



Ph.D. Program
Course Work Structure and Syllabus
*(Revised and Approved in the 46th RCM dated
13.07.2023)*



Recognised under Section 2(f) of UGC Act

**The ICFAI University,
Dehradun
July 2023**

Ph.D. Course Work Structure*

S. No.	Name of the Subject	Code	Credit	Type	Page
1	Research Methodology / Legal Research Methodology*	PHDRMM-101/ PHDRML-101/ PHDRMST-101/ PHDRME-101	04	Core	2
2	Research & Publication Ethics	PHDRPE-101	02	Core	11
3	Literature Review Seminar		03	Core	-
4	Subject Specific		03	Elective	-
Total Credit (Course Work)			12		

Subject-Specific Electives: -

S. No.	School	Subject	Name of the Subject	Subject Code	Credit	Page No.
1	IBS	Management	Advanced Strategic Management	PHDASM-101	3	12
2			Analytical Approach to Marketing	PHDAAMM-	3	14
3			Advanced Marketing Management	PHDAMM-101	3	15
4			Investment Analysis and Risk	PHDIAR-101	3	17
5			Human Resource Management	PHDHRM-101	3	19
6	ILS	Law	Advanced Legal Studies	PHDALS-101	3	21
7			Indian Constitutional Law	PHDICL-101	3	23
8			Criminal Law	PHDCL-101	3	25
9			Human Rights and Humanitarian Law	PHDHRHL-101	3	26
10			International Law	PHDIL-101	3	28
11	ITS	CSE	Machine Learning Techniques	PHDMLT-101	3	30
12			Advanced Database Management System	PHDADMS-101	3	32
13		ME	Structure & Bonding in Materials	PHDSBM-101	3	33
14			Nanomaterials and Nanotechnology	PHDNAN-101	3	34
15		CE	Environmental Modeling	PHDETP-101	3	36
16			Sustainability Development	PHDSD-101	3	38
17		ECE	Communication System Design	PHDCSD-101	3	40
18			Advanced Antenna Theory	PHDAAT-101	3	41
19		Mathematics	Optimization and Operations Research	PHDOOR101	3	42
20			IEdS	Philosophical and Sociological Basis of Educational Research	PHDPSE-101	3
21	Developments in Indian Education System	PHDDIE-101		3	45	

**Ph.D. Course work from Batch-2023 onwards is of one (01) semester only which comprises of 04 subjects of total 12 credits.*

ICFAI Business School (IBS)

Doctor of Philosophy (Ph.D.)

Course work (Full-Time and Part-Time Scholars of IBS)

Course: Research Methodology			Semester: I
Course Code: PHDRMM-101	L T P	3 0 1	Credits: 4

Course Objective: The main goal of this subject is to introduce the basic concepts in research methodology in management. This subject addresses the issues inherent in selecting a research problem and discusses the techniques, software's and tools to be employed in completing a research project. This will also enable the students to prepare report writing and framing Research proposals.

Syllabus

Unit-1: Introduction to Research

Meaning & definition of Research – Relevance and significance of Research in business – Types of Research, Research Process: Various Steps in Research Process, Identification of the problem, review of literature, tools for review of literature, research and sample design, characteristics of good research design.

Unit-2: Sample & Survey Design

Census and sample survey, Population & sample, sampling, meaning and types of sampling techniques, Sample size determination, Questionnaire design process, Response format: open-ended questions close ended questions. Classification of method of data collection; personal interview, telephone interview, mail interview and electronic interview. Validity of the questionnaire, Data collection in qualitative research: focus group technique, depth interview technique and projective technique Editing, coding, classification and tabulation of data; methods of data presentation. nominal scale, ordinal scale, interval scale, ratio scale; criteria for good measurement, Likert scale, reliability, reliability test. single item scales, multiple items scales.

Unit-3: Computer, Statistical Software's and Data Preparation

Computer and its role in research, MS-Office-Power point, word, Excel. Uses of Microsoft Excel and SPSS for data analysis. Data Coding, Data Cleaning, Identification Outliers, Handling, Missing Values.

Unit 4: Descriptive & Inferential Statistics

Measures of central tendency, Measures of dispersion, Probability distributions, Estimation theory: point and interval estimation, Testing of hypothesis, One sample test, Independent t-test, paired t-test, Analysis of variance, Correlation analysis and introduction to regression analysis Non-Parametric testes: Chi-square goodness of fit and indecency tests, Kruskal-Wallis test, Wilcoxon test, Mann-Whitney test.

Unit-5: Multivariate Techniques:

Introduction to Multivariate analysis, classifications of multivariate, Multiple regression analysis, Discriminant analysis, Logistic regression, Factor analysis, Cluster analysis,

Structural equation modeling (SEM), Qualitative research methods; content analysis.

Unit-6: Research Proposal and Report Writing

Structure and scope of research proposal, Elements of research proposal, Significance, steps and structure of research report; presentation of the research report and Ph. D. Thesis. Footnotes, end-notes, referencing and bibliography.

Suggested Readings:

- Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2013). *Business Research Methods*. Cengage learning.
- Cooper, D. R., Schindler, P. S., & Sharma, J.K. (2018). *Business Research Methods*. 12th Edition, Tata Mc Graw Hill, New Delhi
- Kothari, C.R., Garg, G. (2019). *Research Methodology: Method and Techniques*, Fourth Edition, New Age International Publishers.
- Bryman, A. and Bell, E. (2007). *Business Research Methods*, Oxford University Press.
- Levin, Richard, I and David S Rubin: *Statistics for Management*, Pearson
- Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage publications.

ICFAI Law School (ILS)
Doctor of Philosophy (Ph.D.)
Course Work (Full-Time and Part-Time Scholars of ILS)

Course: Legal Research Methodology			Semester: I
Course Code: PHDLRM-101	L T P	3 0 1	Credits: 4

Objectives

This course comprises of 6 modules focusing on Research, Research Methodology, Research Design and Sampling Techniques, Research data & Data Analysis, various types of tools in collection of data; selection of size of sample, use of sample collected, data analysis, preparation of research report and production of quality legal writings, Reference & Research Ethics, research integrity, E Publication ethics. Indexing and citation databases, open access publications, research metrics (citations, h-index, Impact Factor, etc.) and plagiarism tools.

Syllabus

Unit-1: Introduction of Research

Meaning, nature and kinds of research; objective of research; scientific methods, research process. Types of legal research for Doctrinal and Non-Doctrinal researches (Descriptive research; Explanatory research; Historical research; Comparative research; Fundamental & Applied research; Analytical & Critical research).

Unit-2: Research Methodology

Research Methods and Methodology Used, Identification and Selection of Research Problem; Formulation of Research Problem, Literature Review, and Hypothesis: its meaning and significance; types of hypothesis; characteristic of valid hypothesis; stages in formulation of hypothesis; testing of hypothesis. Use of deductive and inductive methods in Legal Research; tools of doctrinal Legal Research; tools of non-doctrinal Legal Research.

Unit-3: Research Design & Sampling Techniques

Meaning and definition of research design; need for research design; aspects to be considered in research design; components of research design; formulation of research design; types of research design (Exploratory; Descriptive; Diagnostic; Historical and Experimental); characteristics of workable design. Meaning of population and sampling; significance of sampling method; methods of sampling; types of sampling (Probability sampling—Simple random sampling, Stratified random sampling, Cluster sampling, and Multi stage sampling; Non probability sampling—Purposive sampling, Quota sampling, Area sampling); errors in sampling.

Unit-4: Research Data & Data Analysis & Computers

Meaning, nature and importance of data; types of data; sources of data (Primary, Secondary, Vertical and Horizontal); limitations of data collections; selection of

appropriate method for data collection. Stages of data procession (edition, coding, classification, tabulation); types of analysis (descriptive, casual, co-relation and inferential); hypothesis testing; interpretation and generalization. Methods for the collection of statutory and case materials and juristic literature; various tools of collecting primary data (observation, sampling, questionnaire, interviews, case study and content analysis). Use of information technology in legal research; legal data base and digital library; digital tools of data analysis (SPSS, spread sheet, Email and web-based forms).

Unit-5: Preparation of Research Report

Legal research report; essentials and significance of legal research report; different stages of report writing (logical analysis of the subject matter, preparation of the final outline, preparation of the rough draft, rewriting and polishing, preparation of the final bibliography, writing the final draft); types of legal research reports (thesis, monograph, research article); modes of citation; styles of citations (APA, MLA, Chicago; Blue books); illustration and tables; bibliography, Plagiarism tools.

Unit-6: Research Proposal and Report Writing

Structure and scope of research proposal, Elements of research proposal, Significance, steps and structure of research report; presentation of the research report and Ph. D. Thesis. Footnotes, end-notes, referencing and bibliography.

Suggested Readings:

- *Kothari C.R., Research Methodology (New Age International, 2004)*
- *S.K. Verma and M. Afzal Wani (Eds.) Legal Research and Methodology, (ILI, New Delhi, 2nd Edo., 2001)*
- *Pauline V. Young, Scientific Social Surveys and Research, methods, and An Introduction to methods and Analysis of Social Studies (New York: Prentice Hall, Rev Ed. 1949)*
- *Rattan Singh, Legal Research Methodology (Lexis Nexis, 2013)*
- *Myneni, S. R., Legal Research methodology (Allahabad Law Agency, 2015)*
- *Bruce L. Berg, Qualitative Research Methods for the Social Science (London: Allyn and Bacon, 2001)*
- *Cohen L. Morris, Legal Research in Nutshell, (Minnesota West Publishing Co., 1996)*
- *Ghosh B.N., Scientific Methods and Social Research, (Sterling, New Delhi, 2003)*
- *John W. Creswell, Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, (Sage Publications, 2002)*
- *Kalven, Hans H. Social Science Research and the Law: A symposium in Honor of Hans Zeisel, University of Chicago Law Review 41 (1974) Winter 20995*
- *Miller, Delbert. C. Handbook of Research Design and Social measurement, (New York: DS. Mckay, 1977)*

ICFAI Tech School (ITS)
Doctor of Philosophy (Ph.D.)
Coursework (Full-Time and Part-Time Scholars of ITS)

Course: Research Methodology			Semester: I
Course Code: PHDRMT-101	L T P	3 0 1	Credits: 4

Course Objective: The main goal of this subject is to introduce the basic concepts in research methodology in Science and Technology. This subject addresses the issues inherent in selecting a research problem and discuss the techniques, software's and tools to be employed in completing a research project. This will also enable the students to prepare report writing and framing Research proposals.

Syllabus

Unit-1: Introduction

Meaning, objectives and significant of research, Motivation in research, Types of research, Research methods versus methodology, Research and scientific method, Research process, Features of good research, Problems encountered by researchers at National / International level.

Unit-2: Descriptive Statistics and Probability Distributions

Measures of central tendency, Measures of dispersion: Range, quartile deviation, mean deviation, standard deviation, coefficient of variation, probability, Probability distributions: discrete and continuous distribution, Binomial distribution, Poisson distribution, Normal distribution.

Unit-3: Operational Research: Applications and Methodology

Multi-criteria decision making (MCDM): Analytical Hierarchy Process (AHP), TOPSIS, and Advanced MCDM and Meta-heuristic: FUZZY, Genetic Algorithm (GA), Particle Swarm Optimization (PSO), etc.

Unit-4: Computer Software's and its Applications in Research

Fundamentals of Computer Programming PYTHON and MATLAB, Analysis Software's: Microsoft Power BI and VOSviewer for bibliographic, and Simulation Techniques etc.

Unit-5: Research Proposal and Report Writing

Structure and scope of research proposal, Elements of research proposal, Significance, steps and structure of research report; presentation of the research report and Ph. D. Thesis. Footnotes, end-notes, referencing and bibliography.

Suggested Readings:

- *Mueller, J. P. (2023). Beginning programming with Python for dummies. John Wiley & Sons.*
- *Eshkabilov, S. (2019). Beginning MATLAB and Simulink (Vol. 1339). Springer.*
- *Clark, D., & Clark, D. (2020). Introducing Power BI. Beginning Microsoft Power BI: A Practical Guide to Self-Service Data Analytics, 1-20.*
- *Talbi, E. G. (2009). Metaheuristics: from design to implementation. John Wiley & Sons.*
- *Emrouznejad, A., & Ho, W. (2017). Fuzzy analytic hierarchy process. CRC Press.*
- *Kothari, C. R., & Gaurav, G. (2019). Research Methodology: Methods and techniques fourth edition. New Age International, New Delhi.*

ICFAI Education School (IEdS)
Doctor of Philosophy (Ph.D.)
Course Work (Full-Time and Part-Time Scholars of IEdS)

Course: Research Methodology			Semester I
Course Code: PHDRME-101	L T P	3 0 1	Credits: 4

Course Objective: To Understand the concept of research in the field of education by solving real-life problems with the help of different educational tools, techniques & procedures.

Syllabus

Unit-1: Introduction to Research

Meaning & definition of Research – Relevance and significance of Research in Education, Types of Research, Research Process: Various Steps in Research Process, Identification of the problem, review of literature, tools for review of literature, research and sample design, characteristics of good research design.

Unit-2: Sample & Survey Design

Census and sample survey, Population & sample, sampling, meaning and types of sampling: size determination, Questionnaire design process, various methods of data collection: personal interview, telephone interview, mail interview, and electronic interview. Validity of the questionnaire, Data collection in qualitative research: focus group technique, depth interview technique and projective technique. Scales of Measurement: nominal scale, ordinal scale, interval scale, ratio scale; criteria for good measurement, Likert scale, reliability of data

Unit-3: Computer, Statistical Software's and Data Preparation

Computer and its role in research, MS-Office-Power point, word, Excel. Uses of Microsoft Excel and SPSS for data analysis. Data Coding, Data Cleaning, Identification Outlier, Handling, Missing Values.

Unit 4: Descriptive & Inferential Statistics

Measures of central tendency, Measures of dispersion, Probability distributions, Estimation theory: point and interval estimation, Testing of hypothesis, One sample test, Independent t-test, paired t-test, Analysis of variance, Correlation analysis and introduction to regression analysis Non-Parametric testes: Chi-square goodness of fit and indecency tests, Kruskal-Wallis test, Wilcoxon test, Mann-Whitney test.

Unit-5: Multivariate Techniques:

Introduction to Multivariate analysis, classifications of multivariate, Multiple regression analysis, Discriminant analysis, Logistic regression, Factor analysis, Cluster analysis

Unit-6: Research Proposal and Report Writing

Structure and scope of research proposal, Elements of research proposal, Significance, steps and structure of research report; presentation of the research report and Ph. D. Thesis. Footnotes, end-notes, referencing and bibliography.

Suggested Readings:

- *Schutt, R. K., Check, J. W. (2011). Research Methods in Education. United States: SAGE Publications.*
- *Practical Research Methods in Education: An Early Researcher's Critical Guide. (2019). United Kingdom: Taylor & Francis.*
- *Exploratory Factor Analysis: Applications in School Improvement Research. (2017). United States: Nova Science Publishers.*
- *Kothari, C.R., Garg, G. (2019). Research Methodology: Method and Techniques, Fourth Edition, New Age International Publishers.*
- *Best, John W. & James Kahn, Research in Education (2008). New York, Prentice-Hall*

Doctor of Philosophy (Ph.D.)
Coursework (Full-Time and Part-Time Scholars)

Course: Research and Publication Ethics			Semester: 1
Course Code: PHDRPE-101	L T P	2 0 0	Credits: 2

Objective: This course comprises 6 modules focusing on basics of the philosophy of science and ethics, research integrity, and publication ethics. Hands-on sessions are designed to identify research misconduct and predatory publications. Indexing and citation databases, open-access publications, research metrics (citations, h-index, Impact Factor, etc.), and plagiarism tools will be introduced in this course.

Syllabus

RPE 01: Philosophy and Ethics

1. Introduction to philosophy: definition, nature and scope, concept, branches
2. Ethics: definition, moral philosophy, nature of moral judgments and reactions

RPE 02: Scientific conduct

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1. Ethics with respect to science and research
2. Intellectual honesty and research integrity
3. Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP)
4. Redundant publications: duplicate and overlapping publications, salami slicing
5. Selective reporting and misrepresentation of data

RPE 03: Publication Ethics

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1. Publication ethics: definition, introduction and importance
2. Best practices / standards setting initiatives and guidelines: COPE, WAME, etc.
3. Conflicts of interest
4. Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa, types
5. Violation of publication ethics, authorship and contributor ship
6. Identification of publication misconduct, complaints and appeals
7. Predatory publishers and journals

RPE 04: Open Access Publishing

1. Open access publications and initiatives
2. SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies
3. Software tool to identify predatory publications developed by SPPU
4. Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.

RPE 05: Publication Misconduct

A. Group Discussions

1. Subject specific ethical issues, FFP, authorship
2. Conflicts of interest
3. Complaints and appeals: examples and fraud from India and abroad

B. Software tools

Use of plagiarism software like Turnitin, iThenticate and other open source software tools.

RPE 06: Databases and Research Metrics

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A. Databases

1. Indexing databases
2. Citation databases: Web of Science, Scopus, etc.

B. Research Metrics

1. Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score
2. Metrics: h-index, g index, i10 index, altmetrics.

Suggested Readings

- Bird, A. (2006). *Philosophy of science*. Routledge.
- MacIntyre, Alasdair (1967) *A Short History of Ethics*. London.
- P. Chaddah, (2018) *Ethics in Competitive Research: Do not get scooped; do not get plagiarized*, ISBN:978- 9387480865
- National Academy of Sciences, National Academy of Engineering and Institute of Medicine. (2009). *On Being a Scientist. A Guide to Responsible Conduct in Research: Third Edition*. National Academies Press.
- Resnik, D. B. (2011). *What is ethics in research & why is it important*. National Institute of Environmental Health Sciences, 1-10. Retrieved from <https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm>
- Beall, J. (2012). *Predatory publishers are computing open access*. *Nature*, 489(7415), 179–179. <https://doi.org/10.1038/489179a>
- Indian National Science Academy (INSA). *Ethics in Science Education, Research and Governance*(2019), ISBN:978-81-939482-1-7. <http://www.insaindia.res.in/pdf/EthicsBook.pdf>.

ICFAI Business School (IBS)
Doctor of Philosophy (Ph.D.)
Coursework (Full-Time and Part-Time Scholars)

Course: Advanced Strategic Management			Semester I
Course Code: PHDASM-101	L T P	3 0 0	Credits: 3

Objective

To introduce the fundamentals of Strategic Management and to explain the complexity involved in developing and implementing business strategies.

Syllabus

Introduction to Strategic Management

Meaning, Definition and Need for Strategic Management & its Introduction covering various dimensions, Evolution of strategy, strategy at different levels in organization

Strategic Positions

Environmental scanning & study of different models, Conventional Models of strategic management, Recent Models of strategic management used in 21st century, Fit between organizational objectives and strategic decision, stake holder mapping, Strategic management process, Analyzing resources and capabilities, Competitive advantage and core competencies, Value chain analysis,

Strategy Development

Strategy development approaches, Implications of various approaches, Understanding Strategic drift

Strategic choices

Formulating corporate level strategy, Formulating business level, functional level strategy, Hybrid strategy, Product Development & market development, TOWS matrix

Strategy Implementation

Managing internal organization for strategic implementation, Mckinsey 7s framework

Competing for Future

Basic Restructuring, Re-engineering and beyond it in context to global business, Emerging strategic tools, Co-creation

Corporate Restructuring

Forms of restructuring, Business Restructuring & its Outcome, Numerator and Denominator Management,

Turnaround Management

Turn around theory, Implications, Strategic Alliances and Joint Ventures, Need for strategic alliances and its process in detail, Licensing, franchising, Understanding Joint ventures: famous success and failures.

Mergers & Acquisition

Merger theories, Famous mergers & acquisition

Strategic Tools

Kanban, Benchmarking, Kaizen, Balanced score card & Grand strategies

Contemporary Issues

Red Ocean, Blue Ocean, Sustainable development, Green washing, Bottom of pyramid

Suggested Readings:

- Strategy Safari by Henry Mintzberg, Bruce Ahlstrand and Joseph Lampel, 2000.
- The concept of corporate Strategy by Kenneth R Andrews, Dow Jones-Irwin, 1971.
- Corporate Strategy: An analytical approach to business policy for growth and Expansion by Igor Ansoff, Mc-Graw Hill, NY, 1965.
- Chandler, A D. Jr. (1962). Strategy and Structure, MIT Press, MA, Cambridge.
- Competitive Advantage: Creating and Sustaining Superior Performance by Michael Porter, Free Press, 1980.
- Johnson, G., Whittington, R., & Scholes, K. (2020). Exploring Strategy: Text and Cases. Pearson.
- Rothaermel, F. T. (2019). Strategic Management. McGraw-Hill Education.

ICFAI Business School (IBS)
Doctor of Philosophy (Ph.D.)
Course work (Full-Time and Part-Time Scholars)

Course: Analytical Approach to Marketing Management			Semester I
Course Code: PHDAAMM-101	L T P	3 0 0	Credits: 3

Course Objective: To equip students with an understanding of the "importance and role of marketing analytics" in modern business enterprises and how business firms can take advantage of marketing analytics

Introduction

Introduction to marketing, Nature and Scope of Marketing, The Environment of Marketing in the Twenty-First Century

STP

Segmenting, Targeting and Positioning

Buyer Behavior:

Product: Definition, PLC, New Product Development, Branding Issues, Services Marketing, Price: Definition, Pricing Methods, Implications

Promotion and Distribution:

Promotion: Advertising, Sales Promotion, PR, Personal Selling, and Distribution: Special focus on Retailing and Retailing in India

Suggested Readings:

- Gary L. Lilien Philip Kotler K. Sridhar Moorthy (1995), "Marketing Models," Prentice-Hall of India
- Philip Hans Franses and Richard Paap (2001), "Quantitative Models in Marketing Research", Cambridge University Press

ICFAI Business School (IBS)
Doctor of Philosophy (Ph.D.)
Course work (Full-Time and Part-Time Scholars)

Course: Advanced Marketing Management			Semester I
Course Code: PHDAMM-101	L T P	3 0 0	Credits: 3

Course Objective:

- To understand of range of contemporary issues facing marketing academics, practitioners and consumers within the realm of marketing analytics, customer relationship management, service marketing, digital marketing and social responsibility and/or sustainability.
- Introduce marketing tools and frameworks to address problems of practice in marketing with emphasis on competition and strategic considerations
- To analyse research on marketing analytics, customer relationship management, digital marketing and marketing's impact on society and organisational and societal approaches to social responsibility and sustainability.
- Proficiency in applying selected concepts, principles and frameworks of the course in chosen contexts

Marketing Analytics and Big Data in Marketing: Exploring the marketing information needs, Customer databases and developing a marketing information system, Data mining, Marketing Research, Analyzing and using marketing information for forecasting, Impact of big data in marketing

Innovation Diffusion & Understanding Consumer Behavior (CB)

Diffusion of innovation in CB and consumer adoption process, Internal and external determinants of consumer buying, Opinion leadership, Complaint behavior.

Capturing Customer Value & Creating Competitive advantage: CRM & managing customer-firm relationships, Customer satisfaction & retention of customer. Creating useful Life Time Value of customer, Focus on effective competitive analysis & strategies, Balancing customer & competitor orientations

Services Marketing: Strategic Issues & Managing Service Quality

The service encounter, Managing customer expectations, Level of expectations, Zone of tolerance. Customer perceptions of service, Designing the service, Service delivery system, Measuring service quality, SERVQUAL and its benefits

Social media, Digital Marketing & Contemporary Marketing Trends: Growth of e-Commerce; Social media and Direct Marketing, Online Marketing, Digital Marketing and its advantages in the present age, Experiential Marketing, Ambush marketing, Buzz marketing, Viral marketing any other latest trends

Marketing Strategy, Social Responsibility (SR) and Sustainable Marketing

Social responsibility, Ethics and Marketing: A comprehensive view, Incorporating SR into marketing strategy, Consumer and stakeholders orientation in SR Marketing Strategies, Towards New 'Marketing Practice': Social Entrepreneurship

Suggested Readings:

- *Marketing Management - A South Asian Perspective*, Philip Kotler, Kevin Lane Keller, Abraham Koshy and Mithileshwar Jha, Pearson Prentice Hall
- *Principles of Marketing- A South Asian Perspective, 13th Edition*, Philip Kotler, Gary Armstrong, Prafulla Y. Agnihotri and Ehsan ul Haque, Pearson Prentice Hall
- *Marketing – Asian Edition*, Paul Baines, Chris Fill, Kelly Page, Piyush K Sinha, Oxford University Press
- *Social Media Marketing*, Tracy Tuten, Michael Solomon
- *Understanding Digital Marketing*, Damian Ryan and Calvin Jones
- *Schiffman, Leon G. and Kanuk, L. L.; Consumer Behavior; Pearson Education*

ICFAI Business School (IBS)
Doctor of Philosophy (Ph.D.)
Course work (Full-Time and Part-Time Scholars)

Course: Investment Analysis and Risk Management			Semester I
Course Code: PHDIAR-101	L T P	3 0 0	Credits: 3

Course Objective:

The objective of this course is to familiarize the students with the various types of financial markets and their regulators. The course has been designed to provide the research scholars with in-depth knowledge of different investment avenues. To make the researcher learn the concept and tools needed to analyse the securities and to manage the risk prevalent in financial market

Syllabus

Unit-I: Financial Markets and Regulators

Financial Markets – Function and Classification -Capital Markets- Nature, Growth, Components and instruments, Introduction to Money Market- Characteristics, Need and Instruments- Government security market- Forex Market-Commodity Market. Regulators- AMFI- SEBI- PFRDA- Objectives, Functions & Guidelines.

Unit-II: Investment Scenario and Avenues

Concept of Investment- Investment Objectives and Constraints- Elements of investment- Security and Non- security Forms of Investment- Life Insurance Schemes, Small Saving Schemes and Bank Deposits, real assets and real estate investments- Pension funds- Mutual Funds - The evaluation of mutual funds - Objectives of Mutual Funds-Organization and Management of Mutual Funds-Types of Mutual Funds- Designing and marketing of mutual fund schemes

Unit-III: Risk and Investment Analysis

Risk and Return – Introduction to risk, Systematic and Unsystematic Risk, factors of risk- Concept and Components of Total Risk-Security Returns: Measuring Historical and Ex Ante (Expected) Returns- Diversification and its benefits. Fundamental Analysis- Economy, Industry & Company Analysis- Technical Analysis- Charts, Technical Indicators, RSI, Moving Average Analysis.

Unit IV: Risk Management

Evolution of risk management- Approaches to risk management, Risk management process and tools of risk management - Derivatives- Meaning, Historical Perspective, Participants, Risk management using derivatives- Forwards- Futures- Options- Swaps- Credit Derivatives and Value at Risk.

Suggested Readings:

- *Pathak, B.V. (2018). Indian Financial System, Pearson Education India. 5th Edition.*
- *Gordon, E., & Natarajan, K. (2016). Financial Markets and Services. Mumbai: Himalaya Publishing House Pvt. Ltd.*
- *Chandra, P. (2010). Investment Analysis and Portfolio Management. (n.p.): Tata McGraw-Hill.*
- *Fischer, Donald E./Jordan, Ronald J. Security (1995). Analysis and Portfolio Management, Prentice Hall, India.*
- *Hull, J. (2010). Options, Futures, and Other Derivatives. India: Pearson Education.*
- *Gupta, S. L. (2017). Financial Derivatives: Theory, Concepts and Problems. India: Prentice Hall India Pvt., Limited.*

ICFAI Business School (IBS)
Doctor of Philosophy (Ph.D.)

Course work (Full-Time and Part-Time Scholars)

Course: Human Resource Management			Semester I
Course Code: PHDHRM-101	L T P	3 0 0	Credits: 3

Course Objective:

The objective of the course is to enable the scholar to explore emerging areas in HRM and OB that will facilitate in choosing an appropriate topic for research and understand the theoretical backdrop of his/her area of research.

Syllabus

Unit-I: Paradigm Shift in HR

Overview of HRM, Human Resource Management Vs. Strategic Human Resource Management, Changes in Emphasis from Personnel to Human Resources Management and Human Capital Management, Talent Management, Green HRM, E- HRM, Social media in HRM, Artificial intelligence in HRM

Unit-II: Performance Management and Development

Performance Appraisal and Potential Evaluation, Performance management, Balanced scorecard, Competency mapping, Succession planning, Compensation and Reward management, Training and Development and Organizational Outcomes, Career planning and development, Leadership Styles & development, Human Resources Development

Unit-III: Organizational Behavior

Personality, Emerging HR practices and Employee perception, Motivation, Employee job satisfaction, commitment and intention to stay, Work-life balance, Employee Engagement, Employee empowerment, Employee welfare, Employee value proposition, Spiritual & Emotional intelligence, Work stress, Employee flexibility

Unit-IV: Organizational Dynamics and Challenges of HRM

Organizational Culture, HRIS, Change management, International Human Resource Management: Dynamics of HRM in Multinational Corporations, Cross Cultural HRM. Current & Future HRM Challenges, Cross Cultural Management, Work-force diversity, Team and organizational effectiveness,

Unit-V: Industrial Relations & Ethics in HRM

Industrial Relations: Causes of Industrial Unrest and Remedial Measures, Industrial disputes in India, Collective Bargaining, Discipline, Grievance Redressal, Employment Security and Management of Redundancies. Trade Unionism in India. Social Security, Health & Welfare Measure in India.

Suggested Readings:

- *Robbins, S.P., Sanghi, S. & Judge, T. A. (2015). Organizational Behavior. New Delhi: Pearson Education.*
- *Luthans, F. (2010). Organizational Behaviour. New Delhi: Tata McGraw-Hill.*
- *Dessler, G. (2015). Human Resource Management. New Delhi: Pearson Education.*
- *Rao, N.S. (2017). Compensation System and Performance Management: New Delhi: Himalaya Publishing House.*
- *Mead, R. (2015). International Management-Cross cultural Dimension. UK: Blackwell.*
- *Henry, L. Maznevski, J. and Dietz. (2009). International Management Behavior: Leading with a Global Mindset, Chichester, UK: Wiley.*
- *Snell & Bohlander (2013). Human Resource Management. Nashville, TN: South Western. 8. Rao, T.V. (2017). Performance Management: Toward Organizational Excellence. New Delhi: Sage Publishers*

ICFAI Law School (ILS)
Doctor of Philosophy (Ph.D.)
Course Work (Full-Time and Part-Time Scholars)

Course: Advanced Legal Studies			Semester: I
Course Code: PHDALS-101	L T P	3 0 0	Credits: 3

Objective

To familiarize the student to advanced studies of law, morality, justice, and the like, including the recent trends in the studies of legal theories.

Syllabus

Law and Social Transformation	9
Relationship between law and society; law as an instrument for social change; recent development in the law.	
Ethics, Morality and Law	6
Concepts of morality in law with reference to Prof Hart, Devlin, Fuller, Dworkin, Joseph Raj and Finnis; interrelationship among ethics, morality and law.	
The concept of Justice	9
Modern theories of justice with specific reference to Rawls, Nozick, Dworkin and Finnis; social justice—concepts and their application in India.	
Economic Approach of Law	3
Relationship between law and economics; economic analysis of specific laws of crime, torts, contract, property and environment.	
Modern Challenges to Legal Formalism and Recent Legal Theories	6
Modernism; postmodernism; feminism and critical legal Studies	
New Perspectives on Legal Theories:	9
Human rights; sustainable development; liberalization and globalization; GATT and WTO.	

Suggested Readings

- *Lloyd, L., Introduction to Jurisprudence, London: Stevens & Sons, 1985*
- *Friedmann, W., Law and Social Change, University of California Press, 1959*
- *Morrison, W., Jurisprudence: From Greeks to post modernism*
- *R. Posner, R., The Economics of Justice, Harward University Press, London*
- *Wacks, R., Understanding jurisprudence, Lawman (India) Private Limited, New Delhi 1997*
- *Mclaid, Jan, Legal Theory, Macmillan Publication, 2007*
- *Singh, Yogendra, Modernization of Indian Tradition, Jaipur: Rawat Publications, Reprint, 1994*
- *Giddens, Anthony, The constitution of Modernity, Cambridge: Polity Press, 1990*
- *Ann C. Scales, Toward Feminist Jurisprudence, Indiana Law Journal*
- *Weber, Max, The theory of social and Economic organization*

- *Best, S. and D. Kellner, Postmodern Theory: Critical interrogation, New York: Guilford, 1991*
- *Hutchinson, Allan C. Critical Legal Studies. Totowa: Rowman & Littlefield Publishers, Inc., 1989. Prin*
- *Ritzer, George, Postmodern social theory, New York: Mcgraw Hill, 1997*
- *Sengupta, Chandran, Conceptualizing Globalization*
- *Vanessa E. Munro, Legal Feminism and Foucault: A Critique of the Expulsion of Law, Journal of Law and Society, Vol. 28, No. 4 (Dec., 2001), pp. 546-567*
- *Ward, Gleen, Postmodernism, London: Teach Yourself Books, 1997*

ICFAI Law School (ILS)
Doctor of Philosophy (Ph.D.)
Course Work (Full-Time and Part-Time Scholars)

Course: Indian Constitutional Law			Semester: I
Course Code: PHDICL-101	L T P	3 0 0	Credits: 3

Objectives: To develop necessary understanding in the research scholars about Indian Constitution, its nature, philosophy, some important working principles, challenges and desirability to adapt it to present circumstances.

Syllabus

- Constitutionalism** 4
 Constitution, Constitutional Law and Constitutionalism; Concept of limited government and limitations on government power.
- Separation of Power and Rule of Law** 5
 Concept and new horizons; Separation of powers, Concept of rule of law and separation of power; its applicability in England, USA and India, Judicial Review.
- Indian Federalism** 4
 Conceptual position of federalism; federal nature of the Indian Constitution; federalism versus state autonomy; cooperative federalism; relationship of trust and faith between center and state; challenges before the Indian federalism.
- Distribution of Legislative Powers** 4
 A comparative study of scheme of the distribution of legislative powers in US, Australia and India; judicial approach and the present position; recommendation of Sarkaria Commission & Venkatchaliah Commission
- The Judiciary** 5
 The Judicial system in England; Crown Proceeding Act 1947; Judicial Review and Constitutionalism in India; Prerogative writs.
- Right to Equality** 4
 General principles; protective discrimination with special references to emerging judicial response to the problems of group inequalities; comparative study of the decisions of the Indian and American courts.
- Freedom of Speech and Expression** 4
 The area of freedom and its limitation; freedom of press and challenges of new scientific development

Rights to Life and Personal Liberty

4

Judicial determination of the scope of the term “personal liberty”, “procedure established by law” and the American expressions “liberty” and “due process”. Radical changes in judicial thinking in this area.

Right to Freedom of Religion

4

The scope of the freedom and the state control; secularism and religious fanaticism.

Working of the Constitution

4

Achievements and failures; areas of concern and challenges before the Constitution; the perception of National Commission to review the working of the Constitution.

Suggested Readings:

- *Basu, Durga Das, Commentary on the Constitution of India, Lexis Nexis*
- *Jain, M.P., Indian Constitutional Law, New Delhi: Wadhwa and Company Nagpur, 2003.*
- *Singh, M.P., Shukla's V.N, Constitution of India, Eastern Book Company, 2017.*
- *Bhat, Ishwara Inter-relationship between Fundamental Rights, Eastern Law House*
- *De, D. J., The Constitution of India, Asia Law House, 2002.*
- *Seervai, H. M., Constitutional Law of India, Tripathy, 1983.*
- *Bakshi, P.M, The Constitution of India, Universal Law Publishing, 2002.*
- *Singhvi, Laxmi Mall & Swarup, Jagadish, Constitution of India, Thomson Reuters, 2013.*
- *Gajendragadkar, P.B., Law, Liberty and Social Justice, Asia Publishing House*

ICFAI Law School (ILS)
Doctor of Philosophy (Ph.D.)
Course Work (Full-Time and Part-Time Scholars)

Course: Criminal Law			Semester: I
Course Code: PHDCL-101	L T P	3 0 0	Credits: 3

Objective

To develop necessary understanding in the research scholars about basics of criminal law, and its application addressing some specific crime, some emerging trends and some of its interdisciplinary approach.

Introduction

8

Meaning of Crime; essential elements of crime; individual liability and group liability; stages of crime; theories of punishment; general defenses under IPC; strict liability and its dimensions in specific crimes.

Drug Addiction and Criminal Justice

9

Analysis of the background, text and operation of the Single Convention on Narcotic Drugs, 1961, 1972; Analysis of the Convention on Psychotropic Substances, 1972; International collaboration in combating drug addiction; the penal provisions (under the IPC and the Customs Act); judicial approaches to sentencing in drug trafficking and abuse; The Narcotic Drugs and Psychotropic Substances Act, 1985, patterns of resource investment in India—policing adjudication, treatment, aftercare and rehabilitation.

Privileged Class Deviance and response of Indian legal order

9

Conceptions of white-collar crimes; Indian approaches to socio-economic offences; notions of privileged class deviance as providing a wider categorization of understanding Indian development; typical forms of such deviance— official deviance (deviance by legislators, judges, bureaucrats), professional deviance—journalists, teachers, doctors, lawyers, engineers, architects and publishers; trade union deviance including teachers, doctors and lawyers; police deviance; gender-based aggression by socially, economically and politically powerful; response of Indian legal order to the deviance of privileged classes—vigilance commission, public accounts committee, ombudsman, commissions of enquiry, Prevention of Corruption Act, 1947, The Antulay Case.

Emerging Criminal Jurisprudence

9

Compensatory jurisprudence; state liability; the concept of human rights and law of crimes in India; extension of protection to foreigners; prison reforms and prisoners' rights.

Inter Disciplinary Horizons

7

Forensic medicine and forensic science; media laws; cyber-crimes.

Suggested readings:

- *Ratan Lal and Dhiraj Lal, Indian Penal Code, Wadhwa & Co., 2000*
- *Achutan Pillai, Criminal Law, Butterworth Co., 2000.*
- *Gour, H.S, Indian Penal code, Allahabad: Law Publisher, 2013*
- *Gour K.D, Criminal Law, Cases and Materials, Butterworth Co., 1999.*
- *Kenny's: Outlines of Criminal Law, (1998 Edition).*
- *Srivastava, O.P.General Principles of Criminal Law*

ICFAI Law School (ILS)
Doctor of Philosophy (Ph.D.)
Course Work (Full-Time and Part-Time Scholars)

Course: Human Rights and Humanitarian Law			Semester: I
Course Code: PHDHRHL-101	L T P	3 0 0	Credits: 3

Objectives: To develop necessary understanding in the research scholars about Human rights, its philosophy, history, nature, sources, importance, it's utility in making humanitarian law and some contemporary issues.

Syllabus

Introduction	8
Human rights: Concept, Nature, Origin and Development, Importance, International Movements for Protection of Human Rights, U. N. and regional organizations, European Commission and Courts on human Rights; U. N. declaration on human Rights; civil and political rights and social and economic rights—international instruments; violence against women in public and private life as human rights issue; international regime of enforcement of human rights—machinery and procedure.	
Human Rights in Indian Perspective	8
Conceptual dimensions of human rights with special reference to India; fundamental rights under the Constitution; Derogation of Fundamental rights; Directive Principles of State Policy; Statutory Enforcement; Human Rights and enforcement agencies like the police and excise-prevention of abuse of rights; Human Rights and Preventive laws like TADA and NDPs and POTA Act.	
Rights of Vulnerable Groups	7
Defining vulnerability; women and children; disabled persons; minorities; refugees, migrants, displaced persons and indigenous persons, Rights of LGBT.	
Science-Technology and Human Rights	7
Scientific and technological researches; impact on ethics, morality and human rights; development vis-à-vis human rights, conflicts, confrontation and resolution; freedom of information, freedom for scientific research, controls and constraints; intellectual property rights—international dimensions, protection of economic and social rights of indigenous people; role of judiciary in the dialogue among science, technology, human rights and law; limitations on the right to information under information technology laws, the approach of the judiciary.	
Humanitarian Law	7
International humanitarian law: An overview; history, scope and conceptual background; Conduct of Hostilities; Treatment of victims, Prisoners of War; International Institutions; State and Individual accountability; enforcement of humanitarian law; human rights and humanitarian law.	
Human Rights and Contemporary Issues	5
Cultural relativism; religious fundamentalism and its impact on human rights; self-determination; increasing role of NGOs & press-role of International Criminal Court.	

Suggested readings:

- Saksena, K. P *human rights fifty years of independence*. New Delhi: Gyan publication house, 1999).
- Baxi, Upender, *human rights in a post human world: critical essays* (2010)
- Iyer, v. Krishna *the dialectics and dynamics of human rights in India: yesterday, today and tomorrow* (2000)
- Ishay, Micheline R. *The history of human rights: from ancient times to the globalization era* (new delhi: orient Longman, 2004).
- Jois, M. Rama *seeds of modern public law in ancient Indian jurisprudence and human rights-bharatiya values* (lucknow: eastern book company, second edition, 2000).
- Chowdhury, Rahman Azizur, (el ed) *issues in human rights* (2010)
- Jois, m. Rama *legal and constitutional history of India: ancient legal, judicial and constitutional system*. (Delhi: universal law publishing co. Pvt. Ltd. Reprint 2004).
- Patel, N Bimal, *a comprehensive guide of laws of human rights in common wealth countries* (2007)
- Anand, A. S. *Justice for women* (third edition 2008).
- Koenig, Mattnias and Paul de Guchteneire (ed) *democracy and human rights in multicultural societies* (2007)
- Addicott, F Jeffrey. (el ed), *Globalization, international law and human rights* (2012)
- Bhat, P. *Ishwara fundamental rights: a study of their interrelationship* (2004).
- Chakrabarti, Nirmal Kanti Dr. (ed), *law and child* (2011)
- Clapham, Andrew, *human right: a very short introduction* (new york: oxford university press, 2007)
- Lohoti, justice R.C., *preamble: the spirit and backbone of the constitution of India* Lucknw: Eastern book company, first edition, 2004)
- Mohanty, Jagannath, *Human rights education* (2000)
- N S Sreenivasulu Dr. *Human rights: many sides to a coin* (2004)
- Naikar, N Lohit, *the law relating to human rights* (2004)
- Ness, peter van *debating human rights: critical essays from United States and Asia*, (London: Rutledge, first edition, 1999).
- Nirmal, J *Human rights in India: historical, social and political perspective*, (New Delhi: oxford university press, 1999)
- R K Narasimham, *Human Rights and social Justice* (1999)
- Saksena, K. P *human rights and the constitution; vision and reality*, (New Delhi: Gyan publication house, 2003).
- Scolnicor, Snat *the right to religious freedom in international law: between group rights and individual rights* (2011)
- Shami, Nayyar (ed.) *Human rights in the New Millennium* (2003)
- Sircar, V K, *Protection of Human Rights in India* (2005)
- Stone, julius *social dimensions of law and justice*, (new delhi: universal law publishing co. Pvt. Ltd)
- Symonides, janusz (ed), *human rights: concept and standard* (2002)
- Vijapur, p abdulrahim and suresh kumar (ed) *perspectives on human rights* (2003)
- *Handbook of human rights and criminal justice in india: the system and procedure* (2007)

ICFAI Law School (ILS)
Doctor of Philosophy (Ph.D.)
Course Work (Full-Time and Part-Time Scholars)

Course: International Law			Semester: I
Course Code: PHDIL-101	L T P	3 0 0	Credits: 3

Objectives: To know basic principles of international law, its institutions, and conventions, and modern development.

Syllabus

Introduction

6

Evolution of international Law; Sources of international law (Treaties, Customs, General Principles of Law, Judicial Decisions and Opinion of the Jurist and W riters, other sources of law, law making through international organization); Codification and Progressive Development; Role of International Law Commission.

Individual as a subject of International Law

6

Nationality; extradition; asylum—territorial and extra-territorial; UNO & Human Rights—UDHR, Covenant on Civil Political Rights, 1966, Covenant on Economic Social and Cultural Rights, 1966.

Law of Treaties

5

Concept of treaty in international law; nature, scope and importance of treaty; Vienna Convention on Law of treaties, historical background of the law of treaty; capacity, conclusion and entry into force; reservation and problem of unequal treaty; interpretation, jus cogens, amendment, invalidity, termination and suspension, Pacta Sunt Servanda, Rebus Sic Stantibus and succession.

Law of Sea

5

Evolution and recent developments; territorial sea and contiguous zone; continental shelf; exclusive economic zone (EEZ); high seas; landlocked states; exploration, exploitation and management of the resources of the international sea-bed area; protection and preservation of marine environment.

Air Space and International Law

5

Aircraft hijacking; important conventions relating to airspace – Paris, Havana, Warsaw and Chicago conventions; five freedoms of air; legal regime of outer space; important conventions such as outer space treaty.

Jurisdiction of State

5

Nationality, its acquisition, loss and proof; double nationality and statelessness; criminal jurisdiction; basis of criminal jurisdiction; international criminal law and international criminal

tribunals; aliens—acquired rights of aliens and responsibility of state for injuries to aliens; sovereign immunity—immunity of States; immunity of state organs and property.

International Institutions

5

Legal personality; League of Nations; United Nations – origin and purposes; agencies of United Nations; specialized agencies of United Nations- ILO, WHO, UNESCO.

Settlement of Disputes and Role of International Court of Justice

5

International adjudication in a historical perspective; International Court of Justice-a principal organ and principal judicial organ of the United Nations; Organization and Structure of the ICJ; Peaceful Methods and Coercive Methods of Settlement of Disputes.

Suggested Readings:

- *Stark J G, Introduction to International law, Butterworths, 1996*
- *Brierly J L, The Law of nations, Fourth edition*
- *Brownlie, I, Principles of Public International law, oxford, Fourth ed, 1990*
- *Kapoor, Shyam Kishore. A text book of international law. No. 341. Central Law Agency, 1982.*
- *Akehurst M, A Modern Introduction to International law, sixth ed, 1987*
- *Jarros D J, Cases and Materials on International law, fifth ed, 1998*
- *Oppenbeim, International law, ninth ed, 1992, by h Lauterpacht (ed.)*
- *Wallace RMM, International law, Sweet & Maxwell, London, second ed, 1992*

ICFAI Tech School (ITS)
 Doctor of Philosophy (Ph.D.)
 Course Work (Full-Time and Part-Time Scholars)

Course: Machine Learning Techniques			Semester: I
Course Code: PHDMLT-101	L T P	3 0 0	Credits: 3

OBJECTIVES: • To introduce students to the basic concepts and techniques of Machine Learning. • To have a thorough understanding of the Supervised and Unsupervised learning techniques

- To study the various probability based learning techniques
- To understand graphical models of machine learning algorithms.

Syllabus

UNIT I: Introduction

8

Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants – Perceptron – Linear Separability – Linear Regression.

UNIT II: Linear Models

8

Multi-layer Perceptron – Going Forwards – Going Backwards: Back Propagation Error – Multi-layer Perceptron in Practice – Examples of using the MLP – Overview – Deriving Back-Propagation – Radial Basis Functions and Splines – Concepts – RBF Network – Curse of Dimensionality – Interpolations and Basis Functions – Support Vector Machines.

UNIT III: Tree and Probabilistic Models

8

Learning with Trees – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers – Probability and Learning – Data into Probabilities – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means Algorithms – Vector Quantization – Self Organizing Feature Map.

UNIT IV: Dimensionality Reduction and Evolutionary Models

8

Dimensionality Reduction – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – Isomap – Least Squares Optimization – Evolutionary Learning – Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms – Reinforcement Learning – Overview – Getting Lost Example – Markov Decision Process.

UNIT V: Applications

8

To study and model ML based real life applications such as: Recommender systems, online shopping, Social networking, market predictions etc.

TEXT BOOKS:

1. Stephen Marsland, —Machine Learning – An Algorithmic Perspective, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.
2. Tom M Mitchell, —Machine Learning, First Edition, McGraw Hill Education, 2013.

REFERENCES BOOKS:

- *Peter Flach, —Machine Learning: The Art and Science of Algorithms that Make Sense of Data, First Edition, Cambridge University Press, 2012.*
- *Jason Bell, —Machine learning – Hands on for Developers and Technical Professionals, First Edition, Wiley, 2014*

ICFAI Tech School (ITS)
Doctor of Philosophy (Ph.D.)

Course Work (Full-Time and Part-Time Scholars)

Course: Advanced Database Management System			Semester I
Course Code: PHDADMS-101	L T P	3 0 0	Credits: 3

Objective: To educate students about advanced developments pertaining to databases and database management systems. Course covers review of DBMS concepts, deadlock handling, homogenous and heterogeneous database, data mining query language.

Syllabus

Basic Database Concepts and Transaction Management	9
Review of DBMS concepts, relational database systems and applications of DBMS Concurrent executions, serializability view and conflict serializability and recoverability	
Concurrency Control and Recovery System	12
Lock based protocols, timestamp based protocols, validation based protocols, deadlock handling, insert and delete operations. Failure classification, recovery and atomicity, log based recovery, shadow paging, buffer management and remote backup systems	
Distributed Database and Advanced Data Types	11
Homogeneous and heterogeneous databases, distributed transactions, commit protocols and concurrency control in distributed databases. Time in databases, spatial and geographic databases and multimedia databases	
Advanced Applications	10
Knowledge discovery and data mining, data mining functionalities, classification of data mining systems, data warehousing concepts, slicing, dicing, schemas, data warehouse architecture, introduction to Data Mining Query Language (DMQL), Study of typical DBMS packages.	
Suggested Reading	
<ul style="list-style-type: none">• Silberchatz, A., Korth, H. F. and Sudarshan, S., <i>Database System Concepts</i>, 6th Ed., Tata-McGraw Hill, 2010.• Han, J. and Kamber, M., <i>Data Mining: Concepts and Techniques</i>, 2nd Ed., Morgan Kaufmann, 2006.• Ray Chhanda, <i>Distributed Database Systems</i>, Pearson, 2009.• Date, C. J., <i>An Introduction to Database Systems</i>, 8th Ed., Pearson, 2008	

ICFAI Tech School (ITS)
 Doctor of Philosophy (Ph.D.)
 Course work (Full-Time and Part-Time Scholars)

Course: Structure and Bonding in Materials			Semester I
Course Code: PHDSBM-101	L T P	3 0 0	Credits: 3

Objective

To familiarize the students with the role of bonding in the structure formation of materials. The study with this course shows how the property of a material reflects on its applications. The course imparts the structures of crystalline solids, ceramics, polymers, Nanomaterials, biomaterials and some of the important characterization techniques.

Syllabus

- Atomic Structure and Some General Chemical Properties** 7
 Fundamental concept of atomic structure, electrons in atoms, atomic spectra, Schrödinger equation, electron orbitals, Aufbau principle, Pauli exclusion principle and Hund's rules. bonding forces and energies, electronegativity, ionization potential, polarization.
- Chemical Bonding** 7
 Ionic bonding, covalent bonding, metallic bonding, hydrogen bonding, van der Waals bonding, bond theory, VSEPR theory, Hybridisation
- Structures of Crystalline Solids** 6
 Crystal structures (crystal systems, crystallographic points, directions and planes), FCC, BCC and HCP crystal structures of metals, density computations of metals, atomic arrangements, linear and planar densities
- Ceramic and Polymer Structures** 8
 Crystal structures of ceramic, Imperfection in ceramics, stress and strain behavior, glass ceramics, clay products, refractories, abrasives, advanced ceramics, chemistry of polymers, molecular weight, molecular structure, copolymers.
- Structure of Materials of Importance** 8
 Nanomaterials, biomaterials, smart materials, semiconducting materials, optoelectric material, superconducting material.
- Structure Characterization** 6
 X-ray diffraction microscopy, scanning electron microscopy, transmission electron microscopy, atomic force microscopy, scanning tunneling microscopy.

Suggested Readings

- Lee, J. D., *Concise Inorganic Chemistry, Blackwell Science, OUP.*
- Atkins, P. W., *Elements of Physical Chemistry.*
- Balasubramaniam, R, *Callister's Materials Science and Engineering, Wiley publication*
- Cullity, B. D., *Elements of X-ray Diffraction, Addison-Wesley Publishing Co.*
- Flewitt, P. E. J. and Wild R. K., *Physical Methods for Material Characterisation, Institute of Physics Publishing.*

ICFAI Tech School (ITS)
Doctor of Philosophy (Ph.D.)
Course Work (Full-Time and Part-Time Scholars)

Course: Nanomaterials and Nanotechnology			Semester: I
Course Code: PHDNAN-101	L T P	3 0 0	Credits: 3

Objective:

This course is designed for the students to acquire knowledge in nonmaterial's and nanotechnology. The course will comprise of the preparation and characterization of nanomaterials in connection with the recent development of the field. Techniques such as XRD, SEM, TEM, AFM, FESEM, HRTEM etc will be studied in order to get the nano scale structural informations of the materials. The course will also cover applications of nano scale devices, such as nanorobots, NEMS, MEMS, Photonic devices etc.

Syllabus

Introduction

7

Definition of nanomaterials and nanosystems, surface to volume ratio concept, surface energy, surface stress, surface defects, properties at nanoscale (optical, electronic, mechanical and magnetic), application of Nanomaterials.

Different classes of nanomaterials

8

Classification based on dimensionality, quantum dots, wells and wires, carbon-based nano materials (buckyballs, nanotubes, graphene), Metal based nano materials (nanogold, nanosilver and metal oxides), Nanocomposites, Nanopolymers, Nanoglasses, Nano ceramics, Biological nanomaterials.

Preparation/fabrication of nanomaterials

10

Bottom-up and top down methods, Chemical methods, Sol-gel method, Co-precipitation method, Solvothermal methods, Photochemical methods, Sonochemical routes, Chemical vapor deposition, Metal oxide chemical vapor deposition. Physical Methods: Ball milling, Electrodeposition, Spray pyrolysis, Flame pyrolysis, DC/RF magnetron sputtering, Molecular beam epitaxy. Nanofabrication: Photolithography and its limitation, Electron-beam lithography, MEMS and NEMS fabrication, Nanoimprint, Softlithography patterning,

Characterization techniques

10

Scanning Electron Microscopy (SEM), Field Emission Scanning Electron Microscopy (FESEM), Environmental Scanning Electron Microscopy (ESEM), Transmission Electron Microscopy (TEM), High Resolution Transmission Electron Microscopy (HRTEM), Scanning

Tunneling Microscopy (STM), Surface enhanced Raman spectroscopy (SERS), X-ray Photoelectron Spectroscopy (XPS), Auger electron spectroscopy (AES), Rutherford backscattering spectroscopy (RBS).

Applications

7

Solar energy conversion and catalysis, Molecular electronics and printed electronics, Nanoelectronics, Polymers with aspecial architecture, Liquid crystalline systems, Linear and nonlinear optical and electrooptical properties, Applications in displays and other devices, Nanotransistors and Nanorobots, Nanomaterials for hybrid-vehicle applications, Photonics, Plasmonics, Chemical and biosensors, Nanomedicines.

Suggested Readings:

- *Mark A Ratner & Daniel Ratner Nanotechnology: A gentle introduction to the next big idea, Pearson education, Inc.*
- *Pradeep T., A Textbook of Nanoscience and Nanotechnology, Tata McGraw Hill Education Pvt. Ltd., 2012.* 2. *Hari Singh Nalwa, "Nanostructured Materials and Nanotechnology", Academic Press, 2002.*
- *Nabok A., "Organic and Inorganic Nanostructures", Artech House, 2005.* 2. *Dupas C., Houdy P., Lahmani M., "Nanoscience: Nanotechnologies and Nanophysics", Springer-Verlag Berlin Heidelberg, 2007.*
- *Charles P. Poole Jr. & Frank J. Owens, Introduction to Nanotechnology, Wiley, India.*
- *Mick Wilson et.al, Nanotechnology: Basic Science & Emerging Technologies, (2002), CRC Press.*

ICFAI Tech School (ITS)
Doctor of Philosophy (Ph.D.)
Coursework (Full-Time and Part-Time Scholars)

Course: Environmental Modelling			Semester: I
Course Code: PHDETP-101	L T P	3 0 0	Credits: 3

Course Objective: The Course will be delivered in two parts, in Part I Water Pollution will be covered, whereas in Part II Air Pollution will be discussed.

Syllabus

Part-I: Water pollution

Introduction: Sources and effects of water pollutants in Indian context, Principles of water quality modelling: River hydrology and derivation of basic stream equations, surface water pollutants, physical laws and their use in modelling, Surface Water Quality Modelling: Distribution of water quality in rivers, estuaries and lakes, measurements and evaluation of DO and BOD in rivers, Eutrophication process and basic mechanisms and its significance in surface water, Ground Water Quality Modelling: Contaminant transport in groundwater; basics and fate of pollutants in ground water, hydrodynamic dispersion, decay, reactive processes; site specific groundwater quality problems in India, Water quality model applications: Model set-up, calibration, and validation procedures, selection; case studies and applications of water quality model. Ecological modelling.

Part-II: Air pollution

Introduction: Sources and effects of air pollutants, air quality standards. Meteorological aspects related to air pollution: Wind circulation, lapse rate, stability conditions, turbulence, Richardson number, boundary layer structure, mixing height, plume behavior, heat island effect, and wind rose. Air Quality modelling and its application: Model classification, box model, Gaussian dispersion model, dispersion parameters, plume rise, removal mechanisms, point, line, and area sources, long-term and short-term dispersion models. Case studies and model applications. Transboundary features of air pollution.

Suggested readings:

Water pollution

- *Chapra, S: Surface Water-quality modeling, Tata McGraw-Hill, 1997.*
- *Thomann, Robert V., John A. Mueller. Principles of Surface Water Quality Modeling and Control.*
- *HarperCollins Publisher Inc., New York, 1987*
- *Bouwer, H. Groundwater hydrology. Mc-Graw Hill International Editions (Civil Engineering series), 1978*
- *Todd, D.K. Groundwater hydrology. John Wiley and Sons, 1980*
- *Freeze, A., Cherry, and J.A. Groundwater. Prentice Hall, 1979.*
- *Zheng, C and Bennett, G.D. Applied Contaminant Transport Modeling: Theory and Practice. Van Nostrand Reinhold. 1995*

Air and Noise pollution

- *Boubel, R W, Fox, D L, Turner, D B (Ed.) and Stern, A C (Ed.) (1994) Fundamentals of Air Pollution, 3rd edition, Academic Press Inc*
- *Turner, D B (1994) Workbook of Atmospheric Dispersion Estimates: An introduction to dispersion modeling, 2nd edition, and Lewis publishers.*
- *Wark, K, Warner, C F, and Davis, W T (1997) Air Pollution- Its origin and control, Addison Wesley Longman, Inc.*
- *Rao C S (1991), Environmental pollution controls engineering. New Age International (P) Ltd., Publishers, New Delhi.*
- *Pasquill, F and Smith, F B (1983) Atmospheric Diffusion, Ellis Horwood Ltd., Chichester.*
- *Heinsohn R J and Kabel R L (1999) Sources and control of air pollution, Prentice hall, NJ*
- *Rau, J.G. (1980) Environmental Impact analysis handbook. McGraw*

ICFAI Tech School (ITS)
Doctor of Philosophy (Ph.D.)

Course Work (Full-Time and Part-Time Scholars)

Course: Sustainability Development			Semester I
Course Code: PHDSD-101	L T P	3 0 0	Credits: 3

Objectives:

- To position the Department of social work as a “thought-leader” and dynamic actor in Social Work education.
- To develop and impart service based, innovative and research-oriented curriculum.
- To inculcate accountable and ethical standards.
- To develop personal and professional competences through integration of knowledge and practice.
- To develop indigenous knowledge and intervention strategies in social work.
- To develop as a resource Centre for research, consultancy, training and skill development.

Unit 1 - Introduction to sustainable development Concept, nature and scope of Sustainable development. Globalization and Economic growth. Economic development: Economic inequalities, Income and growth. Social development: Poverty, conceptual issues and measures, impact of poverty.

Unit 2 - Social Development Diversity and social exclusion: Concept and implications, human development of the socio-cultural and other ethnic groups of the society. Contemporary Issues of Development — Bottom of the pyramid approach; understanding the importance of social capital and social mobilization. Social security: Systems and role in development. People’s participatory processes in development. Millennium Development Goals, Sustainable development Goals.

Unit 3- Individual, change and development Human development across the life span: Context and impact of deprivation. Conception and birth: issues of genetics and environment; birth processes; socio-cultural influences. Infancy, childhood, school years and middle childhood: Milestones of development, childhood deprivation and children at risk. Adolescence and adulthood: cultural construction and development deprivations. Old age: needs and impact of deprivation.

Unit 4 - Society, change and development Government to governance: Democracy and development; decentralization policies in India; local governance; shifting forms of governance in urban and rural regions, linkages between decentralization, power and poverty. Sustainable Development

Unit 5 - Emerging of role of CBOs and NGO and human rights institutions. Role of law, education, media and international organizations. Models of development: Rostow’s stages of growth, Structural change approaches, Models of community development, Model of sustainable livelihood.

Suggested Readings:

- *Agrawal, A N (1995). Indian Economy: Problems of development and planning. pune: Vishwa Prakashan.*
- *Baldev Raj Nayar, Globalization and Nationalism: The Changing Balance of India's Economic Policy, 1950–2000 (New Delhi: Sage, 2001)*
- *Beckman, M. (1968), Location Theory, Random House, London.*
- *Bidyut Mohanty (1993) Urbanization in Developing Countries Basic Services and community Participation, Institute of Social Science, Concept Publishing House.*
- *Brahmadanda, P.R. and V.R. Panchmukhi (Eds.) (2001), Development Experience in the Indian Economy: Inter-State Perspectives, Bookwell, Delhi.*
- *Dholakia, R.H. (1985), Regional Disparity in Economic Growth in India, Himalaya Publishing House, Bombay.*

ICFAI Tech School (ITS)
Doctor of Philosophy (Ph.D.)
Course Work (Full-Time and Part-Time Scholars)

Course: Communication System Design			Semester: I
Course Code: PHDCSD-101	L T P	3 0 0	Credits: 3

Course Objectives

The course will cover communication theory, algorithms and implementation architectures for essential blocks in modern physical-layer communication systems (coders and decoders, filters, multi-tone modulation, synchronization sub-systems). The course is hands-on, with a project component serving as a vehicle for study of different communication techniques, architectures and implementations. This year, the project is focused on WLAN transceivers.

Course Overview

CppSim, Introduction to practical digital communications, Multi-tone systems, Verilog® review, 802.11a transceiver architecture, ASIC design, 802.11a PHY standard, Micro-architecture and transformations, 802.11 transceiver systems.
(7h)

Design Flow

Bluespec™ overview, Bluespec™, Synthesis, Design Flow, Bluespec™ Simulator, Bluespec™ Compiler
(7h)

Fast Fourier Transform

Theory and algorithms, Fast Fourier transform practical aspects and basic architectures, Design flow, Fast Fourier transform- advanced VLSI architecture.
(7h)

Coding and Error Control

Convolutional codes, Design flow, Trellis codes, Viterbi algorithm, Design flow, Block Codes- introduction, Block codes: code classes and Reed-Solomon codes, Block Codes implementations.
(8h)

OFDM Techniques

Synchronization introduction, Synchronization OFDM, Orthogonality, Synchronization: implementations, Wireless Channels, Channel estimation.
(7h)

Suggested Readings

Stephen B. Wicker, "*Error control systems for Digital communication and storage*", Prentice Hall, Upper Saddle River, NJ, 1995.

Bernard Sklar, "*Digital Communications, Fundamentals and Applications*", Second Edition, Pearson Education, 2001.

Leon Garcia and Wijeya, "*Communication networks: Fundamental concepts and key architectures*", McGraw Hill, Inc., NY, USA, 2006

ICFAI Tech School (ITS)
 Doctor of Philosophy (Ph.D.)
 Course Work (Full-Time and Part-Time Scholars)

Course: Advanced Antenna Theory			Semester: I
Course Code: PHDAAT-101	L T P	3 0 0	Credits: 3

Course Objectives:

The objective of this course is to provide an in-depth understanding of modern antenna concepts, and practical antenna design for various applications. The course will explain the theory of different types of antennas used in communication systems. Starting from the basic antenna parameters, the course will discuss various types of antennas including the planar printed antennas. An in-depth study will be made for the analysis and design of arrays. A brief introduction of smart antenna concept will be given at the end with a view that the student can further explore the topic, if interested.

Syllabus

Fundamental Concepts: Physical concept of radiation, Radiation pattern, near- and far-field regions, reciprocity, directivity and gain, effective aperture, polarization, input impedance, efficiency, Friis transmission equation, radiation integrals and auxiliary potential functions.

Radiation from Wires and Loops: Infinitesimal dipole, finite-length dipole, linear elements near conductors, dipoles for mobile communication, small circular loop.

Aperture Antennas: Huygens' principle, radiation from rectangular and circular apertures, design considerations, Babinet's principle, Radiation from sectoral and pyramidal horns, design concepts.

Broadband Antennas: Broadband concept, Log-periodic antennas, frequency independent antennas.

Microstrip Antennas: Basic characteristics of microstrip antennas, feeding methods, methods of analysis, design of rectangular and circular patch antennas.

Antenna Arrays: Analysis of uniformly spaced arrays with uniform and non-uniform excitation amplitudes, extension to planar arrays.

Basic Concepts of Smart Antennas: Concept and benefits of smart antennas, Fixed weight beam forming basics, Adaptive beam forming

References:

1. C.A.Balanis, "Antenna Theory and Design", 3 rd Ed., John Wiley & Sons., 2005.
2. W. L.Stutzman, and G.A. Thiele, "Antenna Theory and Design", 2 nd Ed., John Wiley & Sons., 1998.
3. R.S.Elliot, "Antenna Theory and Design", Revised edition, Wiley-IEEE Press., 2003.

ICFAI Tech School
Doctor of Philosophy (Ph.D.)
Course Work (Full-Time and Part-Time Scholars)

Course: Optimization and Operations Research			Semester I
Course Code: PHDOOR-101	L T P	3 0 0	Credits: 3

Objectives

To familiarize the students with the execution of research it covers Applied Mathematics, Modeling, Decision Making without Experimentation and with Experimentation, Real Queuing Systems and Basic of Crisp and Fuzzy Logic.

Syllabus

Unit- 1; Introduction to Linear Programming Problem

Origin, Nature and impact, Defining the problem, Formulating a Mathematical Model, deriving solution, testing, preparing and implementation of the model, LPP model and assumptions, The Essence, Setting Up of the Simplex Method, Concept of Duality.

Unit- 2: Transportation , Assignment and Game Theory

Transportation Problems, A Streamlined Simplex Method for the Transportation Problem, Assignment Problems, Two person Zero Sum Game, Probabilistic and Graphical Method to solve Game theory, Decision Making without Experimentation and with Experimentation.

Unit- 3: Dynamic Programming & CPM-PERT

Dynamic Programming, Characteristics of Dynamic Programming, Problems, Deterministic and Probabilistic Dynamic Programming, Scheduling a Project with PERT/CPM, Dealing with Uncertain Activity Durations, An Evaluation of PERT/CPM.

Unit- 4: Queuing Model

Basic Structure of Queuing Models, Examples of Real Queuing Systems, The Birth- and-Death Process, Queuing Models based on Birth-and-Death Process, Basics of Inventory model, Components, Deterministic Continuous- Review Models, Deterministic Periodic- Review Inventory Model.

Unit- 5: Introduction to Fuzzy Theory

Introduction to Crisp Sets and Fuzzy Sets: An overview of fuzzy logic, Membership Function, Fuzzy Complement, Fuzzy Union, Fuzzy Intersection and combinations of operations Fuzzy sets. Crisp and Fuzzy Relations.

Suggested Readings:

1. Taha, H. A. (2013). Operations Research: An Introduction. India: Pearson Education.
2. Hillier, F. S., Lieberman, G. J. (2021). Introduction to Operations Research. United States: McGraw-Hill Education.
3. Klir, G. J., St. Clair, U. H., Yuan, B. (1997). Fuzzy Set Theory: Foundations and Applications. United Kingdom: Prentice Hall.
4. Sharma, S.D. (2009). Operations Research: Theory and Applications. India: Macmillan Publishers India Limited.
5. Pant, J.C. (2008). Introduction to Optimization Operation Research. (2008). India: Jain Brothers.

ICFAI Education School (IEdS)
Doctor of Philosophy (Ph.D.)
Course Work (Full-Time and Part-Time Scholars)

Course: Philosophical and Sociological Basis of Educational Research			Semester I
Course Code: PHDPSE-101	L T P	3 0 0	Credits: 3

Research Objectives of the Course:

- To understand the indispensable role of Philosophy and Sociology in Education.
- To initiate scholars to the process of critical reflection of texts pertaining to the Philosophy of Education.
- To acquaint them about the ideas of thinkers in the realm of Education.
- To develop a critical understanding of the relationship between Philosophy and Education and Sociology and Education in the context of inter disciplinary in research.

Unit –I

Philosophy as a Discipline and its Role

- Philosophy: Meaning and Significance
- Functions of Philosophy: Speculative, Analytic, Prescriptive and Normative
- Philosophical Methods: Analysis, Synthesis, Induction, Deduction
- Philosophical Foundations of Research
- Sociological Foundations of Research

Unit-II

Critical Appraisal of Western and Indian Thinkers on Education

Emile Durkheim, Francis Bacon, Jean Paul Sartre, Rabindranath Tagore, Swami Vivekananda, Sri Aurobindo, Jiddu Krishnamurti, B.R. Ambedkar, S. Radhakrishnan.

Unit-III

Social change and Education

- Social change and its implications on Education and Society
- Social development and their impact on Society and Education
- Media and its uses for uplifting the Education and Society with special reference to Social Media.

- Social Stratification its impact on Society and Education

Unit –IV

Critical Reflection on the writings of the following thinkers:

- Learning without Burden: Prof. Yashpal
- Pedagogy of the Oppressed: Paul Freire
- Deschooling Society: Ivan Illich
- Role of following social thinkers on Society and Education- Savitri Bai Phule, Raja Ram Mohan Roy, Dr. B. R. Ambedkar, Gopal Krishna Gokhale, Mohan Das Karm Chand Gandhi, Mother Teresa.

References:

- *Brubacher (1950) Modern Philosophies of Education, McGraw Hill Book Co. New York*
- *Krishna murthi, J Education and the Significance of life, KFI Publications.*
- *Kumar Krishna (2004) What is Worth teaching/3rd Edition Orient Longman*
- *Gandhi M K (1956) Basic Education, Ahmedabad, Nav jivan.*
- *Giroux Henry (2011) On Critical Pedagogy, Continuum Press.*
- *Govt. of India (1952) Report of the Secondary Education Commission, New Delhi*
- *Govt. of India, MHRD (1986, Revised 1992) National Policy of Education, New Delhi.*
- *Govt. of India, MHRD (1992) Program of Action (Draft) New Delhi, Aravali Printers and Publishers.*
- *Paulo Freire (1996) Pedagogy of the Oppressed, Penguin Books.*
- *Mani R S (1964) Educational Ideas and Ideals of Gandhi and Tagore, New Book Society New Delhi.*
- *Noddings Nel (2012) Philosophy of Education, West View Press.*

ICFAI Education School (IEdS)
Doctor of Philosophy (Ph.D.)
Course Work (Full-Time and Part-Time Scholars)

Course: Development in Indian Education System			Semester I
Course Code: PHDDIE-101	L T P	3 0 0	Credits: 3

- To acquaint the researcher with new knowledge pedagogies and approaches for teaching.
- To sensitize towards the need of revamping teacher education to ensure quality
- To understand the need of assessment, standards, and management in Education System.
- To develop an understanding of total quality management system in education
- To analyze the policy, programmed and recent trends pertaining to Indian Education System.

Unit-1:

New Knowledge Pedagogies and approaches in Educational Research

- Ensuring Learning out-come in Elementary Education
- Extending out reach of secondary and senior secondary Education
- Strengthening Vocational Education, Accelerating Rural Literacy, Adult Education and National Open Schooling Systems.
- Promotion of Information and Communication Technology in Education.
- Comprehensive Education– Ethics, Physical Education, Theory and Practice of Yoga and Life Skills and Value based Learning

Unit-II:

Revamping Teacher Education for Quality Improvement

- Recent trends in Teacher Education and Present Scenario
- Issues related to Teacher Education programmes in India with reference to pre-service and in-service Teacher Education program
- Inclusive pedagogy and its challenges for revamping Teacher Education.
- Centrally sponsored scheme for Teacher Education for promoting research aptitude in Teachers.
- Role of UGC based Teacher Education for promoting research in teacher Education, Fund and grant system, Assessment and Management Systems.

Unit-III:

Standards, School Assessment and School Management.

- Total Quality Management: Concept-indicators of quality, setting standards for performance
- Institutional Autonomy and Accountability
- Pro-visional financial Education in 12th five year plan.
- Assessment and accreditation in Education

Unit-IV:

National Policy of Education 2020: Recommendations

- Major recommendations of NEP 20 with regards to elementary education, Secondary Education and Higher Education
- Recommendations in Area of Research
- Recommendations with regards to competency based Teacher Education and Innovative program for Professional Development of Teachers and Teacher Education.

References:

- *Desai D.M.: New directions in the Education of Indian teachers Baroda, M.S. University 1971.*
- *India, Ministry of Education; Report of the Education Commission (1964-66) Education & National development New Delhi publication division 1966.*
- *Jangira N.K.: Teacher training & teacher effectiveness an experience in teacher, behaviour New Delhi, National Publishing House, 1979.*
- *NCF 2000, NCF 2005-NCERT Publication, New Delhi.*
- *NCFTE-2009-NCTE Publication, New Delhi.*
- *NEP 2020, Government of India, New Delhi*
- *UNESCO: Regional office for Education in Asia, Bangkok, Exploring, New dimensions in Teacher Education, Bangkok, UNESCO, 1976:*
- *UNESCO: A System approach to teaching & learning procedures a guide for teacher Educators, Paris: UNESCO, 1981.*