Diagrams – Development of research model – Model verification – Open source and licensed software for designing

3 **Development & Implementation Tools**

- Selection of tools
- Open source tools
- Licensed tools
- Scheduling [Time framing]
- Implementation strategies

4 **Testing & Evaluation Tools**

- Standard datasets in the domain
- Verification and Validation
- Simulation tools
- Evaluation criteria [F –Score, Accuracy]
- Comparative study of models with contemporary system

References:

1. Dr. Shanti Mishra and Dr. Shashi Alok, Handbook of Research Methodology: A Compendium for Scholars & Researchers. N.p., Educreation Publishing, 2017
2. Kumar, Ranjit. Research Methodology: A Step-by-Step Guide for Beginners. United Kingdom, SAGE Publications, 2010.
3. Pressman, Roger S., and Maxim, Bruce R.. Software Engineering: A Practitioner's Approach. United Kingdom, McGraw-Hill Education, 2019.
4. Rao, R. Nageswara : Core Python Programming, 2nd Edition, Dreamtech Press, 2018
5. Material available on the World Wide Web related to research review and methodology

SARDAR PATEL UNIVERSITY
Ph.D Course Work (Computer Science)
(Course – II) (W.E.F. January, 2022)

Course Name: Research Review

Learning Objectives:

- To learn the fundamentals of research review
- To learn and implement the tools for research review
- To learn implementation of methods of knowledge acquisition
- To learn about indexing measures and review paper publication

Prerequisites:

- Basic knowledge of research methodology

Outcome of the Course:

- Ability to understand types and sources of literature for research
- Ability to find out research gap
- Ability to write and present the review work in proper format
- Knowledge of indexing measures for scholastic activities

Course Content:

Unit No.	Course Content
1	**Introduction to Research Review** - Introduction - Meaning - Goals and objectives - Need - Importance and benefits
2	**Process of Research Review** - Types - Sources - Classification and strategies - Identification of sources - Research gap

3 **Tools for Research Review**

- Fact finding methods, and knowledge acquisition
- Online and offline questionnaire
- Open and closed questions
- Record review
- Plagiarism tools

4 **Academic Writing and Presentation of Research Review**

- Components of research paper and its writing
- Automatic referencing and in-text citations
- Documentation for review
- Formats of citation
- Publication of review paper
- Popular indexing measures

References:

1. C. R. Kothari and Gaurav Garg : Methods and Techniques, fourth edition, New Age International Publishers, 2019
2. Ridley, Diana. The Literature Review: A Step-by-Step Guide for Students. United Kingdom, SAGE Publications, 2012.
3. Gustavii, Björn. How to Write and Illustrate a Scientific Paper. United Kingdom, Cambridge University Press, 2017.
4. Subhash Chandra Parija and Vikram Kate, Writing and Publishing a Scientific Research Paper. Singapore, Springer Singapore, 2017.
5. Material available on the World Wide Web related to research review and methodology

P. G. DEPARTMENT OF ECONOMICS
SARDAR PATEL UNIVERSITY
VALLABH VIDYANAGAR

3rd January 2022

Minutes of the Meeting

Departmental Research Advisory Committee meeting was held on 3rd January 2022 in the office of the Head of the Department, P. G. Department of Economics, Sardar Patel University to discuss and prepare the Coursework structure and Syllabus for Course -2 & Course -3 for Ph. D. coursework *(Ref. Letter No. D/E/10/4891 dated 21/12/2021)*. The final draft for the Syllabus for coursework for Ph. D. is prepared, approved and recommended for further approval by the competent authority of the university.

Members of DRAC Committee who remained present

Sr. No.	Name	Designation	Signature
1.	Dr. Kinjal V. Ahir	Chairperson of DRAC	
2.	Dr. H. P. Trivedi	Member of DRAC	
3.	Dr. Sonal V. Bhatt	Member of DRAC	
4.	Dr. Jignesh K. Barot	Member of DRAC	
5.	Dr. Vijay S. Jariwala	Member of DRAC	

Dr. Kinjal V. Ahir
Chairperson
Departmental Research Advisory Committee
& Head
Post Graduate Department of Economics
Sardar Patel University
Vallabh Vidyanagar

P. G. DEPARTMENT OF ECONOMICS
SARDAR PATEL UNIVERSITY
VALLABH VIDYANAGAR

3rd January 2022

Minutes of the Meeting

Departmental Research Advisory Committee meeting was held on 3rd January 2022 in the office of the Head of the Department, P. G. Department of Economics, Sardar Patel University to discuss and prepare the Coursework structure and Syllabus for Course -2 & Course -3 for Ph. D. coursework *(Ref. Letter No. D/E/10/4891 dated 21/12/2021)*. The final draft for the Syllabus for coursework for Ph. D. is prepared, approved and recommended for further approval by the competent authority of the university.

Members of DRAC Committee who remained present

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4.	Dr. Jignesh K. Barot	Member of DRAC	
5.	Dr. Vijay S. Jariwala	Member of DRAC	

Dr. Kinjal V. Ahir
Chairperson
Departmental Research Advisory Committee
& Head
Post Graduate Department of Economics
Sardar Patel University
Vallabh Vidyanagar

DOCTOR OF PHILOSOPHY (ECONOMICS)
COURSEWORK

Course Code	Coursework -2	Title of the Course	Introduction to Research Study
Total Credits of the Course	3	Total Contact Hours	45

Course Objectives	• To make the researcher aware about the research areas • To make the researcher aware about the present socio-economic scenario related to the selected research study • To understand and evaluate the economic policies related to the selected research study as applicable level viz.; - International, National, State, Local • The researcher will be able to realise the importance of the selected research study

Course outline	Weightage

▪ Selection of research theme
▪ Present Socio-Economic Scenario – related to the theme of the research study as applicable viz.;
  ▪ International level
  ▪ National level
  ▪ State level
  ▪ Local level
▪ Understanding of Economic Policies in the context of the theme of the research study as applicable viz.;
  ▪ International level
  ▪ National level
  ▪ State level
  ▪ Local level
▪ Evaluation of Economic Policies in the context of the theme of the research study as applicable viz.;
  ▪ International level
  ▪ National level
  ▪ State level
  ▪ Local level
▪ Theoretical Framework associated with the theme of the research study
	100 %

Teaching-Learning Environment	The course would be taught/learnt through various means like lectures, group discussions, seminars, tutorial, written assignments, viva-voce, seminars presentations, browsing online-resources relevant to the content.

Evaluation System		
Sr. No.	**Details of the Evaluation**	**Weightage**
1.	Written Examination or Written Assignments	50%
2.	Review, Presentation and Viva-voce	50%
	Total	100%*

* In addition, students will have to make a presentation on a topic related to experimental or theoretical methodology and the techniques for data analysis with chosen illustrative case relevant to the field of the research proposal and approved by the guide and the DRAC.

Course Outcomes: Having completed this course, student should be able to :	
1.	Identify and justify the research areas
2.	Assess the present socio-economic scenario related to the selected research study
3.	Evaluate the economic policies related to the selected research study as applicable level viz.; - International, National, State, Local
4.	Appreciate the importance and develop a critical understanding about the selected research study

Suggested References:

Relevant references as suggested by the respective guide and the DRAC like: Government websites, journals, reports, books, and other publications related to the research study.

Evaluation System		
Sr. No.	**Details of the Evaluation**	**Weightage**
1.	Written Examination or Written Assignments	50%
2.	Review, Presentation and Viva-voce	50%
	Total	100%*

* In addition, students will have to make a presentation on a topic related to experimental or theoretical methodology and the techniques for data analysis with chosen illustrative case relevant to the field of the research proposal and approved by the guide and the DRAC.

Course Outcomes: Having completed this course, student should be able to :	
1.	Identify the relevant existing literature related to the selected theme of the research study
2.	Categorise the existing literature according to the objectives of the selected research study
3.	Critically evaluate the existing literature related to the selected theme of the research study
4.	Select the appropriate methodology for the selected research study

Suggested References:

Relevant literature related to the selected research study from the various sources like: Government websites, journals, reports, books, and other publications related to the research study. The books related to the selection of the appropriate research methodology can be used.

PRE-PHD COURSE WORK (EDUCATION)

Course Code	Pre-PhD course work(EDUCATION) 2	Title of the Course	**TRENDS, ISSUES & RESEARCH IN EDUCATION**
Total Credits of the Course	3	Total Hours	45

Course Objectives:	The course will enable the student teachers to • reflect on recent trends, issues, and research in education • learn about some basic concepts of research and its methodologies • realize the policy framework for Education in India • learn about various policies and programmes

Course Content		
Unit	**Description**	**Weightage* (%)**
	new policies and practices in education in India: NCF 2005, NCFTE 2009, RTE 2009, NCTE REGULATIONS 2014, NEP2020, NCTE, NCERT **Social learning approaches**: lev vygotsky's(social constructivism), Albert Bandura(social learning theory) **Yoga in education**: general introduction to yoga, the definition of yoga according to Patanjali yoga sutra, Bhagavad Gita, and yoga vasistha **ICT:** ICT in teacher education **Inclusive education**: advantages of inclusive education for teacher education, inclusive education process, contemporary researches in inclusive education **Indian psychology**: panch kosha, applications of Indian perspectives: Health and Well-Being **Introduction to Indian Philosophy**: Veda and Upanishads. Origin of Indian Philosophy. **Qualitative and quantitative research**	100%

	Research methods: survey, experimental, content analysis **Research tool**: interview, questionnaire, attitude scale, standardized test **Population and sampling:** probability sampling and non-probability **Data analysis**: qualitative and quantitative data **A parametric and non-parametric technique** **Report writing:** APA style **Different useful educational websites & Modes of Digital Education**	

Teaching-Learning Methodology	Lecture-cum-discussion, Group Discussion, Presentations, Seminars, tutorials, Research Exercises

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Written Examination or written assignment submission The topic for the assignment shall be from the syllabus of the respective courses as approved by the concerned DRAC. If the number of students is large, a written examination may be conducted. The written examination/the assignment topics shall cover the full content of the syllabus of the respective courses.	50%
2.	Review presentation and viva voce (the research scholar shall prepare a PowerPoint presentation on a topic (different from the assignment) related to the experimental/ theoretical methodology and the techniques for data analysis with chosen illustrative case relevant to the field of the research proposal and approved by the guide and the DRAC. The Ph.D. guide of the research scholar shall remain present.	50%

Course Outcomes: Having completed this course, the learner will be able to

1.	Explore emerging trends, issues, and research areas of teacher education.
2.	Develop knowledge, understanding, and insight into the various underlying concepts of research.
3.	Explain Research designs, tools of gathering data, and sampling.
4.	Apply the theoretical knowledge into practical thesis work.
5.	Use different Statistical Techniques
6.	Carry out the research work in a systematic manner.

Suggested References:

Aiterya Brāhmana. Aiterya Brāhmana of the Ṛg Veda. Trans. Martin Haug. Sacred Books of the Hindus. Ed. B.D. Basu. Allahabad: Sudhindra Nath Vasu, 1922.

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PRE-PHD COURSE WORK (EDUCATION)

Course Code	Pre-PhD course work (EDUCATION) 3	Title of the Course	REVIEW OF RELATED LITERATURE
Total Credits of the Course	3	Total Hours	45

Course Objectives:	The course will enable the student teachers to • describe the concept and need for a review of related literature. • classify various research reviews of related literature according to its area. • identify research review of related literature. • explain the sources of review of the related literature. • develop the theoretical review of related literature. • develop past research review of related literature. • choose an appropriate method for review of related literature. • describe different methods review of related literature.

Course Content		
Unit	**Description**	**Weightage* (%)**
	- Review of related literature: define, purpose, nature of the review, sources, process, steps - Theoretical review in the context of the problem of the study - Review of past researches in the context of the problem of the study -metaanalysis in the context of the problem of the study (if require) -write the review, note-taking skill, bibliography, footnote, online search	100%

Teaching-Learning Methodology	Lecture-cum-discussion, Group Discussion, Presentations, Seminars, tutorials, Research Exercises

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Written Examination or written assignment submission	50%

	The topic for the assignment shall be from the syllabus of the respective courses as approved by the concerned DRAC. If the number of students is large, a written examination may be conducted. The written examination/the assignment topics shall cover the full content of the syllabus of the respective courses.	
2.	Review presentation and viva voce (the research scholar shall prepare a PowerPoint presentation on a topic (different from the assignment) related to the experimental/ theoretical methodology and the techniques for data analysis with chosen illustrative case relevant to the field of the research proposal and approved by the guide and the DRAC. The Ph.D. guide of the research scholar shall remain present.	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	describe concept and need of review of related literature.
2.	classify various research reviews of related literature according to its area.
3.	identify research review of related literature.
4.	explain the sources of review of the related literature.
5.	develop the theoretical review of related literature.
6.	develop past research review of related literature
7.	to choose an appropriate method for research review of related literature.
8.	describe different methods review of related literature.

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Sukhia, S.P. Mehrotra, P.A. and Methotra, R.N. Elements of Educational Research (Second Edition) New Delhi: Allied Publishers, 1966.

Travers, R.M.V. An Introduction to Educational Research (Third Edition) London: The Macmillan. 1969.

Tuckman, B.W. Conducting Educational Research (Second Edition) New York: Harcourt BraceJovenovich, Inc. 1978.

Van Dalen, D.B. and Mayer, William J. Understanding Educational Research an IntroductionNewYork: Mc Graw Hill Book Company, 1979.

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DEPARTMENT OF LECTRONICS
SARDAR PATEL UNIVERSITY

Revised Pre-PhD Course Work Effective from 2021-22

Course No.	Course Title	Credit
DSCRPE	Research and Publication Ethics (Mandatory across the faculty. Common for all research scholars and conducted centrally through HRDC)	02
DSCRM51	Research Methodology (Common for all research scholars and conducted centrally through HRDC)	04
Research area specific Elective pre-PhD courses approved by the DRAC (any two of the following courses shall be selected by the research scholar in consultation with the PhD Guide)		
DSEELE51	Fabrication and Characterization of Electronic Devices	03
DSEELE52	Industrial Process Control and Instrumentation	03
DSEELE53	Fundamentals of Nano Electronics	03
DSEELE54	Embedded System Design and Digital Signal Processing	03
DSEELE55	Study of Quantum Systems and the Reality	03
DSEELE56	Artificial Intelligence and Electronic Fuzzy and Neural Networks	03
DSEELE57	Electronic Science-History, Present and Beyond	03

Pre Ph.D. (Electronics) Course work

Course Code	DSEELE57	Title of the Course	**Electronic Science-History, Present and Beyond**
Total Credits of the Course	3	Hours per Week	3

Course Objectives:	1. To get an understanding about the purpose of the development of Electronics Science subject 2. To correlated the past, present and future of the developments in Science in general and Electronics in particular 3. To explore the possibilities of Future of mankind and role of Electronics

Course Content	
Unit	Description
1.	The Objective and purpose of Electronics Science, Discovery of Electron, An overview of the developmental Stages of Electronic Devices- from Vacuum Tube to VLSI systems, from Analog to Digital to Fuzzy Control Systems, From Analog, Digital and 1G to 5G Communication Systems, Supercomputers, AI based Systems, IoT, March of Electronics towards a better, sustainable world
2.	History of Science and Scientific Methods: Physical, Chemical, Biological and Mathematical Sciences – The Contribution of ancient rishis of India to Science and the existence and working of electrons, development of battery
3.	Experiments of Sir J C Bose on Consciousness in Tin atoms, Matter and Mind, NeuroScience and Electrons, Consciousness and Electrons,Consciousness in Neurons, Electrons and Cosmology, Science through Intuition
Teaching-Learning Methodology	Review of Literature, Classroom Teaching (Offline/Online), Group Discussion

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	University Examination	100%

Course Outcomes: Having completed this course, the learnerwill be able to

1.	Understand deeply the concept and the aims and objectives of Electronic Science and the various developmental stages, right from the discovery of electron
2.	Get a detailed idea about the History of Science and Scientific Methods
3.	Gen an idea about the future trend towards refinement in the subject of Electronics by correlating between electrons and consciousness

Suggested References :

1.	A History of the Electron : J J and G P Thomson Jaume Navarro, Cambridge University Press, 2012
2.	History of Science and Scientific Method N K Jain, Oxford & IBM Publishing Co. Pvt. Ltd, 1990
3.	Science and Beyond - Cosmology, Consciousness and Technology in the Indic Traditions Ed. Sangeetha Menon, B V Sreekanatam, Annindya Sinha, Philip Clayton, R Narasimha National Institute of Advanced Studies, Bangalore, 2004
4.	Response in the Living and Non living Jagadish Chunder Bose, London, Longmans, Green, 1902
5.	History of Semiconductor Research G. L. Pearson, Bel Telephone Laboratories, Inc., Murray Hill, NJ, USA W. H. Brattain, Bel Telephone Laboratories, Inc., Murray Hill, NJ, USA IEEE Explore, IRE, Vol. 43, Issue 12,

On-line resources to be used if available as reference material

1.On Line literature about the overview of the Developments in Electronics and consciousness and Electrons

2 Online reading material and videos available in plenty on the related topics

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DEPARTMENT OF LECTRONICS
SARDAR PATEL UNIVERSITY

Pre-PhD Course Work Effective from 2021-22

Course No.	Course Title	Credit
DSCRPE	Research and Publication Ethics (Mandatory across the faculty. Common for all research scholars and conducted centrally through HRDC)	02
DSCRM51	Research Methodology (Common for all research scholars and conducted centrally through HRDC)	04
Research area specific Elective pre-PhD courses approved by the DRAC ((any two of the following courses shall be selected by the research scholar in consultation with the PhD Guide)		
DSEELE51	Fabrication and Characterization of Electronic Devices	03
DSEELE52	Industrial Process Control and Instrumentation	03
DSEELE53	Fundamentals of Nano Electronics	03
DSEELE54	Embedded System Design and Digital Signal Processing	03
DSEELE55	Study of Quantum Systems and the Reality	03
DSEELE56	Artificial Intelligence and Electronic Fuzzy and Neural Networks	03

Pre-PhD course work Evaluation Scheme:

1	The two credits course on Research and Publication Ethics (RPE) (a mandatory course by UGC) and the four credits Research Methodology course shall be Conducted and Evaluated centrally for all the admitted Research Scholars by the University as per R. Ph.D. : 9.1.1.
2	The attendance of the Ph D scholar for each course shall be 80%. The Concerned P.G. Department will maintain the attendance records of the student for each course work.
3	The evaluation of each of the course work shall have the following components: i) A Written Examination OR Written Assignment Submission (50 marks) The topics for assignment shall be from the syllabus of the respective courses as approved by the concerned DRAC. If the number of students is large, written examination may be conducted. The written examination / the Assignment topics shall cover the full content of the syllabus of the respective courses. ii) Review presentation and viva voce (50 marks)
4	The research scholar shall prepare a power point presentation on a topic (different from the assignment) related to the experimental / theoretical methodology and the techniques for data analysis with chosen illustrative case relevant to the field of the research proposal and approved by the guide and the DRAC. The Ph D guide of the research scholar, the allotted teacher of the course and the atleast one of the DRAC member shall remain present and shall evaluate during the presentation cum viva. The marks awarded must be signed by all the above and shall submit to the DRAC chairman.
5	The respective PG Department where the students are appearing for the pre-PhD course work shall submit the entire records viz. time table, syllabi, attendance, marks awarded / scored, the copy of the written exam paper or the assignments, copy of the ppt presentation etc of the research scholar to the respective DRAC.

Course Code: DSCRPE (02Credits)
Research and Publication Ethics (mandatory across the faculty)
Conducted centrally by HRDC

Theory

RPE01: Philosophy and Ethics (3hrs)
Introduction to Philosophy: Definition, nature and scope, concept, branches
Ethics: Definition, moral philosophy, nature of moral judgements and reactions

RPE02: Scientific Conduct (5hrs)
Ethics with respects to science and research; Intellectual honesty and research integrity
Scientific misconduct: Falsification, Fabrication and Plagiarism (FFP)
Redundant publications: duplicate and overlapping publications, salami slicing; Selective reporting and misrepresentation of data

RPE03: Publication Ethics (7hrs)
Publication Ethics: Definition, Introduction and Importance
Best Practices/standards setting initiatives and guidelines: COPE, WAME, etc
Publication misconduct: definition, concept, problems that lead to unethical behaviour and vice versa, types
Violation of publication ethics, authorship and contributorship; Identification of publication misconduct complaints and appeals

Practice

RPE04: Open Access Publishing (4hrs)
Open access publications and initiatives; SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies; Software tool to identify predatory publications developed by SPPU; Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.

RPE05: Publication Misconduct (4hrs)
A. Group Discussions (2hrs)
Subject specific ethical issues, FFP, authorship; Conflict of interest; Complains and appeals: examples and fraud from India and abroad.
B. Software tools (2hrs)
Use of plagiarism software like Turnitin, Urkund and other open source software tools
RPE06: Databases and Research metrics (7hrs)
A. Databases (4hrs)
Indexing data bases; Citation databases: Web of Science, Scopus, etc.
B. Research Metrics (3hrs)
Impact factor of Journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score
Metrics: h-index, g-index, i10-index, altmetrics

References:

1. P Chaddah, (2018)Ethicsin competetiveResearch: Do not get scooped; do not get plagiarized, ISBN: 978-9387480865
2. NationalAcademy ofScience, National Academy of Engineering andInstitute of Medicine (2009) on Being a scientist: A guide to Responsible Conduct of Research: 3rd Ed. NationalAcademiesPress
3. Indian National Science Academy(INSA), Ethics inScience Education , Research and Governance(2019) ISBN:978-81-939482-I-7*http://www.insaindia.res.in/pdf/Ethics_Book.pdf*

Course Code: DSCRM51: Research Methodology (04 Cr)

Unit I: Fundamentals and Core concepts of Research methodology (9h)

1) Introduction to Research (Selecting a topic, building a hypothesis, experimental and non experimental research).
2) Innovation and critical thinking; Steps involved in research (Scientific methodology)
3) Literature Survey (Importance (Need) of literature survey, How to do literature survey, objectives and methods)
4) Kinds and Types of Research Reports: Research Proposal, Synopsis, Progress Report, Review Article, Thesis, Poster
5) Research Paper Writing: Types of research papers, structure of research paper, abstract writing, methodology, results and discussions, conclusion.
6) Thesis writing: Structure of Thesis, Scope of work, Review of Literature, Results and Discussion, Figures and Table formats, Conclusion and future works, Bibliography, Appendices.

Unit II: Research Design and Planning (7.5 h)

1) Research Design
2) Sampling and types of error in sampling
3) Design of Experiments, types of basic experimental designs, common errors in experimental design.
4) Organization of work elements
5) Collection and organization of Data

Unit III: Data analysis (12h)

1) Statistical Data analysis: Parametric and non parametric statistics
2) Graphical and tabular presentation of Data

Unit IV: Computational tools in Research (9h)

1) SciLab for Statistical and Numerical Methods
2) MS Excel
3) Bibliography tools

References: 1. The Scientific Endeavor-Methodology and Perspectives Of Sciences by Jeffrey A Lee; Publisher: Pearson Education India
2. Research Methods for Science, M. P. Marder, Cambridge University Press, 2011.
3. Research Methodology Techniques and Trends, Y. K. Singh and R. B. Bajpai, APH Publishing Corporation House, 2008.
4. C R Kothari, Research Methodology-Methods and Techniques, New Age International (P) Ltd., Publishers (2004)

Pre Ph.D. (Electronics) Course work

Course Code	DSEELE51	Title of the Course	Fabrication and Characterization of Electronic Devices
Total Credits of the Course	3	Hours per Week	3 Hours

Course Objectives:	1. This course entails the preparation of electronic devices by different techniques. 2. To understand the characterization techniques, analysis and physical interpretation. 3. To impart working knowledge of measurement of various properties. 4. To get aware about different types of sensors.

Course Content		
Unit	Description	
1.	Thin Film Requirements, Introduction to Vacuum System, Importance of Vacuum, Pumping Techniques, Deposition Methods – Physical vapour deposition (PVD), Chaemical vapour deposition (CVD), Thermal Evaporation, Flash Evaporation, Pulse laser Deposition (PLD).	
2.	Xray Diffracometer, Transmission Electron Microscope, Scanning Electron Microscope, Energy Dispersive Analysis of X-Rays, Atomic Force Microscopy, Electron Probe Microanalysis, Hall Effect, Conductivity Measurement, Optical Techniques, Differential Thermal Conductivity Meter, Thermo gravimetric Analysis	
3.	Fabrication of Electronic Devices and its characteristics – Solar Cell, Schottky diode, Chemical Sensors, Gas Sensors, Bio Sensors, Optical Sensors, Thermoelectric Devices	
Teaching-Learning Methodology	Use of ICT Tools, Classroom Teaching (Offline/Online), Use of Power point Presentation, Group Discussion, Video Animation and Presentation, Experimental demonstration.	

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand the different methods of Thin Film Deposition.
2.	Learn all basic terminologies and importance of vacuum.
3.	Understand the analytical techniques.
4.	Grasp the concepts of fabrication of electronic devices and measurement of its properties.

Suggested References :	
1.	Semiconductor Devices : Basic Principle Jasprit Singh, (John Wiley & Sons Inc., N Y, USA
2.	Physics of Semiconductor Devices S.M. Sze (Wiley Estern Ltd, New Delhi, INDIA)
3.	Semiconductor Optoelectronics Devices P. Bhattacharya, Printice Hall NJ, USA
4.	Optoelectronics : An Introduction J. Wilson and J.F.B. Hawkes (Printice Hall, ND, India)
5.	Biosensors Principle & Application Loic J Blum and P.R. Coulet, M Dekar, Inc. USA
6.	Thin Film Technology and Application K. L. Chopra and L.K. Malhotra, Tata Mc-Grow Hill, New Delhi, India

On-line resources to be used if available as reference material
On-line Resources
1.On Line Video Lectures on SWAYAM
2.On Line Video Lectures of course on thin film deposition techniques NPTEL

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Pre Ph.D. (Electronics) Course work

Course Code	DSEELE52	Title of the Course	Industrial Process Control and Instrumentation
Total Credits of the Course	3	Hours per Week	3 Hours

Course Objectives:	1. To Introduce the basic concept of PLC Hardware, Programming and its applications. 2. To understand the use of microcontroller and its Interfacing. 3. To acquire knowledge of Industrial controllers.

Course Content	
Unit	Description
1.	Programmable logic Controllers, Process event and space sequence description, Ladder Logic diagram, Applications, PLC ladder instructions –Address and Registers, Timers and counters
2.	Use of Microcontrollers and its interfacing, Fuzzy logic, Types of Process control Systems and Automation, Case studies of Bottling plant, Tea/Coffee Vending machine Control, Furnace Control, Stepper Motor Control
3.	Process Control Loop Characteristics, Types of Controllers and Controller modes , ON-OFF Control, Proportional Control, Integral and differential actions, PID controllers –Analog and Digital, Open Loop-Closed Loop Systems, Auto tuning of PID Controllers.
Teaching-Learning Methodology	Use of ICT Tools, Classroom Teaching (Offline/Online), Use of Power point Presentation, Group Discussion, Video Animation and Presentation, Experimental demonstration.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand the different aspects of PLC Hardware and Programming.
2.	Develop programming skills of microcontrollers and its interfacing.
3.	Identify and Demonstrate the Industrial process control loops.

Suggested References :	
1.	Industrial Electronics (4th Edition) James Humphries, Leslie Sheets (Delmar Publishers Inc., N.Y., USA)
2.	Industrial Solid State Electronics Devices and system (2nd Edition) Timothy J.Maloney, (Prentice Hall International, N.Y., USA)
3.	Industrial Electronics and Control Biswanath Paul, (Prentice Hall of India, New Delhi, INDIA)
4.	Electronics in Industry G.M.Chute, Robert D.Chute (McGraw–Hill Book Company)
5.	Fundamentals of Industrial Electronics Bogdan M.Wilamowski, J.David Irwin
6.	Industrial Electronics & Control S K Bhattacharya, S.Chatterjee (Tata McGraw-Hill Publishing Company Limited, New Delhi)
7.	Programmable Logic Controllers : Principles and Applications John W.Webb and Ronald A.Reis (Prentice Hall of India, New Delhi, INDIA)
8.	Modern Industrial Electronics T.J.Maloney

On-line resources to be used if available as reference material
1.On Line Video Lectures on SWAYAM
2.On Line Video Lectures of course on thin film deposition techniques NPTEL

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Pre Ph.D. (Electronics) Course work

Course Code	DSEELE53	Title of the Course	Fundamentals of Nano Electronics
Total Credits of the Course	3	Hours per Week	3 Hours

Course Objectives:	1. This course emphasize on the concepts of Nano Electronics 2. To understand the transport phenomena in nanostructures. 3. To impart knowledge of Fabrication of Nano structured devices.

Course Content	
Unit	Description
1.	Nano Science, Nanotechnology, Nanostructure and bulk materials, Zero dimensional, one dimensional, two dimensional and three dimensional nanostructures, Nano fabrication, Characterization techniques for Nano materials, Scanning Electron Microscopy and Transmission Electron Microscopy, Atomic Force Microscopy, Cluster and Nano structure
2.	Electron transport in semiconductors and nanostructures, Quantum and classical regimes of electron transport, single electron transport, Energy band transitions in quantum wells, quantum wires and nano wires, Quantum dots and nano particles
3.	Nano structure Devices, Nano electronic and optoelectronic devices, tunneling effect, photon absorption and emission, Interband emission and absorption in semiconductors, Luminescence -LED and LASER Diode
Teaching-Learning Methodology	Use of ICT Tools, Classroom Teaching (Offline/Online), Use of Power point Presentation, Group Discussion, Video Animation and Presentation, Experimental demonstration.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand the different aspects of Nanoscience and Nanotechnology.
2.	Learn all basic terminologies and importance of Nano devices.
3.	Understand the Quantum well structures.
4.	Grasp the concepts of fabrication of Nano electronic and optoelectronic devices and measurement of its properties.

Suggested References :	
1.	Fundamentals of Nanoelectronics George W. Hanson, Pearson Education, New Delhi, INDIA
2.	Introduction to Nanoelectronics Valdimir V. Mitin, Viatcheslav A Kochelap, Michael A Stroscio
3.	Nanoelectronics A.S. Bhatia, NuTech Books, New Delhi, INDIA
4.	Low Dimensional Semiconductors : Materials, Physics, Technology & Devices M.J. Kelly, Clarendon Press Oxford, N.Y. USA
5.	Nanoelectronics : Principles and Devices Mireea Dragoman and Daniele, Artech House Publication, N.Y. USA
6.	Nano technology Gregory Timp
7.	Handbook of nanopahse materials Avery N Goldstein
8.	Semiconductor Hetero junctions and Nanostructures Omar Manasreh, McGraw Hill, N.Y., USA

On-line resources to be used if available as reference material
1.On Line Video Lectures on SWAYAM
2.On Line Video Lectures of course on thin film deposition techniques NPTEL

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Pre Ph.D. (Electronics) Course work

Course Code	DSEELE54	Title of the Course	Embedded System Design and Digital Signal Processing
Total Credits of the Course	3	Hours per Week	3 Hours

Course Objectives:	1. To Introduce the fundamental understanding of Operating system. 2. To understand the basic concepts of embedded system design. 3. To acquire knowledge of different techniques of digital signal processing.

Course Content	
Unit	Description
1.	Embedded system design and its architecture, Interfacing memory and input/output devices, data transfer, types, Interrupts, DMA, Serial data transfer, RS-232C, GPIB,I2C, CAN bus protocols, RFID, Smart cards, PDA's, Zip drives, Development and troubleshooting tools, IDE
2.	Introduction to operating Systems, Process Management and Inter Process communication, conditional critical regions, Memory Management, I/O subsystem, File system Organization, POSIX Thread Programming –Real time.
3.	Methods and techniques for digital signal processing, A/D and D/A converters, Design of digital filters, Application to spectrum analyzer, Speech processing, Audio CD Player, AM detector, Image processing.
Teaching-Learning Methodology	Use of ICT Tools, Classroom Teaching (Offline/Online), Use of Power point Presentation, Group Discussion, Video Animation and Presentation, Experimental demonstration.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand the different aspects of embedded system design and its programming.
2.	Identify different operating systems.
3.	Demonstrate the concepts of digital signal processing.

Suggested References :	
1.	Signals and Systems Simon Haykins and Barry Vankeen John Wiley & Sons, N.Y. (U.S.A)
2.	Signals and Systems : Continuous and Discrete Rodger E. Ziemer, William A. Tranter and D. Ronald Fannin Max Well Macmillan Int. (U.S.A)
3.	Digital Signal Processing Alan. V. Oppenheim and Ronald. W. Schafer Prentice Hall of India, New Delhi (INDIA)
4.	Theory and Applications of Digital Signal Processing Lawrence R. Rabiner and Bernard Gold Prentice Hall of India, New Delhi (INDIA)
5.	Introduction to Digital Signal Processing Johnny R. Johnson Prentice Hall of India, New Delhi (INDIA)
6.	Digital Signal Processing John G. Proakis and Dimitris G. Manolakis Prentice Hall of India, New Delhi (INDIA)
7.	The 8051 Microcontroller and Embedded Systems – using assembly and C ", Muhammad Ali Mazidi and Janice Gillespie Mazidi and Rollin D. McKinlay; PHI, / Pearson, 2006

On-line resources to be used if available as reference material
1.On Line Video Lectures on SWAYAM
2.On Line Video Lectures of course on thin film deposition techniques NPTEL

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Pre Ph.D. (Electronics) Course work

Course Code	DSEELE55	Title of the Course	Study of Quantum Systems and the Reality
Total Credits of the Course	3	Hours per Week	3 Hours

Course Objectives:	1. An in depth study of the Quantum Systems, and Quantum Entanglement of electrons 2. To facilitate the scientific enquiry to the Reality of the Universe

Course Content	
Unit	Description
1.	The Quantum particle- Schrodinger's Equation, Quantum Theory's experimental background, Understanding Wave-particle duality, What is Quantum Reality? The 'holistic' nature of Wave function,Wave Function Collapse, Probability distribution, The Copenhagen interpretation
2.	The Entangled Quantum World- Bell inequalities, Bohm type EPR experiments, Hardy's EPR example, The quantum states of Boson and Fermions, Quantum teleportation
3.	Scientific Enquiry to the Reality- The Nature of Space and Time, Quantum Theory and Space Time, Einstein's Quest for the Unified Filed Theory, Stephen Hawking's views of Space Time, Penrose's Model for the role of mentality in the Physical world
Teaching-Learning Methodology	Review of Literature, Classroom Teaching (Offline/Online), Group Discussion

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	University Examination	100%

Course Outcomes: Having completed this course, the learnerwill be able to

1.	Understand deeply the behaviour of quantum particles in general, electron in particular.
2.	Have an in depth view about the modern experiments of Quantum teleportation
3.	Summarise and Correlate the existing scientific principles about the description of the Reality of the World.

Suggested References :	
1.	The Road to Reality, A complete guide to the Laws of the Universe, - Roger Penrose, Jonathan Cape, London, 2004
2.	The Nature of Space and Time, - Stephen Hawking and Roger Penrose Princeton University Press, 2010 Printed in India by Gopsons Papers Ltd.
3.	The World according to Quantum Mechanics; - Why the laws of Physics make perfect sense after all Ulrich Mohroff World Scientific Publishing Co. Pvt. Ltd., 2011

On-line resources to be used if available as reference material
1.On Line Video Lectures on SWAYAM and The Oxford University
2 Online reading material available in plenty

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Pre Ph.D. (Electronics) Course work

Course Code	DSEELE56	Title of the Course	Artificial Intelligence and Electronic Fuzzy and Neural Networks
Total Credits of the Course	3	Hours per Week	3 Hours

Course Objectives:	1. To provide a detailed understanding about the Artificial Intelligence 2. An understanding about the Neural Network models 3. An in depth study of the Fuzzy Logic Systems 4. An understanding about the Fuzzy Neuro Systems and Their Applications

Course Content	
Unit	Description
1.	Introduction to Artificial Intelligent Systems, Fundamentals of Neural Networks-Models of a Biological and Artificial Neurons, Neural Network Architecture. Learning Methods, Adaline Network, Back Propagation Network
2.	Associative Memory, Adaptative Resonance Theory, Fuzzy versus Crisp Logic, Fuzzy Set Theory, Fuzzy Quantifiers, Fuzzy Inference, Fuzzy Rule Based Systems
3.	Fuzzy circuits, Fuzzy Neuro Systems, Fuzzy Neurons, Applications
Teaching-Learning Methodology	Review of Literature, Classroom Teaching (Offline/Online), Group Discussion

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	University Examination	100%

Course Outcomes: Having completed this course, the learnerwill be able to	
1.	Understand deeply the concept and the importance of Artificial Intelligence and its Applications.
2.	Get a detailed idea about various Neural Network structures and algorithms
3.	Gen an idea about the Fuzzy system and Circuits, and Fuzzy Neuro systems and their applications

Suggested References :	
1.	Neural Networks, Fuzzy Logic and Genetic Algorithms – Synthesis and Applications S. Rajasekaram and G A Vijayalakshmi Pai Prentice Hall of India Pvt. Ltd., 2007
2.	Understanding Neural Networks and Fuzzy Logic: Basic Concepts and Applications Stamatios V. Kartalopous Prentice Hall of India Pvt. Ltd., 2000
3.	Introduction to Applied Fuzzy Electronics Ahmad M. Ibrahim Prentice Hall of India Pvt. Ltd., 1999
4.	Fuzzy Sets and Fuzzy Logic – Theory and Applications George J Klir/Bo Yuan Prentice Hall of India Pvt. Ltd., 2006

On-line resources to be used if available as reference material
1.On Line Video Lectures on SWAYAM
2 Online reading material and videos available in plenty

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PhD (English)
Course-work

Paper	II	Title of the Course	Literary and Critical and Cultural Theories
Total Credits of the Course	03	Hours per Course	45

Course Content		
Unit	Description	Weightag* (%)
1.	**Feminist and Ecofeminist Theories:** 1. **Elaine Showalter**: "Feminist Criticism in the Wilderness" in *Critical Inquiry*, Vol. 8, No.2, Writing and Sexual Difference (Winter, 1981), pp. 179-205) **2. Carolyn Merchant**: "Introduction: Women and Ecology" and "Nature as Female" in *The Death of Nature: Women, Ecology and the Scientific Revolution*. New York: Harper and Row, 1980, xix-41.	33
2.	**Postcolonial and Postmodern Theories:** 1. **Linda Hutcheon:** "The post always rings twice: The postmodern and the postcolonial" in *Textual Practice*, Vol. 8, No.2, 1994, Pp. 205–238. 2. **Jean-Francois Lyotard:** "From *The Postmodern Condition: A Report on Knowledge"* in *Postmodernism and the Contemporary Novel,* Eds. Bran Nicol, Edinburgh: Edinburgh University Press, 2002, Pp 72-90	33
3.	**Translation and Film Adaptations Theories:** **1. Lawrence Venuti:** ""Translation as Cultural Politics: Regimes of Domestication in English", *Textual Practice* 7/2 (Summer 1993), 208-23; also reprinted in *Translation-Theory and Practice: A Historical Reader*, ed. Daniel Weissbort and Astradur Eysteinsson, Oxford: OUP, 2006, 546-557 2. **Robert Stam**: "Introduction: The Theory and Practice of Adaptation" in ***Literature and Film***, Eds. Robert Stam and Alessandra Raengo, Malden, USA: Blackwell Publishing, 2005, Pp. 1–52.	34

Teaching-Learning Methodology	1. Classroom Teaching 2. Use of Multi-media Tools 3. Use of Online / Internet Resources & Reference Materials

Evaluation Pattern		
No.	Details of the Evaluation	Weightage
1.	Written Examination Or Written Assignment Submission	50 Marks
2.	Review Presentation and Viva-voce	50 Marks

PhD (English)
Course-work

Paper	III	Title of the Course	Literary Text: Approaches and Analysis
Total Credits of the Course	03	Hours per Course	45

Course Content		
Unit	Description	Weightage* (%)
1.	**Sociological Approach:** 1. **Wilbur S. Scott**: "The Sociological Approach" in ***Five Approaches to Literary Criticism***, New York: Collier Books, 1962. Pp. 121–176. 2. **Diana Laurenson and Alan Swingewood**: "Introduction: Sociology and Literature" and "The Social Theories of Literature" in ***The Sociology of Literature***, London: Paladin, 1972, Pp. 11–58.	33
2.	**Psychological Approach:** 1. **Wilbur S. Scott**: "The Psychological Approach" in ***Five Approaches to Literary Criticism***, New York: Collier Books, 1962. Pp. 67–120. 2. **Michael Ryan**: "Psychoanalysis and Psychology" in ***Literary Theory: A Practical Introduction***, West Sussex, UK: Wiley Blackwell, 2017. Pp.	33
3.	**Posthuman/ist Approach to Literature** 1. **Francesca Ferrando:** "What is Philosophical Posthumanism?" in *Philosophical Posthumanism*. London: Bloomsbury, 2019, 19-61. 2. **Rosi Braidotti**: "Posthuman Humanities: Life beyond Theory" in *The Posthuman*. Malden: Polity Press, 2013, 143-185.	34

Teaching-Learning Methodology	1. Classroom Teaching 2. Use of Multi-media Tools 3. Use of Online / Internet Resources & Reference Materials

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Written Examination Or Written Assignment Submission	50 Marks
2.	Review Presentation and Viva-voce	50 Marks

PG Department of Gujarati

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Ph.D. Course Work Details :

- **Course - 2**

No.	Course Work Details
૧.	ગુજરાતી સાહિત્યમાં સંશોધન, સંપાદન, વિવેચન, અનુવાદ, સર્જન પ્રવૃતિ.
૨.	ગુજરાતી સાહિત્ય સંશોધનના ક્ષેત્રો, પદ્ધતિઓ.
૩.	ગુજરાતી લોકસાહિત્ય સંશોધનના પ્રશ્નો.
૪.	ગુજરાતી લોકસાહિત્ય સંશોધનનો ઇતિહાસ.
૫.	ગુજરાતી લોકસાહિત્ય સંશોધનમાં ઝવેરચંદ મેઘાણીનું પ્રદાન.
૬.	ગુજરાતી લોકસાહિત્ય સંશોધનમાં શાંતિભાઈ આચાર્યનું પ્રદાન.
૭.	મધ્યકાલીન ગુજરાતી સાહિત્ય સંશોધનના પ્રશ્નો.
૮.	મધ્યકાલીન ગુજરાતી સાહિત્ય વણખેડાયેલાં ક્ષેત્રો.
૯.	સિંહાસન બત્રીસી.
૧૦.	અખો એક અધ્યયન.
૧૧.	ગુજરાતી સાહિત્યના સુધારક યુગનું સંશોધન કાર્ય.
૧૨.	અર્વાચીન ગુજરાતી સાહિત્યમાં સંશોધન પ્રવૃતિ.
૧૩.	ગુજરાતી સાહિત્યમાં સંશોધનના સ્રોત.
૧૪.	સાહિત્ય સંશોધનની ભાષા.
૧૫.	સાહિત્ય સંશોધન : જોડણી, પ્રૂફ.
૧૬.	સાહિત્ય સંશોધન : સંદર્ભસૂચી, પાદટીપ.

PG Department of Gujarati

Sardar Patel University,
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Ph.D. Course Work Details :

- **Course-3**

No.	Course Work Details
૧.	કાવ્ય સાહિત્યમાં પ્રયુક્તિઓ.
૨.	કાવ્ય સાહિત્યમાં પ્રયુક્તિઓ.
૩.	કાવ્ય સાહિત્યમાં પ્રયુક્તિઓ.
૪.	તુલનાત્મક સાહિત્ય.
૫.	સાહિત્ય અને પર્યાવરણ.
૬.	સાહિત્ય અને નારીવાદ.
૭.	સાહિત્ય અને ફિલ્મ.
૮.	ભારતીય ડાયસ્પોરા.
૯.	ગુજરાતી ડાયસ્પોરા.
૧૦.	સાહિત્ય સંશોધન કોમ્પ્યુટર.
૧૧.	સાહિત્યિક સામયિકો.
૧૨.	ગ્રંથાલય વિનિયોગ.
૧૩.	સંશોધન અંગે. મહેન્દ્ર નાયી
૧૪.	સંશોધન અંગે. ગુણવંત વ્યાસ
૧૫.	સંશોધન અંગે. હિતેન્દ્ર ઓઝા

PhD (Hindi) Course work syllabus

प्रश्न पत्र-०२ (हिंदी साहित्य की वैचारिक पृष्ठभूमि)

Paper- 2

Term Paper-50 marks

Seminar-50 marks

पाठ्यक्रम	पाठ्यक्रम का नाम	क्रेडिट
इकाई ०१	भारतीय चिंतन- अद्वैतवाद, विशिष्टाद्वैतवाद, अविकृतिवाद, नववेंदात (स्वामी विवेकानंद)	१
इकाई ०२	विश्वप्रपंच की भूमिका - आ. रामचंद्रशुक्ल (हेकल की पुस्तक द रिडल ऑफ यूनिवर्स का अनुवाद), महात्मा गांधी और डॉ. भीमराव अम्बेडकर का चिंतन	१
इकाई ०३	सांमतवाद, पूंजीवाद, साम्राज्यवाद, समाजवाद, लोकतंत्र, आधुनिकता, उत्तर आधुनिकता, दलित-विमर्श, स्त्री-विमर्श	१

प्रश्न पत्र- ३ (शोध प्रारूप)

Paper-3

Term Paper-50 marks

Seminar-50 marks

पाठ्यक्रम	पाठ्यक्रम का नाम	क्रेडिट
इकाई ०१	प्रस्तावना, विषयचयन, रूपरेखा, सामग्री संकलन	१
इकाई ०२	अध्याय विभाजन, लेखन	१
इकाई ०३	उपसंहार, संदर्भसूची, पाद टिप्पणी	१

नोंध :- इसमें दोनों प्रश्नपत्रों में टर्मपेपर 50 अंक के और सेमिनार 50 अंक के होते हैं।

आचार्य एवं अध्यक्ष
स्नातकोत्तर हिन्दी विभाग
सरदार पटेल विश्वविद्यालय
वल्लभ विद्यानगर-388 120

End-1

Sardar Patel University Vallabh Vidyanagar
Ph.D. (History) Coursework

Rules and Regulations for Ph.D. Programme
Effect from September, 2021
R. Ph. D. 9. Course Work

Course No and Title of the coursework	Lectures Guidance in weekly	Credits	Total
Course-II Gandhi, Sardar, and Politics in Gujarat (1915-1960)	03	03	100
Course-III Study of Important Essays	03	03	100

Course-II Gandhi, Sardar, and Politics in Gujarat (1915-1960)

Unit I

- Politics in Gujarat at the Dawn of Gandhian Era
- Gandhi's Advent in Gujarat: Beginning of the Ashram System: Kochrab and Sabarmati; The Early Activism: Ahmedabad Mill Labourers' Issues
- Peasant Satyagrahas in Gujarat: Kheda, Borsad, and Bardoli Satyagrahas
- The Non-cooperation Movement in Gujarat (1920-22)

Unit II

- Sardar Patel's rise in politics: Ahmedabad Municipal Corporation and Bardoli Satyagrahas: Leadership and Role
- The Civil Disobedience in Gujarat and Ras, Dharasana, and Dholera Satyagraha
- Political Implications of Gandhian Constructive Activities in Gujarat (1920-1947): A Survey
- Emergence of Political Associations and Activities in Princely States of Gujarat: Vadodara Rajya Prajamandal, Kathiawar Rajakiya Parishad; Rajkot, Limdi and Mansa Satyagraha

Unit III

- The Individual Satyagraha and Quit India Movement
- Sardar Patel in National Politics and Congress Organisation (1928-1947)
- Political Formation of the State of Gujarat (1947-1960): Integration of Princely States; Saurashtra, the Bombay State, and foundation of Gujarat.
- The The Mahagujarat Movement; Indulal Yajnik

Reference:

Professor & Head
P.G. Department of History
Sardar Patel University,
Vallabh Vidyanagar

English:

Gandhi, Rajmohan. *Sardar: A Life*. Ahmedabad: Navjeevan.
Lakha, Salim. 1988. *Capitalism and Class in Colonial India: The Case of Ahmedabad*. New Delhi: Sterling.
Mashruwala, Kishorlal. 1971. *Towards Sarvoday Order*. Ahmedabad: Navjeevan.
Sharp, Gene. 1979. *Gandhi as a Political Strategist*. Boston: Porter Sargent.
Terchek, Ronald J. 2000. *Gandhi: Struggling for Autonomy*. New Delhi: Vistaar.

Gujarati:

પરીખ, ૨. છો. અનેહ. ગં. શાસ્ત્રી (સંપા.) *ગુજરાતનોરાજકીયઅનેસાંસ્કૃતિકઇતિહાસ*. ગ્રંથ૯. અમદાવાદ: ભો. જે. વિદ્યાભવન.
ગાંધી, રાજમોહન. સરદાર: એકસમર્પિતજીવન. અમદાવાદ: નવજીવન.
ગાંધી, મોહનદાસ. આત્મકથાઅથવામારાસત્યનાપ્રયોગો. અમદાવાદ: નવજીવન.
યાજ્ઞિક, છંદુલાલ. મારીજીવનકથા.

Course-III **Study of Important Essays**

Unit I:

- प्राचीनभारतकेसामाजिकइतिहासकेअध्ययन, प्रवृत्तियांऔरसंभावनाएं. *इतिहास*२, जनवरी-दिसम्बर१९९३, पृ०१-७०.
- सुमीतसरकार. १८८५–१९०५: राजनीतिकएवंआर्थिकसंरचना. तदीय, आधुनिकभारत, पृ०२९–६०. नयीदिल्ली: राजकमलप्रकाशन.
- રશ્મિકાંતએલ૦રાવળ. ૧૯૮૧. ૨૦મીસદીદરમ્યાનગુજરાતમાંસામાજિકસુધારાનીપ્રક્રિયા. *વિદ્યાપીઠ*. શિશિ૨૧૯૮૧, પૃ૦૨૭–૩૭.

Unit II

- સાંસ્થાનિકહિંદમાંઉચ્ચશિક્ષણનોઉદયઅનેવિકાસ. ૧૮૫૦-૧૯૩૦: મુખ્યપ્રવાહો. *અભિદૃષ્ટિ*. ઓગસ્ટ૨૦૦૯, પૃ૦૨–૧૧.
- ઘનશ્યામશાહ. ૨૦૦૨. સમાજજીવન. શિરીષપંચાલ, બકુલટલેર, જયદેવશુક્લ (સંપા૦). *૨૦મીસદીનુંગુજરાત*. પૃ૦૧–૨૦. વડોદરા : સંવાદપ્રકાશન.

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- डेविडहार्डिमन. १९९५. दक्षिणगुजरातमेंआदिवासीआत्माग्रह१९२२-१९२३.
  शाहिदअमीनऔरज्ञानेन्द्रपांडेय,*निम्नवर्गीयप्रसंग*भाग१, पृ०९६-१२८.

Unit III

- ए०आर०कुलकर्णी. १९९४. भारतीयग्राममध्यकालीनदकन (मराठादेश) केविशेषसंदर्भमें. *इतिहास*३, जनवरी-दिसम्बर१९९४, पृ०५९-१००.
- અનંતકાકબાપ્રિયોળકર. ૧૯૪૫/૨૦૦૬.
  સ્વર્ગદુર્ગારામમહેતાજીઅનેમાનવધર્મસભાનોઉદ્ભવઅનેવિકાસ.
  *ફાર્બસગુજરાતીસભાત્રૈમાસિક*૭૧ (૨): ૨૨૮–૨૪૬.

Professor & Head
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SCHEME FOR Ph.D.(Home Science)

FOODS and NUTRITION

COURSE WORK UNDER CBCS

(Effective from 2021-22)

C/E	Course No.	Title	T/P	Credits	Contact hrs. (15 hrs./ credit)	Marks	
						Written exam/ Assignment	Review presentation and viva voce
C		Research Methodology	T	4	As per university rules		
C		Research and Publication Ethics	T	2			
C	PH05CFDN51	Advances in Nutritional Sciences	T	3	45	50	50
E	PH05EFDN51	Advances in Food Sciences	T	3	45	50	50
E	PH05EFDN52	Mother and Child Nutrition					

C/E=Core/Elective

T/P= Theory/Practical

Course Code: PH05CFDN01

Course Title : Advances in Nutritional Sciences **credits:3**

Unit I: Recent updates in metabolism of carbohydrates and energy

Unit II: Recent updates in metabolism of proteins and amino acids

Unit III: Recent updates in metabolism of lipids

Unit IV: Recent updates in vitamins and minerals

Unit V: Advanced Omics technology and Nutrition: Nutrigenomics, Nutrienetics and epigenomics

Course Code: PH05EFDN51

Course Title: Advances in Food Sciences **credits :3**

Unit I: Advances in food processing techniques for extending shelf-life of food

Unit II: Functional foods and nutraceutical for various health claim

Unit III: Application of unconventional foods for food product development

Unit IV: Recent updates on packaging materials and techniques

Unit V: Food Quality management

Course Code : PH05EFDN52

Course Title: Mother and Child Nutrition **credits:3**

Unit I: Physiological changes pregnancy and lactation.

Unit II: Breast feeding versus artificial feeding.

Unit III: Recent guideline in infant feeding and complementary feeding

Unit IV: Nutritional requirement for infants and children, Nutritional disorders of childhood

Unit V: Strategies to improve maternal and child health in India.

SCHEME FOR Ph.D.(Home Science)

FOOD BIOTECHNOLOGY

COURSE WORK UNDER CBCS

(Effective from 2021-22)

C/E	Course No.	Title	T/P	Credits	Contact hrs (15 hrs./ credit)	Marks	
						Written exam/ Assignment	Review presentation and viva voce
C		Research Methodology	T	4	As per university rules		
C		Research and Publication Ethics	T	2			
C	PH05CFBT51	Advances in Nutritional Sciences	T	3	45	50	50
C	PH05CFBT52	Advances in Food BioSciences	T	3	45	50	50

C/E=Core/Elective

T/P= Theory/Practical

Course Code:PH05CFBT51

Course Title: Advances in Nutritional Sciences **credits:3**

Unit I: Recent updates in metabolism of carbohydrates and energy

Unit II: Recent updates in metabolism of proteins and amino acids

Unit III: Recent updates in metabolism of lipids

Unit IV: Recent updates in vitamins and minerals

Unit V: Advanced Omics technology and Nutrition: Nutrigenomics, Nutrienetics and epigenomics

Course Code: PH05CFBT52

Course Title: Advances in Food BioSciences **credit: 3**

Unit 1: Applications of biotechnological techniques in enhancing nutritional quality and shelf-life of food

Unit II:Advances in Fermentation technology

Unit III: Functional foods and nutraceutical for various health claim

Unit IV: Food Safety: Molecular detection of pathogens, Molecular detection of genetically modified organisms in food. (plants and bacteria),

Unit V: Food Quality management

SCHEME FOR Ph.D.(Home Science)

TEXTILES AND CLOTHING

COURSE WORK UNDER CBCS

(Effective from 2021-22)

C/E	Course No.	Title	T/P	Credits	Contact hrs. (15 hrs./ credit)	Marks	
						Written exam/ Assignment	Review presentation and viva voce
C		Research Methodology	T	4	As per university rules		
C		Research and Publication Ethics	T	2			
C	PH05CTCL51	Advances in Textiles	T	3	45	50	50
C	PH05CTCL52	Advances in Clothing & Fashion	T	3	45	50	50

C/E=Core/Elective

T/P= Theory/Practical

Course Code: PH05CTCL51

Course Title: Advances in Textiles **Credits:3**

Unit I: Overview of textile industry-

-Global textile scenario
- Indian textile scenario
-present statistics
-future projections

Unit II(A) Innovations in production and manufacture of:

textile fibers(elastane/spandex, nano fibers)
yarns
fabrics

(B) Exploration/analysis of current trends in textiles and fiber development focusing on new technologies and materials

(C) Innovations in dyeing and finishing

Unit III Ecological concerns and eco-friendly textile manufacture and processing

Unit IV Smart/ intelligent textiles and technical textiles

Unit V Most recent researches in fibers, yarns, fabrics, dyes and finishes.

References:

1. www.teonline.com
2. www.innovationintextiles.com
3. www.wikipedia.org/textile.industry
4. www.rebaid.com/tech/functional-clothing-just-combine-cotton-clothes
5. Thilagavati G, Parthiban M and Viju S, Functional textiles and Clothing, Woodhead Publishing.

Course Code: PH05CTCL52

Course title: Advances in Clothing and Fashion **credits:3**

Unit I Overview of clothing consumption practices:
-global scenario
-Indian scenario
-present statistics
-future projections

Unit II(A) Modern approach to wearable clothing (special pockets, connector cables, colour changing fabrics)

(B) Functional Clothing- design of clothing, researches conducted in clothing design for situations regarding thermal or impact protection, accommodation of mobility, or facilitation of bodily functions, consideration of garments used for those with special needs.

(C) Clothing Ergonomics – human characteristics in physical constitution and factors to design applicable clothing

Unit III Advances in Apparel Production

Unit IV 3D pattern making

Unit V Special topics in clothing- exploration of current conceptualization and research methods in the areas of clothing, apparel technology, fashion, accessories

References:

1. www.woodheadpublishing.com/en/book.aspx?bookID=1346
2. www.wikipedia.org/wiki/Clothing-technology
3. Fairhurst.C(ed.)Advances in apparel production , Woodhead Publishing Ltd.
4. Thiagavati G, Parthiban M and Viju S. Functional textiles and Clothing, Woodhead Publishing

SCHEME FOR Ph.D (Home Science)
FAMILY RESOURCE MANAGEMENT
COURSE WORK UNDER CBCS
(Effective from 2021-22)

C/E	Course Code	Title	T/P	Credits	Contact hrs. (15 hrs/credit)	Marks	
						Written exam/Assignment	Review presentation and Viva voice
C		Research Methodology	T	4	As per University rules		
C		Research and Publication Ethics	T	2			
C	PH05CFRM51	Advances in Resource Management	T	3	45	50	50
C	PH05CFRM52	Sustainable Development: Initiatives & Approaches	T	3	45	50	50

C/E = Core/Elective

T/P = Theory/Practical

SARDAR PATEL UNIVERSITY
Ph.D COURSE (Core) PH05CFRM51
ADVANCES IN RESOURCE MANAGEMENT

Credits: 3 + 0

OBJECTIVES:

(1) To equip the students for academic excellence, enhancement of life and enable them to apply scientific knowledge and methods while working in home, institution and industry.

Unit – I

Advances in discipline of resource management: classical approach; behavioural approach; system approach and scientific management.

Unit – II

Managerial decision making: techniques, modes, creativity, rationality, risk and certainty, team management.

Unit – III

Management process: planning, techniques & dimensions; organization: principles & types; staffing and recruitment: concepts and principles.

Unit – IV

Directing: types and significance; controlling: types and significance, monitoring and evaluation: tools and techniques; Motivation: theories and approach; leadership: theories and styles.

Unit – V

Current trends in resource management, socio-economic environment impact on families and organization, stress: concept and management; group behaviour and dynamics

References

1. Craig, H and Rush,O.(1969).Homes with Character. New Delhi: Universal Book Store
2. Fitzsimmons, C. (1950).The Management of Family Resources. California: W. H. Freeman Co.
3. Gandotra,V., and Jaiswal, N.(2008). Management of Work in Home, New Delhi: Dominant Publishers and Distributors.(ISBN No. 81-7888-526-3)
4. Koontz, H., and O'Donnel C. (2005), Management – A Systems and Contingency Analysis of Managerial Functions. New York: McGraw-Hill Book Company
5. Gross.I.H., Crandall, E. W. and Knoll, M. M.(1980). Management for Modern Families. New Jersey: Prentice Hall Inc.

SARDAR PATEL UNIVERSITY

Ph.D COURSE (Core) PH05CFRM52

SUSTAINABLE DEVELOPMENT: INITIATIVES AND APPROACHES

Credits: 3 + 0

OBJECTIVES:

To expose the students to global environmental issues and strategies related to housing environment, consumerism and ergonomic designing

Unit – I

Introduction to technology and environment, Sustainable development- international perspective, State of Indian environment, Energy flow audit and economy – green strategies for sustainable development

Unit – II

Housing & Environment: Building materials and their impact on the environment, green rating systems, energy efficiency in buildings, indices of indoor comfort, houses for elderly

Unit III

Work Environment and its impact on performance of worker: assessment techniques, Control of exposure and Methods to reduce

Unit – IV

Ergonomic Product design: Design thinking process, diffusion, and innovation, design communication with ergonomic considerations, Spatial organization in interiors: work zones, space bubble with special reference to people with disabilities (PWD)

Unit – V

Consumer challenges, consumer behaviour approaches, gender issues in consumerism, consumer empowerment, diffusion of innovation: brand loyalty, Green Consumerism- adopting sustainable lifestyles, consumer redressal : issues and challenges

References

1. Gangawane, L. V., and KhilareV. C. (2007).Sustainable Environmental Management: Dr Jayshree Deshpande Festchrift Volume. Delhi: Daya (ISBN 13: 9788170354741)
2. Chauhan, B.C. (2008). Environmental Studies. New Delhi: University Science Press,.
3. Singh, S. (2007). Ergonomics Integration for Health and Productivity. New Delhi/ Udaipur: Himanshu Publication
4. Kubba, S. (2003). Space Planning for Commercial and Residential Interiors. (1 st Ed.). New Delhi: McGraw-Hill Professional,

5. Rinehart and Winston Stuart. L. (2013). Furniture Design: An Introduction to Development, Materials and Manufacturing.London : Laurence King Publishing
6. Wagner, S. (2003). Understanding Green Consumer Behaviour. Routledge (ISBN 9780415316194)

SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.25)

PRE-PhD COURSE-WORK
(w.e.f. 2018)

Course Code	Paper-II	Title of the Course	Advance Legal Research-II
Total Credits of the Course	03	Hours per Week	15*3

Course Objectives:	The object of the course is to: (a) Familiarize the students with the fundamentals of law, the new challenges and perspectives in legal and constitutional development and the role of law in contemporary Indian society as applicable to the general area chosen for research. (b) Endow the students with adequate knowledge to understand the fundamentals of law. (c) Equip them with various theories, different aspects, theoretical foundations, concepts and developments in law. (d) Make the students aware of the intricacies of judicial creativity and the tools and techniques employed in judicial process.

Course Content		
Unit	**Description**	**Credits**
1.	**The Constitution of India:** • The significance of the Preamble, • Definition of State (Article 12), • Fundamental Rights: right to equality (Article 14 – 18), right to freedom (Article 19 – 22), right against exploitation (Article 23 – 24), right to freedom of religion (Article 25 – 28), cultural and educational rights (Article 29), right to constitutional remedies (Article 32 & 226), • Directive principles of State policy (Article 36 – 51), • Fundamental duties (Article51A).	01
2.	**Jurisprudence:** • Theories of Law: Natural law theory, analytical legal positivism, American legal realism, historical and sociological schools, Critical legal studiesmovement. • Theories of Justice: Theories of justice propounded by Aristotle, Bentham, Rawls, Amartya Sen and Dharmic concept ofjustice	01
3.	**Interpretation of Statutes:** • General rules of interpretation, interpretation of Constitution and legislative documents, internal and external aids of interpretation. **Judicial Process:** • Concepts of Judicial Review, Judicial Activism and Judicial Precedent.	01

Evaluation Pattern		
Sr. No.	**Details of the Evaluation**	**Weightage (%)**
1.	There would be two seminar/Presentation. One on Constitution of India and the other on Jurisprudential Perspectives. The topic for the seminars/Presentation should be linked to a specific area connected to the area of research. The marks for each seminar/Presentation would be25.	50%
2.	There will be awritten exam conducted at the end of the course by the University/Concerned Institute where students are registered for 50 Marks.	50%
	Total	**100%**

SuggestedReferences:	
Sr. No.	**References**
1.	**Reference books:** 1. Amartya Sen, *The Idea ofJustice.* 2. Benjamin Cardozo, *The Nature of JudicialProcess.* 3. Bodenheimer, *Jurisprudence: The Philosophy and Method ofLaw.* 4. H.M. Seervai, *Constitutional Law ofIndia.* 5. John Rawls, *A Theory ofJustice.* 6. Julius Stone, *Legal System and Lawyer'sReasoning.* 7. Julius Stone, *Precedent and theLaw.* 8. Laxmikant, *Precedent in IndianLaw.* 9. M.P. Jain, *Outlines of Indian Legal History.* 10. Marc Galanter, *Law and Society in ModernIndia.* 11. N.K. Jayakumar, *Judicial Process inIndia.* 12. Rajeev Dhawan, *The Supreme Court of India: Socio-legal Critique of its JuristicTechniques.* 13. S.N. Dhyani, *Fundamentals of Jurisprudence: The IndianApproach.* 14. Upendra Baxi, *The Crisis of the Indian LegalSystem.* 15. Upendra Baxi, *The Indian Supreme Court andPolitics.* 16. W. Friedman, *LegalTheory*

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SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar, Gujarat

(Reaccredited with 'A' Grade by NAAC (CGPA 3.25)

PRE PH.D COURSE WORK

(W.e.f-2018)

Course Code	Paper - III	Title of the Course	Advance Legal Concepts- II
Total credit of Course	03	Total Hours	15 * 3

The object of the course is to :
(a) Enhance the knowledge of the students on various issues and challenges in the cyber space
(b) Equip the students with new tools of Scientific criminal justice proceedings based on new technique
(c) Identify the emerging challenges and generate new policy for the protection of IPR in the digitalized era
(d) Discuss the various aspects of cyber laws, criminal laws and law related to IPR in the modern legal system

Course Content

Unit	Description	Credits
1	**Social media, cyber crimes and Information Technology** • Cyberspace - Issues and challenges • Impact of Information Technology on Indian Judiciary • Emerging trends in Cyber crime • Cyber crimes in social media • Rights of privacy in digital era	01
2	**Criminology -** • Law relating to Scientific Investigation in Criminal matters. • Criminal Justice in India: Primitivism to Post-Modernism • DNA Profiling and the Forensic use of DNA Evidence in Criminal Proceedings • Criminal Justice in India: Primitivism to Post-Modernism	01
3	**Trends in IPR : emerging issues and challenges** • Protection of Trade Secrets and Undisclosed Information in the digital era : Law and Litigation • Protection of Copyright in Internet Age – New Challenges and application of laws	01

	• Trends in Protection of Geographical Indication: Indian scenario	

Evaluation Pattern

Sr.No	Details of evaluation Pattern	Weightage
1	**Component-I -Assignment** 1) Topic of assignment in course shall be related to Ph.D. topic and Ph.D. supervisor shall take approval topics of assignment from DRAC 2) Assignment shall be Minimum of 5000 words (submission in soft and hard copy both, rules of plagiarism should be followed) 3) Marks in assignment shall be given out of 50	Evaluated for 50 marks (50%)
2	**Component-II -Presentation-** 1) Ph.d scholar is required to make presentation cum viva on topic (different from assignment of component-1) before the DRAC in each course given by Ph.D. guide in consultation of DRAC 2) At the time of Presentation Ph.D. Guide shall remain present	Evaluated for 50 marks (50%)
	Total	100 Marks 100%

Reference books :

- Law Relating to Intellectual Property Rights, V.K. Ahuja, LexisNexis India
- Intellectual Property Law P. Narayanan, Eastern Law House
- Scientific Criminal Investigation Author : B R Sharma, Universal Law Publishing
- Bharat's Forensic Science (For Law Students & Law Professionals) by Dr. (Prof.) V. P. Singh Publisher : Bharat Law House Pvt. ltd.
- Asia Law House's Forensic Science - Identification of Finger Prints by C. K. Johari
- Cyber Law Simplified, Author: Vivek Sood
- Technology Laws Decoded, by N. S. Nappinai, LexisNexis
- Information Technology Law and Practice, Vakul Sharma, Universal Law Publishing

Doctor of Philosophy (Library & Information Science)

COURSEWORK

Course Code	Coursework-3	Title of the Course	Review of Literature
Total Credits of the Course	3	Hours per Week	45

Course Objectives:	To make the researcher aware about the existing literature related to the selected theme of the research study. To categorize the existing literature according to the objectives of the selected research study. To critically evaluate the existing literature related to the selected theme of the research study. To conclude and select the appropriate methodology for the selected research study.

Description	**Weightage (%)**
Review of literature. • Importance of review of literature. • Concept of literature review. • Objectives of literature review. • Forms of literature review – Analytical, Chronological, Problem solution etc. • Procedure of literature review. • Selection of relevant literature for the study. • Critical analysis of existing literature. • Written presentation of review work.	100

Review of different methods and methodologies available and relevant for the selected study. • Study the literature related to the different methods and methodologies relevant to the selected research theme. • Arriving at conclusion and selecting the relevant methodology for the study based on the review work.	

Teaching- Learning Methodology:	The course would be taught / learnt through various means like lectures, group discussion, seminars, tutorial, written assignments, viva-voce, seminars presentations, and browsing online-resources relevant to the content.

Evaluation Pattern:

Sr. No.	Details of the Evaluation	Weightage %
1.	Written Examination or written assignments	50
2.	Review, Presentation and viva-voce	50
3.	Total	100

In addition, students will have to make a presentation on a topic related to experimental of theoretical methodology and the techniques for data analysis with chosen illustrative case relevant to the field of the research proposal and approved by the guide and the DRAC.

Course Outcomes: Having completed this course, the learner will be able to

1.	Identify the relevant existing literature related to the selected theme of the research study
2.	Categorize the existing literature according to the objectives of the selected research study
3.	Critically evaluate the existing literature related to the selected theme of the research study.
4.	Select the appropriate methodology for the selected research study.

Suggested References:

Relevant literature related to the selected research study from the various sources like:

Government websites, journals, reports, books, and other publications related to the research study. The books related to the selection of the appropriate research methodology can be used.

Doctor of Philosophy (Library & Information Science)

COURSEWORK

Course Code	Coursework-2	Title of the Course	Introduction to Research Study
Total Credits of the Course	3	Hours per Week	45

Course Objectives:	To make the researcher aware about the research areas. To make the researcher aware about the present Library & Information Science scenario related to the selected research study. To understand and evaluate the Library & Information Science Policies/ Practices/Problems related to the selected research study as applicable level viz.; - International, National, State, Local The researcher will be able to realize the importance of the selected research study

Description	**Weightage (%)**
Selection of research theme Present Library & Information Science scenario related to the theme of the research study as applicable VIZ.; • International level • National level • State level • Local level Understand of Library & Information Science Policies/Practices/Problems in the context of the theme of the research study as applicable VIZ.; • International level • National level • State level	100

• Local level Evaluation of Library & Information Science policies/practices/problems in the context of the theme of the research study as applicable VIZ.; • International level • National level • State level • Local level Theoretical framework associated with the theme of the research study	

Teaching- Learning Methodology:	The course would be taught / learnt through various means like lectures, group discussion, seminars, tutorial, written assignments, viva-voce, seminars presentations, and browsing online-resources relevant to the content.

Evaluation Pattern:

Sr. No.	Details of the Evaluation	Weightage %
1.	Written Examination or written assignments	50
2.	Review, Presentation and viva-voce	50
3.	Total	100

In addition, students will have to make a presentation on a topic related to experimental of theoretical methodology and the techniques for data analysis with chosen illustrative case relevant to the field of the research proposal and approved by the guide and the DRAC.

Course Outcomes: Having completed this course, the learner will be able to	
1.	Identify and justify the research areas.
2.	Asses the present Library & Information Science scenario related to the selected research study.
3.	Evaluate the Library & Information Science policies/practices/problems related to the selected research study as applicable level viz.; - International, National, State, Local.
4.	Appreciate the importance and develop a critical understanding about the selected research study.

Suggested References:

Relevant references as suggested by the respective guide and the DRAC like:

Government websites, journals, reports, books, and other publications related to the research study.

POSTGRADUATE DEPARTMENT OF BUSINESS MANAGEMENT
SARDAR PATEL UNIVERSITY, VALLABH VIDYANAGAR
MBA PROGRAMME

Syllabus of Ph. D Course work

Course– II

Research Ethics & Publication

1.	Research Paper Publication
2.	Report writing – ethical confederation and plagiarism check, Referencing styles
3.	Synopsis writing
4.	Pre submission presentations
5.	Research paper presentation in conferences & seminars
6.	Literature Review
7.	Questionnaire Design
8.	Sampling Methods
9.	Data collection
10.	Ethical considerations in Research

Course – III

Advanced Data Analysis & Computer Application in Research

1.	Data Management, Data transformation, Descriptive statistics
2.	Parametric tests
3.	Non – parametric tests
4.	Correction & Regression Analysis
5.	Factor Analysis – Exploratory
6.	Factor Analysis – Confirmatory
7.	Cluster Analysis
8.	Structural Equation Modeling
9.	Discriminate / Logistic Regression
10.	Qualitative Research
11.	Data Analysis – Qualitative Research

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Sardar Patel University

Post Graduate Department of Business Management

Ph.D Coursework Time Table – 07th to 17th February 2022

Venue: Room No. 105

Date	Day	Time	Topic	Resource Person
07-02-2022	Monday	9:00 to 10:30	Fine-tuning the Research Plan with Research Supervisor (In light of Previous Learning)	Concerned Supervisor
		11:00 to 12:15	Introduction to PhD Programme in Management	Prof. P. K. Priyan
		12:30 to 1:30	Identifying Research Problem, Framing Research Objectives and Deciding the scope	Prof. Darshana Dave
		1:30 to 2:30	Lunch Break	
		2:30 to 3:45	Advanced Microsoft Tools	Dr. Biraj Patel
		4:00 to 6:00	Emerging developments in theory of Finance/ Marketing/ HR	Prof. P. K. Priyan / Prof. Darshana Dave
08-02-2022	Tuesday	9:00 to 10:30	Fine-tuning the Research Plan with Research Supervisor (In light of Previous Learning)	Concerned Supervisor
		11:00 to 12:15	Literature Review Searching Quality Papers, Flow of Writing, Language, Determination of Literature Gap, APA Citation, Referencing Software etc)	Dr. Vilas Kulkarni
		12:30 to 1:30		
		1:30 to 2:30	Lunch Break	
		2:30 to 3:45	Publishing a Research Paper Based on Literature Review	Mr. Divyang Purohit
		4:00 to 6:00	Advance theoretical developments in Finance/ Marketing/ HR	Prof. Mitesh Jayswal Dr. Vilas Kulkarni Dr. Ashish C. Mehta

09-02-2022	Wednesday	9:00 to 10:30	Fine-tuning the Research Plan with Research Supervisor (In light of Previous Learning)	Concerned Supervisor
		11:00 to 12:15	Hypothesis Formulation & Data Collection	Prof. Yogesh C Joshi
		12:30 to 1:30		
		1:30 to 2:30	Lunch Break	
		2:30 to 3:45	Introduction to Capitaline & Other Web sources of Data	An Executive from Capitaline
		4:00 to 6:00	Contempory Research in Finance/ Marketing/ HR	Prof. Yogesh C Joshi Dr. Ashish C. Mehta Dr. K S Prasad
10-02-2022	Thursday	9:00 to 10:30	Fine-tuning the Research Plan with Research Supervisor (In light of Previous Learning)	Concerned Supervisor
		11:00 to 12:15	Measurement and Scaling	Prof. Mitesh Jayswal
		12:30 to 1:30		
		1:30 to 2:30	Lunch Break	
		2:30 to 3:45	Scale Adoption and Modification	Dr. Riddhish Joshi
		4:00 to 6:00	Nobel Prize Winning Researches in Economics; A Review	Prof. Yogesh C. Joshi
11-02-2022	Friday	9:00 to 10:30	Fine-tuning the Research Plan with Research Supervisor (In light of Previous Learning)	Concerned Supervisor
		11:00 to 12:15	Data Analysis - Introduction to SPSS	Dr. Rachita Jayswal
		12:30 to 1:30		
		1:30 to 2:30	Lunch Break	
		2:30 to 3:45	Secondary Data Analysis	Dr. Drashti Shah
		4:00 to 6:00	Practical / Assignment	Dr. Rachita Jayswal

		9:00 to 10:30	Fine-tuning the Research Plan with Research Supervisor (In light of Previous Learning)	Concerned Supervisor
		11:00 to 12:15	Advance Data Analysis (Advance Regression analysis, Factor Analysis, Cluster Analysis etc)	Dr. Hitesh Parmar
12-02-2022	**Saturday**	12:30 to 1:30		
		1:30 to 2:30	Lunch Break	
		2:30 to 3:45	Use of Advance Data Analytical Techniques in PhD Thesis	Dr. Milind Parekh
		4:00 to 6:00	Practical / Assignment	Dr. Hitesh Parmar
		9:00 to 10:30	Fine-tuning the Research Plan with Research Supervisor (In light of Previous Learning)	Concerned Supervisor
		11:00 to 12:15	Introduction to AMOS software (CFA, Scale Validation etc)	Dr. Hitesh Parmar
14-02-2022	**Monday**	12:30 to 1:30		
		1:30 to 2:30	Lunch Break	
		2:30 to 3:45	Use of Advance Data Analysis Techniques in PhD Thesis	Dr. Rahim Munshi
		4:00 to 6:00	Practical / Assignment	Dr. Hitesh Parmar
		9:00 to 10:30	Fine-tuning the Research Plan with Research Supervisor (In light of Previous Learning)	Concerned Supervisor
		11:00 to 12:15	Reporting of Research Results and Report Writing	Prof. R. M. Rathod
15-02-2022	**Tuesday**	12:30 to 1:30		Prof. S.S. Kalamkar
		1:30 to 2:30	Lunch Break	
		2:30 to 3:45	Role of Language in Report Writing	Dr. Swati Joshi
		4:00 to 6:00	Practical / Assignment	Prof. R. M. Rathod
16-02-2022	**Wednesday**	9:00 to 10:30	Fine-tuning the Research Plan with Research	Concerned Supervisor

			Supervisor (In light of Previous Learning)	
		11:00 to 12:15	Publication in Reputed Journals	Dr. Anushree Karani
		12:30 to 1:30		
		1:30 to 2:30	Lunch Break	
		2:30 to 3:45	Book Chapter Writing	Prof. Priti Sajja
		4:00 to 6:00	Practical / Assignment	Dr. Anushree Karani
17-02-2022	**Thursday**	9:00 to 10:30	Fine-tuning the Research Plan with Research Supervisor (In light of Previous Learning)	Concerned Supervisor
		11:00 to 12:15	Case Study as a Research Method	Dr. Yagnesh Dalwadi
		12:30 to 1:30	Presentation of Research Plan	Dr. Ashish Mehta
		1:30 to 2:30	Lunch Break	
		2:30 to 3:45	Presentation of Research Plan	Dr. K S Prasad
		4:00 to 6:00	Test	Dr. K S Prasad

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Course 2: Selected Topics in Polymers

Total hours: 45 hours **Total Credit: 03 credits**

Polymer supported reagents and catalysts, Non-petroleum based renewable agricultural resources for monomer and polymers CNSL, Castor oil, Vegetable oil, terpenes, phenolics, carbohydrates-lactic acid, Green route to synthesis of selected monomers.

Introduction, structure, properties and applications of special purpose polymers like polymer liquid crystal, Polymer in lithography, Composites and Nanocomposites, Hydrogels and stimuli sensitive hydrogels, Controlled release drug delivery polymer systems, Polymer membrane for miscellaneous applications, Per evaporation and fuel cell, Ionic polymers, Biomedical polymers.

Polymer industry and environment, Waste management, Polymer recycling processes. Waste polymer recovery, Sortation and Microsortation, Polymer reprocessing. Polymer incineration.

Reference books:

Composite Materials by K. K. Chawla
Safety management practices for Hazardous materials by Nicholas and Medalyn
Plastic materials by Brydson
Chemistry for environmental engineering and science by Chair N. Sawyer, Perry L. Mccarty and Gene F. Parkin
Waste Recycling for Energy Conservation by David Kut and Gerard Hare

Course 3: Testing Methods for Various Materials

Total hours: 45 hours **Total Credit: 03 credits**

Non-Destructive techniques for various materials: Ultrasonic testing, Magnetic particle flaw detection, Radiographic testing, Liquid penetrant testing and other NDT methods. XPS (X-ray Photoelectron Spectroscopy), XRF (X-ray Fluorescence Spectroscopy), ICP (Inductively Coupled Plasma) techniques for materials characterization. Raman Spectroscopy method and its applications in materials science.

Grain dependence properties of ceramic: crack propagation, tensile strength, hardness, thermal shock resistance, wear, compressive strength. Ceramic processing and product. Advance techniques for specific surface area analysis, pore size and pore size distribution measurements. ASTM standard and testing of ceramic composites. Advance applications of glass and ceramic. Materials processing furnaces and heat treatments of ceramic.

Catalyst and Biocatalyst, Synthesis of solid support and catalysts. TPR/TPO (Temperature Programmed Reduction/Oxidation) and TPD (Temperature-Programmed Desorption) study of catalysts characterization, Chemisorption study of different materials: metal dispersion and metallic surface area analysis.

Durability of coatings, Adhesion, Measurement of adhesion: mechanical methods, tape method, scratch method, deceleration method, engineering methods. Basic concepts, Nucleation rate measurements, Island density measurements, Critical condensation measurements, Comparison between mechanical and nucleation methods, Nature of adhesion forces.

Reference books:

Non-Destructive Testing techniques by Ravi Prakash
Handbook of Ceramic, Glasses and Diamond by Charles A. Harper
Composite Engineering Handbook by P. K. Mallick
ASM Handbook of Mechanical Testing, Volume-8
Mechanical Properties of Ceramic and Composites by Roy W. Rice
Principle of Ceramic Processing by James S. Redd
Calorimetry and Thermal Methods in Catalysis, edited by Aline Auroux
Catalysis: An Integrated Textbook for Students, edited by Ulf Hanefeld and Leon Lefferts
Catalyst Principles and Applications edited by B. Viswanathan, S. Sivasanker, A.V. Ramaswamy
Handbook of Adhesive Technology edited by A. Pizzi, K. L. Mittal

Pre-PhD Courses to be given to the students of PhD (Mathematics) Year-2021-22
Second Term

Course Title: Mathematical Modelling

Unit-1

Mathematical modelling-an introduction, objectives of modelling, classifications of models, stages of modelling.

Building models, systems analysis, making assumptions, flow diagrams, choosing mathematical equations, data exploration, solving equations, analytic methods, numerical methods.

Basic examples

Unit-2

Dimensionless form, asymptotic behaviour, sensitivity analysis, modelling model output

Testing models: testing the assumptions, model structure, prediction of previously unused data, reasons for prediction errors, estimating model parameters, comparing two models for the same system

Examples

Uni-3

Predictions with estimates of precision, decision support, description of a model, deciding when to model and when to stop

Examples

Reference Books:

1. E.S. Allman and J.A. Rhodes, Mathematical Models in Biology – An Introduction, Cambridge University Press, 2004.
2. E. Batschelet, Introduction to Mathematics for Life Scientists, Springer-Verlag, 1979

Pre-PhD Courses to be given to the students of PhD (Mathematics) Year-2021-22
Second Term

Course Title: Integral Transforms and Special Functions

Unit-1: Special Functions (Summary)
The Hypergeometric and Generalized and Confluent hypergeometric functions
Bessel functions
Legendre polynomials
Hermite polynomials
Jacobi polynomials

Unit-2: Laguerre Polynomials
Definition
Generating functions
Recurrence relations
Rodrigues formula
Orthogonality
Expansion of polynomials

Umit-3: Mellin and Hankel Transforms
Introduction of Mellin transform
Definition of Mellin transform and Examples
Operational Properties of Mellin transform
Introduction of Hankel transform
Definition of Hankel transform and Examples
Operational Properties of Hankel transforms

Reference books

1. E.D.Rainville, Special Functions, Macmillan Co. 1960
2. Lokenath Debnath and Dambaru Bhatt: Intergral Transform and their Applications, CRC Press, 2007

Timetable for the Pre-PhD Coursework

(Starting from 27/01/2022)

Day/Time	10 am to 11 am	5 pm to 6 pm
Monday	JCP (IT&SF)	AHH (MM)
Tuesday	JCP (IT&SF)	AHH (MM)
Wednesday	JCP (IT&SF)	AHH (MM)
Thursday	JCP (IT&SF)	AHH (MM)
Friday	JCP (IT&SF)	AHH (MM)
Saturday	JCP (IT&SF)	AHH (MM)

AHH: A.H. Hasmani

JCP: J.C. Prajapati

MM : Mathematical Modelling

IT&SF : Integral Transforms & Special Functio ns

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Ph. D. Course Work

Structure and Syllabus

Structure

Sr. No.	Title of Course	Total Credit	No. of Hrs	Component of Marks		
1	Course - 2	3	45	Written Examination - 50 marks	Presentation and viva voce - 50 marks	Total - 100/50
2	Course - 3	3	45	Written Assignment/ Report Submission - 50 marks	Presentation and viva voce - 50 marks	Total - 100/50

Course - 2

The research scholar shall select any one course from the below elective courses:

PHDPH01 Modern Analytical Techniques

PHDPH02 Novel Drug Delivery System

PHDPH03 Phytochemical Screening and Analysis

PHDPH04 Preformulation

Course - 3

The research scholar shall prepare written document in form of assignment on the topic related to the field of the research proposal and approved by the guide and the DRAC.

The research scholar shall prepare a power point presentation on the literature reviewed for research proposal and will be evaluated in form of presentation cum viva voce.

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Department of Pharmaceutical Sciences

Ph. D. Course Work

Course Code	PHDPH01	Course Name	Modern Analytical Techniques
Total Credits	03	Total Hours	45

Detail Syllabus:

Sr. No	Chapter	Detail Syllabus	Hours
1	INFRARED SPECTROPHOTOMETRY	Different sampling techniques for IR Spectroscopy Applications of IR Spectroscopy in Solid State Analysis Near infrared Spectroscopy (NIR) -theory and applications	6
2	NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY	Simplification of complex spectra, FT-NMR, 2D - NMR and applications in Pharmacy, interpretation of spectra. C^{13} NMR-Introduction, Natural abundance, C^{13} NMR Spectra and its structural applications.	6
3	MASS SPECTROMETRY	Various ionization modes, interpretation of spectra and HRMS Techniques.	6
4	X:-RAY DIFFRACTION METHODS	Introduction, generation of X-rays, X-ray diffraction, Bragg's law, X-ray powder diffraction, interpretation of diffraction patterns and applications	6
5	CHROMATOGRAPHIC TECHNIQUES	a) Theories of chromatographic separation. b) Principles, elution techniques, instrumentation, derivatization and applications of gas chromatography, HPLC and HPTLC. c) Principles, elution techniques, applications of ion exchange and ion pair chromatography, affinity chromatography, size exclusion chromatography, and chiral chromatography, super fluid chromatography (SFC)	9
6	HYPHENATED TECHNIQUES	Introduction, Need of Hyphenation LC-MS, GC-MS, LC-NMR, LC-IR, GC-IR	6
7	THERMAL METHODS OF ANALYSIS	Theory, Principle, Instrumentation and Applications of TGA, DTA and DSC	6

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References Books:

1. Spectrometric Identification of Organic compounds - Robert M Silverstein, Sixth edition, John Wiley & Sons, 2004.
2. Principles of Instrumental Analysis - Doglas A Skoog, F. James Holler, Timothy A. Nieman, 5th edition, Eastern press, Bangalore, 1998.
3. Instrumental methods of analysis – Willards, 7th edition, CBS publishers.
4. Practical Pharmaceutical Chemistry – Beckett and Stenlake, Vol II, 4th edition, CBS Publishers, New Delhi, 1997.
5. Organic Spectroscopy - William Kemp, 3rd edition, ELBS, 1991.
6. Quantitative Analysis of Drugs in Pharmaceutical formulation - P D Sethi, 3rd Edition, CBS Publishers, New Delhi, 1997.
7. Pharmaceutical Analysis- Modern methods – Part B - J W Munson, Volume11, Marcel Dekker Series

JOURNALS

1. Journal of Chromatography A.
2. AnalyticaChimicaActa.
3. Analyst.
4. Journal of Separation Science.
5. SpectrochimicaActa, Part B: Atomic Spectroscopy.
6. Journal of Pharmaceutical and Biomedical Analysis.

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Ph. D. Course Work

Course Code	PHDPH02	Course Name	Novel Drug Delivery System
Total Credits	03	Total Hours	45

Detail Syllabus:

Sr. No	Chapter	Detail Syllabus	Hours
01	Unit - I	Basics of CDDS and its need, Computation of desired release rate and dose for CRDDS, Types of rate controlled drug delivery systems, Effect of system parameters on Controlled drug delivery system i.e. Polymer Solubility, Solution solubility, pKa, Polymer diffusivity, solution diffusivity, Thickness of polymer layers, Thickness of diffusion layer, Drug loading, Surface area, etc.	08
02	Unit - II	Various mechanisms on Controlled Release, Evaluation of Controlled Drug Delivery Systems Various polymers/excipients used in CDDS with its criteria of selection Recent advances in Controlled/Sustained Release Drug Delivery System	07
03	Unit - III	Mechanism of working, Criteria for selection of drug and polymers/ excipients with their properties, merits and demerits, Evaluation Parameters for: Ocular DDS, Buccal DDS, Periodontal DDS, Gastro-retentive DDS, Intestinal and Colon targeted DDS, Nasal DDS, TDDS	07
04	Unit - IV	Various Patented Technologies like oral powder jet system, Periochip, Medicated Chewing Gum, Ora Vescent technology, Immediate and Time-delayed release technology, Egalet technology, Enterion capsule technology, Procise, Ringcap, Inlay matrix tablet, OROS Tablets and Capsules, Pellet type Pulsatile release technology, PORT system, PULSINCAP, CODES, OROS CT, ALZET Technique, DUROS Implant, Macroflux System, Zydis, etc.	08
05	Unit - V	Mechanism of working, Criteria for selection of drug and polymers/ excipients with their properties, merits and demerits, Evaluation Parameters for – Micro and Nano particulate DDS, Liposomes, Niosomes, Monoclonal antibody, Multiple Emulsions, Micro and Nano Emulsions, SEDDS, Nanosuspension	10

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		Peyer's patches targeted drug delivery system – lymphatic delivery	
06	**Unit - VI**	Packaging components and its evaluation, Factors affecting selection, Types and classification, Primary and secondary and regulatory aspects. Contribution in stability of the dosage forms.	05

Books Recommended

1. Joseph R. Robinson, "Sustained and Controlled Release Drug Delivery Systems", Drugs & Pharm. Sci. Series, Vol. 6 Marcel Inc.,N.Y.
2. Yie W. Chien, Novel Drug Delivery Systems, Drugs and Pharm. Sci. Series, Vol.14, Marcel Dekker Inc.N.Y.
3. J.R.Robinson and Vincent H.L. Lee, Controlled Drug Delivery, Drugs and Pharm. Sci. Series, Vol. 29, Marcel Dekker Inc. N.y.
4. **Remingtons** "Pharmaceutical Sciences" 19th edition.
5. **Lachman** "The theory and Practice of Industrial Pharmacy" 3 rd edition.
6. Pharmaceutics "The Science of Dosage form design" **by Aulton**
7. Pharmaceutical dispensing **by Husa**.
8. Modern pharmaceutics **by G. S. Banker.**
9. Encyclopedia of pharmaceutical technology Volumes: 1 to 19.
10. Pharmaceutical dissolution testing **by Banaker.**
11. United States Pharmacopeia.
12. Drug stability (Principles and Practices) **by Jens. T. Carstensen.**
13. J.N.Nixon, Microencapsulation, Drugs and Pharm. Sci. Series, Vol.3, Marcel Dekker Inc., N.Y.,
14. G. Jolles and R.H. Wooldridge, Drug Design – Faact of Fantasy? Academic Press,1984
15. J.R.Juliano, Drug Delivery Systems Oxford University Press, Oxford, 1980.
16. M.I.Gutcho, Microcapsules and Microencapsulation Techniques, Noyes Data Corporation, 1976.
17. E.B.Roche, Design of Biopharmaceutical properities through prodrug and analogs, Am. Pharm. Assoc. Academy of Pharm. Sci. 1977.
18. Lisbeth, llum & Stanley S. Davis. Polymers in controlled drug delivery wright Bristol(1987)

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Ph. D. Course Work

Course Code	PHDPH03	Course Name	Phytochemical Screening and Analysis
Total Credits	03	Total Hours	45

Detail Syllabus:

1	**Extraction and Phytochemical analysis** Difference between Isolation and Extraction, Traditional and Modern methods of extraction along with Principle, Construction, Application, Merit and Demerit. Qualitative and Quantitative methods for screening of Medicinal Plants and Herbal formulations	8
2	**Phytochemical Fingerprinting** Definition, Methods, Generation and Evaluations of Fingerprints, Documentations, Criteria, Identification and role of Marker Compounds in herbal drugs	8
3	**Standardization of Herbal Formulations / Extracts** Standardization of Herbal Drugs, Herbal Medicines / Formulations, Ayurvedic preparationand their quality, safety, efficacy,stability assessment for acceptance by FDA.	8
4	**Pharmacopocial Testing of Herbal Drugs / Extracts / Formulations** Importance of Monographs of standards of medicinal plant drugs / extracts and their parts in Different Pharmacopoeia and Regulatory guidelines for Herbal Medicinal Formulations.	8
5	**Stability Testing of Natural Products** Procedures, predictable chemical and galenicalchanges, technical limitations, testing methods and combination products	5
6	Bioavailability and pharmacokinetics aspects for herbal drugs with examples of well known documented clinically used herbal drugs. Phytoequivalence, pharmaceutical equivalence	8

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Ph. D. Course Work

Course Code	PHDPH04	Course Name	Preformulation
Total Credits	03	Total Hours	45

Detail Syllabus:

Sr. No	Chapter	Detail Syllabus	Hours
1	UNIT - 1	General Considerations, Spectroscopy and Assay development, dissociation, partitioning and Solubility of Pharmaceutical Solids, pKa, salts, solvents, $K_{o/w}$, drug design, phase solubility analysis, solubilisation, release, dissolution and permeation, chiral drug substances, characterization scheme.	10
2	UNIT-2	Solid state properties, crystal morphology, melting point and its analysis, microscopy and particle size analysis, laws of crystallography, habit, polymorphism, pseudomorphism, isomorphism, purity, solubility, hygroscopicity, study methods for evaluation of solid state.	10
3	UNIT-3	Dosage form consideration in preformulation, solid dosage form, solution formulations, evaluations and its regulatory considerations, stability testing, OVIs along with their regulatory limits. Brief about method of its determination	10
4	UNIT-4	Preformulation study, Stability aspect and PEGylation based stability of Biopharmaceutical drugs, Stability study of Phytomedicines, IVIVC concept. Drug diffusion: steady state diffusion, diffusion principles in biological systems, thermodynamics of diffusion, Fick's Law of diffusion. Theory of dissolution, factors influencing dissolution, interpretation of dissolution rate data, Comparison of dissolution profile by model independent (similarity and dissimilarity factor) and dependent methods. Dissolution of immediate release and modified release dosage forms	10
5	UNIT-5	Preformulation study of various semisolid and liquid dosage forms like Cream, Ointments, emulsions, suspension and SEDDS	5

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REFERENCES

1. Modern Pharmaceutics by H. G. Banker.
2. Physical Characterization of Pharmaceutical Solids by H. Brittain.
3. Polymorphism in Pharmaceutical Solids by H. Brittain.
4. Solid State Chemistry of Drugs by S.R. Byrn.
5. Chemical Stability of Pharmaceuticals by K.A. Connors.
6. Pharmaceutical Preformulation and Formulation by M. Gibson.
7. Solubility Behavior of Organic Compounds by D.J.W. Grant and T. Higuchi.
8. Remingtons "Pharmaceutical Sciences" 19th edition.
9. Pharmaceutical Preformulation by J. Wells.
10. Solubility and Solubilisation in Aqueous Media by S. Yalkowsky.
11. Pharmaceutics "The Science of Dosage form design" by Aulton.
12. Hand book of Preformulation by Sarfaraz K. Niazi.
13. Industrial Pharmacy, Selected Topics by CVS Subrahmanyam
14. Pharmaceutical Dosage Forms : tablets, Lierberman H. A. and Leon Lachman, Marcel Dekker, New York
15. Pharmaceutical dissolution testing, U.V. Banaker, Marcel Dekker, Inc., New York.
16. Pharmaceutical Dissolution Testing, Jennifer J. Dressman, Johannes Kramer
17. Drug stability (Principles and Practices) by Jens. T. Carstensen.
18. Stability of drug and dosage forms by Yoskioka.
19. Relevant articles from Journals
20. http://www.ich.org

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References Books:

1. Quality Control, Herbal Drugs, An approach to evaluation of Botanicals. Dr. Pulok K. Mukherjee. Business Horizons Pharmaceutical Publishers; 2002
2. Recent Progress in medicinal Plants Volumes 1-25. Govil JN, Singh VK, Siddiqui NT. Studim press, LLC USA; 2007
3. Laboratory handbook for fractionation of Natural Products. Houghton PJ and Raman A. Chapman and Hall New York; 1998
4. Herbal Drugs Industry. R.D. Chaudhary, Eastern Publishers, New Delhi
5. The Ayurvedic Pharmacopoeia of India, Part I, (Vol. I–X) , part II (I & II) Govt. of India, Ministry of Health and Family Welfare, Dept. of Indian Systems of Medicine and Homeopathy, New Delhi 2008
6. Ayurvedic Formulary of India, Vol. I and II, Ministry of Health, New Delhi
7. Indian Herbal Pharmacopoeia, revised new edition 2002, Published by RRL, Jammu and IDMA, Mumbai – 2002
8. Trease and Evans Pharmacognosy. 16h Edition, William Charles Evans, W. Saunders, Edinburg London New York Philadelphia St. Louis Sydney Toronto 2009
9. V. Rajpal, Standardization of Botanicals Botanicals (Testing and Extraction Methods of Medicinal Herbs), vol. 1& 2, Eastern Publishers, New Delhi, India, 2002
10. Pharmacognosy: C. K. Kokate, A. P. Purohit, S. B. Gokhale, NiraliPrakashan Pune, 42nd edition, 2008.
11. Textbook of Pharmacognosy: T. E. Wallis, CBS Publishers and Distributors, New Delhi, 5th Edition, reprinted, 2009.
12. Essentials of Pharmacognosy by Ansari S. H., Birla Publications Pvt. Ltd., 4th Edition, 2011
13. A Text book of Pharmacognosy: C. S. Shah, J. S. Quadry, B. S. Shah Prakashan, Ahmadabad. 15th Edition, 2009
14. Textbook of Industrial Pharmacognosy, A. N.Kalia, CBS Publishers & Distributors Pvt. Ltd., 1st Rev. Edition, 2011
15. Plant Drug Analysis: A Thin Layer Chromatography Atlas, H. Wagner, S Bladt, Springer, New York, 2nd Edition, 2007.
16. Quality Standards of Indian Medicinal Plants, Volume I to XI (2003 to 2013) Editor: NeerajTandon&Parul Sharma; By: Medicinal Plant Unit, ICMR, New Delhi

Journals

a. Pharmacognosy Journal
b. Fitoterapia
c. PlantaMedica
d. Phytochemistry Letters
e. Phytomedicine
f. Phytochemistry
g. Natural Products
h. Drug Research

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DEPARTMENT OF PHYSICS
SARDAR PATEL UNIVERSITY

Pre-PhD Course Work

Course No.	Course Title	Credit
DSCRPE	**Research and Publication Ethics** (Mandatory across the faculty. Common for all research scholars and conducted centrally through HRDC)	02
DSCRM51	**Research Methodology** (Common for all research scholars and conducted centrally through HRDC)	04
Research area specific Elective pre-PhD courses approved by the DRAC (any two of the following courses shall be selected by the research scholar in consultation with the PhD Guide)		
DSEPHY51	**Computational and Numerical Techniques in Physics**	03
DSEPHY52	**Advanced Course on Theoretical Atomic & Molecular Physics**	03
DSEPHY53	**Advanced Course on Theoretical Condensed Matter Physics**	03
DSEPHY54	**Advanced Course on Theoretical Particle Physics**	03
DSEPHY55	**Advances in Materials Characterization Techniques**	03
DSEPHY56	**Experimental Condensed Matter Physics**	03
DSEPHY57	**Simulation Techniques for Many Particle Systems (03 Credits)**	03

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DEPARTMENT OF PHYSICS
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Pre-PhD course work Evaluation Scheme:

1	The two credits course on Research and Publication Ethics (RPE) (a mandatory course by UGC) and the four credits Research Methodology course shall be Conducted and Evaluated centrally for all the admitted Research Scholars by the University as per R. Ph.D. : 9.1.1.
2	The attendance of the Ph D scholar for each course shall be 80%. The Concerned P.G. Department will maintain the attendance records of the student for each course work.
3	The evaluation of each of the course work shall have the following components: i) A Written Examination OR Written Assignment Submission (50 marks) The topics for assignment shall be from the syllabus of the respective courses as approved by the concerned DRAC. If the number of students is large, written examination may be conducted. The written examination / the Assignment topics shall cover the full content of the syllabus of the respective courses. ii) Review presentation and viva voce (50 marks)
4	The research scholar shall prepare a power point presentation on a topic (different from the assignment) related to the experimental / theoretical methodology and the techniques for data analysis with chosen illustrative case relevant to the field of the research proposal and approved by the guide and the DRAC. The Ph D guide of the research scholar, the allotted teacher of the course and the atleast one of the DRAC member shall remain present and shall evaluate during the presentation cum viva. The marks awarded must be signed by all the above and shall submit to the DRAC chairman.
5	The respective PG Department where the students are appearing for the pre-PhD course work shall submit the entire records viz. time table, syllabi, attendance, marks awarded / scored, the copy of the written exam paper or the assignments, copy of the ppt presentation etc of the research scholar to the respective DRAC.

Course Code: DSCRPE (02Credits)
Research and Publication Ethics (mandatory across the faculty)
Conducted centrally by HRDC

Theory

RPE01: Philosophy and Ethics (3hrs)
Introduction to Philosophy: Definition, nature and scope, concept, branches
Ethics: Definition, moral philosophy, nature of moral judgements and reactions

RPE02: Scientific Conduct (5hrs)
Ethics with respects to science and research; Intellectual honesty and research integrity
Scientific misconduct: Falsification, Fabrication and Plagiarism (FFP)
Redundant publications: duplicate and overlapping publications, salami slicing; Selective reporting and misrepresentation of data

RPE03: Publication Ethics (7hrs)
Publication Ethics: Definition, Introduction and Importance
Best Practices/standards setting initiatives and guidelines: COPE, WAME, etc
Publication misconduct: definition, concept, problems that lead to unethical behaviour and vice versa, types
Violation of publication ethics, authorship and contributorship; Identification of publication misconduct complaints and appeals

Practice
RPE04: Open Access Publishing (4hrs)
Open access publications and initiatives; SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies; Software tool to identify predatory publications developed by SPPU; Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.

RPE05: Publication Misconduct (4hrs)
A. Group Discussions (2hrs)
Subject specific ethical issues, FFP, authorship; Conflict of interest; Complains and appeals: examples and fraud from India and abroad.
B. Software tools (2hrs)
Use of plagiarism software like Turnitin, Urkund and other open source software tools
RPE06: Databases and Research metrics (7hrs)
A. Databases (4hrs)
Indexing data bases; Citation databases: Web of Science, Scopus, etc.
B. Research Metrics (3hrs)
Impact factor of Journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score
Metrics: h-index, g-index, i10-index, altmetrics

References:

1. P Chaddah, (2018)Ethicsin competetiveResearch: Do not get scooped; do not get plagiarized, ISBN: 978-9387480865
2. NationalAcademy ofScience, National Academy of Engineering andInstitute of Medicine (2009) on Being a scientist: A guide to Responsible Conduct of Research: 3rd Ed. NationalAcademiesPress
3. Indian National Science Academy(INSA), Ethics inScience Education , Research and Governance(2019) ISBN:978-81-939482-1-7*http://www.insaindia.res.in/pdf/Ethics_Book.pdf*

Course Code: DSCRM51: Research Methodology (04 Cr)

Unit I: Fundamentals and Core concepts of Research methodology (9h)

1) Introduction to Research (Selecting a topic, building a hypothesis, experimental and non experimental research).
2) Innovation and critical thinking; Steps involved in research (Scientific methodology)
3) Literature Survey (Importance (Need) of literature survey, How to do literature survey, objectives and methods)
4) Kinds and Types of Research Reports: Research Proposal, Synopsis, Progress Report, Review Article, Thesis, Poster
5) Research Paper Writing: Types of research papers, structure of research paper, abstract writing, methodology, results and discussions, conclusion.
6) Thesis writing: Structure of Thesis, Scope of work, Review of Literature, Results and Discussion, Figures and Table formats, Conclusion and future works, Bibliography, Appendices.

Unit II: Research Design and Planning (7.5 h)

1) Research Design
2) Sampling and types of error in sampling
3) Design of Experiments, types of basic experimental designs, common errors in experimental design.
4) Organization of work elements
5) Collection and organization of Data

Unit III: Data analysis (12h)

1) Statistical Data analysis: Parametric and non parametric statistics
2) Graphical and tabular presentation of Data

Unit IV: Computational tools in Research (9h)

1) SciLab for Statistical and Numerical Methods
2) MS Excel
3) Bibliography tools

References: 1. The Scientific Endeavor-Methodology and Perspectives Of Sciences by Jeffrey A Lee; Publisher: Pearson Education India
2. Research Methods for Science, M. P. Marder, Cambridge University Press, 2011.
3. Research Methodology Techniques and Trends, Y. K. Singh and R. B. Bajpai, APH Publishing Corporation House, 2008.
4. C R Kothari, Research Methodology-Methods and Techniques, New Age International (P) Ltd., Publishers (2004)

Course No. DSEPHY51

Computational and Numerical Techniques in Physics (03 Credits)

Unit I

Uncertainties in Measurements: Measuring Errors, Uncertainties, Parent and Sample Distributions, Mean and Standard Deviation of Distributions, Binomial Distributions, Poisson Distribution, Gaussian or Normal Error Distribution, Lorentzian Distribution.

Approximation and Errors in Computing: Significant Digits, Numerical Errors, Modeling errors, Conditioning and Stability, Convergence of Iterative Processes.

Error Analysis: Instrumental and Statistical Uncertainties, Propagation of Errors, Application of Error Equations, Method of Least squares, Statistical Fluctuations, Probability Tests, χ^2 Test of a distribution.

Unit II

Curve fitting (Regression Analysis); Least square Fit to a Straight line, error estimation of the fitted parameters, limitations of the least square method, Least squares fit to a polynomial, matrix solution, Goodness of a fit, Linear Correlation Coefficient, Multivariable Correlations.

Monte Carlo techniques: Random numbers, Random numbers from Probability Distributions, Specific Distributions, Efficient Monte Carlo generation, Confidence Intervals, Monte Carlo Tests for the Fit. Applications.

Unit III

Numerical solution of Transcendental Equations: Bisection method, False Position Method, Newton - Raphson method; Numerical Solution of Ordinary Differential Equations: Taylor series method, Euler's method, Runge - Kutta Methods, Multistep methods.

Boundary Value and Eigen Value Problems: Shooting Method, Finite difference Method, Solving Eigen Value Problems, Polynomial Methods Power method.

Solution of Partial Differential Equations: Deriving Difference equations, Laplace's equation, Poisson's equation, Solution of Heat equation, Bender- Schmidt method, Solution of hyperbolic equations.

Books:

1. Data Reduction and Error Analysis for the Physical Sciences 3rd Ed by Philip R Bevington & D Keith Robinson, McGraw – Hill (2003)
2. Numerical Methods by Balagurusamy, Tata McGraw – Hill (2000)
3. Numerical Analysis, 2nd Ed. by Francis Scheid, McGraw-Hill (2009)
4. Numerical mathematical Analysis, James B Scarboroughs
5. Numerical Methods for Scientists and Engineers, K Sankara Rao, 3rd Ed. PHI

Course No. DSEPHY52
Advanced Course on
Theoretical Atomic & Molecular Physics

Unit-I

Resume of the Quantum Mechanics of one-electron atom, expectation values, virial theorem, atom interaction with electromagnetic radiation, the dipole selection rules, two electron atoms, many electron atoms, Central field approximation, Atomic charge densities, Average radii, Ionization energy – periodic correlations.

Quantum mechanical scattering – experimental aspects, channels, thresholds and cross sections of scattering, potential scattering and the method of partial waves, S-matrix, K-matrix and T-matrix, Calculation of phase-shifts, scattering length, resonances.

Unit II

Integral equation of scattering, Born-series approximation, semi-classical approximations; the R-matrix method, Absorption processes and scattering by complex potentials.

Born approximation- resume, Born cross section for a point dipole potential;

Electron-atom collisions – general features, Electron collisions with atomic hydrogen – the optical potential, Born calculations for electron-hydrogen scattering, high energy Born cross sections – elastic and inelastic scattering, Electron impact ionization of atoms, Bethe-Born approximation Atomic photo-ionization, Applications of electron scattering studies

Unit III

General nature of molecular structure – rotational vibrational degrees of freedom, the LCAO method for H_2^+ ion and H_2 molecule; Structure and bonding in polyatomic molecules like H_2O, CO_2, NH_3 (inversion spectrum), CH_4, C_6H_6 (resonance features), Group-theory concepts applied to standard molecules, Molecular properties- a correlation

Introduction to Clusters, Fullerenes and nano-particles

Reference Books:

1. Physics of atoms and molecules-By B. H. Bransden & C. J. Joachain, Pearson Education India
2. Quantum collision theory-By C. J. Joachain(North Holland)
3. Chemical Bond-By J. N. Murrell, S. Kttle& J. M. Tedder (ELBS)

Course No. DSEPHY53
Advanced Course on Theoretical Condensed Matter Physics

Unit: I

Introduction to lattice dynamics including longitudinal and transverse vibrations, Normal modes, Quantization of normal modes, Distribution of energy among the normal modes, Secular determinant for a face centered cubic lattice, Covalent crystals, Ionic crystals, Molecular crystals, Metallic crystals, Frequency distribution function, quantization of lattice vibrations (three dimensions), Normal coordinates of a lattice, Measurements of phonon frequencies through Neutron scattering.

Unit-II

Need for density functional theory (DFT) – beyond Hartree-Fock approximation, Thomas-Fermi theory of N-electron ground state, Dirac-Slater exchange potential, Electron correlation, Local-density and density-gradient corrections, application to equation of state for metals: cell-boundary electron density. Basic Kohn – Sham equation for single-particle potential, Schrödinger equation for ground state density.

Unit III

Self-consistent field approximation, Small core approximation, Perturbative treatment, OPW method, Pseudo-potential formulation, Separation of pseudo-potential, Diffraction model, Energy eigen states, Scattering, Second-order scattering, Factorization of matrix elements, Evaluation of total energy. Effective interaction between ions, Self-consistent screening of local pseudo-potential, The point-ion potential, Optimization of pseudo-potential, Linearization of the optimum pseudo-potential, Crystal potential and core energies, Computation of form factors, Phenomenological and Model pseudo-potentials.

ReferenceBooks:

1. Coulson's valence-By R. McWeeny (ELBS).
2. Pseudopotentials in the Theory of Metals – W. A. Harrison (W. A. Benjamin, 1966)
(add few more books)

Course No. DSEPHY54
Advanced Course on
Theoretical Particle Physics

Unit I

A pre-view of particle Physics, Interacting Scalar field theories: scalar field with ϕ^4 coupling, Scattering processes and cross sections, Scalar field with ϕ^3 coupling, Feynman rules, QED Lagrangian and Feynman rules, $e^-e^+ \to \mu^-\mu^+$, $e^-e^+ \to f\bar{f}$, Bhabha scattering ($e^-e^+ \to e^+e^-$), Moller scattering ($e^-e^- \to e^-e^-$), Gauge invariance in Feynman diagrams, Compton scattering ($\gamma e^- \to \gamma e^-$), $e^-e^- \to \gamma\gamma$.
Decay rates and partial widths, Two-body decays, Scalar decays to fermion-antifermion pairs; Higgs decay, Three-body decays, Weak nuclear decays, Muon decay, Corrections to muon decay, Inverse muon decay ($e^-\bar{\nu}_\mu \to \nu_e\mu^-$), $e^-\bar{\nu}_e \to \mu^-\bar{\nu}_\mu$, Charged currents and $\pi^\pm$ decay, Unitarity, Renormalizability, and the W boson.

Unit II

Groups and representations, The Yang-Mills Lagrangian and Feynman rules, QCD Lagrangian and Feynman rules, Quark-quark scattering ($qq \to qq$),Renormalization, Gluon-gluon scattering ($gg \to gg$), The parton model, parton distribution functions, and hadron-hadron scattering, Top-antitop production in $p\bar{p}$ collisions, Kinematics in hadron-hadron scattering, Drell-Yan scattering (l^+l^- production in hadron collisions).

Unit III

Global symmetry breaking, Local symmetry breaking and the Higgs mechanism, Goldstone's Theorem and the Higgs mechanism in general, $SU(2)_L \times U(1)_Y$ representations and Lagrangian, The Standard Model Higgs mechanism. Fermion masses and Cabibbo-Kobayashi-Maskawa mixing The SU(5) Gauge theory, Spontaneous Breaking of SU(5) Symmetry breaking and the Proton Decay, Extension of Standard Model.

Books:

1. Phenomenology of Particle Physics by Stephen P. Martin, NIU Spring 2008. (Online available at http://131.156.85.18/586/ppp.pdf)
2. Phenomenology of Particle Physics by Stephen P. Martin, NIU Spring 2008. (Online available at http://131.156.85.18/586/ppp.pdf)
3. Introduction to elementary Particles by David Griffiths, John Wiley and sons(1987)
4. Quarks and Leptons An introductory course in Modern Particle Physics by Francis Halzen and Alan D. Martin, John Wiley and sons
5. A Modern introduction to particle physics by Fayyazuddin and Riazuddin, World scientific publication 1992,(Indian Reprint by Allied publishers,2000)
6. Quantum Electrodynamics, 3rd Ed. by Greiner and Reinhardt, Springer, 2003.
7. Quantum Chromodynamics, 3rd Ed. by Walter Greiner, Stefan Schramm and Eckart Stein, Springer, 2007
8. Gauge Theory of weak Interactions, 3rd Ed. by Greiner and Muller, Springer, 2000(Indian Reprint 2009)

Course No. DSEPHY55

Advances in Materials Characterization Techniques

UNIT-I

Basics of two dimensional crystallography: Two dimensional lattices:-Lattice, Basis, and Crystal Structure (3D case), Concept of a 2D Lattice, 2D Bravais Lattices. Miller Indices for Crystal Planes: Definition, Low-Miller-Index Planes of Some Important Crystals, High-Miller-Index Planes Stepped Surfaces. Indices of Directions. Notation for Surface Structures: Matrix Notation, Wood's Notation, Some Examples. 2D Reciprocal Lattice Brillouin Zone Problem.

Probing Surfaces with Ions: General Principles: Classical Binary Collisions, Scattering Cross Section, Shadowing and Blocking, Channeling, and Sputtering, Ion-Induced Electron Processes.

Low Energy Ion Scattering Spectroscopy: General Remarks-Merits and Problems, Alkali Ion Scattering and Time-of-Flight Techniques, Quantitative Structural Analysis in Impact-Collision Geometry.

Rutherford Backscattering (RBS) and Medium Energy Ion Scattering Spectroscopy:-general Remarks, Surface Peak, Thin Film Analysis.

Elastic Recoil Detection Analysis; Secondary Ion Mass Spectroscopy(SIMS).

UNIT-II

Diffraction Methods: Low Energy Electron Diffraction (LEED): Ewald Construction in LEED Conditions, LEED Experimental Set-Up, Interpretation of a LEED Pattern.

Reflection High Energy Electron Diffraction (RHEED):Ewald Construction in RHEED Conditions, RHEED Set-Up, RHEED Analysis.

Grazing Incidence X-Ray Diffraction (GIXRD):Refraction of X-Rays at Grazing Incidence, Ewald Construction in GIXRD Conditions and Basics of the Kinematic Approximation, GIXRD Experimental Set-Up, Structural Analysis by GIXRD.

Other Diffraction Techniques: Transmission Electron Diffraction (TED), Atom Scattering, Photoelectron Diffraction (PED) and Auger Electron Diffraction (AED).

UNIT-III

Electron Spectroscopy Methods: General Remarks: Surface Specificity, Spectrum of Secondary Electrons, Electron Energy Analyzers

Electron Energy Loss Spectroscopy: Core Level Electron Energy Loss Spectroscopy, Electron Energy Loss Spectroscopy, High-Resolution Electron Energy Loss Spectroscopy.

Photoelectron Spectroscopy: Photoelectric Effect, PES Experimental Set-Up, PES Analysis.

Books

1. Surface Science: An Introduction
   K. Oura, V. G. Lifshits, A. A. Saranin, A.V. Zotov, M. Katayama
   Springer Verlag – Berlin.
2. Advances in Materials Characterization
   Editors: G. Amarendra, Baldev Raj, M. H.Manghnani
   Universities Press (India) Pvt. Ltd. – Hydrabad.
3. Semiconductor Material and Device Characterization
   D. K. Schroder
   Willey Interscience Publication, New York.
4. Surface Science Reports
   L. J. Brillson
   Vol. 2, No.2, (1982) North Holland Publishing Co. Amsterdam

Course No. DSEPHY56

Experimental Condensed Matter Physics

UNIT I

Nucleation, homogeneous nucleation and heterogeneous nucleation, driving force for crystallization, growth on rough faces, growth on perfect singular faces, growth on imperfect singular faces, transport at growth interface, transport in bulk solids, growth rate of a crystal.

Bridgman and related methods-basic processes, Czochralski and related methods: Kyropoulos growth, other melt growth processes: the Verneuil process, floating zone processes, high temperature solution growth: flux growth, hydrothermal growth, gel growth,Chemical vapour transport technique: introduction to closed systems, open systems for bulk crystals.

UNIT II

Carbon clusters, carbon nano-tubes – fabrication, structure, electrical, vibrational and mechanical properties, applications of carbon nano-tubes, nano-structured crystals – natural nano-crystals, computational prediction of cluster lattices, arrays of nano-particles in zeolites, crystals of metal nano-particles lattices in colloidal suspensions, photonic crystals.

Self assembly and catalysis : Process of self assembly, semiconductor islands,monolayers, surface area of nanoparticles, porous materials, pillared clays, colloids.

UNIT III

Production and measurement of high pressure: Introduction, properties of materials for high pressure systems, Practical methods of pressure generation: Gravitational methods, Thermodynamic methods, shock – wave methods, Piston methods- Single and multi stage, Pressure measurements : Primary pressure and secondary measuring instruments-. Bridgman Anvil Cell and Diamond Anvil Cell.

Equation of state of solids at moderately high pressures: Isothermal theories: Theory of finite strain, equation of state derived from inter-atomic forces, Elevated temperature: The Gruneisen relations.

The electrical properties of metals and semiconductors : introduction, theory of electrical resistivity for metals and semiconductors.

BOOKS

1. Crystal growth processes by J.C. Brice (Blackie and sons Ltd.)
2. Crystal growth by Santaraghvan and P. Ramasamy (Kru Publishers)
3. Introduction to nanotechnology by Charles P. Poole, Jr., Frank J. Owens.
4. High pressure Physics and Chemistry Volume-1, Editor: R.S.Bradley
   Academic Press- London and New York-1963.
5. Introduction to crystal growth: *Principles and Practice by H.L.Bhat,* CRC press,
   Taylor and Francis Group, Boca Raton, New York (2015)

Course No. DSEPHY57
Simulation Techniques for Many Particle Systems (03 Credits)

Unit I

Basics of Statistical Mechanics:

Canonical ensemble: Physical significance of various statistical quantities, energy fluctuations, the equipartition and the virial theorems, a system of harmonic oscillators

Grand-canonical ensemble: Physical significance of various statistical quantities, density and energy fluctuations, classical ideal gas, a system of independent, localized particles

System of interacting particles: Cluster expansion for a classical gas, Virial expansion of the equation of state, Evaluation of the virial coefficients

Phase transitions: Phase equilibrium and Clausius-Clapeyron equation, General remarks on the problem of condensation, A dynamical model of phase transitions and statistical mechanics of the Ising model

Unit II

Random numbers, Random-walk and Random-Decay: Deterministic Randomness, Random Sequences, Random-Number Generation Algorithm. Assessing Randomness and Uniformity, Random Walk Model of Diffusion and its Simulation, Spontaneous Decay Problem (Discrete and Continuous Decay)

Monte Carlo Simulation:

Ensemble averages, The Metropolis algorithm (MA), Sampling in MA, updating the energy in MA, The Ising model, Example simulations of the Ising model, Monte Carlo for atomic systems, Simulations of atoms in the canonical (NVT) ensemble, Example calculations for "Lennard-Jonesium", Other ensembles, Time in a Monte Carlo simulation, Assessment of the Monte Carlo method, Uses of the Monte Carlo method in materials research

Unit III

Classical Molecular Dynamics (MD) Simulation:

Basics of molecular dynamics for atomic systems, Numerical integration of Newton's equations, Conservation laws, Examining the reliability of a simulation, Connection to thermodynamics, Initial conditions, Steps in an MD simulation, An example calculation, Potential cutoffs, Analysis of molecular dynamics simulations, "Lennard-Jonesium" as a model for materials, Spatial correlation functions, Time correlation functions, Velocity rescaling, Molecular dynamics in other ensembles, Accelerated dynamics, Limitations of molecular dynamics, Molecular dynamics in materials research

Books:

1. Statistical Mechanics, R K Pathria and P. D. Beale, Third Edition, Butterworth-Heinemann (Elsevier), 2011.
2. Thermodynamics and Statistical Mechanics, Walter Griener, I Ludwig Neise and H. Stoecker, Springer, 1997.
3. Computational Physics: Problem Solving with Computers, R. H. Landau, M. J. Páez, and C. C. Bordeianu, Second Edition, Wiley-VCH Verlag GmbH (2007).
4. An Introduction to Computational Physics, T. Pang, Second Edition, Cambridge University Press (2006).
5. Introduction to Computational Materials Science : Fundamentals to Applications, R. Lesar, Cambridge University Press (2013)
6. Computational Physics: Simulation of Classical and Quantum Systems, P. O. J. Scherer, Springer-Verlag Berlin Heidelberg (2010).

DEPARTMENT OF PHYSICS
SARDAR PATEL UNIVERSITY
VALLABH VIDYANAGAR- 388 120 (GUJARAT) INDIA
NAAC Accredited with Grade 'A' (CGPA 3.25) (23-01-2017 to 22-01-2022)
Tel. No. Head: 02692-226843
Office : 02692-226844,226846
Website : www.spuvvn.edu
E-mail : headphys@spuvvn.edu

Date: 21/01/2022

Pre-PhD Coursework Schedule
Subject: PHYSICS
With effect from 24 Jan' 22 to 10 Feb'22

Session Time	Course No.	Work Distribution	Faculty I/C
10:00 am to 12:00	DSE 51/ DSE 55	Tutorials	Respective PhD Guide
12:00 to 1:30 pm	DSE 56/ DSE 57	Tutorials	Respective PhD Guide
2:15pm to 3:45pm	DSE 51/ DSE 55	Contact Hr*	PCV, BYT & KNL(51)/ KDP,SJP,VMP(55)
3:45pm to 5:15pm	DSE 56/ DSE 57	Contact Hr*	GKS,MPD, SHC (56) / BYT & KNL (57)

*as per the timetable

It is decided to conduct written exams of 50 marks and presentation cum viva (50 marks) for both the courses as the two components of evaluation. A minimum of 55% of marks on each course is mandatory for passing the course work.

Head
Department of Physics

HEAD
DEPARTMENT OF PHYSICS
SARDAR PATEL UNIVERSITY
VALLABH VIDYANAGAR

Pre-PhD Coursework Schedule (With effect from 24 Jan' 22 to 10 Feb'22)

Subject: PHYSICS

Date	10:00 am to 12:00	12:00 to 1:30 pm	2:15pm to 3:45pm	3:45pm to 5:1 5pm
24 Jan'22	DSE 51/ DSE 55 (Tutorials)	DSE 56/ DSE 57 (Tutorials)	DSE 51(U-1 PCV) / DSE 55 (U-1 KDP)	DSE 56 (U-1 GKS) / DSE 57 (U-1 KNL)
25 Jan'22	DSE 51/ DSE 55 (Tutorials)	DSE 56/ DSE 57 (Tutorials)	DSE 51(U-1 PCV) / DSE 55 (U-1 KDP)	DSE 56 (U-1 GKS) / DSE 57 (U-1 KNL)
27Jan'22	DSE 51/ DSE 55 (Tutorials)	DSE 56/ DSE 57 (Tutorials)	DSE 51(U-1 PCV) / DSE 55 (U-1 KDP)	DSE 56 (U-1 GKS) / DSE 57 (U-1 KNL)
28Jan'22	DSE 51/ DSE 55 (Tutorials)	DSE 56/ DSE 57 (Tutorials)	DSE 51(U-1 PCV) / DSE 55 (U-1 KDP)	DSE 56 (U-1 GKS) / DSE 57 (U-1 KNL)
29 Jan'22	DSE 51/ DSE 55 (Tutorials)	DSE 56/ DSE 57 (Tutorials)	DSE 51(U-1 PCV) / DSE 55 (U-1 KDP)	DSE 56 (U-1 GKS) / DSE 57 (U-1 KNL)
31 Jan'22	DSE 51/ DSE 55 (Tutorials)	DSE 56/ DSE 57 (Tutorials)	DSE 51(U-2 KNL) / DSE 55 (U-2 SJP)	DSE 56 (U-2 MPD) / DSE 57 (U-2 BYT)
01 Feb'22	DSE 51/ DSE 55 (Tutorials)	DSE 56/ DSE 57 (Tutorials) .	DSE 51(U-2 KNL) / DSE 55 (U-2 SJP)	DSE 56 (U-2 MPD) / DSE 57 (U-2 BYT)
02 Feb'22	DSE 51/ DSE 55 (Tutorials)	DSE 56/ DSE 57 (Tutorials)	DSE 51(U-2 KNL) / DSE 55 (U-2 SJP)	DSE 56 (U-2 MPD) / DSE 57 (U-2 BYT)
03 Feb'22	DSE 51/ DSE 55 (Tutorials)	DSE 56/ DSE 57 (Tutorials)	DSE 51(U-2 KNL) / DSE 55 (U-2 SJP)	DSE 56 (U-2 MPD) / DSE 57 (U-2 BYT)
04 Feb'22	DSE 51/ DSE 55 (Tutorials)	DSE 56/ DSE 57 (Tutorials)	DSE 51(U-2 KNL) / DSE 55 (U-2 SJP)	DSE 56 (U-2 MPD) / DSE 57 (U-2 BYT)
05 Feb'22	DSE 51/ DSE 55 (Tutorials)	DSE 56/ DSE 57 (Tutorials)	DSE 51(U-3 BYT) / DSE 55 (U-3 VMP)	DSE 56 (U-3 SHC) / DSE 57 (U-3 KNL)
07 Feb'22	DSE 51/ DSE 55 (Tutorials)	DSE 56/ DSE 57 (Tutorials)	DSE 51(U-3 BYT) / DSE 55 (U-3 VMP)	DSE 56 (U-3 SHC) / DSE 57 (U-3 KNL)
08 Feb'22	DSE 51/ DSE 55 (Tutorials)	DSE 56/ DSE 57 (Tutorials)	DSE 51(U-3 BYT) / DSE 55 (U-3 VMP)	DSE 56 (U-3 SHC) / DSE 57 (U-3 KNL)
09 Feb'22	DSE 51/ DSE 55 (Tutorials)	DSE 56/ DSE 57 (Tutorials)	DSE 51(U-3 BYT) / DSE 55 (U-3 VMP)	DSE 56 (U-3 SHC) / DSE 57 (U-3 KNL)
10 Feb'22	DSE 51/ DSE 55 (Tutorials)	DSE 56/ DSE 57 (Tutorials)	DSE 51(U-3 BYT) / DSE 55 (U-3 VMP)	DSE 56 (U-3 SHC) / DSE 57 (U-3 KNL)
11 Feb'22	DSE 51/ DSE 55 (Student's Presentation)	DSE 51/ DSE 55 (Student's Presentation)	DSE 56/ DSE 57 (Student's Presentation)	DSE 56/ DSE 57 (Student's Presentation)

Sardar Patel University Vallabh Vidyanagar
Ph.D. (Political Science) Coursework
Rules and Regulations for Ph.D. Programme
Effect from September, 2021
R. Ph. D. 9. Course Work

Course No and Title of the coursework	Lectures Guidance in weekly	Credits	Total
Course-II Changing Nature of Indian Politics	03	03	100
Course-III Political Essays	03	03	100

Course-II Post Independence Indian Politics

Unit I	**Political Parties Era**
	Congress Era
	Coalition Era
	Bhartiya Janta Party Era
Unit 2	**Elections in India**
	Political Campaign
	Election studies
	Political Ethics
Unit 3	**Issues in Indian Politics**
	Criminalization of Indian Politics
	Corruption in Indian Politics and Administration
	Centre- State Relations Conflict

References:

Pravin N. Sheth& Dinesh M. Shukla, (2016), "Politics in India", Granthnirman. (Gujarati)

Mahajan, Gurpreet. The Multicultural Path: Issues of Diversity and Discrimination in Indian Democracy. New Delhi: Sage, 1995

Vanaik, Achin& Rajeev Bhargava, , ed. Understanding Contemporary India: Critical Perspectives. (Delhi University Reader). Delhi: Orient BlackSwan, 2010

Hasan, Zoya, E. Sridharan & R. Sudarshan, ed. India 's Living Constitution: Ideas, Practices, Controversies. New Delhi: Permanent Black, 2002

Dreze, Jean & Sen, Amartya,. India: Economic Development & Social Opportunity.ND: OUP, 1997

Kohli Atul, The Success of Indian Democracy New Delhi, Cambridge Press 2001

Kohli Atul, India 's Democracy: An Analysis of Changing State-Society Relations, New Jersey, Princention Press 1990

Jayal Gopal Nirja, Democracy in India, Oxford Oxford University press 2001.

Ganguli Sumit, Diamond L., Plalteener F.M., The State of India 's Democracy, Maryland, The Johns Hopkins University Press 2007

Diamond Larry, MarlinoLeonardro, Assessing the Quality of Democracy, Maryland, JolnesHapkins press, 2005

19/01/2022

Professor & Head
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Vallabh Vidyanagar

(Contd Page-2)

Course-III Political Essay on contemporary Issues

Unit I	**International Politics**
	India's relations with China and Pakistan
	Role of Non Political Actors in International Politics
	Contemporary Issues in International Relations
Unit 2	**National Politics**
	Separation movements in India
	Caste, Class and Religion Politics in India
	Contemporary issues in Indian Politics
Unit 3	**State Politics in Gujarat**
	Leadership of Gandhi and Sardar Patel in Gujarat Politics
	Socio-Political Movements in Gujarat
	Origin and Development of Panchayati Raj System in Gujarat

References:
Banerjee, Dipankar, Security of South Asia: Comprehensive and Cooperative (ND: Manas, 1999)
Banerjee, Dipankar, SAARC in the 21st Century (New Delhi: India Research Press, 2002)
Behra, Navnita Chadha, International Relations of South Asia (New Delhi: Sage, 2008)
Chari, P.R. & Gupta, Sonika (eds.), Human Security in South Asia (ND: Social Science Press, 2003)
Hagerty, Devin T., South Asia in World Politics (Lanham, MD: Rowman and Littlefield, 2005)
Sridharan, Kripa, Regional Cooperation in South and Southeast Asia (Singapore, ISEAS 2007)
S.P. Verma, International System and the Third World, New Delhi, Vikas, 1988.
K. Bahadur, Democracy in Pakistan: Crisis and conflict, New Delhi, Har Anand, 1998.
Bhartiya VideshNiti: BadlteyAyam, Printwell, Jaipur, 1991 (Hindi)
Dr. B.C. Shah, BharatiyaVideshniti, (Gujarati), 1985
Pravin N. Sheth& Dinesh M. Shukla, (2016), "Politics in India", Granthnirman. (Gujarati)
Mahajan, Gurpreet. The Multicultural Path: Issues of Diversity and Discrimination in Indian Democracy. New Delhi: Sage, 1995
Vanaik, Achin& Rajeev Bhargava, , ed. Understanding Contemporary India: Critical Perspectives. (Delhi University Reader). Delhi: Orient BlackSwan, 2010
Hasan, Zoya, E. Sridharan & R. Sudarshan, ed. India's Living Constitution: Ideas, Practices, Controversies. New Delhi: Permanent Black, 2002
Dreze, Jean & Sen, Amartya,. India: Economic Development & Social Opportunity.ND: OUP, 1997
Kohli Atul, The Success of Indian Democracy New Delhi, Cambridge Press 2001
Kohli Atul, India's Democracy: An Analysis of Changing State-Society Relations, New Jersey, Princention Press 1990
Jayal Gopal Nirja, Democracy in India, Oxford Oxford University press 2001.
Ganguli Sumit, Diamond L., Plalteener F.M., The State of India's Democracy, Maryland, The Johns Hopkins University Press 2007
Diamond Larry, MarlinoLeonardro, Assessing the Quality of Democracy, Maryland, JolnesHapkins press, 2005

19/01/2022

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—X—X—

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Ref.: Psy./379/3/54/2021-22 Date : 18/1/2022

University letter No.D/E/10/4891 Dated:21/12/2021, for Ph.D., Course work
Time Table for academic year-(21/1/2022 to 22/02/2022) **2021-22**

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
11.00 to 12.00	SJP-(L) MA01CPSY52	SJP-(L) MA01CPSY53	SJP-(G.D). MA01CPSY52	(G.D) MA01CPSY52.	(G.D) MA01CPSY52	(G.D) MA01CPSY53
12.05 to 01.05	SMM-(L) MA01CPSY53	SMM-(S) MA01CPSY53	SMM-(T) MA01CPSY52	SNP-(L) MA01CPSY52	SMM-(S) MA01CPSY52	SMM-(S) MA01CPSY53
01.10 to 02.10	SN-(L) MA01CPSY53	(G.D) MA01CPSY53	PSS-(L) MA01CPSY52	(G.D) MA01CPSY53	SNP(S) MA01CPSY52	PSS -(S) MA01CPSY53
RECESS-2.10 to 2.40						
02.40 to 03.40	SJP-(T) MA01CPSY52	SJP-(T) MA01CPSY52	SNP-(T) MA01CPSY53	PSS-(T) MA01CPSY53	SJP-(T) MA01CPSY52/53	SNP-(S) MA01CPSY53

LIST OF PAPER CODE & NAME AND NAME OF TEACHER

Teacher Name		Paper code	Paper Name
Dr.Suresh M. Makvana	(SMM)	MA01CPSY52	Introduction And Planning Of The Research
Dr.Pankaj.S.Suvera	(PSS)		
Dr.S.N.Pathak	(SNP)		
Dr. Samir J.Patel	(SJP)	MA01CPSY53	Design, Techniques And Analysis

Abbreviation
(L) Lecture
(G.D) Group dissection
(S) Seminar
(T) Tutorials

Note: Ph.D Course work during above said time-table and name of teachers will deliver lecture seminar tutorials ect as per guideline by above said letter

1. Prof.Suresh M.Makvana,-**SMM**- Designation as a Professor and Head.....18/1/22
2. Prof.Samir J.Patel,- **SJP**- Designation as a Professor .....
3. Prof.Sangeeta N.Pathak, -**SNP**-Designation as a Professor.....19-1-22
4. Dr.Pankaj S.Suvera, -**PSS**-Designation as an Associate Professor .....18/1/2021.....

18/1/2022
Professor & Head
Department of Psychology
Sardar Patel University
Vallabh Vidyanagar

Copy to:
Assistant Registrar: Academic Section purpose for information of course work time-table

SARDAR PATEL UNIVERSITY

Course work Programme (M.Phil/Ph.D).

(Under the Choice based Credit Scheme)

PH.D course work Paper code No.. MA01CPSY52

Introduction And Planning of The Research

Effect from: June 2021-22

PSYCHOLOGY

Course Code	MA01CPSY52	Title of the Course	**Introduction And Planning of The Research**
Total Credits of the Course	03	Hours per Week	03

Course Objective	**OBJECTIVES OF THE PAPER:** ➢ To expose the student to the basic knowledge of Introduction and Planning of the research ➢ To help student understand and learn the Introduction and Planning of the research

Course Content

Unit	Description	Weightage* (%)
1.	Introduction of the research Topic and its implication in the society	33.33%
2.	How to get review of literature and past studies. Importance of past studies in research	33.33%
3.	Planning and procedure of the research	33.33%

Teaching-Learning Methodology	Lecture, (G.D) Group dissection, Seminar, Tutorials Presentation, Assignment method, Power point presentation, 80% attendance

Evaluation Pattern

Sr. No	Details of the Evolution	Weightage
1.	Internal Written, Examination and assignment Continues Assessment, Viva-voce, Quizzes.	50%
2.	University Examination	50%

Course outcomes: Having completed this course, the learner will be able to	
1.	Students would gain basic knowledge about research , planning and its implication in the society
2.	Student would learn clear concept of related reviews of research
3.	Student would gain knowledge about basics of methodology

Suggested References:	
Sr. No	Reference
1.	Broota, K. D. (1992), Experimental Design in Behavioral Research, N. Eastern.
2.	Dhila, B. D., Yagnik, L. R. and Chothani, K. B., (2004), Sanshodhan Padhattee, Vartanik Vignanma, (Research Method in Social Science), Akshar Publication, Ahmedabad.
3	Jogsan, Y. A., (2016), Manovignanma Sanshodhan Padhdhati, (Research Methodology in Psychology), J K Print Shop, Rajkot.
4	Karlinger, F. N., (1953) Research methods in the Behavioural Science, Dryden.
5	Kothari, C. R., (2007), Research Methodology (Methods & Techniques), New Age International (P) Limited, Publishers.
6	Kumar, (2016), Research Methodology (A step by step guide for Beginners) sage publications Mathura road, New Delhi.
7	Parekh, S. C. and Dixit, S. K. (1995), Statistical Testing in Psychological Research, Champa Prakashan, Junagadh.
8	Rajmanikam, M. (2001), Statistical Methods in Psychological and Educational Research, Concept Publication Company, New Delhi.
9	Sadhu, A. N. and Sing A., (1983), Research Methods in Social Science, Publication House, New Delhi.
10	Mangal, S. K., (2016), Statistics in psychology and Education, (2nd Edition), Mudrak publication, Patparganj, Delhi.
11	Sendecor, G. W. and Cochran, W. G. (1968), Statistical Methods, Mohan Primlani, Oxford & IBH Publishing Company.
12	Trivedi, M. D. and Parekh, B. U. (1989), Statistics in Education, Granth Nirman Board, Ahmedabad.
On-line resources to be used if available as reference material	
On-line Resource	

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SARDAR PATEL UNIVERSITY
Course work Programme (M.Phil/Ph.D).
(Under the Choice based Credit Scheme)
PH.D course work Paper code No. MA01CPSY53
Design, Techniques And Analysis
Effect from: June 2021-22
PSYCHOLOGY

Course Code	MA01CPSY53	Title of the Course	**Design, Techniques And Analysis**
Total Credits of the Course	03	Hours per Week	03

Course Objective	**OBJECTIVES OF THE PAPER:** ➢ To expose the student to the basic knowledge of sampling and its importance in the research ➢ To understand various design and techniques of analysis ➢ To know APA style report writing

Course Content		
Unit	Description	Weightage* (%)
1.	Sampling and Research design	33.33%
2.	Techniques and Analysis	33.33%
3.	Research and report writting	33.33%

Teaching-Learning Methodology	Lecture, (G.D) Group discussion, Seminar, Tutorials Presentation, Assignment method, Power point presentation and 80% attendance as per university rules and regulation

Evaluation Pattern		
Sr. No	Details of the Evolution	Weightage
1.	Internal Written, Examination and assignment Continues Assessment, Viva-voce, Quizzes.	50%
2.	University Examination	50%

Course outcomes: Having completed this course, the learner will be able to	
1.	Students would learn population, sampling, types and techniques of sampling
2.	Students would gain knowledge about various methods of data collection and data analysis
3.	Students will enhance their knowledge about APA style Report writing

Suggested References:	
Sr. No	Reference
1.	Broota, K. D. (1992), Experimental Design in Behavioral Research, N. Eastern.
2.	Dhila, B. D., Yagnik, L. R. and Chothani, K. B., (2004), Sanshodhan Padhattee, Vartanik Vignanma, (Research Method in Social Science), Akshar Publication, Ahmedabad.
3	Jogsan, Y. A., (2016), Manovignanma Sanshodhan Padhdhati, (Research Methodology in Psychology), J K Print Shop, Rajkot.
4	Karlinger, F. N., (1953) Research methods in the Behavioural Science, Dryden.
5	Kothari, C. R., (2007), Research Methodology (Methods & Techniques), New Age International (P) Limited, Publishers.
6	Kumar, (2016), Research Methodology (A step by step guide for Beginners) sage publications Mathura road, New Delhi.
7	Parekh, S. C. and Dixit, S. K. (1995), Statistical Testing in Psychological Research, Champa Prakashan, Junagadh.
8	Rajmanikam, M. (2001), Statistical Methods in Psychological and Educational Research, Concept Publication Company, New Delhi.
9	Sadhu, A. N. and Sing A., (1983), Research Methods in Social Science, Publication House, New Delhi.
10	Mangal, S. K., (2016), Statistics in psychology and Education, (2nd Edition), Mudrak publication, Patparganj, Delhi.
11	Sendecor, G. W. and Cochran, W. G. (1968), Statistical Methods, Mohan Primlani, Oxford & IBH Publishing Company.
12	Trivedi, M. D. and Parekh, B. U. (1989), Statistics in Education, Granth Nirman Board, Ahmedabad.
On-line resources to be used if available as reference material	
On-line Resource	

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Sardar Patel University Vallabh Vidyanagar
Ph.D. (Sanskrit) Coursework

Rules and Regulations for Ph.D. Programme
Effect from September, 2021
R. Ph. D. 9. Course Work

Course No and Title of the coursework	Lectures Guidance in weekly	Credits	Total
Course-II Indian Textual Criticism	03	03	100
Course-III Research-oriented Practical work	03	03	100

Course-II Indian Textual Criticism

Unit I

1. Types of Manuscripts
2. Libraries of Manuscripts
3. Multi-faceted problem of text-editing
4. Stages of text-editing
5. Rules for text-comprehension

Unit II

1. The critical edition of Abhijnanashakuntalm
2. The critical edition of Panch-Tantra
3. The critical edition of the Mahabharata
4. The critical edition of the Ramayana

Unit III

1. Shreemad Bhagavat Purana
2. Mahavira Charita
3. Mruchchhakatikm

Course-III Research-oriented Practical work & Indian Research Method

1. Preparation and Submission of a research proposal.
2. The format of thesis- Title, Table of Content, Preface, Acknowledgement, Cauterization, Footnotes, Appendices, Tables, Photographs, Bibliography and Index, Institutional requirements; and the use of computers for this end.
3. The style of presentation: Language and logic.
4. A brief introduction to the Libraries, record offices, etc. Useful for research in history of Gujarat.
5. Techniques of Research Writing:

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Sardar Patel University
Vallabh Vidyanagar

i) Diacritical Marks
ii) Abbreviation
iii) Translation
iv) Referencing (Foot-note, End-note, ibid. etc.)
v) Proof Reading
6. Insights from Indian Research Methodology
7. Anubandha Chatushtaya; Tantrayuktis; Sangatis; Nyayas.

Essential Reading:

1) Pandulipi.
2) Indian Textual Criticism- Prof. Katre.
Gujarati Translation, K. H. Trivedi, (Gujarat Rajya Grantha Nirman Board, Ahmedabad)
3) Indian Textual Criticism, Vijay Pandya, Parimal Publication, New Delhi.
4) Bharatiya Patha-sancharan ni prakriya, Prof. Vasant Bhatt, (Saraswati Pustak Bhandar, Ahmedabad).
5) Mahabharat-Adi Parva, V.S. Sukthankar & S. V. Belvalkar, BORI, Pune.
6) Research Methodology -Methods and Techniques by C.R. Kothari, New Age International (P) Ltd, New Delhi.
7) Anusandhana paddhati of Prof.Bhagirath Prasad Tripathi, Sarasvati sushama, vol.2, V.S. Sampurnanda Sanskrit University

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SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

(Reaccredited with 'A' Grade by NAAC (CGPA 3.25)

Doctor of Philosophy in Social Work –Course work

(With Effect from June 2022)

Paper Code II	Title of the paper Introduction to social work research and research concepts	Credits: 03

Course Objectives	1. To help student critically appreciate the changing perspectives in social work research. 2. To develop practical skills to review literature in social work research and use the same in carrying out studies. 3. To help student critically appreciate social work theories and its significance insocial work research.

Course Outline:		
Unit	**Unit Description**	**Weightage***
1	**Social work research**	**20%**
	Social work research: Definition and factors affecting research in social work. Intervention research designs: Single subject designs, Steps in intervention research designs.	
2	**Ethics in Social Work Research**	**20%**
	Ethics in Social Work Research: The concept and context of research ethics, history of research ethics, guiding ethical principles in research with human being, Ethics in the Research process.	
3	**Theories and Theoretical Framework in Quantitative Research**	**20%**
	Theories and Theoretical Framework in Quantitative Research: Concept of theory in quantitative research, Development of Theory, Common Quantitative Theories	
4	**Theoretical Frame Works and Review of Studies in Social Work**	
	Theoretical Frame Works and Review of Studies in Social Work: Social Work Theories. Types of social work theories: Macro/Grand, middle range and micro level theories. Need of theory in social work research.	
5	**Case Studies/Assignment**	**20%**

	Review of social work/social welfare research generally and preparation of a comprehensive review paper in a particular field of social work for presentation; review of selected studies on intervention.	

*Units will have the same weightage in the evaluation as suggested in the course outline

Teaching-Learning Environment	The course would be taught /learnt through various means like lectures, discussions, writing assignments, seminars, presentations, case studies and reviews of literature.

Evaluation Pattern		
Sr. No	**Details of the Evaluation**	**Weightage**
1	Internal Written/Practical Examination	**20%**
2	Internal continuous assessment in the form of Quizzes, seminars, presentation, assignments and attendance.	**10%**
3	University Examination	**70%**

Course outcomes: Having completed this course, student should be able to:	
1	Critically appreciate the changing perspectives in social work research.
2	Develop practical skills to review literature in social work research and use the same in carrying out studies.
3	Critically appreciate social work theories and its significance in social work research.

Suggested References: (include reference material from where a student is expected to study the said content in APA style)	
1	Iston and Bowles, 2003, Research for social workers, An introduction to methods, Rawat publications
2	B.N. Ghosh, 1992, Scientific method and social research, Sterling publishers
3	Babbie and Rubin, 2000, Research methods for social work, Brooks and Cole publishing company.
4	D.K. Laldas 2000, Practise of social research. Rawat Publishers
5	D.K.Laldas, 2005, Designs for social research, Rawat publishers.
6	https://www.slideshare.net/srengasamy/theories-of-social-work

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SARDAR PATEL UNIVERSITY

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Doctor of Philosophy in Social Work –Course work

(With Effect from June 2022)

Paper Code-III	Title of the paper Community Engagement Activities	Credits: 03

Course Objectives	1. To help research scholars critically appreciate role of social worker in rural development and CSR activities undertaken by industries. 2. To help students able to develop skills and knowledge, so that able to involve in and contribute towards community development.

Course Outline:		
Unit	**Unit Description**	**Weightage***
1	Students must engage themselves in community engagement activity/activities for 45 hours in any village from Anand district. The community engagement activity can be taken up in the field of health, education, and social problems for example: 1.Teaching children in a rural school 2. Imparting adult education in rural areas 3. Awareness programmes on relevant topics in rural areas 4. Activities for women empowerment, health enhancement, de-addiction, sensitization programmes on human rights, child rights, legal rights in rural area etc or and CSR activities undertaken by corporate.	**100%**

*Units will have the same weightage in the evaluation as suggested in the course outline

Teaching-Learning Environment	Students can complete this course by involving themselves in various community engagement practices in rural areas of Anand district.

Evaluation Pattern		
Sr. No	**Details of the Evaluation**	**Weightage**
1	Certificate from the school authority/ Sarpanch of village duly certifying the successful completion of community engagement activity for 45 hours during the stipulated time duration	**15%**

2	Report and presentation of community engagement activity.	**15%**

Course outcomes: Having completed this course, student should be able to:	
1	Critically appreciate the importance of youth involvement in fast track rural development and nation building.
2	Develop practical skills to unlock the demographic dividend and inherent talent of rural masses.

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Vallabh Vidyanagar.

Sardar Patel University,
Department of Sociology
(Name of the Degree) (Programme Name)
1. (Degree abbreviation): **Ph.D in Sociology**

Course Code	Ph .D Course 2	**Title of the Course**	Theoretical Perspectives in Sociology

Course Objectives:	1. To acquaint students with the Concepts of theories and relationship between theory and research. 2. To acquaint students with the Sociological theories and to orient them towards the theory.

Course Content		
Unit	**Description**	Weightage* (%)
1.	Nature of Sociological Theory, Construction of Sociological theory, Functions of Sociological Theory.	20
2.	Functionalism -Intellectual roots of Functionalism - Emile Durkhim - Talcot Parsons ✓ Action system, AGIL Model ✓ Sub Structure System, Pattern Variables ✓ Robert K. Merton Postulates ✓ Latent Manifest Function ✓ Functional Analysis of Political Machine	20
3.	Conflict Theory - Intellectual roots of conflict theory - Karl Marx's views on conflict theory - Ralf Daherndorf's views on conflict theory - Louies Cozer's views on conflict theory	20
4.	Social Exchange Theory - Intellectual roots of Social Exchange Theory - George C. Homan's views on Social Exchange Theory - Peter M. Blau's views on Exchange Theory	20
5	Symbolic Interactionism - Intellectual roots of symbolic Interactionalism	20

	- Charles H. Cooley's views on symbolic Interactionalism - George H. Meadis views on symbolic Interactionalism -Herbert Blumer's views on symbolic Interactionalism	

Teaching-Learning Methodology	- To deliver lecture on the topic - Discussion on the topic - Indicate the present and future importance of the topic - To give synopsis of the topic - To give list of the reference book - To assign research project related to the subject - To assign assignment and tutorial to the student. - Special discussion and additional classes are requested topic by student and additional lecture will be taken in needed. - Students will be guide for research for research project - Audio-video will be used. - Remedial class will be taken

Evaluation Pattern		
Sr. No.	**Details of the Evaluation**	**Weightage**
1.	Written Assignment	50%
2.	Viva Voce	50%
		100%

Course Outcomes: Having completed this course, the learnerwill be able to	
1.	Students willbe able to understand perspectives of Sociological Theories.
2.	Students will be able todescribe structured functionalism and the contribution made by Durkheim, Robert Merton and Tallcot Parsons.
3.	Students will be able to understand Marxism and neo-marxism and major theories associated with these perspectives.
4.	Students willbe able to understand symbolic interactionism and identify major theories associated with these perspectives.

Suggested References:

Sr. No.	References
1.	AbrahamFrancis and John Harry Morgan: Modern Sociological Thoughts: From Comte to Sorokin, Mcmillan Indian Ltd. Delhi 1985.
2.	Alexander, Jeffery C. 1987. Twenty lectures: Sociological theory since world war II. New York: Columbia University Press.
3.	Collions, Randall. 1997 (Indian Edition), Sociological Theory Jaipur and New Delhi: Rawat
4.	Closer Lewis A: Masters of Sociological Thought Harcourt Base New York 1977.
5.	Craib, Ian. 1992 Modern Social Theory: From Parsons to Mabermass (2nd Edition). London: Harvester Press.
6.	Giddens Anthony: Capitalism and Modern Social Theory – An Analysis of Writing of Marx Durkheimme and Weber Cambridge Uneversity Press 1997.
7.	Giddens, Anthony.1983. Central Problems in Social theory: Action, structure and contradiction in social analysis. London: Macmillian
8.	Kuper, Adam and Jessica Kuper (eds). 1996 (2nd Edition). The social science encyclopedia. London and New York: Routledge.
9.	Kuper, Adam 1975, Anthropologists and anthropology: The British School, 1922-72. Harmonds worth, Middlesex: Penguin Books.
10.	Morrison Ken Marx, Durkheim and Weber – Formation of Modern Social Thought Sage New Delhi 1995.
11.	Ritzer, George. (1992) (3rd Edition). Sociological Theory. New York: McGraw-Hill.
12.	Ruth A Wallance and Alison Wolf, Contemporary Sociological Theory. Prentice hall inc. Englewood cliffs, NJO7682, 1980.
13.	Sturrock. John (ed.) 1979. Structuralism and since: From Levi Strauss to Derida. Oxford: Oxford University Press.
14.	Turner Jonatham H. 1995 The structure of sociological theory, Rawat Publication, Jaipur and New Delhi
15.	Turner, Jonatham H. 1995 (4th Edition). The structure of sociological

	theory, Jaipur and New Delhi: Rawat
16.	Zeitlin, Irving M. 1998 (Indian Edition). Rethinking sociology: A critique of contemporary theory. Jaipur and New Delhi: Rawat.
17.	Dr. Y. Parmar, Sociological theories, Granth Nirman Board, Ahmedabad. (Guj.)
18.	Dr. Y. Parmar, Lefttist thinkers of 20th century, Popular Prakashan, Surat. (Guj.)

On-line resources to be used if available as reference material
1. Courses.lumenlearning.com
2. Openstax.org>book
3. Libguides.hmboldt.edo.soc
4. www.sdbor.edu>document
5. Libguides.roanol<e.edu>socialtheory

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Sardar Patel University,
Department of Sociology
(Name of the Degree) (Programme Name)
1. (Degree abbreviation): **Ph.D in Sociology**

Course Code	Ph .D Course 3	**Title of the Course**	3 Monograph Study

Course Objectives	1. To acquaint students with the Concepts of theories and relationship between theory and research. 2. To acquaint students with the Sociological theories and to orient them towards the theory

Unit	**Description**	Weightage* (%)
1.	Importance and relevance of the study of Monograph .Nature, scope of monograph studies	20%
2.	Research problem and objective of monograph studies	20%
3.	Issues and Research design of monograph studies	20%
4.	Theoretical Frame work of monograph studies.	20%
5.	Major findings and it's relevance in the contemporary era	20%

Note: Each published Monograph Studies based on empirical research based to be selected and taught

DEPARTMENT OF STATISTICS
SARDAR PATEL UNIVERSITY
VALLABH VIDYANAGAR

SYLLABUS EFFECTIVE FROM: 2021-22

DOCTOR OF PHILOSOPHY Course Work

(STATISTICS / APPLIED STATISTICS)

SEMESTER	Course Code	SUBJECT	Credit	Total Number of Hours	Nature of the Course
I	PS01PHDCW52	On Ideas of Statistical Inference, Design, Sampling and Modeling	03	45	CL
II	PS02PHDCW53	On Statistical Computing Tools and Techniques	03	45	CL

Pages
1+4=5

(Doctor of Philosophy in Statistics)
(Ph. D.) (Statistics Course Work) Semester (I)

Course Code	PS01CPHDCW2	Title of the Course	ON IDEAS OF STATISTICAL INFERENCE, DESIGN, SAMPLING and MODELING
Total Credits of the Course	03	Hours per Week	03

Course Objectives:	In depth learning and overview of the four main branches of Statistics for better reading and following up of research papers in Statistics and Applied Statistics

Course Content		
Unit	Description	Weightage* (%)
1.	Linear Modelling using Auxiliary Variables: (1) Optimal Sampling design (ii) Model-based Estimation/Prediction and (3) Model-assisted Estimation Variance Estimation: (1) Balance Half-samples (2) The Jackknife Technique and (3) The Bootstrap	33.3
2.	Combinatorial design theory: (1) BIBD (2) Latin Squares (3) Orthogonal Arrays Optimal Moment Matrices and Optimal Designs including (1) A-optimality (2) D-optimality (iii) G-optimality A paper from the Selected Statistical Papers of Sir David Cox.	33.3
3.	Modelling repeated non-normal response measurements: Generalized Estimating Equations Modelling non-normal mixed effect models: Generalized linear mixed models	33.3

Teaching-Learning Methodology	Interactive Class Lectures, ICT Tools, Self-Study followed by Group Discussions

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Students will gain thorough understanding of sampling, design and modelling concepts and ability to read research articles
2.	Student will be able to review and grasp the theory, proof and algorithm discussed in research papers/work/book

Suggested References:	
Sr. No.	References
1.	Cassel, C.M., Särndal, C.E., and Wretman, J.H. (1977). Foundations of Inference in Survey New York.
2.	Chaudhuri A. and JWE. Vos. (1988). Unified Theory and Strategies of Survey Sampling", jointly with late (North-Holland)
3.	D. J. Hand and A. M. Hertzberg (2005). Selected Statistical Papers of Sir David Cox Volume 1: Design of Investigations, Statistical Methods and Applications, Cambridge University Press.
4.	Douglas R. Stinson (2010). Combinatorial Designs: Construction and Analysis, Springer(India), India
5.	Friedrich Pukelsheim (1993). Optimal Design of Experiments, John Wiley and Sons, Inc.
6.	Raymond H. Myers, Douglas C. Montgomery, G. Geoffrey Vining and Timothy J. Robinson (2010). Generalized Linear Models with Applications in Engineering and the Sciences (2nd ed.), John Wiley and Sons, Inc.
7.	Särnda, C. E., Swensson, B., and Wretman, J. H. (1992), Model Assisted Survey Sampling, Springer Verlag, New York.
8.	Wolter, K. M. (1985). Introduction to variance estimation, NY: Springer Verlag.

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(Doctor of Philosophy in Statistics)
(Ph. D.) (Statistics Course Work) Semester (II)

Course Code	PS02CPHDCW3	Title of the Course	ON STATISTICAL COMPUTING TOOLS and TECHNIQUES
Total Credits of the Course	03	Hours per Week	03

Course Objectives:	To know theory and practice of some advanced estimation and optimization algorithms

Course Content		
Unit	Description	Weightage* (%)
1.	Bootstrap, GEE, LME and DHGLM using R Response Surface Methodology using Design Expert	33.3
2.	Machine Learning algorithm like Support Vector Machines, Artificial Neural Networks using Python	33.3
3.	Evolutionary algorithm like Genetic algorithm and Nature-inspired algorithm like ant colony algorithm	33.3

Teaching-Learning Methodology	Interactive Class Lectures, ICT Tools, Self-Study followed by Group Discussions

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Students will develop brain storming ability and analytical skills to perform computerized simulation and optimization
2.	Student will be able to employ appropriate algorithms in his/her reviews and research

Suggested References:	
Sr. No.	References
1.	John Lawson (2015). Design and Analysis of Experiments with R, CRC Press.
2.	Xin-She Yang (2018). Optimization Techniques and Applications with Examples, John Wiley and Sons, Inc.
3.	Design Expert, Stat-Ease Inc.
4.	Open source software and Library: cran.r-project (Comprehensive R Archive Network), Python Corporation
5.	SAS Inc.

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