



Gangadhar Meher University

Amruta Vihar, Sambalpur, Odisha, 768004

CRITERIA -6.5.1

Supporting Documents

1. Sample Outcome Based Syllabus
2. Examination Automation
3. MOOC s Training Program with Sample Certificate
4. Students participation in NPTEL Courses
5. ICT Facility
6. Orientation Program

SYLLABUS

Under Choice Based Credit System (CBCS) with Learning Outcomes-based Curriculum Framework (LOCF)

Master of Commerce *2022-2024*



SCHOOL OF COMMERCE
GANGADHAR MEHER UNIVERSITY, AMRUTA VIHAR, SAMBALPUR
ODISHA, INDIA

ABOUT THE SCHOOL

The School of Commerce, G.M. University, Sambalpur, (erstwhile G.M. College, Sambalpur established in the year 1944) is one of the oldest and largest Departments in Odisha. The B. Com course was first introduced in the State by this Department. The Department offers courses like UG, PG, and PhD programmes in Commerce.

Programmes	Year of Establishment	Sanctioned Strength
B. Com	1944	384
M. Com	1965	64
M. Phil	1984	Discontinued from 2022
Ph. D.	2018	08*

* As per the availability of the supervisors

VISION

To build the School of Commerce into a center of academic excellence with a commitment to quality education in Commerce, Management, and allied fields, with a holistic approach towards a better life, environment, and society.

MISSION

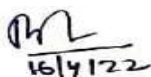
- Developing systems with regard to business, industry, and public services through the pursuit of excellence in commerce education, research, training, and consultancy.
- Encouraging, equipping, and empowering students for the promotion of entrepreneurship in rural and urban areas benefitting both the students and society at large.
- Nurturing a motivating environment for the holistic and value-based development of the students to unfold and enhance their potential and employability.
- Grooming innovative, competent, and ethical future leaders capable of dealing with the dynamic and competitive business environment and its ensuing challenges.

PROGRAMME OBJECTIVES

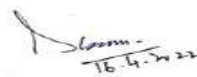
In order to fulfill the Department's stated vision and mission, the syllabi of the M. Com program have been modified to accomplish the following objectives


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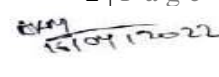
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1.ACADEMIC EXCELLENCE

- Providing exposure to the students in the latest trends in Commerce Education through research and extension activities
- Enabling them to be aware of and adapt to the contemporary developments at local, national and global levels through effective pedagogy and encouraging active involvement in both curricular and co-curricular aspects.

2.PROFESSIONAL EXCELLENCE

- Preparing students for positions of leadership in business organisations at local, national and international levels.
- Capacity building of students to assume productive roles and inculcate the habit of life-long learning.

3.SOCIALLY RESPONSIBLE CITIZENS

- Inculcating a sense of civic responsibility, social concern and commitment, and moral accountability among the students by providing a platform for their socialisation.
- Exposure of students to social issues viz. consumer rights,human rights, value system, culture, scientific temper and environment, corporate social responsibilities, ethics, governance etc.

4. VALUE BASED HOLISTIC DEVELOPMENT

- Imparting quality,need-based education, sensitising the students about their changing role in the society by raising their awareness through various activities.
- Focusing on the all-round development of personality of students through proper education and extra-curricular activities.

ABOUT THE PROGRAMME

The programme with LOCF based syllabi of the School renders students additional skills and knowledge in subjects including economics, management, marketing, accounting, and finance. These courses emphasise practical applications through case studies, research projects, and internships while delving deeper into theoretical ideas. It is imperative that graduates be prepared to take on real-world difficulties in a variety of industries through this blend of theory and practical practice. Students are trained to fulfil personal, local, regional, national, and global needs through the course, which places a high emphasis on theoretical, applied, practical, and scientific research skills. The plan allows students to pursue their studies in their area of interest by offering specific elective courses. With reference to postgraduate attributes, programme outcomes, and course-level learning outcomes, this framework is meant to support the upkeep of teaching standards.

PROGRAMME STRUCTURE

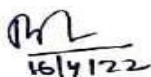
The postgraduate programme comprising two years, will be divided into 4 (four) semesters each of six months duration which is as follows:

Year	Semesters	
First Year	Semester I	Semester II
Second Year	Semester III	Semester IV

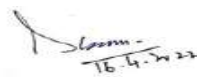
There are twenty-two (22) papers each of 4 credits amounting to 88 credits in total. The detail of the


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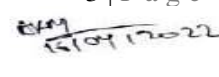
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title of papers, credit hours, division of marks, etc. of all the papers of all semesters are described in the tables.

There will be two elective groups namely:

- Discipline Specific Elective in Sem II.
- Interdisciplinary Elective in Sem III.

A student has to select one of the DSE papers in Sem II and one of the papers in Sem III as offered by the respective department at the beginning of Semester II and Semester III respectively.

EVALUATION

The programme focuses on continuous evaluation. To replicate it, each paper will be of 100 marks, out of which 70 marks shall be allocated for the Semester examination, 20 marks for the Mid Term Examination, and 10 marks for Assignments. The assignments will be of quizzes, group discussions, seminar presentations, internships, poster presentations etc. There will be four lecture hours of teaching per week for each paper. The duration of the examination of each paper shall be three hours.

The minimum marks required to pass any paper shall be 40 percent in each paper and 40 percent in aggregate of a semester. No students will be allowed to avail more than three (3) chances to pass any paper inclusive of the first attempt.

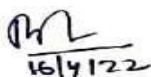
PROGRAM OUTCOMES

The programme outcomes are supposed to be attained by the students after the completion of the study. The outcomes will measure the critical thinking, analytical, and problem-solving skills that are attained by the students after the completion of the programme. The programme outcomes of the programme of the University are centred on a range of knowledge and skill areas that equip students to align with workforce, and civic engagement. In the context, the programme outcomes are as follows:

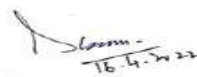
- PO1. **Knowledge Impartation on Business and Commerce:** Acquire, define, and recognize the knowledge on commerce, management, taxation, entrepreneurship, advance statistics, and research methodology in addressing business and socio-economic issues.
- PO2. **Ability to Pursue Higher Education:** Assemble commerce and management knowledge to enhance the ability to pursue professional courses in higher education.
- PO3. **Problem Identification:** Identify, interpret, and summarise literatures to analyse several business problems and reaching robust inferences by using professional knowledge.


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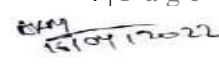
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- PO4. Use of Modern Tools and Resources:** Generate, design, and select appropriate modern tools and techniques in appraising scientific temper to comprehend different business models.
- PO5. Application of Business Knowledge on Environment and Sustainability:** Apply and execute business knowledge to develop products, services, and methods to foster sustainable environmental practices.
- PO6. Associating Business and Society:** Synthesize a sense of civic responsibility, social concern and commitment, and moral accountability by providing a platform for socialisation.
- PO7. Enhancement of Professional Ethics:** Interpret and employ ethics in professional life to develop a sense of responsibility and accountability.
- PO8. Building Leadership Competence:** Preparing students for positions of leadership in business organisations at local, national and international levels.
- PO9: Construction of Life-Long Learning Attitude:** Recognize and create an attitude to assume productive roles and inculcate the habit of life-long learning.
- PO10. Innovation and Creativity:** Innovate and invent and design new ideas, products, services, and methodologies with the application of fundamental knowledge.

PROGRAMME SPECIFIC OBJECTIVES (PSOs)

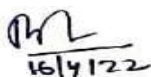
The Master of Commerce Program articulates the students the information, abilities, and mindset they need to fit into the ensuing and future markets. The objectives of the courses are to provide students with in-depth information and training in the subject matter while also assisting them in developing broader views for professional and research purposes. To be specific, the programme specific objectives of the Master Degree programme is as follows:

- PSO1:** To pursue higher education by garnering fundamental and advanced knowledge in commerce and management.
- PSO2:** To inculcate business ethics and social responsibility.
- PSO3:** To enhance leadership competence with professional ethics and innovation.
- PSO4:** To employ commerce and business knowledge in environmental and socio-economic sustainability.

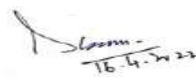
MAPPING OF PROGRAM SPECIFIC OBJECTIVES (PSOS) WITH PROGRAM OUTCOMES (POS)


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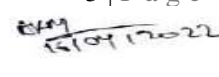
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0 – No relation 1- Low relation 2- Medium relation 3–High relation

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Total
PSO1	1	3	1	1	2	1	1	1	1	1	13
PSO2	1	2	1	1	3	3	2	3	2	2	20
PSO3	1	1	3	1	1	1	1	3	1	3	16
PSO4	2	2	1	1	3	3	2	1	2	2	19
Total	5	8	6	4	9	8	6	8	6	8	68

MATCHING INDICATOR

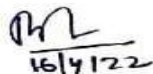
Matching Percentage	Level Indicator
>71	3
51-70	2
<50	1

COURSES AND ITS CORRESPONDING COLOUR SPECIFICATIONS

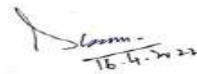
Employability	Entrepreneurship	Skill Development
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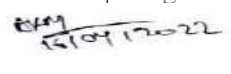
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COURSE FRAMEWORK

Part-I: Semester-I

Papers		Marks			Total Marks	Duration (Hrs)	Credit Hours
Paper Code	Paper Title	Mid Term	Assignment	End Term			
101	Managerial Economics	20	10	70	100	40	4
102	Advance Business Statistics	20	10	70	100	40	4
103	Managerial Accounting	20	10	70	100	40	4
104	Corporate Accounting	20	10	70	100	40	4
105	Organizational Theory and Behavior	20	10	70	100	40	4
Total					500		20

Part-I: Semester-II

Papers		Marks			Total Marks	Duration (Hrs)	Credit Hours
Paper Code	Paper Title	Mid Term	Assignment	End Term			
201	Marketing Management	20	10	70	100	40	4
202	Emerging Business Laws	20	10	70	100	40	4
203	Quantitative Technique for Business Decisions	20	10	70	100	40	4
204	International Business	20	10	70	100	40	4
205	Financial Management and Policy	20	10	70	100	40	4
DSE Papers*							
206 A	International Accounting	20	10	70	100	40	4
206 B	Strategic Cost Management	20	10	70	100	40	4
206 C	Corporate Reporting & Analysis	20	10	70	100	40	4
Total					600		24

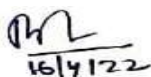
*Discipline Specific Elective Paper. Any one paper can be opted by students of this Department.

Part-II: Semester-III

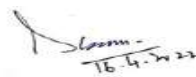
Papers		Marks			Total Marks	Duration (Hrs)	Credit Hours
PaperNo	Title	Mid Term	Assignment	End Term			
301	Computer Application in Business	20	10	70	100	40	4
302	Research Methodology	20	10	70	100	40	4
303	Financial Institutions and Markets	20	10	70	100	40	4
304	Strategic Management	20	10	70	100	40	4
305	Entrepreneurship	20	10	70	100	40	4
IDSE Papers**							
306 A	Financial Institutions and Markets	20	10	70	100	40	4


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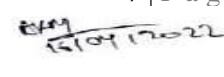
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306 B	Business Organisation & Entrepreneurship Development	20	10	70	100	40	4
306 C	Fundamentals of Accounting	20	10	70	100	40	4
Total					600		24

**Inter Discipline Specific Elective Paper. Any one paper can be opted by students of other Departments.

Part-II: Semester-IV

Papers		Marks			Total Marks	Durationn (Hrs)	Credit Hours
Paper Code	Paper Title	Mid Term	Assignment	End Term			
401	Corporate Governance, Ethics and CSR	20	10	70	100	40	4
402	Corporate Tax Structure & Planning	20	10	70	100	40	4
403	Human Resource Management	20	10	70	100	40	4
404	Business Environment	20	10	70	100	40	4
405	Project Work Report and VIVA VOCE (Non-Practical Papers)			100	100	40	4
Total					500		20
22 Papers	Grand Total				2200		88

VALUE ADDED COURSES

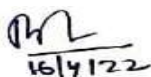
A part from the regular courses, the School also renders a variety of value added courses to enhance the skill, employability and entrepreneurship ability of the students. The courses are designed beyond the core curriculum and aligned with the market requirement to cater diverse industrial requirements and to adhere with different dimensions of social sustainability. Such courses of the school are ranging from data analytics to tax filling, weaving to portfolio management. A brief description of the courses is outlined below.

Value Added Courses	Coordinators
Certificate in Data Analytics	Dr Priyabrata Panda Mr Subash Chandra Jhankar
Certificate in Tax Law and Practice	Dr Gnyana Ranjan Bal Ms Saroja Meher

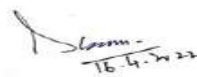
The syllabus and the credit distribution of the above courses can be found at <https://www.gmuniversity.ac.in/department/syllabus/commerce/>.


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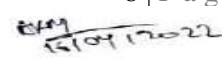
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MAPPING COURSE WITH PROGRAMME SPECIFIC OUTCOMES (PSO) AND PROGRAMME OUTCOMES IN POST GRADUATE IN COMMERCE

Paper Codes	Course Titles	Programme Specific Outcome (PSOs)				Programme Outcomes (POs)									
		PSO1	PSO2	PSO3	PSO4	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
101	Managerial Economics	√	√	√	√	√	√	√		√	√				√
102	Advance Business Statistics	√	√	√	√	√	√	√	√			√			√
103	Managerial Accounting	√	√	√	√	√	√	√				√	√		√
104	Corporate Accounting	√	√	√	√	√	√	√				√		√	
105	Organizational Theory and Behavior	√	√	√	√	√	√	√				√	√	√	√
201	Marketing Management	√	√	√	√	√	√	√		√	√				√
202	Emerging Business Laws	√	√	√	√	√	√	√	√	√	√	√			√
203	Quantitative Technique for Business Decisions	√	√	√	√	√	√	√	√					√	√
204	International Business	√	√	√	√	√					√	√	√		
205	Financial Management and Policy	√	√	√	√	√	√	√		√			√		
206 A	International Accounting	√	√	√	√	√	√	√			√	√	√		
206 B	Strategic Cost Management	√	√	√	√	√	√	√		√	√				√
206 C	Corporate Reporting & Analysis	√	√	√	√	√	√	√		√	√				√
301	Computer Application in Business	√	√	√	√	√	√	√	√						√
302	Research Methodology	√	√	√	√	√	√	√	√	√	√	√			√
303	Financial Institutions and Markets	√	√	√	√	√	√	√			√		√		√
304	Strategic Management	√	√	√	√	√	√	√	√		√		√		
305	Entrepreneurship	√	√	√	√	√	√	√				√	√		√
306 A	Financial Institutions and Markets	√	√	√	√	√	√	√		√	√				
306 B	Business Organisation & Entrepreneurship Development	√	√	√	√	√	√		√	√	√		√		√
306 C	Fundamentals of Accounting	√	√	√	√	√	√	√		√	√				√
401	Corporate Governance, Ethics and CSR	√	√	√	√	√	√	√				√	√		√
402	Corporate Tax Structure & Planning	√	√	√	√	√	√	√				√			√
403	Human Resource Management	√	√	√	√	√	√	√			√		√	√	√
404	Business Environment	√	√	√	√	√	√	√					√	√	√
405	Project Work Report and VIVA VOCE (Non-Practical Papers)	√	√	√	√		√	√	√			√			

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SEMESTER: I
MANAGERIAL ECONOMICS
Paper Code: 101

Prerequisites: Knowledge of basic mathematics, statistics and economics are required.

Learning Objectives: To acquaint the students with the basic principles of micro & macroeconomics for developing the understanding of theory of the firm, markets which would help them in managerial decision-making process.

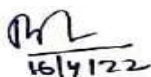
Units	Contents	No. of Classes
I	Concept of Managerial Economics: Nature and Scope of Managerial Economics, Uses of Managerial Economics, Objective of Firm particularly Profit, Wealth and Managerial utility maximization, Role and Responsibilities of Managerial Economists. Fundamental Economic Principles: Incremental, Opportunity Cost, Time perspective, Discounting and Equimarginal principles. Concept of utility, Total Utility and Marginal Utility, Law of Diminishing marginal utility and its assumptions.	10
II	Demand Analysis: Concept and Classification of demand, Determinants of demand, Demand function and Nature of Demand Curve, Estimation of Demand Function, Demand Forecasting, Elasticity of Demand: Concept, Measurement, Price, Income and Cross Elasticities, Managerial Uses of Elasticity. Analysis of Consumer Demand: Theories of Consumer under Cardinal Utility approach, Indifference curve approach, Revealed preference approach and Risk conditions.	10
III	Theories of Production and Cost: Theory of Production: Production Functions with one and two variable inputs, Short-run & Long-run production functions including Law of variable proportion and Law of return to scale, Cobb-Douglas production function, Estimation of production function. Theory of Cost: Concept and classification of costs, Short-run & long-run cost functions, Nature and Shape of short-run & long-run cost curves, Interrelationship between short-run & long-run cost functions, Estimation of short-run & long-run cost function.	10
IV	Price Determination: Concept and characteristics of different market situations, Short-run & long-run pricing under perfect competition, Monopolistic competition, Monopoly and Oligopoly. Pricing Strategies, Price determination in practice, Pricing of multiple products, Transfer Pricing, Price discrimination, International price discrimination and dumping.	10
	Total	40

Suggested Readings:

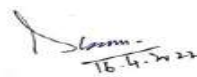
1. Koutsiyannis, A. Modern Microeconomics, Macmillan press Ltd.
2. Varian H.R., Micro-Economic Analysis, Norton
3. Pindyck Robert S., Daniel L. Rubinfeld and Prem L. Mehta, Microeconomics, Pearson Education. Asia, New Delhi.
4. Dean Joel, Managerial Economics, Prentice Hall, New Delhi.
5. Chopra O.P., Managerial Economics, Tata McGraw Hill, Delhi.
6. Mithani D.M, Managerial Economics, Hiamlaya.
7. Colell A. Mass, Wingston M.D., Green J.R, Micro-Economic Theory, Oxford
8. Dholakia R.H & Oza A.L, Micro economics for management students, Oxford


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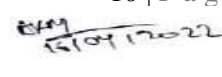
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Course Outcomes:

CO1	Define the role and functions of a managerial economist and explain the fundamental economic principles and concepts.
CO2	Apply managerial economic ideas in decision-making and forecasting methods for anticipating demand for diverse products and services.
CO3	Interpret the functional relationship between production and factors of production, to list various production expenses.
CO4	Analyse competitive strategies, based on the characteristics of products and market structures, including costing, price, product differentiation, and market environment.
CO5	Evaluate a methodical framework with regards to the price strategies to face the real-world business challenges.
CO6	Design and develop various models (Example: Cobb–Douglas Model, Solow–Swan Model, AD–AS Model etc.) that integrate economics, mathematics, and statistical concepts to make the best business decisions.

Program Outcomes Relevant to the Course:

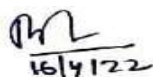
PO1	Knowledge Impartation on Business and Commerce: Acquire, define and recognize the knowledge on commerce, management, taxation, entrepreneurship, advance statistics and research methodology in addressing business and socio-economic issues.
PO2	Ability to Pursue Higher Education: Assemble commerce and management knowledge to enhance ability to pursue professional courses in higher education.
PO3	Problem Identification: Identify, interpret and summarize literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO5	Application of Business Knowledge on Environment and Sustainability: Apply and execute business knowledge to develop products, services and methods to foster sustainable environmental practices
PO6	Associating Business and Society: Synthesize a sense of civic responsibility, social concern and commitment, and moral accountability by providing a platform for socialization.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

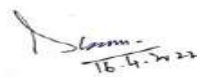
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CO1	3	2	2	3	3	3	3	3	3	2
CO2	3	2	3	3	3	3	3	3	3	3
CO3	2	2	1	3	3	2	3	3	2	3
CO4	2	2	3	3	3	2	3	3	2	3
CO5	1	2	2	3	3	1	3	3	3	3
CO6	3	2	1	3	3	3	3	3	1	3



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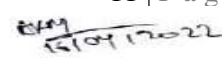
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ADVANCED BUSINESS STATISTICS

Paper Code: 102

Pre-requisites: Basics of statistics like measures of central tendency and measures of dispersion etc. are required.

Learning Objectives: To familiarize the students with basic statistical tools used to summarize and analyze quantitative information for decision making.

Units	Contents	No. of Classes
I	Probability Theory: Probability- Approach to Probability, Addition and Multiplication probability models, Conditional probability, Bayes' theorem, and Mathematical expectation. Theoretical Distribution: Binomial, Poisson and Normal distributions, their characteristics, Constants and fitting of Binomial, Poisson distribution in a normal curve and their applications.	10
II	Statistical Decision Theory: Introduction, Types of Decision Problems, Decision Making under uncertainty, Solving the decision using the expected payoff criterion, Non-Probabilistic decision making criteria. Sampling- Population and Sample, Methods of Sampling, Central Limit Theorem, Sampling distribution of a statistic and its standard error.	10
III	Statistical Estimation and Testing: Point and Interval estimation of population mean, Statistical testing; Hypotheses and errors, Sampling tests-Z test, T test, F test & ANOVA. Non-Parametric Test: Chi-square tests, Statistical Quality Control, Quality control charts, determination of control limits (X and R charts). Control charts for attributes, Acceptance Sampling Plans.	10
IV	Correlation and Regression: Simple, Multiple and Partial Correlation analysis. Rank Correlation. Simple, Multiple Linear Regression Analysis (involving up to three variables).	10
	Total	40

Suggested Readings:

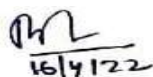
1. Fundamentals of Statistics- S. C. Gupta- Himalaya Publishing House. Ltd. Mumbai
2. Statistical Methods: S.P. Gupta- Sultan Chand
3. Fundamental of Statistics: D.N. Elhance- Kitab Mahal
4. Business Statistics: J.K. Thukral- Taxman Publishers
5. Comprehensive Statistical Methods: P.N. Arra- S.
6. R.P. Hooda, advanced Business Statistics, Macmillan Publishing India Ltd.
7. Business Statistics: Digambar Patri. Kalyani Publishers

Course Outcomes:

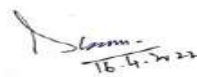
CO1	Describe basic concepts and significance of probability theory and probability distribution.
CO2	Apply the theoretical distribution and tools for business decision making. Also understand population and sampling theories.


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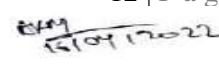
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CO3	Formulation of research hypotheses and testing hypotheses under parametric and non-parametric framework.
CO4	Analyse the statistical quality control and other statistical tests.
CO5	Apply the correlation and regression techniques to determine association between variables.
CO6	Developing the basic statistical understanding for future research.

Program Outcomes Relevant to the Course:

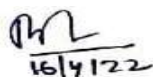
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PO2	Ability to Pursue Higher Education: Assemble commerce and management knowledge to enhance ability to pursue professional courses in higher education.
PO3	Problem Identification: Identify, interpret and summarize literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO4	Use of Modern Tools and Resources: Generate, design and select appropriate modern tools and techniques in appraising scientific temper to comprehend different business models
PO7	Enhancement of Professional Ethics: Interpret and employ ethics in professional life to develop a sense of responsibility and accountability.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

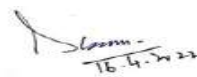
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CO2	3	1	2	1	3	2	3	1	2	1
CO3	3	1	1	2	3	3	3	1	3	2
CO4	1	2	1	3	3	2	3	3	3	3
CO5	3	1	2	1	3	3	2	2	1	1
CO6	3	2	1	3	3	3	3	3	2	2


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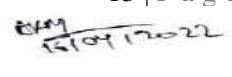
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MANAGERIAL ACCOUNTING

Paper code-103

Pre-requisites: Basic knowledge about Costing and Financial Accounting, Elements of Cost and Cost Sheet is required.

Learning Objectives: To enable the students to acquire knowledge about the concepts, methods and techniques of Management Accounting and develop competence with their usage in managerial decision making and control.

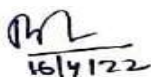
Units	Contents	No. of Classes
I	Management Accounting: Nature & Function: Distinction between Financial & Management Accounting, Cost & Management Accounting Role of Management Accountant. Cost Control Cost Reduction. Social- cost Benefit Analysis. Variable & Absorption costing, concepts & comparison. Preparation of Income Statements under both the methods.	10
II	Marginal Costing: Concepts & application: Contribution, Cost-volume-profit Analysis (CVP), P/V Ratio, Margin of Safety, Break Even Analysis, Differential Cost Analysis, Multiple Product Analysis, Optimal use of limited resources. Types of Managerial Decisions: Make or Buy, Product-mix, Pricing Decision etc.	10
III	Standard Costing: Concept, Types of Standards, Variance Analysis; Material, Labor Overhead Variances. Managerial uses of Variances Budgetary Control: Budget, Budgeting & Budgetary, Control. Requisites of ideal budgeting. Types of Budgets: Fixed, Flexible Budgeting. Zero-Base Budgeting, Performance Budgeting.	10
IV	Responsibility Accounting & Divisional Performance Management: Concepts of Responsibility Accounting; Responsibility Centers: Cost Centre, Revenue Centre, Profit Centre, Investment Centre: Responsibility Centers Reporting, Financial & Non-financial measures of performance. Uniform costing. Transfer Pricing: The concept, Objective, Requisites, Methods of Transfer Pricing, Transfer Pricing in Multinational Companies	10
	Total	40

Suggested Readings:

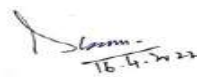
1. Atkinson Anthony A., Rajiv D. Banker, Robert Kaplan and S. Mark Young, Management Accounting, Prentice Hall.
2. Horngreen Charles T., and Gary L. Sundem and William O. Stratton, Introduction to Management Accounting, Prentice Hall of India.
3. Drury Colin, Management and Cost Accounting, Thomson Learning.
4. Garison R.H. and E.W. Noreen, Managerial Accounting, McGraw Hill.
5. Ronald W. Hilton, Managerial Accounting, McGraw Hill Education.
6. Jawahar Lal, Advanced Management Accounting, Text, Problems and Cases, S. Chand & Co., New Delhi.


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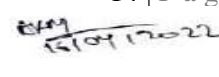
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Course Outcomes

CO 1	Define Management Accounting and explain its role to overcome the limitations of Financial Accounting and make a cost benefit analysis.
CO 2	Differentiate between Cost Accounting and Management Accounting and Marginal Costing and Absorption Costing.
CO 3	Calculate, analyse and apply the technique of Marginal Costing in Managerial decision making.
CO 4	Appraise Standard Costing Categorise, estimate and compare various types of variances.
CO 5	Develop different types of budgets for managerial control.
CO 6	Set up responsibility centres and devise methods for observing the divisional performance.

Program Outcomes Relevant to the Course:

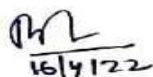
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PO2	Ability to Pursue Higher Education: Assemble commerce and management knowledge to enhance ability to pursue professional courses in higher education.
PO3	Problem Identification: Identify, interpret and summarise literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO7	Enhancement of Professional Ethics: Interpret and employ ethics in professional life to develop a sense of responsibility and accountability.
PO8	Building Leadership Competence: Preparing students for positions of leadership in business organizations at local, national and international levels.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

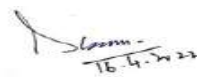
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CO2	3	1	1	2	3	3	1	1	1	1
CO3	3	2	3	3	2	3	1	3	3	2
CO4	3	2	3	1	1	1	0	2	3	1
CO5	2	2	3	1	1	2	1	3	2	3
CO6	2	1	3	2	1	1	0	3	1	3


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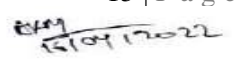
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CORPORATE ACCOUNTING

Paper Code: 104

Pre-requisites: Basic knowledge of financial accounting like fundamentals of accounts, accounting standards, preparation of financial statements & Companies act are required.

Learning Objectives: To help the students to acquire the conceptual knowledge of the corporate accounting and to learn the techniques of preparing the financial statements.

Units	Contents	No. of Classes
I	Final Accounts of Companies: Preparation of Financial Statements including treatment of dividend Valuation of Goodwill and Shares: Theory and Problems	10
II	Concept of Amalgamation, Absorption and Reconstruction: Accounting treatments including Inter-company holding. Internal Reconstruction: Concept and Accounting Treatment.	10
III	Accounts of Holding Company: Preparation of Consolidated Balance Sheet with one subsidiary company as per the relevant provisions of Accounting Standard-21 Liquidation of Company: Concept of Liquidation, modes and consequences of winding up, Statement of affairs, Preparation of Liquidator's final statement of accounts, List 'B' contributors.	10
IV	Banking Companies Accounts: Books and Accounts to be maintained, important provisions of Banking Regulation Act 1949, Non-Performing Assets, Guidelines of RBI for compilation of financial statements, Preparation of Final accounts of Banking Companies including preparation of relevant schedules. Insurance Companies Accounts: Preparation of Financial Statements of both Life and Non-life Insurance Business. SAP vs GAAP	10
	Total	40

Suggested Readings:

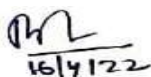
1. Monga, J.R. Fundamentals of Corporate Accounting, Mayur paper backs, New Delhi.
2. Shukla, M.C., Grewal T.C and Gupta S.C. Advanced Accounts. Vol-II S.Chand & Co., New Delhi.
3. Maheswari S.N. & Maheswari S.K., Corporate Accounting Vikas Publishing House, New Delhi.
4. Sehgal Ashok & Sehgal Deepak, Corporate Accounting, Taxman Publication, New Delhi.
5. Gupta Nirmal, Corporate Accounting, Sahitya Bhawan Agra.
6. Jain S.P. & Narang K.L., Corporate Accounting, Kalyani Publishers, New Delhi.

Course Outcomes:

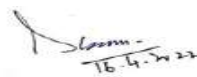
CO1	Define the Final Accounts of Companies and list out the various provisions of companies act in details including corporate sectors & others and replicate the process of valuation of goodwill and share.
CO2	Explain the different concepts of reconstruction of capital structure in the companies such as Amalgamation, Absorption and Reconstruction & its accounting treatment.


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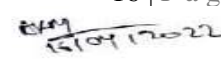
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CO3	Practical solutions of preparation of consolidated balance sheet of holding company & preparation of Liquidator's final statement of accounts at the time winding up of the companies.
CO4	Differentiate between preparation of books of account in Banking companies & Insurance companies as per their provisions. Analyze the guidelines of RBI for compilation of financial statements, preparation of Final accounts of Banking Companies including preparation of relevant schedules.
CO5	To assess & evaluate the quantitative performance of companies' growth like market performance, earning capacity, dividend payable, risk & composition of capital structure etc.

Program Outcomes Relevant to the Course:

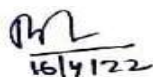
PO1	Knowledge Impartation on Business and Commerce: Acquire, define and recognize the knowledge on commerce, management, taxation, entrepreneurship, advance statistics and research methodology in addressing business and socio-economic issues.
PO2	Ability to Pursue Higher Education: Assemble commerce and management knowledge to enhance ability to pursue professional courses in higher education.
PO3	Problem Identification: Identify, interpret and summarize literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO7	Enhancement of Professional Ethics: Interpret and employ ethics in professional life to develop a sense of responsibility and accountability.
PO9	Construction of Life-Long Learning Attitude: Recognize and create an attitude to assume productive roles and inculcate the habit of life-long learning.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

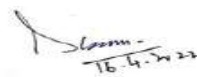
	PSO1	PSO2	PSO3	PSO4	PO1	PO2	PO3	PO7	PO9
CO1	3	2	1	1	3	3	3	3	3
CO2	3	2	2	2	3	3	3	3	3
CO3	2	2	1	2	3	2	3	3	3
CO4	2	3	2	2	3	3	3	2	3
CO5	2	3	3	3	2	2	2	2	1


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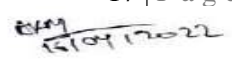
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ORGANISATIONAL BEHAVIOUR

Paper Code: 105

Pre-requisites: Knowledge about some theories related to organisation and its behaviour, group decision and communication, motivation & leadership, organisational culture & development and stress management is required.

Learning Objectives To enable the students to develop a theoretical understanding of about the organization structure.

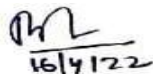
Units	Contents	No. of Classes
I	Organisation Theory and Behaviour: Organisational Theories - Classical, Neo-classical Theories and Contemporary; Authority, Power, Status, Formal and informal structure; Bureaucratic structure; Boundary Less Organisation; Flat and Tall structures; Impact of Environment on Organisational Design. Organisational Behaviour (OB)- Concept, Determinants, Models; Challenges and Opportunities of OB; Transaction Cost; Disciplines contributing to the field of OB; Individual Behaviour- Foundations of individual behaviour, Values, Attitudes, Personality, and Emotions; Perceptual process and Learning; McGregor's Theory X and Theory Y, Chris Argyris behaviour patterns.	10
II	Group Decision and Communication: Concept and nature of decision-making process; Individual versus group decision making; Group Dynamics, Nominal group technique and Delphi technique; Communication effectiveness in organisations; Feedback, Improving Inter-personal Communication- Transactional Analysis and Johari Window.	10
III	Motivation Theories: Content Theories- Maslow's Need Hierarchy, Herzberg's Two factor theory; Contemporary theories of motivation- ERG, Cognitive evaluation, goal setting, equity, Intrinsic Motivation Theory by Ken Thomas, Expectancy model; Behaviour modification; Motivation and Organisational effectiveness. Leadership, Power and Conflict: Concept and theories of leadership- Behavioural approach, Situational approach, Leadership effectiveness; Leadership across cultures; Power-Bases of Power, power tactics; Conflicts- sources, patterns, Levels and strategies.	10
IV	Organisational Culture & Development and Stress Management: Concept and determinants of Organisational culture, Creating sustaining and changing Organisational culture. Managing misbehavior at work- Aggression and Violence, Sexual abuse, Substance abuse, Cyberslacking. Organisational Development- Concept, Values, and Intervention techniques; Appreciative Inquiry.	10
	Total	40

Suggested Readings:

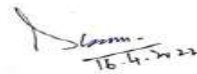
1. Robins S.P., and Mathew, M., Organisational Theory: Structure, Design and Application, Prentice Hall of India Pvt. Ltd.
2. Luthans, Fred, Organizational Behaviour, McGraw-Hill, New York.
3. Sekaran, Uma, Organisational Behaviour: Text and Cases, Tata McGraw-Hill Publishing Co. Ltd.
4. Aswathappa, K., Organisation Behaviour, Himalaya Publishing House, New Delhi.
5. Singh, K., Organizational Behaviour: Text and Cases, Pearson.
6. Pareek, U. and Khanna, S., Understanding Organizational Behaviour, Oxford University Press.


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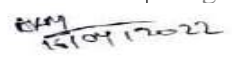
Dr. Priyabrata Panda
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Mr. Arjuna Kumar Maharana,
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Representative, BoS

Course Outcomes:

CO1	Outline the development of the field of organizational behaviour & theories and describe the micro and macro approaches.
CO2	Identify & discuss the processes used in developing communication and resolving conflicts.
CO3	Analyze and compare different models and theories used to explain individual behaviour related to motivation and rewards.
CO4	Identify & evaluate the various leadership styles and the role of leaders in a decision-making process and explicate stress management.
CO5	Construct & explain group dynamics and demonstrate skills required for working in groups with reference to organisational culture.

Program Outcomes Relevant to the Course:

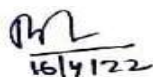
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PO2	Ability to Pursue Higher Education: Assemble commerce and management knowledge to enhance ability to pursue professional courses in higher education.
PO3	Problem Identification: Identify, interpret and summarise literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO7	Enhancement of Professional Ethics: Interpret and employ ethics in professional life to develop a sense of responsibility and accountability.
PO8	Building Leadership Competence: Preparing students for positions of leadership in business organisations at local, national and international levels.
PO9	Construction of Life-Long Learning Attitude: Recognize and create an attitude to assume productive roles and inculcate the habit of life-long learning.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

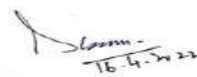
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CO2	1	2	2	3	3	1	3	2	3	2	2
CO3	2	3	1	2	2	2	2	3	2	3	2
CO4	1	3	3	2	2	1	3	2	3	3	3
CO5	2	2	3	3	1	2	2	3	3	2	1


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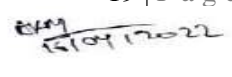
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Representative, BoS

SEMESTER: II

MARKETING MANAGEMENT

Paper Code: 201

Pre-requisites: Knowledge regarding fundamental concepts of marketing is required.

Learning Objectives: To familiarize the students with the basic concepts and principles of marketing and to develop their conceptual and analytical skills to be able to manage marketing operations of a business firm.

Units	Contents	No. of Classes
I	Introduction: Nature and Scope of Marketing; Core Marketing Concepts; Evolution of modern marketing concept; Modern marketing concepts; Marketing Mix; Marketing management process-a strategic perspective; Customer quality, value and satisfaction; Planning and control. Marketing Environment: Significance of scanning marketing environment; economic, demographic, socio-cultural, technological, political and legal segments of Macro Environment; Impact of micro and macro environment on marketing decisions. Consumer behaviour: Need for studying buyer behaviour; Consumer vs. business buying behaviour; Consumer buying decision process and influences. Market Segmentation, Targeting and Positioning: Bases for segmenting a consumer market; Levels of market segmentation; Factors influencing selection of market segments; Criteria for effective market segmentation; Target market selection and strategies; Positioning – concept, bases and process.	10
II	Product and Pricing Decisions: Product - concept and classification; Major product decisions; New product development; Packaging and labelling; Product support services; Branding decisions; Product life cycle – concept and appropriate strategies adopted at different stages. Pricing- Objectives, Factors affecting price of a product, Pricing policies and strategies. Ethical issues in product and pricing decisions	10
III	Distribution Decisions: Channels of distribution – concept and importance; Different types of distribution middlemen and their functions; Channel management, selection, motivation and performance appraisal of distribution middlemen; Distribution logistics – concept, importance and major logistics decisions; Channel integration and systems, Online Marketing concept and Scope, Advantages and Problems of online Marketing.	10
IV	Promotion Decisions: Role of promotion in marketing; Promotion methods; Integrated Marketing Communication – Concept; Communication process and promotion; Determining promotion mix; Factors influencing promotion mix; Developing advertising campaigns. Ethical issues in promotion decisions. Marketing Planning, Organising and Control: Marketing planning process; Different ways of Organising marketing department; Sales, cost and profit analysis. Marketing research: Concept and Scope of Marketing Research, Marketing Research process.	10
	Total	40

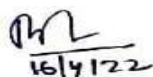
Suggested Readings:

1. Kotler, Philip; Keller, Kevin Lane; Koshy, Abraham, and Mithileshwar Jha, Marketing Management: A South Asian Perspective, Pearson.
2. Lamb, Charles W.; Hair, Joseph F., and Carl McDaniel, Mktg, Cengage Learning.
3. Etzel, Michael J., Walker, Bruce J., Staton, William J., and Ajay Pandit, Marketing Concepts and Cases, Tata McGraw Hill (Special Indian Edition).
4. Kazmi, SHH, Marketing Management Text and Cases, Excel Books.

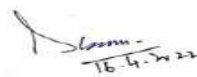
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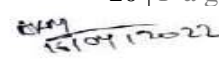
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Mr. Arjuna Kumar Maharana,
Ph. D. Scholar, Students
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5. Kumar, Arun and N. Meenakshi, Marketing Management, Vikas Publishing House.

Course Outcomes

CO1	Identify the key marketing concepts, principles, scope, and functions of marketing in business and society and trace marketing mix strategies.
CO2	Describe the impact of marketing environment on marketing decisions.
CO3	Explain marketing strategies based on product, pricing, location, and promotion.
CO4	Apply the marketing mix and distribution process as a model for making marketing decisions.
CO5	Recognize the value, necessity, and methods of marketing planning and control in reference to distributions.
CO6	Develop creative solutions to marketing challenges and enhance marketing research skills required to discover new market insights.

Program Outcomes Relevant to the Course:

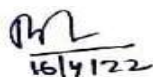
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PO3	Problem Identification: Identify, interpret and summarize literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO5.	Application of Business Knowledge on Environment and Sustainability: Apply and execute business knowledge to develop products, services and methods to foster sustainable environmental practices
PO6	Associating Business and Society: Synthesize a sense of civic responsibility, social concern and commitment, and moral accountability by providing a platform for socialization.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

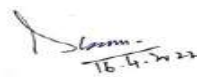
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CO4	3	3	1	2	3	3	3	2	2	3
CO5	1	1	3	1	3	2	3	3	3	2
CO6	3	2	1	3	3	3	3	3	2	3


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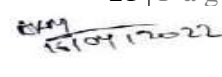
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Mr. Arjuna Kumar Maharana,
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EMERGING BUSINESS LAWS

Paper Code: 202

Prerequisites: Basics of business laws and intellectual property etc. are required.

Learning Objective: The course aims to acquaint the students with knowledge & understanding of emerging business Laws.

Units	Contents	No. of Classes
I	Laws Relating to Intellectual Property; Concept & development of intellectual property law in India. Laws & Procedure relating to patents, trademarks, copy rights, geographical indications. Overview of laws relating other intellectual property rights: Intellectual property appellate board.	10
II	Laws Relating to Competition & Consumer Protection; Concepts of completion, competition Act, 2002. Anti-competitive agreements, abuse of dominant position. Combination: regulation of combination, competition commission of India, Compliance of competition law. Consumer Protection in India, Consumer Protection Act, 1986: Rights of Consumers, Consumer Disputes. Reversal Agencies.	10
III	Laws Relating to Information; Right to Information Act, 2005, Definition, right to information, Obligation of public authorities, request, exemption from disclosure of information, grounds for disclosure of information grounds for rejection to access in certain cases. Central information commission-its constitution, terms of office, conditions appeals & penalties.	10
IV	Law Relating to Pollution Control & Environmental Protection; Concept of sustainable Development: Bio-diversity & carbon credit: Government policy regarding Environment. Laws relating to prevention of air & water pollution: Environment (Protection) Act 1986. National Green Tribunal (NGT)	10
	Total	40

Suggested Readings:

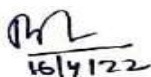
1. Bulchandani KR – Business Laws – Himalaya Publishing House
2. N. D. Kapoor- Mercantile Law- Sultan Chand & Sons.
3. Maheswari, Maheswari – A Manual of Business Law – Himalaya
4. Corporate Laws, Dr. S..K.Kapoor, Taxman Publication
5. SEBI Act- 1992 6. FEMA ACT 1999 7. MRTP ACT 1969 8. Consumer Protection Act –1986.

Course Outcomes:

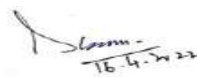
CO1	Describe basic concepts and significance of Intellectual property and understanding regulations regarding Intellectual Property rights.
CO2	Developing the understanding of regulations for competitive business in India.
CO3	Describe the rights of Consumer and regulations for protection of consumer protection in India.
CO4	Describe the rights of citizen under RTI Act and obligation of public authorities.


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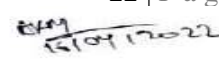
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CO5	Application of legal restrictions for achieving sustainable environment.
CO6	Developing a knowledge framework for pollution control and being law abiding citizen.

Program Outcomes Relevant to the Course:

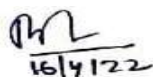
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PO5	Application of Business Knowledge on Environment and Sustainability: Apply and execute business knowledge to develop products, services and methods to foster sustainable environmental practices
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Mapping Program Objectives, Program Education Objectives with Course Outcomes

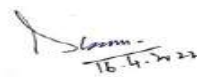
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CO2	1	3	2	2	3	1	1	0	1	1	2	3
CO3	2	3	3	2	3	1	1	1	1	2	2	3
CO4	2	3	3	2	3	2	2	1	1	1	2	3
CO5	2	3	3	3	1	1	2	1	3	3	2	2
CO6	2	3	2	3	1	1	1	1	3	3	3	2


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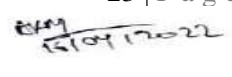
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15/04/2022

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QUANTITATIVE TECHNIQUE FOR BUSINESS DECISIONS.
Paper Code: 203

Pre-requisites: Knowledge about different tools & techniques which helps to Business decision making process and knowledge about mean, median, mode and measures of dispersion is required.

Learning Objectives: The subject can provide an in-depth knowledge about different tools and technique for business data analysis

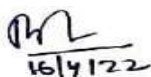
Units	Contents	No. of Classes
I	<p>Fundamentals of Quantitative Techniques and Operation Research. Quantitative Techniques : Meaning and Characteristics of Quantitative Technique, Classification of Quantitative Techniques, Role, Functions and Uses of Quantitative Techniques in Business and Industry, Benefits and limitations of Quantitative Techniques. Operation Research: Origin and Development of Operation Research, Phases/Stages of Operation Research Study, Operation Research Models, Scope, Use and Limitations of Operation Research.</p>	10
II	<p>Decision Analysis and Game Theory Decision Analysis: Elements and Steps in Building Decision Making Models, Decision Making Situations: Decision Making Under Certainty, Under Risk, Under Conflict. Decision Tree Analysis. Game Theory: Properties of Game Theory, Type of Games: Pure Strategy Games, Mixed Strategy Games. Value of the Games, Rule of Dominance.</p>	10
III	<p>Network Analysis Concepts of PERT and CPM Techniques and its Applications and Limitations, Network Construction under PERT and CPM: Determining Critical path, Calculations of floats, Time- Cost Trade-offs, Resource Allocation and Resource Leveling.</p>	10
IV	<p>Queuing Theory and Simulation Concept and Application of Queuing Theory, Queuing System, Queuing Models, Kendall's Notation. Monte Carlo Simulation, Application of simulation in inventory management and queuing situation.</p>	10
Total		40

Suggested Readings:

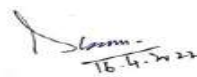
1. Kapoor V K: Operation Research: Concept Problems and Solution, Sultan Chand and Sons.
2. Swarup Kanti, Gupta P K, Manmohan : Operation Research, Sultan Chand and Sons.
3. Vora N D: Quantitative Techniques in Management, Tata McGraw Hill Companies.
4. Sharma Anand: Quantitative Techniques for Decision Making HPH, Mumbai
5. Koyhari, C.R.: Quantitative Techniques, Vikas Publishing House Pvt. Ltd.
6. B.R.K Kashyap, M.L. Chaudhury, An Introduction to Queuing Theory, Arkay Publishing.


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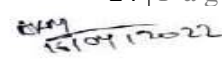
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15/04/2022

**Mr. Arjuna Kumar Maharana,
Ph. D. Scholar, Students
Representative, BoS**

Course Outcomes:

CO1	State the meaning of various quantitative tools, techniques available for decision making.
CO2	Classification of quantitative techniques. Describe the use of various models in different decision-making situations.
CO3	Formulate, implement & apply various business strategies by the use of game theory.
CO4	Assess the time and resources for various projects involving a number of activities and events by the use of PERT & CPM.
CO5	Develop and use various models for providing effective and efficient services to customers under queuing situations.

Program Outcomes Relevant to the Course:

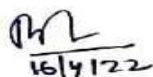
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PO4	Use of Modern Tools and Resources: Generate, design and select appropriate modern tools and techniques in appraising scientific temper to comprehend different business models.
PO9	Construction of Life-Long Learning Attitude: Recognize and create an attitude to assume productive roles and inculcate the habit of life-long learning.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

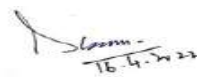
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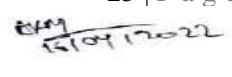
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INTERNATIONAL BUSINESS

Paper Code: 204

Prerequisites: Knowledge regarding basics concepts of forms of business, trade and industry is required.

Learning Objective: To familiarize the students with concept and development of international business with regard to foreign policy and investment.

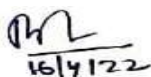
Units	Contents	No. of Classes
I	INTRODUCTION: International business: - Nature and importance; Stages of international business, Basic entry decisions: - Modes of entry: Exporting, licensing, Franchising, Mergers & Acquisitions Multinationals (MNCs) in International Business: Issue in investment, technology transfer, pricing and regulations; International collaborations and strategic alliances.	10
II	INTERNATIONAL TRADE: Reasons for International trade; Theories of International trade; Gains from trade, foreign trade multiplier; Terms of trade. Structure of India's Foreign Trade: - Composition and direction, EXIM Bank, EXIM Policy of India World Trade and Protectionism: GATT, The Uruguay Round, Evaluation of WTO, WTO- Functions and Policies, Important Agreements of WTO-GATS, TRIPS; WTO and Developing Countries	10
III	INTERNATIONAL ECONOMIC INSTITUTIONS: - IMF, World Bank, IFC, ADB, UNCTAD, International Commodity Trading and Agreements INTERNATIONAL FINANCIAL ENVIRONMENT: - International monetary System; Types of Exchange Rate Systems in the World; Movements in foreign exchange and interest rates. FOREIGN DIRECT INVESTMENT: - Types of FDI; Government Policy and FDI, Instruments: GDRs, ADRs, and FIIs	10
IV	Levels of Regional Economic Integration: - Structure and functioning of EC, NAFTA, SAARC and ASEAN. Balance of Payment Account: - Components of BOP, Disequilibrium in BOP; Correction of Disequilibrium. Contemporary Issues in International Business: - Environmental and Labour issues in International Business.	10
	Total	40

Suggested Readings:

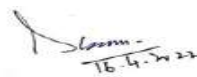
1. P. subha Rao, 'International Business: Text & Cases,' Himalaya Publishing House, Mumbai
2. Cherunilam Francis, 'International Business Environment,' Himalayan Publishing House, Mumbai
3. Adhikary. M, 'Economic Environment of Business,' Sultan Chand & Sons, New Delhi
4. Ahluwalia, J.J., 'Industrial growth in India,' Oxford University press New Delhi


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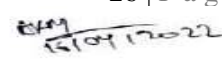
Dr. Priyabrata Panda
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5. Alagh, Yoginder K., ' Indian development Planning and Policy,' VikashPublishing House, new Delhi
6. Ghosh, Biswanath, ' Economic Environment of Business,' Vikash PublishingHouse, New Delhi
7. Government of India: Economic Survey, various Issues
8. Raj Agarwal andParag Diwan, ' Business Environment,' Excel Books, New Delhi
9. Sengupta, N.K., 'Government and Business in India,' Vikash publishing House,New Delhi

Course Outcome:

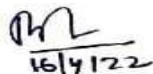
CO1	Define globalization and the concept of MNCs and identify issues and challenges for making an entry into international business.
CO2	Explain business expansion abroad and key issues related to their operations in other countries.
CO3	Demonstrate fundamental knowledge in core functional areas of international business.
CO4	Compare and contrast cultures and societies globally using socio-economic and cultural frameworks.
CO5	Assess the working of various global institutions and their role in supporting and protecting international and domestic business.
CO6	Develop an entry strategy into other markets recognizing the nature of institutions and forces governing the process of globalization.

Program Outcomes Relevant to the Course:

PO1	Knowledge Impartation on Business and Commerce: Acquire, define and recognize the knowledge on commerce, management, taxation, entrepreneurship, advance statistics and research methodology in addressing business and socio-economic issues.
PO6	Associating Business and Society: Synthesize a sense of civic responsibility, social concern and commitment, and moral accountability by providing a platform for socialisation.
PO7	Enhancement of Professional Ethics: Interpret and employ ethics in professional life to develop a sense of responsibility and accountability.
PO8	Building Leadership Competence: Preparing students for positions of leadership in business organisations at local, national and international levels.


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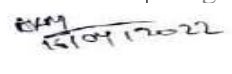
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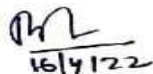
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Mapping Program Outcomes, Program Specific Objectives with Course Outcomes


	PSO1	PSO2	PSO3	PSO4	PO1	PO6	PO7	PO8
CO1	2	2	2	2	3	3	2	3
CO2	2	2	2	3	3	3	2	3
CO3	3	3	2	2	2	2	3	2
CO4	3	2	3	2	2	3	3	3
CO5	3	2	3	3	1	3	3	2
CO6	2	3	2	3	3	3	2	3


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FINANCIAL MANAGEMENT AND POLICY
Paper Code: 205

Prerequisites: Basic concepts of finance, accounting and mathematics is required.

Learning Objectives: Students can actualize the financial decision-making issues faced by present business.

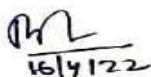
Units	Contents	No. of Classes
I	Introduction to Financial Management: Concept of Finance and Financial Management, Role of finance Manager, Goals of Financial Management, Finance Decisions, Types of Risk, Time Value of Money and Valuation of Securities and Bonds.	10
II	Capital Structure: Theories of Capital Structure- NI, NOI, MM Hypothesis without and with corporate taxes, Merton Miller argument with corporate and personal taxes, Trade off theory, Pecking order theory, Signaling theory and effect of information asymmetry on capital structure. Optimal capital structure. Determinants of Capital structure in practice.	10
III	Dividend Policy: Forms of Dividends. Theories of relevance and irrelevance of dividend in firm valuation (Walter's model, Gordon's Model, MM Hypothesis, Bird-in-hand theory and Dividend signaling theory). Types of dividend policy in practice (constant rupee dividend policy, constant dividend payout policy, smooth stream dividend policy) Determinants of dividend policy. Meaning of Random Walk hypothesis and Efficient Market Hypothesis. Meaning and need of behavioural finance. Different bias under behavioural finance.	10
IV	Working Capital Planning and Management: Concept and types of working capital. Operating and cash cycle. Estimation of working capital requirement. Working capital financing. Determinants of working capital. Components of working capital management. Cash management- Baumol's Model and Miller-Orr Model of managing cash. Receivables management- dimensions of credit policy of a firm and evaluation of credit policies; credit analysis. Inventory management.	10
Total		40

Suggested Readings:

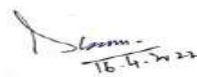
1. Pandey, I. M., *Financial Management*, Vikas Publishing.
2. Chandra, P. *Financial Management*, Tata McGraw Hill.
3. Khan, M.Y & Jain, P.K *Financial Management: Text, Problems and Cases*, Tata McGraw Hill.
4. Rabi M Kishore: Taxman Publishing.
5. Brealey, Richard A and Steward C. Myers: *Corporate Finance*, McGraw Hill, Int. New York.
6. Hampton, John: *Financial Decision Making*, Prentice Hall, Delhi.
7. Van Horne, J.C. and J.M. Wachowicz Jr.: *Fundamentals of Financial Management*, Prentice-Hall, Delhi.
8. Van Horne, James C: *Financial Management and Policy*, Prentice Hall, Delhi.


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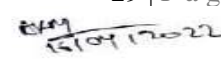
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Course Outcomes:

CO1	Define the concepts of financial management and identify the role and goals of financial management in modern day business.
CO2	Explain the theories of capital structure and discuss the determinants of capital structure in practice.
CO3	Interpret forms of dividend policies and examine the determinants of dividend policy and different bias of behavioral finance.
CO4	Examine the determinants and components of working capital management and calculate working capital requirement of business entities.
CO5	Develop a model for assessing the effectiveness of cash and inventory management of entities and evaluate them. credit policies

Program Outcomes Relevant to the Course:

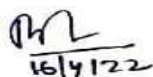
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PO2	Ability to Pursue Higher Education: Assemble commerce and management knowledge to enhance ability to pursue professional courses in higher education.
PO3	Problem Identification: Identify, interpret and summarise literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO5	Application of Business Knowledge on Environment and Sustainability: Apply and execute business knowledge to develop products, services and methods to foster sustainable environmental practices.
PO8	Building Leadership Competence: Preparing students for positions of leadership in business organizations at local, national and international levels.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

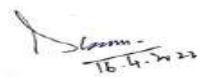
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CO1	3	2	2	1	3	2	2	1	2
CO2	3	2	2	3	3	3	3	3	2
CO3	2	1	2	2	2	3	2	3	2
CO4	3	2	3	2	1	1	3	3	1
CO5	3	2	3	3	1	2	2	3	1


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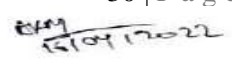
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INTERNATIONAL ACCOUNTING
Paper Code DSE – 206A

Pre-requisites: Basic knowledge on accounting, accounting standards and reporting is required.

Learning Objectives: Students can assemble knowledge about accounting in international context.

Units	Contents	No. of Classes
I	International Dimensions of Accounting- Historical and contemporary perspective, global competition, cross-border mergers and acquisitions, financial innovation. Reporting and disclosure practices, cash flow and funds flow statements, social responsibility disclosures, corporate governance, disclosures, internet business reporting and disclosure	10
II	Foreign Currency Translation: Reasons for translations, financial statement effects of alternative translation rates, foreign currency transactions, translation accounting development, foreign currency translation and inflation, current trends.	10
III	Consolidation of Foreign Financial Statement: Analysis of Foreign Financial Statement, Introduction, Techniques & difficulties. Accounting for Price level Changes; Types of Changes: General, Specific & Relative price level changes, Techniques (GPP, CPP & CAA) & difficulties.	10
IV	International Accounting Harmonization: Meaning, advantages criticisms of international standards, major international organizations promoting accounting harmonization, IASB, New IASB structure, European union harmonization efforts, international organization of securities commissions (IOSCO), international federation of accountants (IFAC) International financial statement analysis, Accounting analysis, International financial analysis – ratio analysis, cash flow analysis.	10
	Total	40

Suggested Readings:

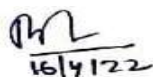
1. Mohapatra A.K.Das, 'International Accounting', PHI Learning Pvt. Ltd.
2. Choi Frederick & Meek Gray, 'International Accounting', Pearson Publication.
3. Rathore, Shirin, International Accounting, PHI Learning.

Course Outcome:

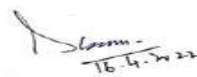
CO1	Define different dimensions of international accounting and identify reporting and disclosure practices.
CO2	Describe and demonstrate a strategic approach towards global accounting practices and translation theories.
CO3	Demonstrate progressive learning in the elements of international reporting of consolidated financial statements.


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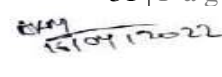
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Representative, BoS

CO4	Calculate the relevant price level changes in context to global markets.
CO5	Analyse the harmonization process and price level changes.
CO6	Prepare and consolidate financial statements in national and international context.

Program Outcomes Relevant to the Course:

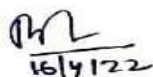
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PO7	Enhancement of Professional Ethics: Interpret and employ ethics in professional life to develop a sense of responsibility and accountability.
PO8	Building Leadership Competence: Preparing students for positions of leadership in business organisations at local, national and international levels.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

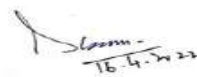
	PSO1	PSO2	PSO3	PSO4	PO1	PO2	PO3	PO6	PO7	PO8
CO1	1	2	2	2	3	2	3	3	2	3
CO2	2	2	2	3	3	3	3	3	2	3
CO3	1	3	2	2	2	2	2	2	3	2
CO4	2	2	3	2	2	1	3	3	3	3
CO5	2	2	3	3	1	2	2	3	3	2
CO6	2	3	2	3	3	3	3	3	2	3


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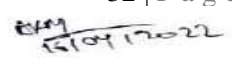
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STRATEGIC COST MANAGEMENT
Paper Code DSE – 206B

Pre-requisites: Basic knowledge on costing methods, costing Process and budgeting is required.

Learning Objectives: Students can know diversified sphere on emerging concepts of cost accounting knowledge about accounting in international context.

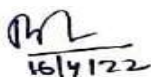
Units	Contents	No. of Classes
I	Cost Management -Nature; Cost Management System; Strategic Cost Management (SCM); SCM and Strategy; Components of SCM. Activity-Based Management [ABM]: Concept and Uses; Relationship between Activity – Based Costing and ABM; Operational ABM and Strategic ABM; Techniques of ABM; Implementation Steps in ABM	10
II	Life Cycle Costing -Meaning and Benefits; Product Life Cycle and Pricing Decisions; Life Cycle Budgeting. Target Costing: Concept; Target Costing and Target Pricing; Key Principles of Target Costing; ABC and Target Costing; Target Costing Process; Market Driven Costing, Product Level Costing, Component Level Costing, Chained Target Costing; Target Costing and Cost Management; Role of Value Engineering in Target Costing.	10
III	Kaizen Costing - Meaning; Implementation Steps in Kaizen Costing; Target Costing and Kaizen Costing; General Kaizen Costing and Item Specific Kaizen Costing; Bench Marking. Total Quality Management (TQM): Meaning and Characteristics; Types of Quality Costs; Traditional and Modern View of Quality, Measuring Quality Costs; Reporting Quality Costs; Success Factors for TQM; Implementing TQM; Quality Cost Information and Managerial Decision Making.	10
IV	Pricing Strategies - Factors Influencing Pricing Decisions; Short run Vs. Long Run Pricing Strategy; Cost-Based Pricing; Economic Approach to Pricing; Pareto Analysis in Pricing Decisions. Activity-Based- Budgeting (ABB): ABB and Traditional Budgeting; ABB Process; Capacity Utilization; Role of ABB in Cost Management.	10
	Total	40

Suggested Readings:

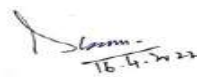
1. Edward J. Blocher, Kung H. Chen, Gary Cokins and Thomas W. Lin, Cost Management: A Strategic Emphasis, McGraw Hill Education (India) Ltd.
2. Don R – Hansen and Maryanne M. Mowen, Cost Management, Accounting and Control, Cengage Learning (India) Ltd.
3. Ronald W. Hilton, Michael W. Maher and Frank A. Selto, Cost Management: Strategies for Business Decisions, McGraw Hill Irwin.
4. Robert S. Kaplan and Robin Cooper, Cost and Effect, Harvard Business School Press.
5. John K. Shank and Vijay Govindarajan, Strategic Cost Management, The Free Press.
6. Leslie G. Eldenburg and Susan K. Wolcott, Cost Management, John Wiley and Sons.


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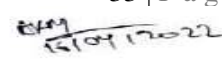
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Program Outcomes Relevant to the Course:

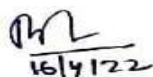
PO1	Knowledge Impartation on Business and Commerce: Acquire, define and recognize the knowledge on commerce, management, taxation, entrepreneurship, advance statistics and research methodology in addressing business and socio-economic issues.
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PO3	Problem Identification: Identify, interpret and summarize literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO5.	Application of Business Knowledge on Environment and Sustainability: Apply and execute business knowledge to develop products, services and methods to foster sustainable environmental practices
PO6	Associating Business and Society: Synthesize a sense of civic responsibility, social concern and commitment, and moral accountability by providing a platform for socialization.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.

Mapping Program Objectives, Program Education Objectives with Course Outcomes

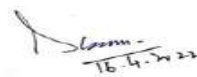
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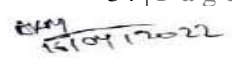
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CORPORATE REPORTING AND ANALYSIS

Paper Code DSE – 206C

Pre-requisites: Basic knowledge on reporting, disclosure and accounting standards is required.

Learning Objectives: Students can gather information on accounting in regard to reporting and disclosures.

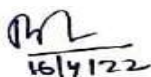
Units	Contents	No. of Classes
I	Financial Reporting: An Overview: Concept, objective, development, users, purpose, characteristics, significance, benefits of financial reporting, Issues in corporate reporting disclosure requirements. Conceptual frame work of IASB, Issues in accounting standard setting. International Financial Reporting Standards (IFRS) vs. Indian Accounting Standards (Ind AS).	10
II	Reporting of Contemporary Issues: Meaning, Importance and Benefits of Interim Reporting, Segment Reporting, Sustainability Reporting and Corporate Social Reporting.	10
III	Voluntary Disclosures: Disclosure issues, Value Added Statements, Economic Value Added, Market Value Added, Shareholders' Value Added, Human Resource Accounting, and Environmental Accounting. Financial reporting by mutual funds, Non-banking finance companies, Merchant Bankers, Stock and Commodity market intermediaries.	10
IV	E Reporting: Theoretical Aspects of Extensible Business Reporting Language (XBRL): Main Features of XBRL, Evolution and Advantages of XBRL, Taxonomy, What XBRL Not? , International Scenario of XBRL, XBRL India. Difference between XML and XBRL.	10
	Total	40

Suggested Readings:

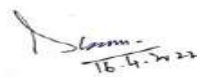
1. Institute of Cost Accountants of India: Corporate Financial Reporting. icmai.in/upload/Students/Syllabus-2012/Study...New/Final-Paper18-Revised-2.pdf
2. Jawaharlal, Accounting : Theory and practice, Himalaya, 2010
3. Das Gupta, N.: Accounting Standard: Indian & International, Sultan Chand, N. Delhi
4. ICAI.: Compendium of Statements & Standard Accounting ICAI, Delhi
5. Narayanswamy R.: Financial Accounting: A Managerial Perspective. PHI, New Delhi.
6. Lal Jawahar.: Corporate Financial Reporting Theory and Practice. Taxman, New Delhi,
7. Vijaykumar M P.: First lesson to Accounting Standards, Snow White, Delhi,
8. Porwal L S.: Accounting Theory- an Introduction, TMG, New Delhi.
9. ICAI'S Relevant Publication.: www.icai.org


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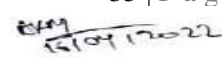
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Course Outcomes:

CO1	Define various concepts of financial reporting, IFRS, Ind AS, and IASB.
CO2	Analyse contemporary issues of reporting.
CO3	Interpret voluntary disclosure and related terms.
CO4	Apply extensible language to reporting practice.
CO5	Design and develop a reporting model.

Program Outcomes Relevant to the Course:

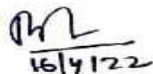
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PO2	Ability to Pursue Higher Education: Assemble commerce and management knowledge to enhance ability to pursue professional courses in higher education.
PO3	Problem Identification: Identify, interpret and summarize literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO5	Application of Business Knowledge on Environment and Sustainability: Apply and execute business knowledge to develop products, services and methods to foster sustainable environmental practices
PO6	Associating Business and Society: Synthesize a sense of civic responsibility, social concern and commitment, and moral accountability by providing a platform for socialization.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

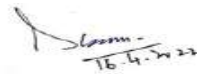
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CO2	3	1	3	2	3	3	3	3	3	3
CO3	2	2	1	3	3	2	3	3	2	3
CO4	2	3	2	2	3	2	3	3	2	3
CO5	1	2	1	1	3	1	3	3	3	3


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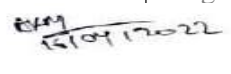
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SEMESTER: III

COMPUTER APPLICATION IN BUSINESS

Paper Code: 301

Prerequisites: Basic knowledge about Costing and Financial Accounting, e-commerce, computer fundamentals are required.

Learning Objective: Students can gather information on software, e accounting methods, inventory management etc.

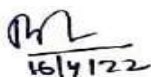
Units	Contents	No. of Classes
I	Computer Networks and Internet: Meaning, Components and Basic Idea, Different Types of Networks; Internet-a Global Network; E-Mail; Common Protocol Used in Internet; Concept of World Wide Web and Internet Browsing; Internet Security; Application of Internet in Business. Basic idea of DOS, WINDOWS, Introduction and working with MS-Word in MS-Office, MS-Excel, MS Power Point- Basic Commands, Formatting Texts and Documents, working with Graphics and Creating Presentation the Easy Way. Introduction to Cyber Crime	10
II	Introduction to E-commerce: Meaning and Concept, Objectives, Advantages and Disadvantages, E-Commerce and E-Business, Traditional Commerce vs. E-Commerce, Forces Driving E-Commerce, Growth of E-Commerce, E-Commerce Opportunities for Industries, Future of E-Commerce. Forms of E-Commerce- Business to Consumer, Business to Business, Business to Government, Other Models: Brokerage Model, Aggregator Model, Info- intermediary model, Community Model and Value Chain Model, Transaction Process.	10
III	Introduction to Accounting Packages and DBMS Maintaining of Ledgers, Preparation of Vouchers and Invoice; Pay Slip Generation through pay roll, Maintenance of Inventory Records, Accounting Books and Final Accounts; Financial Reports Generation as per revised schedule –VI Traditional File Management; Processing Techniques; Limitation of File Management Systems;	10
IV	Meaning and Features of DBMS: Components of DBMS; Architecture of DBMS; Functioning of DBMS. Enterprise Resource Planning Websites Generation Concept: Meaning, Objectives and Advantages, Types of Websites, Website Designing Principles, Methods of Promoting Website, Searching the Website, Factors for Growth of Websites.	10
	Total	40

Suggested Readings:

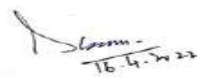
1. Date, C.J.: An Introduction to Database Systems, Addison Wesley, Massachusetts.
2. Sudalaimuthu – Computer Application in Business – Himalaya
3. Dienes, Sheila S : Microsoft office, Professional for Windows 95 ; Instant Reference ; BPB Publication, Delhi.
4. Mansfield, Ron: The Compact Guide to Microsoft office; BPB Publication, Delhi.
5. Norton, Peter: Working with IBM-PC, BPB Publication, Delhi.
6. O'Brian, J. A.: Management Information Systems, Tata McGraw Hill, New Delhi
7. Ullman, J.O.: Principles of Database Systems, Galgotia Publications, New Delhi.


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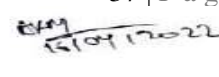
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Course Outcomes:

CO 1	Define concepts like E- commerce, DBMS and other computer programmes, software by recognising their importance of in business.
CO 2	Explain various uses of computer programmes like DBMS in the context of business
CO 3	Apply these tools in business context, especially in accounting and E-Commerce.
CO 4	Analyse various business-related problems using such computer applications.
CO 5	Evaluate and assess various business activities through the application of different computer programmes.
CO 6	Design website to get an advanced business experience.

Program Outcomes Relevant to the Course:

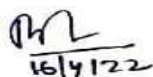
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PO3	Problem Identification: Identify, interpret and summarise literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO4	Use of Modern Tools and Resources: Generate, design and select appropriate modern tools and techniques in appraising scientific temper to comprehend different business models.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.

Mapping Program Objectives, Program Specific Objectives with Course Outcomes

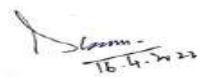
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CO3	2	2	3	2	3	3	3	3	3
CO4	3	2	3	1	3	3	3	3	3
CO5	3	2	3	1	3	2	3	3	3
CO6	3	2	2	3	2	1	1	3	3



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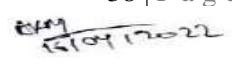
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RESEARCH METHODOLOGY

Paper Code: 302

Pre-requisites: Basics of statistics like average, standard deviations, correlation etc. are required.

Learning objective: To enable the students understanding concepts and process of conducting research. Also, the course aims to prepare the students for solving Business and Social issues through research.

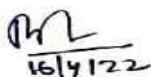
Units	Contents	No. of Classes
I	<p>Introduction: Meaning, Objectives, Significance of Research; Types of Research, Formulation of Research Problems, Review of Literature and Development of Hypothesis, Methods vs Methodology, Criteria of a Good Research, Ethics in Business Research, Plagiarism: Meaning and Types.</p> <p>Type of Data: Meaning and Examples of Cross Sectional, Pooled, Panel and Time Series Data.</p> <p>Research Design: Concept and Classification.</p>	07
II	<p>Marketing and HR Research (Behavioral): Concept, Sample Size Determination--Power Method and Krejcie & Morgan table, Questionnaire and Scale Development. Data Cleaning-Missing Values, Unengaged Responses and Outliers. Reliability vs Validity, Exploratory Factor Analysis- Factor Extraction, Communalities, KMO and Bartlett's test, Eigen Values, Total Variance Extracted, Rotated Component Matrix, Factor Naming.</p>	12
III	<p>Statistical Analysis Parametric vs Non-Parametric Test, One Tailed vs Two Tailed test, Types of Errors.</p> <p>Anova: One Way Anova, Manova and Repeated Measures Anova. Post Hoc Test.</p> <p>Multiple Linear Regression. -Equation, Assumptions and Interpretation. Assumptions: R Squared and Adjusted R Square, Durbin-Watson Statistics, F Statistics, Constant Variance of Residuals with Scatter Plot and Normality of Residuals and Interpretation.</p>	14
IV	<p>Report Writing: Types of Report, Structure of Thesis and Article, Developing a Research Proposal/Synopsis.</p> <p>Citation and Referencing: Citation vs Referencing, Parenthetical Citation vs Narrative Citation,</p> <p>Styles of Referencing: Referencing of Research Articles with DOI and Without DOI, Books, Chapters, News Paper Articles, Working Papers, Thesis, Websites, Blog Post (APA, MLA, Harvard, Chicago)</p>	07
Total		40

Suggested Readings:

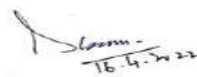
1. Bennet, Roger : Management Research, Routledge, New York
2. Fowler, Floyd, J. JR. : Survey Methods, Sage Publication, New Delhi
3. Gupta, S.P. : Statistical Methods, Vikas Publishing House, New Delhi
4. Kothari, C.R. : Research Methodology, New Age International, New Delhi
5. Aggarwal, S.C. : Business Research Methods, VK Publications, New Delhi


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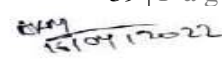
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6. Bajpai, Naval: Business Research Methods, Pearson, New Delhi
7. Cooper, Donald R., and Schindler, Pamela S. Business Research Methods: Tata McGraw Hill
8. Srivastava, T. N. and Rego, Shailja, Business Research Methodology, TataMcGraw Hill.

Course Outcomes:

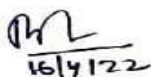
CO1	Describe basic concepts and significance of research and identify research problem to formulate hypothesis. Outline ethics in research.
CO2	Describe marketing and behavioral research and discuss the methodologies of marketing research with exploratory factor analysis to solve social and business issues with latest tool and software.
CO3	Apply finance research in relation to different tests and discuss the methodologies of finance research with regression to solve social and business issues with latest tool and software.
CO4	Analyse the structure of a research report and breakdown the style of referencing with different referencing styles.
CO5	Argue and assess a methodology for a research work.
CO6	Design and develop a research report with relevance to academic relevance and socio-economic and environmental sustainability.

Program Outcomes Relevant to the Course:

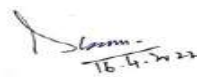
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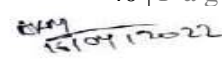
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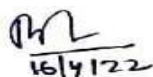
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PO6	Associating Business and Society: Synthesize a sense of civic responsibility, social concern and commitment, and moral accountability by providing a platform for socialization.
PO7	Enhancement of Professional Ethics: Interpret and employ ethics in professional life to develop a sense of responsibility and accountability.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

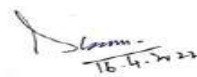
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CO3	3	3	2	2	3	3	2	3	2	2	2	3
CO4	3	1	1	1	3	3	3	3	1	2	2	3
CO5	3	2	1	1	3	3	2	2	1	1	1	2
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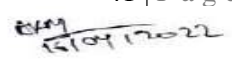
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FINANCIAL INSTITUTIONS AND MARKETS

Paper Code: 303

Pre-requisites: Knowledge of basic financial market concepts like primary market, secondary market and financial system.

Learning Objective: To foster the interest of students to diagnose the financial market concepts and to get more insight.

Units	Contents	No. of Classes
I	Introduction: Overview of Financial Markets and Institutions, Nature and Functions, Role of Financial Institutions in Economic Development, Financial system. An Overview of Indian Financial system, financial sector reforms in India including contemporary issues, Capital Adequacy Norm, NPA Norms.	10
II	Financial Markets: Money Market- Meaning, composition and functions, Capital Market- Primary and Secondary Market and their functions. Financial Institutions: IDBI, IFCI, SFCs, UTI, SIDBI Structure of Indian Banking System: RBI, NABARD, Rural Banking, E-banking	10
III	Financial services: Meaning and features, Kinds of Financial services- Assets/Fund Based services, Fee Based services; Financial Intermediaries rendering financial services, SEBI guidelines. Mutual Funds: Types, Risks associated with Mutual Funds, Growth of Mutual Funds in India.	10
IV	Financial Inclusions: Extent of Exclusions, Financial Inclusions initiative, SHG-Bank Linkage. Micro Finance: Emerging issues and regulations	10
	Total	40

Suggested Readings:

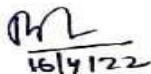
1. Gordon Natarajan: Financial Markets and Services, Himalaya Publishing House.
2. Sashi K. Gupta & Nisha Agrawal: Financial Services, Kalyani Publishers.
3. Kohn Meir: Financial Institutions and Markets, Oxford University Press.
4. Bhole L.M: Financial Markets and Institutions, Tata McGraw Hill, New Delhi.
5. Various Recent Publications of RBI & SEBI.

Course Outcomes:


CO1	Define Financial Market, Financial Institutions and identify the various area of financial system by recognising its importance in economic development & describe financial institutions.
CO2	Classify different aspects of financial market like money market and capital market and explain various aspects of financial services and institutions.
CO3	Apply the financial knowledge to know and get solution for contemporary issues and interpret their view on such matters in reference to mutual funds.


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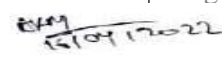
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CO4	Analyse the various problems in the financial system including area of financial inclusion.
CO5	Assess the benefits of various financial services and use them with proper evaluation.

Program Outcomes Relevant to the Course:

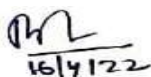
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PO3	Problem Identification: Identify, interpret and summarise literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO6	Associating Business and Society: Synthesize a sense of civic responsibility, social concern and commitment, and moral accountability by providing a platform for socialisation.
PO8	Building Leadership Competence: Preparing students for positions of leadership in business organisations at local, national and international levels.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

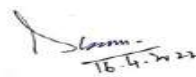
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CO1	3	1	1	2	3	3	2	2	1	1
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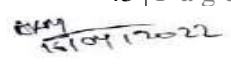
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16/4/22

Mr. Subash Chandra
Jhankar, Assistant
Professor of
Commerce, Member,
BoS


15/04/2022

Mr. Arjuna Kumar Maharana,
Ph. D. Scholar, Students
Representative, BoS

STRATEGIC MANAGEMENT

Paper Code: 304

Pre-requisites: Knowledge of the concept of Management, process and functional areas of Management and Managerial skills and various types of Management structures.

Learning Objective: To familiarize the students with concept and development of business strategy in Global level.

Units	Contents	No. of Classes
I	Introduction: Concepts of Strategy, Levels of Strategy, Vision, Mission, Goal of Organization, Approaches of Strategic Decision making, Strategic Intent, Global Strategy and Global Strategic Management	8
II	Environmental Analysis: Scanning of Global Business Environment, Techniques: ETOP, PEST, SWOT Analysis and SWOT matrix, Porters s' Five Forces Analysis, Value Chain Analysis, International Product Life Cycle	12
III	Formulation of Strategy: Meaning, Analysis of alternative in Strategy Formulation. Diversification, Merger and Takeover, Turnover Strategy, Liquidation Strategy Why and how to Internationalize, Mode of entry into International Market-Joint Venture, Merger and Acquisition, Foreign Technology Agreements, Outsourcing Strategies	12
IV	Strategy Implementation and Evaluation: Meaning, Issues in global Strategy Implementation, Resource Allocation, Strategic Evaluation and Control, Techniques of Strategy Evaluation	8
	Total	40

Suggested Readings:

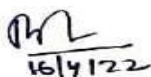
1. Sharma, R. A. Strategic Management in Indian Companies. Deep & Deep Publications, New Delhi
2. David, Fred R.; Strategic Management, Prentice-Hall
3. Grant, Robert M., Contemporary Strategy Analysis, 5th ed., 2005 Blackwell Publishers, Massachussets, U.S.A.
4. Hitt M.A. et. al., Strategic Management, South Western, 2009.
5. Ansoff, H. Igor, R.P. Declorch and R.I. Hayes, From Strategic Planning to Management, Wiley.
6. Kazmi Azhar, Strategic Management & Business Policy- Mc Graw Hill

Course Outcomes:

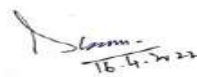
CO 1	Define strategy, Arrange the levels at which strategies operate and recognise the components of strategic intent.
CO 2	Identify the factors governing national global business environment analysis and demonstrate environment analysis.
CO 3	Appraise the various strategies formulation alternatives, examine their application and evaluate the strategic options for their effective implementation.
CO 4	Categorise the various modes of entry into international markets.


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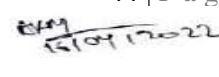
Dr. Priyabrata Panda
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CO 5	Develop and relate strategic tools and techniques to deal with issues relating to the global business environment.
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Program Outcomes Relevant to the Course:

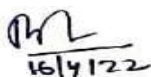
PO1	Knowledge Impartation on Business and Commerce: Acquire, define and recognize the knowledge on commerce, management, taxation, entrepreneurship, advance statistics and research methodology in addressing business and socio-economic issues.
PO2	Ability to Pursue Higher Education: Assemble commerce and management knowledge to enhance ability to pursue professional courses in higher education.
PO3	Problem Identification: Identify, interpret and summarise literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO6	Associating Business and Society: Synthesize a sense of civic responsibility, social concern and commitment, and moral accountability by providing a platform for socialization.
PO8	Building Leadership Competence: Preparing students for positions of leadership in business organizations at local, national and international levels.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

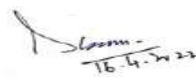
	PSO1	PSO2	PSO3	PSO4	PO1	PO2	PO3	PO6	PO8
CO1	3	1	3	2	3	3	3	2	3
CO2	3	2	3	3	1	3	3	3	2
CO3	3	2	3	3	3	3	2	2	3
CO4	2	3	2	2	1	2	1	2	1
CO5	2	3	3	3	2	2	2	2	1


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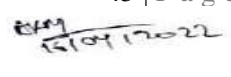
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ENTREPRENEURSHIP

Paper Code: 305

Pre-requisites: The students should have basic knowledge on nature of business, forms of business organization and the formalities required for setting up of an organization.

Learning Objective: To enhance entrepreneurship temper among students.

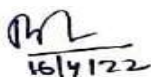
Units	Contents	No. of Classes
I	Introduction: Concept and Definitions, Entrepreneur v/s Intrapreneur; Role of entrepreneurship in economic development; Entrepreneurship process; Factors impacting emergence of entrepreneurship; Managerial versus entrepreneurial Decision Making; Entrepreneur v/s Investors; Entrepreneurial attributes and characteristics; Entrepreneurs versus inventors; Entrepreneurial Culture; Women Entrepreneurs; Social Entrepreneurship; Classification and Types of Entrepreneurs; EDP Programmes; Entrepreneurial Training; Traits/Qualities of an Entrepreneurs	8
II	Creating Entrepreneurial Venture: Generating Business idea- Sources of Innovation, methods of generating ideas, Creativity and Entrepreneurship; Challenges in managing innovation; Business planning process; Drawing business plan; Business plan failures; Entrepreneurial leadership- components of entrepreneurial leadership; Entrepreneurial Challenges; Legal issues – forming business entity, considerations and Criteria, requirements for formation of a Private/Public Limited Company, Intellectual Property Protection- Patents Trademarks and Copyrights – importance for startups, Legal Acts Governing Business in India.	12
III	Functional plan: Marketing plan for the new venture, environmental analysis, steps in preparing marketing plan, marketing mix, contingency planning; Organizational plan – designing organization structure and Systems; Financial plan – proforma income statements, proforma cash budget, funds Flow and Cash flow statements; Proforma balance sheet; Break Even Analysis; Ratio Analysis.	12
IV	Entrepreneurial Finance & Management: Debt or equity financing, Sources of Finance- Commercial banks, private placements, venture capital, financial institutions supporting entrepreneurs; Lease Financing; Funding opportunities for Startups in India; Enterprise Management: Managing growth and Sustenance- growth norms; Factors for growth; Time management, Negotiations;	8
	Total	40

Suggested Readings:

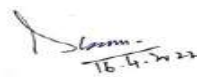
1. Kumar, Arya, Entrepreneurship: Creating and Leading an Entrepreneurial Organization, Pearson, India.
2. Hishrich., Peters, Entrepreneurship: Starting, Developing and Managing a New Enterprise, Irwin
3. Taneja, Entrepreneurship, Galgotia Publishers.
4. Barringer, Brace R., and R. Duane Ireland, Entrepreneurship, Pearson Prentice Hall, New Jersey (USA)
5. Hisrich, Robert D., Michael Peters and Dean Shepherd, Entrepreneurship, Tata McGraw Hill, New Delhi
6. Lall, Madhurima, and Shikha Sahai, Entrepreneurship, Excel Books, New Delhi
7. Charantimath, Poornima, Entrepreneurship Development and Small Business Enterprises, Pearson Education, New Delhi.


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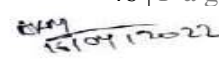
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Course Outcomes:

CO1	Define entrepreneurship and its concepts and identify the role of an entrepreneur.
CO2	Classify entrepreneurship and differentiate between entrepreneurship and entrepreneurship
CO3	Discover business ideas for a new venture and entrepreneurial challenges.
CO4	Examine the legal issues involved in formation of business enterprises.
CO5	Predict and appraise business plans including financial and marketing planning
CO6	Design and implement a plan for enterprise management and control

Program Outcomes Relevant to the Course:

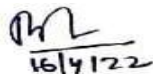
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PO3	Problem Identification: Identify, interpret and summarise literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO7	Enhancement of Professional Ethics: Interpret and employ ethics in professional life to develop a sense of responsibility and accountability.
PO8	Building Leadership Competence: Preparing students for positions of leadership in business organizations at local, national and international levels.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

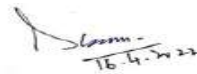
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CO2	3	3	2	2	2	1	3	3	2	3
CO3	3	3	2	3	2	3	2	2	3	3
CO4	2	3	1	3	3	3	3	3	2	3
CO5	1	2	2	3	3	1	3	2	3	3


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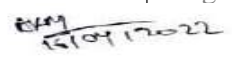
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FINANCIAL INSTITUTIONS AND MARKETS

Paper Code: IDSE-306A

Pre-requisites: Basic knowldges of financial market, institutions and services and its impact on economy are required.

Learning Objective: It can foster the interest of students to diagnosis the financial marketconcepts.

Units	Contents	No. of Classes
I	Introduction: Overview of Financial Markets and Institutions, Nature and Functions, Role of Financial Institutions in Economic Development, Financial system. An Overview of Indian Financial system, financial sector reforms in India including contemporary issues, Capital Adequacy Norm, NPA Norms.	10
II	Financial Markets: Money Market- Meaning, composition and functions, Capital Market- Primary and Secondary Market and their functions. Financial Institutions: IDBI, IFCI, SFCs, UTI, SIDBI Structure of Indian Banking System: RBI, NABARD, Rural Banking, E-banking	10
III	Financial services: Meaning and features, Kinds of Financial services- Assets/Fund Based services, Fee Based services; Financial Intermediaries rendering financial services, SEBI guidelines. Mutual Funds: Types, Risks associated with Mutual Funds, Growth of Mutual Funds in India.	10
IV	Financial Inclusions: Extent of Exclusions, Financial Inclusions initiative, SHG-Bank Linkage. Micro Finance: Emerging issues and regulations	10
	Total	40

Suggested Readings:

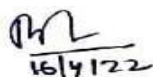
1. Gordon Natarajan: Financial Markets and Services, Himalaya Publishing House.
2. Sashi K. Gupta & Nisha Agrawal: Financial Services, Kalyani Publishers.
3. Kohn Meir: Financial Institutions and Markets, Oxford University Press.
4. Bhole L.M: Financial Markets and Institutions, Tata McGraw Hill, New Delhi.
5. Various Recent Publications of RBI & SEBI.

Course Outcomes:

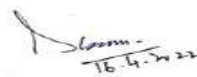
CO1	Define various concepts related to financial markets.
CO2	Interpret types of financial markets and the working of various financial institutions.
CO3	Applying the benefits of various financial services and mutual funds.
CO4	Analyzing the process of financial inclusion and microfinance.
CO5	Creating business and entrepreneurial activities by taking help from various financial institutions.


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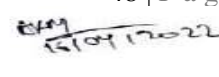
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Program Outcomes Relevant to the Course:

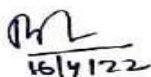
PO1	Knowledge Impartation on Business and Commerce: Acquire, define and recognize the knowledge on commerce, management, taxation, entrepreneurship, advance statistics and research methodology in addressing business and socio-economic issues.
PO2	Ability to Pursue Higher Education: Assemble commerce and management knowledge to enhance ability to pursue professional courses in higher education.
PO3	Problem Identification: Identify, interpret and summarize literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO5.	Application of Business Knowledge on Environment and Sustainability: Apply and execute business knowledge to develop products, services and methods to foster sustainable environmental practices
PO6	Associating Business and Society: Synthesize a sense of civic responsibility, social concern and commitment, and moral accountability by providing a platform for socialization.

Mapping Program outcomes, Program Specific Objectives with Course Outcomes:

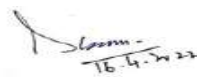
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CO1	3	1	2	2	3	3	3	3	3
CO2	1	3	1	3	3	3	3	3	3
CO3	1	3	2	2	3	2	3	3	2
CO4	2	2	3	2	3	2	3	3	2
CO5	1	1	3	2	3	1	3	3	3


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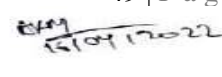
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**BUSINESS ORGANISATION & ENTERPRENURESHIP
DEVELOPMENT
Paper Code: IDSE-306B**

Prerequisites: Knowledge about the meaning and objectives of business. Interest and wages to do something innovative to become self-employed and to set up an independent business enterprise.

Learning Objective: Students can acquire knowledge about business startu p andmanagement.

Units	Contents	No. of Classes
I	BASIC CONCEPT OF BUSSINESS Nature & scope, Objectives, Classification of Business essential of successful businessman.	10
II	FORMS OF BUISNESS-I Sole Proprietorship –Meaning, definition Characteristics, Advantages& Limitation Partnership -Meaning, Definition, characteristics, Advantages & Imitation, Types of Partnership, Partnership Deed, Dissolution of Partnership, firms and Settlement of accounts.	10
III	FORMS OF BUISNESS –II Joint stock Company - Meaning, Definition, characteristics, Advantages&limitation, types of Company. Memorandum of association & Articles of association, Prospectus. Company vs Partnership, Public Company vs. PrivateCompany. Corporative Society - Meaning, Definition, characteristics, Advantages &limitation, Classification Cooperative Society vs Company.	10
IV	Fundamentals of Entrepreneurship: Meaning, Definition, characteristics, Determinants & importance of Entrepreneurship, Types of Entrepreneur vs Manager, Entrepreneurship vs Intrapranureship. Concept of MSME	10
	Total	40

Suggested Readings:

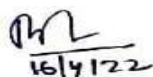
1. Lall, Madhurima, and Shikha Sahai, Entrepreneurship, Excel Books, New Delhi
2. Charantimath, Poornima, Entrepreneurship Development and Small Business Enterprises, Pearson Education, New Delhi
3. Natarajan., K and E. Gordon, Entrepreneurship Development, Himalya Publication, India.
4. Vasant, Desai., Small- Scale Industries and Entrepreneurship, Himalya Publication, India.
5. Kuratko, D.F., and T. V. Rao, Entrepreneurship: A South-Asian Perspective, Cengage Learning

Course Outcomes:

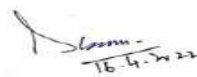
CO1	Define business & understand its nature, scope and objectives. Identify the qualities of successful entrepreneur
CO2	Infer the salient features of different form of business organization


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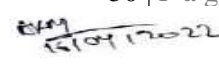
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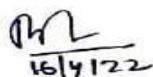
CO3	Classify various types of companies and distinguish between private and public limited companies.
CO4	Appraise the procedural & legal formalities required for setting up of a business enterprise.
CO5	Prepare a plan estimate & justify the financial requirements for the communication of the business.
CO6	Develop initiative for setting up of an individual business enterprise.

Program Outcomes Relevant to the Course:

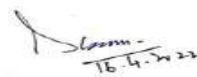
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PO3	Problem Identification: Identify, interpret and summarize literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO4	Use of Modern Tools and Resources: Generate, design and select appropriate modern tools and techniques in appraising scientific temper to comprehend different business models
PO5	Application of Business Knowledge on Environment and Sustainability: Apply and execute business knowledge to develop products, services and methods to foster sustainable environmental practices
PO6	Associating Business and Society: Synthesize a sense of civic responsibility, social concern and commitment, and moral accountability by providing a platform for socialization.
PO7	Enhancement of Professional Ethics: Interpret and employ ethics in professional life to develop a sense of responsibility and accountability.
PO8	Building Leadership Competence: Preparing students for positions of leadership in business organizations at local, national and international levels.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.


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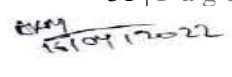
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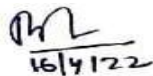
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Mapping of Program Outcomes (POs), Programme Specific Objectives with Course Outcomes (COs)

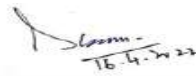
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CO4	2	3	1	2	3	2	2	3	2	2	3	2
CO5	1	2	2	2	2	2	2	2	3	2	2	2
CO6	2	3	1	3	2	3	1	3	2	3	2	3


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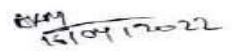
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FUNDAMENTALS OF ACCOUNTING
Paper Code: IDSE-306C

Pre-requisites: Basic knowledge on accounting concepts is required.

Learning Objective: Accounting knowledge can be very much helpful for other discipline students in their future professional life.

Units	Contents	No. of Classes
I	Basic Concept of Accounting: Meaning, Definition of Bookkeeping & Accounting. Branches of Accounting, system & Basis of accounting, Basic accounting terms, accounting principles. Accounting Equation.	12
II	Meaning & classification of accounts: Traditional Classification & Modern Application. Rules of Debit & credit: Golden Rules & Modern Rules of Basic Accounting Process: Journals, ledger & Trial Balance.	10
III	Subsidiary Books: Recording & posting: Cash Book, Purchase book, Purchasereturn book, Sales Book , Sales Return Book, Bill Receivable Book Bills Payables Book, Journal proper.	8
IV	Final Accounting with Adjustments, Budgeting: Preparation Manufacturing Account, Trading Account, Profit & loss Account & Balance sheet; Budget, Budgeting and Budgetary Control, Types of Budgets.	10
Total		40

Suggested Readings:

Shukla, M.C,T.S.Grewal and S.C.Gupta. Advanced Accounting. Vol-I.S.Chand& Co.,New Delhi

Maheswari,S.N&S.K. Maheswari. Financial Accounting. Vikas Publication House, New Delhi.

Tulsian,P.C.Financial Accounting, Pearson Education.

Jain , S.P and K.L Narang. Financial Accounting, Kalyani Publisher, New Delhi

Course Outcomes:

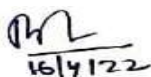
CO1	Define various concepts of accounting, accounting equation and accounting principles
CO2	Analysing and classifying accounts
CO3	Interpret subsidiary books and their usage.
CO4	Apply final accounts in business and other activities.
CO5	Preparing final accounts.

Program Outcomes Relevant to the Course:

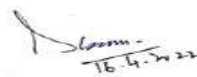
PO1	Knowledge Impartation on Business and Commerce: Acquire, define and recognize the knowledge on commerce, management, taxation, entrepreneurship, advance statistics and research methodology in addressing business and socio-economic issues.
PO2	Ability to Pursue Higher Education: Assemble commerce and management knowledge to enhance ability to pursue professional courses in higher education.


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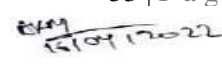
Dr. Priyabrata Panda
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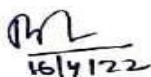
PO3	Problem Identification: Identify, interpret and summarize literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO5	Application of Business Knowledge on Environment and Sustainability: Apply and execute business knowledge to develop products, services and methods to foster sustainable environmental practices
PO6	Associating Business and Society: Synthesize a sense of civic responsibility, social concern and commitment, and moral accountability by providing a platform for socialization.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

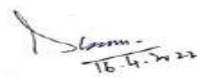
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CO2	3	3	3	2	3	3	3	3	3	3
CO3	1	1	3	2	3	2	2	1	2	1
CO4	2	2	3	1	3	2	3	1	2	3
CO5	1	3	3	3	3	1	3	3	3	2


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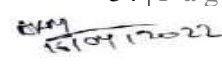
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SEMESTER: IV

CORPORATE GOVERNANCE, ETHICS AND CORPORATE SOCIAL RESPONSIBILITY OF BUSINESS

Paper Code: 401

Prerequisites: Basic knowledge about the concept, objectives and essentials of a successful business and forms of business organisation

Learning Objective: To familiarize students with the knowledge of ethics emerging trends in good governance practice and corporate social responsibilities in global & Indian context.

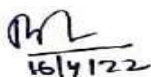
Units	Contents	No. of Classes
I	Business Ethics Concept of ethics; ethics & related connotations; business value & ethics, concept of business ethics; various approaches to business ethics; ethical theories; the concept of corporate ethics; benefits of adopting ethics in business; ethics programme; code of ethics; ethics committee.	10
II	Conceptual Framework of Corporate Governance Evolution of corporate governance; Development in India, Regulatory Framework of Corporate Governance in India. SEBI Guidelines & Clause.49; Reforms in Companies Act; Secretarial Audit; NCL; Insider Trading, Rating Agencies; Green Governance/E-Governance; Shareholders Framework of Corporate Governance - an international perspective	10
III	Major Corporate Failures, Whistle Blowing and Corporate Governance Major corporate failures in India & abroad, common governance problems noticed in various corporate failures; policy actions including major codes & standards, whistle blowing –Types of whistle blowers Whistler –Blower Policy, The Whistle Blower Legislations across countries; Developments in India.	10
IV	Corporate Social Responsibilities (CSR) Meaning of CSR, Corporate Philanthropy, Corporate Sustainability, corporate social Sustainability Reporting; CSR & business ethics; legal framework on CSR, CSR & Corporate Governance; Major Codes on CSR, initiatives in India	10
	Total	40

Suggested Readings:

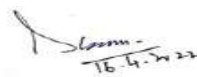
1. Mallin, Christine A., Corporate Governance (Indian Edition), Oxford University Press, New Delhi.
2. Blowfield, Michael, and Alan Murray, Corporate Responsibility, Oxford University Press.
3. Francesco Perrini, Stefano, and Antonio Tencati, Developing Corporate Social Responsibility-A European Perspective, Edward Elgar.
4. Sharma, J.P., Corporate Governance, Business Ethics & CSR, Ane Books Pvt Ltd, New Delhi.
5. Sharma, J.P., Corporate Governance and Social Responsibility of Business, Ane Books Pvt. Ltd, New Delhi.


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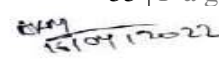
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Course Outcomes

CO 1	Define business ethics, values and codes of ethics and recognise the importance of ethical business practices.
CO 2	Identify the various approaches to corporate ethics.
CO 3	Interpret the regulatory and shareholders' framework of Corporate Governance.
CO 4	Analyse the causes of major corporate failures in India and abroad and assess the Whistle Blower Policy across the countries.
CO 5	Evaluate the existing CSR codes and develop new CSR initiatives for Indian industries.

Program Outcomes Relevant to the Course:

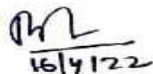
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PO3	Problem Identification: Identify, interpret and summarise literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO7	Enhancement of Professional Ethics: Interpret and employ ethics in professional life to develop a sense of responsibility and accountability.
PO8	Building Leadership Competence: Preparing students for positions of leadership in business organizations at local, national and international levels.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

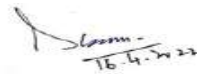
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CO2	3	3	2	2	1	1	3	3	1	1
CO3	3	3	2	3	2	3	2	2	3	1
CO4	2	3	1	3	1	3	3	3	1	1
CO5	1	2	2	3	1	1	3	2	1	3


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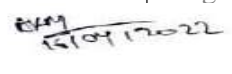
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CORPORATE TAX STRUCTURE & PLANNING

Paper Code: 402

Prerequisites: Knowledge of basic tax concepts like person, assesses, five sources of income are required.

Learning Objective: To familiarize the student with latest provisions of the Indian Corporate tax laws and related judicial pronouncements having implications for corporate tax planning.

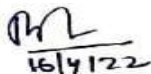
Units	Contents	No. of Classes
I	Introduction to Tax planning and Management: Meaning, Nature and Scope of Tax Planning and Management, Tax evasion and Tax avoidance, Justification of Corporate tax planning and Management. Assessment of Companies: Residential status of corporate assesses and incidence of tax, computation of corporate tax: carry forward and set-off of losses for certain companies under section-79 of Income Tax Act-1961, Deductions available to corporate assesses, computation of taxable income and tax liability. Minimum alternate tax,	10
II	Tax Planning and Specific Management Decisions: Tax Concessions and Incentives available on setting up a new business, Location of Business & Nature of Business. Tax Planning in respect of amalgamation, demerger, slump sale, conversion of a firm into company, conversion of a sole-proprietorship into a company & conversion of a company into a limited liability partnership.	10
III	Tax Planning and Financial Management Decisions: Tax Planning in respect of capital structure decisions, Dividend policy decision, Issue of bonus shares, Investment and Capital gains, owning or leasing of an asset, Acquisition of an asset by Installment purchase or hire purchase system, purchase of an asset out of own fund or out of borrowed funds, manufacturing or buying decisions, Repairing, Replacing, renewing or renovating an asset, sale of assets used for scientific research study, down or continuing operations, private equity.	10
IV	Tax Planning in GST: Composite Levy Scheme: Features, Conditions and Restriction, GST Frauds; Reasons and Remedies, Reducing GST Liability through Effective Procurement. Tax planning relating to Input Tax Credit and its reversal Under Rule 37, Rule 42 and Rule 43, Antiprofitereing Measures, Advance Ruling and E-way Bill under GST.	10
Total		40

Suggested Readings:


1. Srinivas E.A., Corporate Tax planning, Tata McGraw Hill
2. Singhanian, Vinod K., Taxman's Direct Taxes Laws and practice
3. Ahuja Girish and Gupta ravi, Bharat's professional Approach to Direct Taxes, Law & practice, Bharat Law House Pvt. Ltd.
4. Lal B.B. & N. Vasisth, Direct Taxes: Income Tax, Wealth Tax and Tax planning.
5. Bhagbati Prasad, Direct Taxes Law & Practice, Wishwa Prakashan.
6. Lakhota R.N., Corporate Tax Planning, Vision Publication, Delhi.
7. Meherotra H.C., Income Tax Law and Accounts, Sahitya Bhawan, Agra


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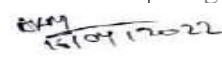
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Representative, BoS

Course Outcomes:

CO1	Define corporate tax planning and identify the rationale behind corporate tax planning by recognising different tax planning principles.
CO2	Classify different aspects of tax planning and generalise its dimensions by reading charge to income tax, minimum alternative tax and deductions.
CO3	Apply tax planning avenues in mergers, slump sale and business conversions by illustrating practical problems.
CO4	Analyse and appraise tax planning schemes for capital gains discriminate leasing and hire purchase in regard to tax benefits.
CO5	Evaluate the quantitative applicability of deductions, tax saving schemes and develop a tax planning model for corporate assesses and replicate tax planning benefits in GST.
CO6	Formulate tax planning models for the benefit of society and develop a sense socio-ethical responsibility.

Program Outcomes Relevant to the Course:

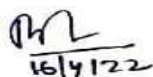
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Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

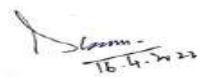
	PSO1	PSO2	PSO3	PSO4	PO1	PO2	PO3	PO7	PO10
CO1	3	2	2	1	3	2	3	2	3
CO2	2	2	1	3	3	1	3	2	3
CO3	2	3	1	2	2	2	2	3	2
CO4	2	2	3	2	2	1	3	2	3
CO5	2	2	3	3	1	2	2	3	3
CO6	2	2	3	3	2	1	3	3	3


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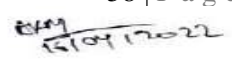
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HUMAN RESOURCE MANAGEMENT

Paper Code: 403

Pre-requisites: Basic knowledge about human resource, management and recruitment.

Learning Objective: The objective of the course is to familiarize the students about the different aspects of managing people in the organizations from the stage of acquisition to development and retention.

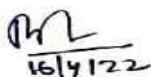
Units	Contents	No. of Classes
I	<p>Introduction: - Evolution of Human Resource management in India. Conceptual framework, meaning, definition.</p> <p>Nature and Scope of Human Resource Management: - Scope, Role, functions and Importance</p> <p>Competencies of HR Manager: - changing role of HRM- Workforce diversity, Technological change, Restructuring and rightsizing, Empowerment; TQM, Managing ethical issues.</p>	10
II	<p>Human Resource Planning: - meaning, definition and Importance of human Resource Planning; factors affecting Human Resource Planning, Human Resource Planning process, Requisites for successful human Resource Planning, Barriers to Human Resource Planning.</p> <p>Job Analysis and Job Design: - Assessing Human Resource requirements; Human resource forecasting; Job analysis technique; Job evaluation technique, job description and specifications; Job characteristic approach to job design.</p>	10
III	<p>Recruitment, Selection, Training, and Development: - Factors affecting recruitment; Sources of recruitment, method and test of selection; Interviewing; Placement and Induction; Job Changes- Transfers, Promotions, and Separations; Emerging trends in Recruitment, Selection, and development.</p>	10
IV	<p>Compensation Management, Performance Appraisal, and Audit: - Compensation Management- Wage versus salary, determination of compensation, incentives schemes, fringe benefits and labour welfare</p> <p>Performance Appraisal- Concept, Objectives and Methods; Traditional and Modern Method, Human Resource Audit.</p>	10
Total		40

Suggested Readings:

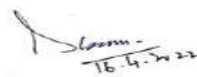
1. D'Ceazo, David A., Stephen P. Robbins, and Susan L. Verhulst, Human Resource Management, John Wiley and Sons, New Delhi.
2. Gomez-Mejia, Luis R., D. B. Balkin, and R. L. Cardy, Managing Human Resources, Prentice Hall, New Jersey.
3. Ian, Beardwell, and Len Holden, Human Resource Management, Prentice Hall.
4. Dessler, Garry, Human Resource Management, Prentice Hall of India.
5. Saiyadain, Mirza S., Human Resource Management, Tata McGraw-Hill Pub. Co. Ltd.,


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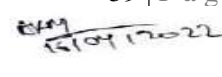
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New Delhi.

6. Noe, Raymond A., John R. Hollenbeck, Barry Gerhart and Patrick M. Wright, Human Resource Management, Tata McGraw Hill.
7. Chhabra T. N., Human Resource Management, Dhanpat Rai and Co. Pvt. Ltd. New Delhi.
8. Aswathappa, K., Human Resource Management-Text and Cases, Tata McGraw Hill

Course Outcomes

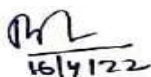
CO 1	Define concepts like Human Resource Management, recruitment, selection etc. and recognise the various roles of the HR manager.
CO 2	Explain the role of HRM in Indian context and discuss its various function like recruitment process, human resource planning.
CO 3	Apply the knowledge in implementing various HR works like job design, recruitment etc.
CO 4	Analyse and compare the performance of employees and effectiveness in jobs assigned.
CO 5	Evaluate and assess the performance of various employees as well as HR planning.
CO 6	Design jobs and develop various techniques to manage various aspects of employees like recruitment and compensation.

Program Outcomes Relevant to the Course:

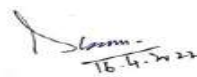
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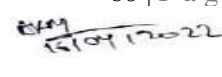
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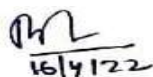
PO9	Construction of Life-Long Learning Attitude: Recognize and create an attitude to assume productive roles and inculcate the habit of life-long learning.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

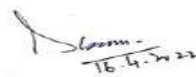
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CO4	2	3	1	2	1	2	3	3	3	2	2
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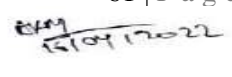
Dr. Priyabrata Panda
Head, School of
Commerce & Member,
BoS


16-4-22

Professor Shyamara Charan
Acharya, Professor of
Commerce, Alumnus
Member, BoS


16/4/22

Mr. Subash Chandra
Jhankar, Assistant
Professor of
Commerce, Member,
BoS


15/04/2022

Mr. Arjuna Kumar Maharana,
Ph. D. Scholar, Students
Representative, BoS

BUSINESS ENVIRONMENT

Paper Code: 404

Prerequisites: Knowledge about Business and its environment which influence the Business.

Learning Objective: The course aims to develop the understanding level of students in changing dimensions of Business Environment.

Units	Contents	No. of Classes
I	Introduction: Concept, component and significance of Business Environment. Internal and External Business Environment, Changing dimensions of Business Environment Economic Environment of India- Significance and elements of Economic Environment, Economic Policies and Economic Planning, Fiscal Policy and Monetary Policy	12
II	Political Environment and Legal Environment in India: Meaning and Elements, Changing scenario of Political and Legal Environment and impact on Business, Competition Policy, FEMA, Consumer Protection	10
III	Socio-Cultural Environment: Meaning and Elements, Social Systems, Social Groups, Values and attitudes, Social Responsibility of Business	8
IV	International Business Environment: Meaning, Liberalisation-Privatisation-Globalisation Policy, Multinationals, Transnational Business, International Financial Institutions –Bretton Wood Twins, WTO	10
	Total	40

Suggested Readings:

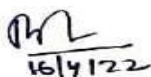
1. Shukla, M.B.: Business Environment, Taxmann, New Delhi
2. Sinha, V.C., Business Environment, Sahitya Bhawan, Agra
3. Cherunilam, Fransis, Business Environment, Himalya Publishing House, Mumbai
4. Ashwathappa, K.: Essentials of Business Environment, Himalaya Publishing House, Mumbai
5. Mishra and Puri, Business Environment, Himalaya Publishing House, Mumbai
6. Jain & Verma, Business Environment, Sahitya Bhawan, Agra

Course Outcomes:

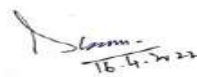
CO1	Present a business environmental analysis and recommendations to reduce the risk of the identified issues. Conduct a business analysis of the local, national & global environment.
CO2	Explain the structure, process and function of business management.
CO3	Describe what business operations encompass. Explore the role of marketing in business.


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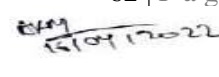
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CO4	Examine how different factors and trends in the external environment are likely to impact upon a proposed business venture.
CO5	Employ business models and tools to evaluate changes in an organization's business environment.

Program Outcomes Relevant to the Course:

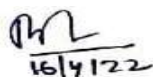
PO1	Knowledge Impartation on Business and Commerce: Acquire, define and recognize the knowledge on commerce, management, taxation, entrepreneurship, advance statistics and research methodology in addressing business and socio-economic issues.
PO2	Ability to Pursue Higher Education: Assemble commerce and management knowledge to enhance ability to pursue professional courses in higher education.
PO3	Problem Identification: Identify, interpret and summarise literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO8	Building Leadership Competence: Preparing students for positions of leadership in business organisations at local, national and international levels.
PO9	Construction of Life-Long Learning Attitude: Recognize and create an attitude to assume productive roles and inculcate the habit of life-long learning.
PO10	Innovation and Creativity: Innovate and invent and design new ideas, products, services and methodologies with application of fundamental knowledge.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

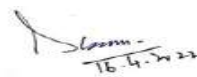
	PSO1	PSO2	PSO3	PSO4	PO1	PO2	PO3	PO8	PO9	PO10
CO1	3	2	2	1	3	2	3	2	3	3
CO2	2	2	1	3	2	1	3	2	3	2
CO3	2	3	1	2	2	2	2	3	2	3
CO4	2	2	3	2	3	3	3	2	3	2
CO5	2	2	3	3	3	2	2	3	3	1


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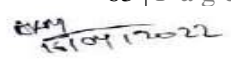
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PROJET WORK REPORT AND VIVA-VOCE.
Paper Code: 405

Course Outcomes:

CO1	Defining various concepts related to research and Identifying research problem.
CO2	Interpreting existing literature and finding research gap.
CO3	Framing suitable methodology as per the objective.
CO4	Developing hypotheses and testing them using appropriate tools.
CO5	Analysing the collected data and interpreting the results.
CO6	Preparing research report and providing direction for future research.

Program Outcomes Relevant to the Course:

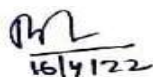
PO1	Knowledge Impartation on Business and Commerce: Acquire, define and recognize the knowledge on commerce, management, taxation, entrepreneurship, advance statistics and research methodology in addressing business and socio-economic issues.
PO2	Ability to Pursue Higher Education: Assemble commerce and management knowledge to enhance ability to pursue professional courses in higher education.
PO3	Problem Identification: Identify, interpret and summarise literatures to analyse several business problems and reaching robust inferences by using professional knowledge.
PO7	Enhancement of Professional Ethics: Interpret and employ ethics in professional life to develop a sense of responsibility and accountability.

Mapping Program Outcomes, Program Specific Objectives with Course Outcomes

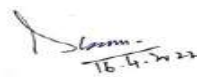
	PSO1	PSO2	PSO3	PSO4	PSO3	PO1	PO2	PO3	PO7
CO1	3	3	2	1	2	3	2	3	2
CO2	2	3	2	3	1	3	1	3	2
CO3	2	2	3	2	1	2	2	2	3
CO4	2	3	2	2	3	2	1	3	2
CO5	2	3	2	3	3	1	2	2	3
CO6	2	3	2	3	3	2	1	3	3


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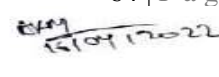
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GANGADHAR MEHER UNIVERSITY
AMRUTA VIHAR, SAMBALPUR, ODISHA



SCHOOL OF COMPUTER SCIENCE

Syllabus for
M.Sc. in Computer Science

(2-Year Programme)

Course Effective from Academic Year 2022-2023

SCHOOL OF COMPUTER SCIENCE

Vision

To create globally competent undergraduates and postgraduates in Computer Science by imparting training in emerging technologies and collaborative research through a conducive and disciplined academic environment, and orient them towards serving the society.

Mission Statements

- M1:** To provide high quality professional training at the undergraduate and postgraduate level with an emphasis on basic principles of computer science.
- M2:** To empower the students with the required skills to solve the complex technological problems of modern society and also provide them with a framework for promoting collaborative and multidisciplinary research.
- M3:** To strengthen the Industry-Academia interface by interacting with the industry, educational & research organizations and alumni that will help the students to emerge as leaders in academics or in entrepreneurship.
- M4:** To impart moral and ethical values, and interpersonal skills to the students for betterment of the society.

PROGRAM OUTCOMES(POs):

- PO1. Knowledge and Understanding:** Develop an ability to understand the theoretical foundations of computer science for designing efficient methodologies along with the knowledge of limitations of computing.
- PO2. General, Technical and Professional Skills:** An ability to function effectively as an individual with diversified skills or as a part of a multi-disciplinary team setting to accomplish defined goals.
- PO3. Application of Knowledge and Skills:** Developing problem analysis skills and knowledge and applying the same in real life situation.
- PO4. Research Skills:** Explore research based knowledge and carry out academic investigations on the cutting edge technologies in allied subjects of Computer Science.
- PO5. General Learning Outcomes:** Create, select and apply advanced techniques and tools including modelling complex activities related to Computer Science.
- PO6. Constitutional, Humanistic, Ethical and Moral Values:** Design, develop and evaluate new system components or processes of computer science that meet the desired needs with appropriate considerations of industry, society, public health, safety, culture, environment and sustainable development sticking on to the ethics and values.
- PO7: Employability Job Skills and Entrepreneur Skills:** Prepare the students to take up a career as versatile contributors in industry, academia, research and development or entrepreneurship employing their expertise to advance personal growth while making meaningful contributions to societal progress

PROGRAM SPECIFIC OUTCOMES(PSOs):

- PSO1.** To shield students from the rapid obsolescence of computer technology, the program focuses on imparting foundational knowledge, fostering critical thinking skills, and cultivating technical expertise.
- PSO2.** Apply principles of computer science theory and concepts of software development to create effective computing-based solutions.
- PSO3.** Empowering the students to function as adept computer science professionals across various domains, including industry, advanced studies, research and development, academia, or entrepreneurship.

Post Graduate Programme Structure

Year	Semesters	
First Year	Semester I	Semester II
Second Year	Semester III	Semester IV

Part-I: Semester-I

Papers		Duration (Hrs)	Credit
Paper No	Title		
CSC101	Advanced Operating Systems	4	4
CSC102	Computer Architecture	4	4
CSC103	Data Communication and Networks	4	4
CSC104	Advanced Data Structures	4	4
CSC105	Lab I (Data Structure and Operating System)	6	4
Total			20

Part-I: Semester-II

Papers		Duration (Hrs)	Credit
Paper No	Title		
CSC201	Object Oriented Programming	4	4
CSC202	Mobile Computing	4	4
CSC203	Discrete Mathematical Structures	4	4
CSC204	Theory of Computation	4	4
CSC205	Lab II (OOP using Java and TOC)	6	4
	DSE-I Papers		
CSC206 A	Data Warehousing and Mining	4	4
CSC206 B	Wireless Sensor Networks	4	4
CSC206 C	Internet of Things	4	4
CSC206D	Microprocessor and Microcontroller	4	4
Total			24

Part-II: Semester-III

Papers		Duration (Hrs)	Credit
Paper No	Title		
CSC301	Compiler Construction	4	4
CSC302	Database Management Systems	4	4
CSC303	Design and Analysis of Algorithms	4	4
	DSE-II Papers		
CSC304A	Data Science	4	4
CSC304B	Web Technology	4	4
CSC304C	Information Security	4	4
CSC304D	Digital Image Processing	4	4
CSC305	Lab III (Algorithms and DBMS)	6	4
IDSE Papers			
CSC306A	Network and Internet Technologies	4	4
CSC306B	Fundamentals of Computer	4	4
CSC306C	Introduction to Programming Using Python	4	4
CSC306D	Artificial Intelligence	4	4
Total			24

Part-II: Semester-IV

Papers		Duration(Hrs)	Credit
Paper No	Title		
CSC401	Machine Learning	4	4
CSC402	Software Engineering and OOAD	4	4
CSC403	Cloud Computing	4	4
CSC404	Project Work Report and VIVA VOCE		8
	MOOCs-1		6
	MOOCs-2		
Total			20+6*
Grand Total			88+6*

*Non-Divisional Credits

SEMESTER WISE CREDIT DISTRIBUTION					
Semester	I	II	III	IV	TOTAL
Total Credit	20	24	24	20+6*	88+6*

NB:

- The students are encouraged to take two extra MOOCs courses to earn a maximum of 6 Credits.
- Each theory paper consists of 100 marks(Mid Sem 20,End Sem 80).
- Lab Exam will be of 100 marks.

Semester-I

Course Code	CSC101
Course Name	ADVANCED OPERATING SYSTEMS
Category	Programme Core Course
Prerequisite	Computer Programming and Data Structures Computer Organization and Architecture

Paper-CSC101	
Advanced Operating Systems	
UNIT-I:	10 hrs
<p>Operating System Overview: -Introduction, The Need of Operating Systems, Evolution of Operating Systems, Types of Operating Systems, Simple Batch, Multiprogrammed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls, Virtual Machines, System Design and Implementation.</p> <p>Process Management – Process concepts, Life cycle, PCB, Schedulers, Process Scheduling, Threads, Scheduling Levels, CPU Scheduling: Scheduling-Criteria, Algorithms, Algorithm Evaluation.</p>	
UNIT-II:	10hrs
<p>Concurrency:-Process synchronization, The Critical- Section Problem, Peterson’s Solution, synchronization Hardware, Semaphores, Classic problems of synchronization, Monitors.</p> <p>Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock detection, deadlock prevention, deadlock avoidance, Recovery from deadlock.</p>	
UNIT-III:	10hrs
<p>Memory Management: Main Memory, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Table.</p> <p>Virtual Memory: Demand Paging, Page Replacement, Allocation of Frames, Thrashing, Memory-Mapped Files</p>	
UNIT-IV:	10hrs
<p>Mass-Storage Structure: Overview, Disk Structure, Disk scheduling, disk management, Swap-space management, RAID structure.</p> <p>File Systems: File Concept, Access Methods, Directory and Disk Structure, File-System Mounting, Protection. File- System Structure and Implementation, Directory Implementation, Allocation Methods, Free-Space Management.</p>	
Text Book:	
1. A. Silberchatz, P. B. Galvin, G. Gagne, Operating System Concepts, 8th Edition, Wiley India,2010.	
Reference Books:	

1. Charles Crowley, Operating Systems : A Design-Oriented Approach, 1st Edition, McGraw-Hill, 1996.
2. A. S. Tanenbaum and H. Bos, Modern Operating Systems, 4th Edition, Pearson, 2015.
3. W. Stallings, Operating Systems – Internals And Design Principles, 9th Edition, Prentice Hall, 2017.
4. D. M. Dhandhere, Operating Systems-A Concept Based Approach, 2nd Edition, McGraw-Hill, 2006

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Explain the different types of Operating systems.
CO2	Describe the lifecycle of a process and its attributes with its scheduling algorithms.
CO3	Analyze the concept of Deadlock.
CO4	Apply segmentation and paging techniques.
CO5	Explain the structure and organization of the file systems and I/O systems

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3		1		1			1	1	1
CO2	3		3		3			3	3	3
CO3	3		3		3			3	3	3
CO4	3		3		3			3	3	3
CO5	3		3		3			3	3	3

Course Code	CSC102
Course Name	COMPUTER ARCHITECTURE
Category	Programme Core Course
Prerequisite	Digital Logic

Paper-CSC102	
Computer Architecture	
UNIT :I	8hrs
<p>Register Transfer and Micro-operations : Register transfer language, Register transfer, Bus and Memory transfer, Arithmetic, Logical and Shift micro-operations, Arithmetic Logic Shift unit.</p> <p>Basic Computer Organisation and Design: Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle & Register Reference Instructions, Memory Reference Instructions, Input-Output and Interrupt , Design of Basic Computer.</p>	
UNIT:II	8hrs
<p>Basic Processing Unit: Some fundamental concepts, Register Transfers, Performing an Arithmetic or Logic operation, Fetching a word from memory, storing a word in memory, Execution of a complete instruction, Branch instructions, multiple Bus Organization.</p> <p>Micro-Programmed Control: Control memory, Addressing sequencing: Conditional branching, Mapping of Instruction, Subroutine; Micro Program example: Computer configuration, Micro-instruction format, Symbolic Micro-instruction, the fetch routine, Symbolic Micro-program, Binary micro-instruction; design of control unit: Micro program sequencer.</p>	
UNIT:III	12hrs
<p>Memory Organization: Memory Hierarchy, Associative Memory: Hardware organization, Match Logic, Read operation., write operation, cache memory: Associative mapping, Direct mapping, Set Associative mapping, write into cache memory, cache initialization, virtual memory: Address space and memory Space, Address mapping using pages, Associative Memory Page table, Page Replacement.</p>	
UNIT: IV	12hrs
<p>Pipeline and Vector Processing : Parallel Processing, Pipelining: General Considerations; Arithmetic Pipeline, Instruction Pipeline: four segment Instruction Pipeline Example, Data Dependency, Handling of Branch Instructions; Vector Processing : Array Processors.</p> <p>Multiprocessors: Characteristics of Multiprocessors, Interconnection structures, Inter-processor arbitration. Inter-processor communication and synchronization , cache coherence.</p>	
Text Book:	
1. William Stalling, Computer Organization and Architecture, 10th Edition , PHI.	

Reference Books:

1. Rajiv Chopra ,Computer Architecture and Organization,1st Edition,S.Chand,2014.
2. Carl Hamacher, Zvonkoranesic, SafwatZaky,Computer Organization,5th Edition,McGrw-Hill Education India

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Explain the register transfer inside the computer along with the associate micro operations and reference instructions .
CO2	Explain the processing unit with the micro-programmed control working.
CO3	Describe the memory organization with the virtual memory concept along with the mapping and replacement technique.
CO4	State the pipeline concept with the relative example and with working of vector processor.
CO5	Solve the complexity of the system related to mapping and replacement.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	3	2	1	3		2	2	1	3
CO2	3	3	3	1	2				2	
CO3	1	3	2	2	2	1		2		3
CO4	2	3	2	2	2		3	1	1	1
CO5	2	3	3	2	1	2			3	

Course Code	CSC103
Course Name	DATA COMMUNICATION AND NETWORKS
Category	Programme Core Course
Prerequisite	Basics of Computers

Paper-CSC103	
Data Communication and Networks	
UNIT :I	12hrs
<p>Overview of Data Communication and Networking. Physical Layer: Analog and Digital, Analog Signals, Digital signals, Analog versus Digital, Data Rate Limits, Transmission Impairment, More about signals, Digital Transmission: Line coding, Block coding, Sampling, Transmission mode, Analog Transmission : Modulation of Digital Data; Telephone modems, modulation of Analog signals, Multiplexing : FDM, WDM, TDM, Transmission media: Guided media, unguided media (wireless), Circuit switching and Telephone Network: Circuit switching, Telephone network.</p>	
UNIT:II	14hrs
<p>Data Link Layer: Error Detection and Correction: Types of errors, Detection, Error correction, Data Link control and Protocols: Flow and Error control, Stop-and-Wait ARQ, Go-Back-N ARQ, Selective Repeat ARQ, HDLC, Point-to-Point Protocol, Multiple Access, Random Access, Controlled Access, Channelization. Local area Network: Ethernet, Traditional Ethernet, Fast Ethernet, Gigabit Ethernet, Wireless LANs : IEEE 802.11, Bluetooth virtual circuits: Frame Relay and ATM.</p>	
UNIT:III	10hrs
<p>Network Layer: Host- to –Host Delivery: Internetworking, Addressing, Routing, Network Layer Protocols: ARP, RARP, NAT, BOOTP, DHCP, IPV4, IPV6, ICMP, ICMPV6 and Unicast Routing protocols, Transport Layer: Process to Process Delivery: UDP, TCP, congestion control and Quality of Service.</p>	
UNIT: IV	04hrs
<p>Application Layer: Client Server Model, Peer to Peer network, Domain Network System (DNS), Electronic Mail (SMTP), and file transfer (FTP), HTTP and WWW.</p>	
Text Books:	
<ol style="list-style-type: none"> 1. B.A. Forouzan, Data Communication and Networking, 6th Edition, Tata McGraw Hill ,2007. 2. Peter Lars Dordal, An Introduction to Computer Networks, 2nd Edition , Loyola University of Chicago 	
Reference Books:	
<ol style="list-style-type: none"> 1.A.S.Tenenbaum, Computer Network, 5thEdition, PHI. 2.James F. Kurose &Keith W.Ross, Computer Networking: A Top-Down Approach Featuring the Internet, 8th Edition, Pearson Education India 	

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Understand the properties of digital and analog signals, functionality of different layers in OSI and TCP/IP network models and the factors which impact performance of data communication systems
CO2	Understand the analog and digital transmission, properties of communication medias, and the concept of multiplexing of data on common communication channel.
CO3	Understand different switching circuits, link layer addressing and exemplify the different coding methods and error detection and correction methods for digital data.
CO4	Identify and describe the system functions in the correct protocol layer and further describe how the layers interact
CO5	Basic understanding of working of different protocols in various layers.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS1	PS2	PS3
CO1	2	2	2	1	3	1	2	2	1	1
CO2	2	2	2	1	3	1	2	2	2	2
CO3	3	3	3	1	3	1	3	2	3	2
CO4	3	2	1	1	3	1	2	2	2	1
CO5	3	2	3	2	2	1	2	2	2	2

Course Code	CSC104
Course Name	ADVANCED DATA STRUCTURES
Category	Programme Core Course
Prerequisite	Elementary Mathematics and C Programming Language

Paper-CSC104	
Advanced Data Structures	
UNIT-I:	12hrs
Introduction to Data Structures, Arrays and Strings, Introduction to Algorithms, Algorithm development, Complexity analysis, Recursion. Linear Data Structures: Stacks: Operations and Applications, Queues: Operations and Applications, Circular Queues: Operations and Applications. Linked Lists: Operation – Creations, insertion, Deletion, Circular Lists, and Doubly Linked List.	
UNIT-II:	8hrs
Sorting: Insertion Sort, Merge Sort, Quick Sort, Radix Sort, and Heap Sort. Searching: Binary Search, Selection. Dictionaries: skip-lists, hashing, analysis of collision resolution techniques.	
UNIT-III:	10hrs
Search Trees- Binary search Trees, Threaded binary tree, AVL Trees, B Trees, Red Black trees. Searching, insertion, deletion operations of trees. Tries and pattern matching: Priority queues and binary heaps	
UNIT-IV:	10hrs
Introduction to Graphs: Breadth first search and connected components. Depth first search in directed and undirected graphs and strongly connected components. Spanning trees: Prim's and Kruskal's algorithm, union-find data structure. Dijkstra's algorithm for shortest path. Shortest path tree. Shortest and longest paths in directed acyclic graphs. Automatic List management, dynamic storage management.	
Text Book:	
1. Y. Langsam, M. Augenstein, A. M. Tenenbaum, Data Structure using C and C++, Prentice Hall, 1996.	
Reference Books:	
1. E. Horowitz, D. Mehta, S. Sahani. Fundamentals of Data Structures in C++, Universities Press. 2007. 2. M. A. Weiss, Data Structures and Algorithm Analysis in C++, Pearson Education 2006. 3. M. T. Goodrich, R. Tamassia, D. Mount, Data Structures and Algorithms in C++, Wiley India Pvt. Ltd, 2004	

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Analyse performance of algorithms and apply basic data structures stack and queue to solve real world problems.
CO2	Employ linked list to implement different ADTs and apply it in solving some problems.
CO3	Examine various sorting algorithms and outline different hashing techniques.
CO4	Describe hierarchical data structures and use it in real life applications.
CO5	Explain graph data structures and apply graph related algorithms in real world scenarios.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3		3		1		3	3	3	3
CO2	3		3		2		3	3	3	3
CO3	3		3		1		3	3	3	3
CO4	3		3		3		3	3	3	3
CO5	3		3		3		3	3	3	3

DATA STRUCTURE PROGRAMS:

1. Implementation of sparse matrix
2. Implementation of linear search, binary search, bubble sort, insertion sort, selection sort
3. Implementation of single linked list and its operations
4. Design a doubly linked list to hold strings and use it for organizing a sequence of cities
5. Repeat Q4 using doubly circular linked list
6. Create a polynomial using single linked list and perform addition operation of two polynomials
7. Implement a stack,use stack for conversion of infix to postfix and evaluation of postfix expression.
8. Implementation of circular queue (using array) with menu options like insert, delete,display and exit.
9. Implementation of a priority queue and use it to organize studentrecords prioritized by marks.
10. Recursive implementation of quick sort and merge sort. Generate 10 random integers in a given range and apply sorting mechanisms.
11. Implement linear search and binary search to find out whether a given element is present or not in the array. Compare two search mechanisms based on number of comparisons required for a successful as well as unsuccessful search.
12. Implementation of a binary search tree with menu options: Construct a tree, insertanode, delete anode, traverse and display preorder, in order and post order sequenceof its nodes.
13. Implementation of Heap Sort.
14. Implementation of digraphs using adjacency matrix and find the transitive closureusingWarshall's algorithm.
15. Implementation of a weighted graph and find minimal cost spanning tree usingPrim's algorithm.
16. Implementation of a weighted graph and find minimal cost spanning tree using Kruskal's algorithm.
17. Implement Dijkstra's algorithm to find single source shortest path.
18. Implement Floyd Warshall's algorithm to find all pair shortest path.
19. Implement Topological sorting.
20. Implementation of a small Real World Application illustrating data structure usage.

OPERATING SYSTEM PROGRAMS:

1. Implementation of FCFS Scheduling.
2. Implementation of Round Robin Scheduling.
3. Implementation of Shortest Job First Scheduling (Non Pre-emptive).
4. Implementation of Shortest Job First Scheduling (Pre-emptive).
5. Implementation of Priority Based Scheduling.
6. Implementation of Deadlock detection
7. Implementation of simple Thread and Multi-Threading.
8. Implementation of Paging techniques of Memory Management(FIFO,LRU,OPTIMAL).
9. Implementation of Semaphore.
10. Implementation of Peterson's Solution in Process Synchronization.

Semester-II

Course Code	CSC201
Course Name	OBJECT ORIENTED PROGRAMMING
Category	Programme Core Course
Prerequisite	Basic procedural programming Language (like C-Programming)

Paper-CSC201	
Object Oriented Programming	
UNIT-I:	8hrs
Java Evolution and Environment: Java evolution, overview of java language, java history, features of java, how java differs from C and C++, java and World Wide Web, web browser. Java Environment: Java Development Kit(JDK), Application Programming Interface(API), java programming structure, java tokens, constants, variables, expressions, decision making statements and looping, java statements, overview of arrays and strings, machine neutral, Java Virtual Machine(JVM), Command Line Arguments.	
UNIT-II:	12 hrs
Classes, Objects and Methods: Introduction, defining a class, creating objects, accessing class members, constructors, method overloading, static members. Inheritance: Defining a sub-class, sub-class constructor, multi-level variables, final classes and finalize methods, abstract methods and classes, visibility control. Arrays and Strings: One-dimensional arrays, creating an array, declaration of arrays, initialization of arrays, two-dimensional arrays, string arrays, string methods, string buffer class, vectors, wrapper classes, Basic I/O Streams: Scanner, buffered reader, Collection classes. Managing Errors and Exceptions: Introduction, types of errors: compile time and run-time errors, exceptions, types of exceptions, syntax of exception handling code, multiple catch statements, using finally statement, throwing our own exceptions.	
UNIT-III:	10 hrs
Interfaces, Package and Multi-threaded Programming: Introduction, defining interfaces, extended interfaces, implementing interfaces. Package: Creation, importing a package and user-defined package. Threads: Introduction to threads, creating threads, extending the thread class, implementing the 'runnable' interface, life-cycle of a thread, priority of a thread, synchronization, and deadlock.	
UNIT-IV:	10 hrs
Applet programming: Introduction, how applets differ from applications, building applet code, applet life cycle, about HTML, designing a web page, passing parameters to applets, getting input from the user. Graphics Programming: Introduction, abstract window toolkit class hierarchy, frames, event-driven programming, layout managers, panels, canvases, drawing geometric	

figures. **Introduction to Swings:** Introduction to Swings, overview of Swing components: JButton, JCheckBox, JRadioButton, JLabel, JTextField, JTextArea, JList.

Text Book:

1. H. Schildt, The Java Complete References, 11th Edition, Tata McGraw Hill, 2019.

Reference Books:

1. Y. Daniel Liang, An Introduction to JAVA Programming, 10th Edition, Pearson.
2. K. Sierra, Head First Java, 2nd Edition, O'Reilly Media, Inc., 2003.
3. E. Balaguruswamy, Programming with JAVA, 6th Edition, Tata McGraw Hill, 2014

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to:-
CO1	Explain the basic principles of object-oriented programming along with its strength and weakness
CO2	Identify Java standard libraries and classes.
CO3	Apply the object-oriented programming techniques in developing small to medium-sized application programs and use it in real life applications.
CO4	Identify Java code utilities in applets, Java packages, and classes.
CO5	Design simple Graphical User Interface applications and use it in real world scenario.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2		3	2	3		3	2	1	1
CO2	3	1	3	3		1	2	2	2	3
CO3	3	3	3	3	2	2	3	3	3	3
CO4	2	2	3	3	2	2	3	3	3	3
CO5	3	2	3	3	2	1	2	3	3	3

Course Code	CSC202
Course Name	MOBILE COMPUTING
Category	Programme Core Course
Prerequisite	Data Communication and Computer Networks

Paper-CSC202	
Mobile Computing	
UNIT-I:	10hrs
Introduction to mobile computing, mobile computing architecture, mobile devices, mobile system networks: Cellular Network and frequency reuse, Channel Assignment, Handoff Strategies, Interferences and System Capacity, Improving coverage and capacity in Cellular Systems – Cell Splitting, Sectoring, Repeaters and Range Extension, Limitations of Mobile Computing.	
UNIT-II:	10hrs
Personal Communications Services (PCS): PCS Architecture, mobility management, Global System for Mobile Communication (GSM). System overview: GSM Architecture, Mobility management, Network signalling. General Packet Radio Services (GPRS): GPRS Architecture, GPRS Network Nodes	
UNIT-III:	10hrs
Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunnelling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP). Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.	
UNIT-IV:	10hrs
Mobile Data Communication: WLANs (Wireless LANs), IEEE 802.11 standards. Mobile Satellite Communication Networks: Case studies of the IRIDIUM and GLOBALSTAR systems. Wireless Enterprise Networks: Introduction to Virtual Networks, VPN, Mobile Ad-hoc networks, 4G Technology, Long Term Evolution (LTE).	
Text Books:	
1. R. Kamal, Mobile Computing, 1 st Edition, Oxford University Press, 2006. 2. A K Talukder & R R Yavagal, Mobile Computing Technology, Applications & Service Creation, 2 nd Edition, TMH. 3. T. S Rappaport, Wireless Communication, 2 nd Edition, Pearson, 2002.	
Reference Books:	
1. Jochen Schiller, Mobile Communications, Addison-Wesley, 2 nd Edition. 2. UWE Hansmann, Lothar Merk, Martin S. Nicklaus, Thomas Stober, Principles of Mobile Computing, 2 nd Edition, Springer. 3. P. Stavronlakis, Third Generation Mobile Telecommunication Systems, 1 st Edition, Springer Publishers	

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Explain the basic of Mobile Computing.
CO2	Infer the fundamentals of wireless communications.
CO3	Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.
CO4	Demonstrate basic skills for cellular networks design.
CO5	Apply knowledge of TCP/IP extensions for mobile and wireless networking.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	1	1		1			2		
CO2	2	2		3				2	1	
CO3	2	3	3	2	2	1	1	2	2	2
CO4	2	3	3	2	2	1	1	3	3	3
CO5	2	3	1		1		1	2	2	

Course Code	CSC203
Course Name	DISCRETE MATHEMATICAL STRUCTURES
Category	Programme Core Course
Prerequisite	Basics of set theory and combinatory

Paper-CSC203	
Discrete Mathematical Structures	
UNIT-I:	16hrs
<p>Fundamentals of Logic: Propositional Logic, Propositional Equivalences, Predicate and Quantifiers, nested Quantifiers, Rules of Inference. Set Theory: Sets, Set Operations. Introduction to proofs: proof by Induction, proof by contradiction, proof by cases with examples. Mathematical Induction: Introduction to Induction, strong Induction, Recursion. Relations: Relations and their properties, n-ary Relations and their applications, Representing relations, Closures of relations, Equivalence relations, and Partial Orderings, lattices, partial order set, properties of lattices. Functions: Types of Functions, Composition of Functions, Invertible Functions, Recursive Functions, Pigeon-hole principle.</p>	
UNIT-II:	06hrs
<p>Discrete Numeric functions and Generating Functions: Discrete Numeric Functions, Generating Functions, Recurrence relations and recursive algorithms, Linear recurrence relations, Solving Recurrence Relations by Generating Functions.</p>	
UNIT-III:	10hrs
<p>Graphs: Graphs, Graph models, special types of graphs, Representing graphs, Graph Isomorphism, connectivity, Euler and Hamilton paths, Planar graphs, Graph Coloring, Matching problem. Trees: Introduction to Trees, Applications of Trees, Binary Trees, n-ary Trees, Tree Traversal, Spanning Trees.</p>	
UNIT-IV:	08hrs
<p>Algebraic Structures: Group, Semi groups ,monoids,subgroup, homomorphism, co-sets, normal subgroup, Lagrange's theorem, algebraic system of two binary operation, Boolean algebra, Boolean function and simplification, group codes, parity check, single error correcting code</p>	
Text Books:	
<ol style="list-style-type: none"> 1. C.L.Liu, D. P. Mohapatra, Elements of Discrete Mathematics: A Computer Oriented Approach, 4th Edition, McGraw-Hill, 2016 2. K. H. Rosen, Discrete Mathematics & Its Applications (withCombinatoricsand Graph Theory), 6th Edition, McGraw-Hill, 2007. 	
Reference Books:	

1. J.P. Tremblay, R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill, 1997.
2. R. L. Graham, D. E. Knuth, O. Patashnik, Concrete Mathematics : A Foundation for Computer Science, 2nd Edition, Pearson Education, 2007.
3. D. B. West, Introduction to Graph Theory, 2nd Edition, PHI Learning, 2009.
4. R. A. Brualdi, Introductory Combinatorics, 4th Edition, Pearson, 2004.

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Able to use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, and functions.
CO2	To apply mathematical foundations, algorithmic principles, and computer science theory to the modelling and design of computer based systems.
CO3	Able to construct simple mathematical proofs and possess the ability to verify them.
CO4	Model problems in Computer Science using graphs and trees methods.
CO5	To Understand and prove fundamental results and solve algebraic problems using appropriate techniques

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	1	2	1	2		2	3	2	1
CO2	3	2	3		3			3	3	3
CO3	2	1	1	2	3		1	3	2	1
CO4	3		3		3			1	1	2
CO5	3	2	2	1	3		2	2	3	2

Course Code:	CSC204
Course Name:	THEORY OF COMPUTATION
Category:	Programme Core Course
Prerequisite:	Fundamental of computer science and mathematics

Paper-CSC204	
Theory of Computation	
UNIT-I:	10hrs
Introduction: Automata theory, Computability theory, Complexity theory, Mathematical notations & terminology, Alphabet, String, Languages & operations on strings; Finite Automata (Deterministic): Formal definition, Transition function, Extended transition function, Language of DFA, Design of DFA; Finite Automata (Non-deterministic): Formal definition, Language of NFA, Equivalence of DFA & NFA; NFA with Epsilon Transition, Conversion from Epsilon-NFA to DFA, Minimization of DFA.	
UNIT-II:	10hrs
Moore machines, Mealy machines; Regular expressions: Regular operators and their precedence, Building regular expressions, DFA to Regular expressions, Regular expressions to DFA, Arden's theorem, Pumping Lemma for Regular languages, Closure properties of Regular languages.	
UNIT-III:	10hrs
Introduction to Grammars: Definition, Derivation of string, Left and right linear grammars, Regular grammars; Context Free Grammars (CFG): Definition, Derivation of string, Language of CFG, Parse Tree, Ambiguity in grammar, Elimination of ambiguity, Normal forms of CFG: Chomsky and Greibach normal forms, Converting CFG to CNF & GNF, Closure properties of context free languages (CFL).	
UNIT-IV:	10hrs
Push Down Automata (PDA): PDA Components, Moves of a PDA, Design of a PDA, PDA to CFG and CFG to PDA conversion, Pumping lemma for CFL; Turing Machines (TM): Design of a TM, Variation of TM, Recursively Enumerable Languages and undecidable problems. Church Turing hypothesis, Recursive and recursively enumerable sets, Chomsky's hierarchy of languages. Godel numbering; NP Completeness: P and NP, NP complete and NP Hard problems.	
Text Books:	
<ol style="list-style-type: none"> 1. J. I.E. Hopcroft, R. Motwani, and J. D. Ullman, Introduction to Automata Theory, Languages and Computation, 3rd Edition, Pearson Education, 2007. 2. P. Linz, An Introduction to Formal Languages and Automata, 4th Edition, Jones & Bartlett Learning, 2006. 	
Reference Books:	
<ol style="list-style-type: none"> 1. M. I. Sipser, Introduction to the Theory of Computation, 3rd Edition, Cengage Learning, 2012. 2. J. I.C. Martin, Introduction to Languages and the Theory of Computation, 4th Edition, Tata McGraw-Hill, 2010. 3. K. I.L. P. Mishra, and N. Chandrasekaran, Theory of Computer Science: Automata, Languages and Computation, 3rd Edition, PHI, 2012. 	

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Develop and implement mathematical models with DFA, NFA for regular languages.
CO2	Design regular expression for regular sets.
CO3	Design and implement grammar and PDA for context free languages and demonstrate their properties. Construct Turing machines for context sensitive and un-restricted languages.
CO4	Describe the Chomsky hierarchy of Formal Languages and Grammar.
CO5	Explain the concept of decidability & recursive enumerability, and classify a given language to the P, NP or NPC complexity classes.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3		3		3			3	3	3
CO2	3		3		3			3	3	3
CO3	3		3		3			3	3	3
CO4	3		3		3			3	3	3
CO5	3		3		3			3	3	3

Lab II: OOP using Java and Theory of Computation

JAVA PROGRAMS:

1. Programs to illustrate class and objects
2. Programs to illustrate Overloading & Overriding methods in Java.
3. Programs to illustrate constructors
4. Programs Illustrate the Implementation of Various forms of Inheritance. (Ex. Single, Hierarchical, Multilevel inheritance....)
5. Program which illustrates the implementation of multiple Inheritance using interfaces in Java.
6. Program to illustrate the implementation of abstract class.
7. Programs to illustrate Exception handling
8. Programs to create Packages in Java.
9. Program to Create Multiple Threads in Java.
10. Program to Implement Producer/Consumer problem using synchronization
11. Developing a simple paint like program using applet
12. Developing programs on JButtons, JTextBox, JTextButton etc.

TOC PROGRAMS:

1. Review of C-Programming and use of JFLAP.
2. Simulation of DFA for a specific language using C program.
3. Simulation of DFA using JFLAP.
4. Simulation of a generalized DFA to recognize any given language.
5. Simulation of NFA using JFLAP.
6. NFA to DFA conversion using JFLAP.
7. DFA minimization using JFLAP.
8. String parsing for a CFG using JFLAP.
9. Design of PDA using JFLAP.
10. Design of TM using JFLAP

Course Code:	CSC206 A
Course Name:	DATA WAREHOUSING AND MINING
Category:	Programme Elective Course
Prerequisite:	Data Structure and Algorithm, Linear Algebra, Basics of Web programming

DSE Paper – CSC206A	
Data Warehousing and Mining	
UNIT-I:	10hrs
Evolution of Decision Support Systems- Data warehousing Components –Building a Data warehouse, Data Warehouse and DBMS, Data marts, Metadata, Multidimensional data model, OLAP vs OLTP, OLAP operations, Data cubes, Schemas for Multidimensional Database: Stars, Snowflakes and Fact constellations.	
UNIT-II:	10hrs
Types of OLAP servers, 3–Tier data warehouse architecture, distributed and virtual data warehouses. Data warehouse implementation, tuning and testing of data warehouse. Data Staging (ETL) Design and Development, data warehouse visualization, Data Warehouse Deployment, Maintenance, Growth, Business Intelligence Overview- Data Warehousing and Business Intelligence Trends - Business Applications.	
UNIT-III:	10hrs
Data mining-KDD versus datamining, Stages of the Data Mining Process-task primitives, Data Mining Techniques -Data mining knowledge representation – Data mining query languages, Integration of a Data Mining System with a Data Warehouse – Issues, Data preprocessing – Data cleaning, Data transformation, Feature selection, Dimensionality reduction, Discretization and generating concept hierarchies-Mining frequent patterns- association-correlation. Decision Tree Induction - Bayesian Classification – Rule Based Classification –Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods.	
UNIT-IV:	10hrs
Clustering techniques – , Partitioning methods- k-means Hierarchical Methods - distance-based agglomerative and divisible clustering, Mining complex data objects, Spatial databases, temporal databases, Multimedia databases, Time series and Sequence data; Text Mining –Graph mining-web mining-Application and trends in data mining	
Text Books:	
1.Jiawei Han and MichelineKamber, Data Mining: Concepts and Techniques, 3 rd Edition, MorganKaufmann Publishers, ,2011. 2.Alex Berson and Stephen J. Smith, “ Data Warehousing, Data Mining & OLAP”,10 th Edition,TataMcGraw Hill Edition, ,2007. 3.G. K. Gupta, “Introduction to Data Min Data Mining with Case Studies”, Easter EconomyEdition, Prentice Hall of India, 2006	
Reference Books:	
1.Mehmedkantardzic,Datamining:Concepts,Models,Methods and Algorithms,Wiley,Interscience, 2003.	

- 2.Ian Witten, Eibe Frank, Data Mining; Practical Machine Learning Tools and Techniques, 3rd Edition, Morgan Kaufmann, 2011.
- 3.George M Marakas, Modern Data Warehousing, Mining and Visualization, Prentice Hall,2003.

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Describe the requirement of a data warehouse and its components.
CO2	Explain the data warehouse life cycle.
CO3	Explain the concepts of data mining and data pre-processing.
CO4	Analyze different classification algorithms and apply the same to real life problems.
CO5	Apply different clustering algorithms for solving problems in various domains.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2						1	2	2	2
CO2	2						1	2	2	2
CO3	3		2	2			2	3	3	3
CO4	3		3	3	3		3	3	3	3
CO5	3		3	3	3		3	3	3	3

Course Code	CSC206B
Course Name	WIRELESS SENSOR NETWORKS
Category	Programme Elective Course
Prerequisite	Basic Idea of Computer Networks

DSE Paper – CSC206B	
Wireless Sensor Networks	
UNIT-I:	10hrs
Introduction: Networked wireless sensor devices, Applications: Habitat Monitoring, Smart Transportation, Key design challenges. Network deployment: Structured versus randomized deployment, Network topology, Connectivity. Introduction to cloud system, Sensor Cloud Systems, Challenges in Sensor Cloud Systems.	
UNIT-II:	8hrs
Localization: issues & approaches, Coarse-grained & Fine-grained node localization, Network-wide localization. Wireless characteristics: Basics, Wireless link quality, Radio energy considerations, SINR capture model for interference.	
UNIT-III:	10hrs
Issues in designing MAC protocol for WSNs, Classification of MAC Protocols, Energy efficiency in MAC protocols, Asynchronous sleep techniques, Sleep-scheduled techniques. Classification of Energy Management Schemes Sleep-based topology control: Constructing topologies for connectivity, constructing topologies for coverage.	
UNIT-IV:	12hrs
Routing: Metric-based approaches, Routing with diversity, Multi-path routing, Lifetime-maximizing energy-aware routing techniques, Geographic routing. Data-centric routing, Data-gathering with compression, Querying, Data-centric storage and retrieval, The database perspective on sensor networks.	
Text Books:	
1. Kazem Sohraby, Daniel Minoli, Taieb Znati, Wireless Sensor Networks: Technology, Protocols, and Applications, Wiley Inter Science. 2. Bhaskar Krishnamachari, Networking Wireless Sensors, 1 st Edition, Cambridge University Press	
Reference Books:	
1. Edgar H. Callaway, Wireless Sensor Networks: Architectures and Protocols, 1 st Edition, Jr. Auerbach Publications, CRC Press. 2. C.S Raghavendra, Krishna M, Sivalingam, Taieb Znati, Wireless Sensor Networks, 1 st Edition, Springer. 3. Victor Lesser, Charles L. Ortiz, and Milind Tambe, Distributed Sensor Networks: A Multiagent Perspective, 1 st Edition, Kluwer Publications. 4. Feng Zhao, Leonidas Guibas, Morgan Kaufmann, Wireless Sensor Networks: An Information Processing Approach, 1 st Edition, Series in Networking 2004.	

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Define the basic concepts of wireless sensor networks, sensing, and challenges.
CO2	Explain various deployment structures of wireless sensor networks.
CO3	Describe and explore localization, radio standards and wireless characteristics.
CO4	Discuss the communication protocols adopted in wireless sensor networks and distinguish energy management schemes.
CO5	Analyze different routing techniques and identify various storage and retrieval issues.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3							1		
CO2	3		1	1	1		1	1	1	1
CO3	3			1	1		1		1	
CO4	3		2	2	2		2	2	2	
CO5	3		3	3	3		3	2	2	3

Course Code	CSC206C
Course Name	INTERNET OF THINGS
Category	Programme Elective Course
Prerequisite	Basic Idea of Computer Networks

DSE Paper –CSC 206C	
Internet of Things	
UNIT-I:	10hrs
<p>Introduction to IoT, Basic requirements for building an IoT system, IoT reference framework, IoT network level – performance criteria.</p> <p>IoT devices: Sensors, Types of sensors and their functions: temperature, pressure, air pollution, proximity, infrared, moisture & humidity, flow, level, noise, and speed sensors. Characteristics of sensors. Use of RFID</p> <p>Actuators, Types of actuators and their functions: electrical, mechanical, and hydraulic actuators, controlling IoT devices</p>	
UNIT-II:	10hrs
<p>IoT requirements for networking protocols, device addressing, credential management, wireless spectrum, determinism, security and privacy, application interoperability, semantic interoperability. IoT Protocol Stack: layered view.</p> <p>Link layer: IEEE 802.15.4 technology, LoRaWAN end-to-end architecture, Time-Sensitive Networking</p> <p>Internet Layer: Routing Protocol for Low-Power and Lossy Networks.</p>	
UNIT-III:	10hrs
<p>Application Protocols Layer: Data Serialization Formats, Communication Paradigms: Request/Response Versus Publish/Subscribe, Blocking Versus Non-blocking, QoS: Resource Utilization, Data Timeliness, Data Availability, Data Delivery</p> <p>IoT Application Protocols: CoAP, XMPP, MQTT, AMQP, SIP, IEEE 1888, and DDS RTPS.</p> <p>Application Services Layer: ETSI M2M network architecture, oneM2M standards.</p> <p>IoT Services Platform: Functions and Requirements, IoT Platform Manager, Discovery, Communication Manager, Data Management, Management of IoT Devices, Configuration and Fault Management, Performance Management and measures</p>	
UNIT-IV:	10hrs
<p>IoT security and Privacy: challenges, requirements, IoT Three-Domain Architecture, Attacks and Countermeasures for each domain.</p> <p>Applications of IoT in areas like Smart home, Agriculture, Healthcare, Industry, Transportation, Retail, Oil and Gas, Energy etc. IoT Service Model: Anything as a Service, IoT Connected Ecosystems Models</p>	
Text Book:	
1. AmmarRayes and Samer Salam, Internet of Things from Hype To Reality: The Road to Digitization, 2nd Edition, Springer, 2019.	

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Describe basic concepts of IoT, its architecture and system design.
CO2	Employ the communication mechanisms between sensors and systems using various protocols and network models.
CO3	Explain IoT with respect to machine to machine and design IoT systems with data synchronization and resource manipulation. Explore various application protocols.
CO4	Discuss and describe different security issues and challenges.
CO5	Identify real world applications of IoT in multidisciplinary domains.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3		2		1			1	3	3
CO2	3		3		3			1	3	3
CO3	3		3		3			1	3	3
CO4	3		3		3			1	3	3
CO5	3		3		3			1	3	3

Course Code	CSC206D
Course Name	Microprocessor and Microcontroller
Category	Programme Elective Course
Prerequisite	Basic of Computer Organization and Architecture

DSE Paper –CSC 206D	
Microprocessor and Microcontroller	
UNIT-I:	10hrs
<p>8085 AND 8086 Microprocessors: Architecture, Pin diagram, Physical memory organization, Timing diagrams, Interrupts of 8085, Instruction set and Assembly Language Programming of 8085. 8086 Microprocessor: Architecture, signal descriptions, common function signals, Minimum and Maximum mode signals, addressing modes, interrupt structure.</p>	
UNIT-II:	10hrs
<p>I/O Interfacing: Interfacing with 8086/ 8085: Interfacing with RAMs, ROMs along with the explanation of timing diagrams. Interfacing with peripheral ICs like 8255, 8254, 8279, 8259, 8259 etc. Interfacing with key boards, LEDs, LCDs, ADCs, and DACs etc. Introduction to microprocessors like 80386, 80486</p>	
UNIT-III:	10hrs
<p>8051 Microcontrollers: Overview of 8051 microcontroller Architecture. I/O Ports. Memory organization, addressing modes and instruction set of 8051, Interrupts, timer/Counter and serial communication, programming Timer Interrupts, programming external hardware interrupts, programming of serial communication interrupts, programming 8051 timers and counters, Introduction to other micro controllers.</p>	
UNIT-IV:	10hrs
<p>Real World Interfacing Design With 8051: Real world interface design: LED, SWITCH, keyboard, LCD, ADC, DAC, UART, RTC, PWM, Watch Dog Timer, DC Motor, Stepper Motors.</p>	
Text Books:	
<ol style="list-style-type: none"> 1. A.K. Roy and K.M. Bhurchandi ,Advance Microprocessor and Peripherals, Tata McGraw-Hill Education. 2. Mazidi and Mazidi, The 8051 Microcontroller and Embedded Systems using Assembly and C, 2nd Edition, Pearson Education. 3. Ramesh Gaonkar, Microprocessor Architecture, Programming and Applications with the 8085, 5th Edition, Penram International Publishing 	
Reference Books:	
<ol style="list-style-type: none"> 1. Walter A. Triebel & Avtar Singh ,The 8088 and 8086 Microprocessors: Programming, Interfacing, Software, Hardware, and Applications , 4th Edition. 2. D. V. Hall, Micro processors and Interfacing, 2nd Edition, TMGH. 3. Kenneth. J. Ayala, The 8051 Microcontroller Architecture, Programming and Applications, Cengage learning. 4. Ajay. V. Deshmukh ,Microcontrollers: Theory and Applications, Tata McGraw-Hill Education 	

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Analyze role of microprocessor and microcontroller in computer systems.
CO2	Distinguish between maskable and non-maskable interrupt, and role of DMA in microprocessor.
CO3	Analyze working of 8086 and its architecture.
CO4	Analyze the data transfer information through serial & parallel ports.
CO5	Identify a detailed s/w & h/w structure of the Microprocessor.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	1	1	1	1			1	2	1
CO2	1	1			1					
CO3	2	1	1	2	2	2	1	2	2	1
CO4	2	1			1					
CO5	1	1	1	1	1	1		1	2	2

Semester-III

Course Code:	CSC301
Course Name:	COMPILER CONSTRUCTION
Category:	Programme Core Course
Prerequisite:	Theory of Computation / Automata theory

Paper-CSC301	
Compiler Construction	
UNIT-I:	12 hrs
Introduction: Overview and Phases of compilation. Lexical Analysis: Non-Deterministic and Deterministic Finite Automata (NFA & DFA), Regular grammar, Regular expressions and Regular languages, Design of a Lexical Analyzer as a DFA, Lexical Analyzer generator, Lex.	
UNIT-II:	14 hrs
Syntax Analysis: Context free grammars and Context free languages, Parse trees and derivations, Ambiguous grammar. Parser, Top down Parsing: Recursive descent parsing, LL (1) grammars, Non-recursive Predictive Parsing, Error reporting and Recovery. Bottom Up Parsing: Handle pruning and shift reduces Parsing, SLR parsers and construction or SLR parsing tables, LR(1) parsers and construction of LR(1) parsing tables, LALR parsers and construction of efficient LALR parsing tables, Parsing using Ambiguous grammars, Error detection, Parser generator.	
UNIT-III:	08 hrs
Syntax Directed Translation – Syntax Directed Definitions. Evaluation Orders for SDDs. Applications of Syntax Directed Translation. Symbol Table Organization - Structure of Symbol table, Symbol Table organization, Data Structures of symbol Table. Intermediate code generation: Intermediate code (IC), IC for various constructs in programming language.	
UNIT-IV:	06 hrs
Machine code generation, Issues in the design of a code Generator, Machine code generation scheme. Elements of code optimization, Peephole Optimization, Elimination of redundant loads and stores, Elimination of unreachable code, Elimination of jump over jumps, Elimination of local common sub-expressions, Basics of flow of control optimization.	
Text Book:	
1.A. V. Aho, M. S. Lam, R. Sethi and J. D. Ullman, Compilers: Principles, Techniques & Tools , 2 nd Edition, Pearson Education, 2007.	
Reference Book:	
1.K. D. Cooper and L. Tarezon T. Munakata, Engineering a Compiler, 2 nd Edition, Elsevier, 2011.	

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Identify phases of a compiler, process of designing lexical analyzer, and apply LEX tool.
CO2	Construct parsing tables and implement parser using BISON tool.
CO3	Understand use of symbol table and design SDT as semantic analyzer for a language.
CO4	Generate intermediate code using lexical analyzer, parser and semantic analyzer.
CO5	Translate intermediate code to machine code, handle run-time environment, and apply code optimization techniques.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3		3		3			3	3	3
CO2	3		3		3			3	3	3
CO3	3		3		3			3	3	3
CO4	3		3		3			3	3	3
CO5	3		3		3			3	3	3

Course Code	CSC302
Course Name	DATA BASE MANAGEMENT SYSTEMS
Category	Programme Core Course
Prerequisite	Basic Understanding of Algorithms and Data Structures

Paper-CSC302	
Database Management Systems	
UNIT-I:	10hrs
Introduction to DBMS: Characteristics, Purpose, Application of the Database approach, Advantages of using DBMS approach upon file structure, Three-schema Architecture, Data Abstraction, Data Independence, Data base languages, DBMS Architecture, Data Models overview, Introduction to ER model and Relational data model.	
Relational Query Language: Relational algebra, Tuple and Domain Relational Calculus, SQL.	
UNIT-II:	12hrs
Database Design and ER model: Overview of Design Process, Entities, Attributes, Constraints, Weak Entities, ER diagram, Extended ER Features, Reduction to Relational Schemas.	
Relational Database Design: Feature of Good Relational Design, Atomic Domain and First Normal Form, Functional Dependency Theory, Decomposition of Schemas, Properties of Relational Decompositions, Normal forms and Normalization, 2NF, 3NF, BCNF, Multivalued Dependencies & 4NF. Performance tuning and Denormalization	
UNIT-III:	8hrs
Query Processing and Optimization: Evaluation of Relational Algebra Expression, QueryEquivalence, Join strategy, Query optimization algorithms. Storage Strategies: Indices, B+Trees, Hashing	
UNIT-IV:	10hrs
Transaction Processing: Transaction Concept, ACID Properties of Transaction, Serializability, Recoverability.	
Concurrency Control: Overview, Lock-based Protocol, Timestamp ordering protocol, Multi version and Optimistic concurrency control techniques.	
Recovery Systems: Database Failure and Recovery, Log based Recovery to preserve Atomicity and Durability	
Text Book:	
1.A. Silberschatz, F. H. Korth, Database System Concepts, 6th Edition, MGH, 2010.	
Reference Books:	
1. R. Elmasri, Fundamental of Database Systems, 7 th Edition, Pearson Education, 2008.	
2. B. Desai, An Introduction to Database System, 2 nd Edition, Galgotia publication.	
3.C.J. Date, An Introduction to Database Systems, 8 th Edition, Pearson Education	

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to
CO1	Define the basics of databases, database management systems, architecture of database systems, and the role of database users. Explain effectively the features of database management systems and data models.
CO2	Construct formal queries using relational algebra and relational calculus and structured query languages to perform database operations.
CO3	Identify the attributes to code a real world entity and create E-R models for designing databases for real-world applications. Examine the database design to check for improvement using normalization.
CO4	Describe various indexing techniques and explain the basics of query evaluation mechanisms.
CO5	Recognize the state of a database instance. Apply concurrency control and recovery mechanisms to maintain the correctness and consistency in the database.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3				1		1			
CO2	3				1		2	2	2	
CO3	3		3		1		2	3	3	
CO4	3		2	1	1		2			2
CO5	3		2		1		2	2		

Course Code	CSC303
Course Name	DESIGN AND ANALYSIS OF ALGORITHMS
Category	Programme Core Course
Prerequisite	Data Structure

Paper-CSC303	
Design and Analysis of Algorithms	
UNIT-I:	10hrs
Introduction to Design and analysis of algorithms, Growth of Functions (Asymptotic notations), Recurrences, Solution of Recurrences by substitution, Recursion tree method, Master Method, Analysis of Searching and Sorting Techniques: Brute Force Technique, Selection sort, Bubble sort.	
UNIT-II:	10hrs
Divide and Conquer: Merge sort, Quick sort, Time complexity analysis for Merge and Quick sort. Transform and Conquer: Balanced search tree, Heaps and Heap sort. Dynamic Programming algorithms: Matrix Chain Multiplication, Elements of Dynamic Programming, Longest Common Subsequence, 0/1 Knapsack problem.	
UNIT-III:	10hrs
Greedy Algorithms: Activity Selection Problem, Elements of Greedy Strategy, Fractional Knapsack Problem, Huffman Codes. Graph Algorithm - BFS and DFS, Minimum Spanning Trees, Kruskal algorithm, Prim's Algorithm, Single Source Shortest paths, Bellmen Ford Algorithm, Dijkstra's Algorithm.	
UNIT-IV:	10hrs
String matching, Rabin-Karp Algorithm, KMP Algorithms. Theory of NP-completeness: Complexity classes of P, NP, NP-Hard, NP complete. Polynomial reduction, Cook's theorem, discussion on SAT, CNF-SAT, Min vertex cover, max clique, Graph coloring.	
Text Book:	
1. T.H.Coreman et.al. Introduction to Algorithms,3 rd Edition,MIT press Cambridge, 2010.	
Reference Books:	
1.M. R. Kabat, Design and Analysis of Algorithms, 1 st Edition,PHI, 2013. 2. S. Sridhar, Design and Analysis of Algorithms, Oxford University Press,2015. 3. E. Horowitz, S. Sahni, Fundamentals of Computer Algorithms, 2 nd Edition,ComputerScience press, 2010.	

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to
CO1	Describe asymptotic notation, its properties and use it in measuring algorithm behaviour
CO2	Apply mathematical principles in analysis of algorithms to solve real world problems
CO3	Analyze and apply the complexities of various algorithms and select the best one
CO4	Know the different strategies that are known to be useful in finding efficient algorithms to solve problems and to be able to apply them in real scenario
CO5	Choose appropriate data structures and algorithms and use it to design algorithms for a specific problem

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2		2	3	2	1	3	3	3
CO2	2	2	3	2	3	2	1	2	2	2
CO3	2	2	3	3	2	1	2	3	3	3
CO4	2	3	3	3	2	3	2	2	2	3
CO5	2	3	2	3	2	3	2	3	3	3

Course Code	CSC304A
Course Name	Data Science
Category	Programme Elective Course
Prerequisite	Statistics, Mathematics, Programming Knowledge

Paper-CSC304A	
Data Science	
UNIT-I:	8hrs
Brief Introduction to Data Science. Descriptive statistics, notion of probability, distributions, mean, variance, covariance, covariance matrix, hypothesis testing	
UNIT-II:	8hrs
Introduction to Machine Learning: Supervised Learning, Decision Tree Induction, Naïve Bayes Classification, Rule based Classification, K-Nearest Neighbour, Unsupervised Machine learning, Clustering, K-Means, Association rule mining, Apriori, FP-Tree	
UNIT-III:	12hrs
Attribute-oriented analysis: Attribute generalization, Attribute relevance, Class comparison, Statistical measures, Data pre-processing: Data cleaning, Data transformation, Data reduction. Predictive Modelling: Regression, Decision Tree, SVM.	
UNIT-IV:	12hrs
Feature selection (Filters; Wrappers), Dimensionality reduction: PCA and LDA. Ensemble Learning, Bagging, Boosting, Gradient Boosting (Random Forest, Adaptive Boosting) Time Series Data Analysis: Introduction to Time Series, Correlation, Forecasting (Univariate): Autoregressive Moving Average (ARMA) models, Autoregressive Integrated Moving Average (ARIMA) models, Introduction to Deep Learning.	
Text Books:	
<ol style="list-style-type: none"> 1. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk from The Frontline. O'Reilly. 2014. 2. James, G., Witten, D., Hastie, T., Tibshirani, R. An introduction to statistical learning with applications in R. Springer, 2013. Joel Grus, Data Science from Scratch: First Principles with Python. 1st Edition. 3. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson. 4. Laura Iguál and Santi Seguí, Introduction to Data Science, Springer. 	
Reference Books:	
<ol style="list-style-type: none"> 1. Han, J., Kamber, M., Pei, J. Data mining concepts and techniques. Morgan Kaufmann, 2011. 2. "Practical Data Science with R". Nina Zumel, John Mount. Manning, 2014. 3. Davy Cielin, Arno Meysman, Mohamed Ali, Introducing Data Science, Manning 4. Andreas, Practical Data Science, Apress 	

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Develop in depth understanding of the key technologies in data science and business analytics: data mining, machine learning, visualization techniques, predictive modelling, and statistics.
CO2	Practice problem analysis and decision-making.
CO3	Gain practical, hands-on experience with statistical programming languages and tools through coursework and applied research experiences.
CO4	Analyze and interpret data using an ethically responsible approach.
CO5	Apply data science concepts and methods to solve problems in real-world contexts and will communicate these solutions effectively.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3		2		2			1	1	1
CO2	3		3		3			3	3	3
CO3	3		3		3			3	3	3
CO4	3		3		3			3	3	3
CO5	3		3		3			3	3	3

Course Code	CSC304B
Course Name	WEB TECHNOLOGY
Category	Programme Elective Course
Prerequisite	Knowledge of Internet basics, Database and object oriented programming

Paper-CSC304B	
Web Technology	
UNIT-I:	8hrs
Web Essentials: Clients, Servers, and Communication. The Internet-Basic Internet Protocols - The World Wide Web-HTTP request message-response message-Web Clients Web Servers-Case Study. Markup Languages: XHTML. An Introduction to HTML History-Versions-Basic XHTML Syntax and Semantics-Some Fundamental HTML Elements-Relative URLs-Lists-tables-Frames-Forms-XML Creating HTML Documents-Case Study.	
UNIT-II:	8hrs
Style Sheets: CSS-Introduction to Cascading Style Sheets-Features-Core Syntax-Style Sheets and HTML Style Rule Cascading and Inheritance-Text Properties-Box Model-Normal Flow Box Layout-Beyond the Normal Flow-Other Properties-Case Study. Client-Side Programming: The JavaScript Language-History and Versions Introduction to JavaScript in Perspective-Syntax-Variables and Data Types-Statements-Operators-Literals-Functions-Objects-Arrays-Built-in Objects-JavaScript Debuggers.	
UNIT-III:	12hrs
PHP: Introducing PHP, PHP Language Basics–Using variables, Understanding Data Types, Operators and Expressions, Constants. Decisions and Loops–Making Decisions, Doing Repetitive Tasks with Looping, Mixing Decisions and Looping with HTML. Strings –Creating and Accessing Strings, Searching Strings, Replacing Text with strings, Dealing with Upper and Lowercase, Formatting Strings. Arrays –Creating Arrays, Accessing Array Elements, Looping Through Arrays with for-each, Working with Multidimensional Arrays, network and Manipulating Arrays. Functions , writing your own Functions, Working with References, Writing Recursive Functions. Objects–Introduction OOP Concepts, Creating Classes and Objects in PHP, Creating and using Properties, Working with Methods.	
UNIT-IV:	12hrs
PHP MySQL: Handling HTML Forms with PHP–How HTML form works, Capturing Form Data with PHP, Dealing with Multi-Value Fields, Generating Web Forms with PHP, Storing PHP Variables in Forms, Creating File Upload Forms, Redirecting After a Form Submission. Introducing Databases and SQL –Deciding How to Store Data, Understanding Relational Databases, Setting Up MySQL, A Quick Play with MySQL, Connecting MySQL from PHP. Retrieving Data from MySQL with PHP –Setting Up the Book Club Database, Retrieving Data with SELECT, Creating a Member Record Viewer. Manipulating MySQL Data with PHP–Inserting, Updating, and Deleting Records.	
Text Books:	
1. M. Doyle, Beginning PHP 5.3, 1 st Edition, John Wiley & Sons, 2011. 2. J. Duckett, Beginning HTML, XHTML, CSS and JavaScript, 1 st Edition, John Wiley & Sons, 2011	
Reference Book:	

1. L. Welling, L. Thomson, PHP and MySQL Web Development, 1st Edition, Sams Publishing, 2003.

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to
CO1	Identify basic HTML elements, XML elements and develop static webpages.
CO2	Describe different styles in web page design. Apply style sheets and java script to prepare elegant webpages with client side validations.
CO3	Implement server side business logic into dynamic web pages using PHP.
CO4	Use PHP to design user interactive forms for data entry with proper validation.
CO5	Develop aesthetic web applications with database connectivity using PHP.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3		1	1	1		1	1	1	1
CO2	3		2	2	2		2	2	2	2
CO3	3		3	3	3		3	3	3	3
CO4	3		3	3	3		3	3	3	3
CO5	3		3	3	3		3	3	3	3

Course Code	CSC304C
Course Name	INFORMATION SECURITY
Category	Programme Elective Course
Prerequisite	Computer Network

Paper-CSC304C	
Information Security	
UNIT-I:	8hrs
<p>Attacks on Computers and Computer Security: Introduction, The need for security, Security goals, Security attacks(Attack on Confidentiality,Integrity,Availability)Security Services and Mechanisms, Techniques(Cryptography,Steganography).</p> <p>Introduction to plain text and cipher text, encryption and decryption. substitution techniques, transposition techniques, symmetric and asymmetric key cryptography, steganography, possible types of cryptanalysis attacks.</p>	
UNIT-II:	12hrs
<p>Symmetric key Ciphers: Block Cipher principles &Algorithms(DES, AES, Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers RC4,Location and placement of encryption function.</p> <p>Introduction to number theory-Prime numbers,Euler’s Phi-Function,Fermat’s and Euler’s theorem, Chinese Remainder Theorem,Generating Primes(MersennePrime,Fermat Prime),Primality testing(Deterministic algorithms,Probabilistic algorithms)</p> <p>Asymmetric key Ciphers: Principles of public key cryptosystems, Algorithms(RSA, Diffie-Hellman), Key Distribution.</p>	
UNIT-III:	10hrs
<p>Message Authentication Algorithms and Hash Functions:Message authentication (MDC,MAC)Nested MAC,HMAC,CMAC,Whirlpool. Hash functions: MD5 Message Digest algorithm,SHA-1. Digital signatures, Authentication Applications: Kerberos, X.509 Authentication Service, Public — Key Infrastructure, Biometric Authentication.</p>	
UNIT-IV:	10hrs
<p>E-Mail Security: Pretty Good Privacy, S/MIME IP Security:IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, key management.</p> <p>Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction. Intrusion Detection System(types, techniques).</p> <p>Intruders, Virus and Firewalls: Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls.</p>	
Text Book:	
1. B. A. Forouzan,D.Mukhopadhyay,Cryptography and Network Security, 2 nd Edition, McGraw Hill, 2008.	

Course Code	CSC 304D
Course Name	DIGITAL IMAGE PROCESSING
Category	Program Elective Course
Prerequisite	Basics of Digital Electronics and Basic understanding of calculus

Paper-CSC304D	
Digital Image Processing	
UNIT-I:	08hrs
Digital Image Fundamentals and Transforms: Elements of visual perception: Light, Brightness adaption and discrimination, Pixels, coordinate conventions, Imaging Geometry, Image sampling and quantization Basic relationship between pixels: Basic geometric transformations-Introduction to Fourier Transform and DFT : Properties of 2D Fourier Transform , FFT, Separable Image Transforms ,Walsh – Hadamard – Discrete Cosine Transform, Haar, Slant – Karhunen – Loevetransforms.Perspective Projection, Spatial Domain Filtering, sampling and quantization	
UNIT-II:	08hrs
Image Enhancement Techniques: Spatial Domain methods: Basic grey level transformation, Histogram equalization, Image subtraction, Image averaging, Spatial filtering: Smoothing, sharpening filters,Laplacian filters, Frequency domain filters : Smoothing, Sharpening filters,Homomorphic filtering.	
UNIT-III:	16hrs
Image Restoration and Image Compression: Model of Image Degradation/restoration process: Noise models, inverse filtering, least mean square filtering, constrained least mean square filtering, blind image restoration, Pseudo inverse, Singular value decomposition. Lossless compression: Variable length coding: LZW coding, Bit plane coding- predictive coding, DPCM. Lossy Compression: Transform coding – Wavelet coding – Basics of Image compression standards: JPEG, MPEG, Basics of Vector quantization	
UNIT-IV:	08hrs
Image Segmentation and Representation: Edge detection: Thresholding, Region Based segmentation, Boundary representation: chain codes, Polygonal approximation, Boundary segments: boundary descriptors: Simple descriptors, Fourier descriptors, Regional descriptors, Simple descriptors, Texture.	
Text Book:	
1.Rafael C Gonzalez and Richard E Woods ,Digital Image Processing, 4 th Edition, Prentice Hall,2002.	

Reference Books:

1. Anil K Jain ,Fundamentals of Digital Image Processing, Prentice Hall
2. William K Pratt, John Willey ,Digital Image Processing, 4th Edition, CRC Press,2001.
3. Milan Sonka, Vaclav Hlavac, Roger Boyle, Image Processing Analysis and Machine Vision, 4th Edition.
4. B. Chanda, D. DuttaMagundar ,Digital Image Processing and Analysis,2nd Edition, Prentice Hall of India, 2000.

COURSE OUTCOMES:

After completion of this course successfully, the students will be able to-

CO1	Understand the need for image transforms and their properties
CO2	Develop any image processing application.
CO3	Understand the rapid advances in Machine vision
CO4	Learn different techniques employed for the enhancement of images
CO5	Understand a digital image and different processing techniques for the better analysis of an image

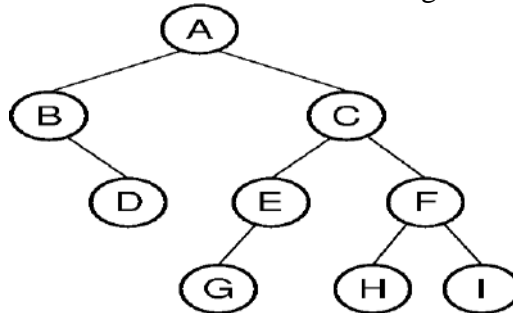
Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2			1	1		2	3	3	3
CO2	3	3	2	2	2	1	3	2		
CO3	2	3	1	3	2	1	2		2	3
CO4	2			3	3	1	3		2	3
CO5	2	1	3	3	3	3	3	2	3	3

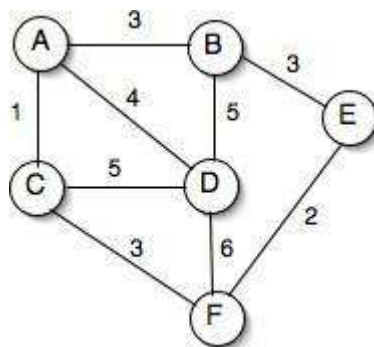
Lab III: Algorithms and DBMS

ALGORITHM PROGRAMS:

1. Sort a given set of elements using Selection Sort and Merge Sort and determine the time taken to sort the elements. The elements can be read from a file or can be generated using the random number generator.
2. Sort a given set of elements using Merge Sort and Quick Sort and determine the time taken to sort the elements. The elements can be read from a file or can be generated using the random number generator.
3. Implement 0/1 Knapsack problem using dynamic programming.
4. Perform various tree traversal algorithm for the given tree.



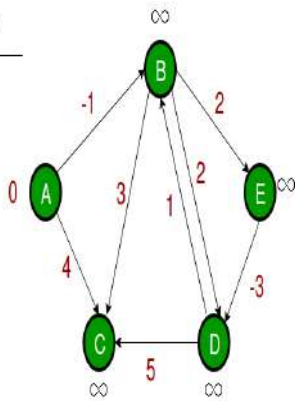
5. Print all the nodes reachable from a given starting node in a digraph using BFS method.
6. Check whether a given graph is connected or not using DFS method.
7. Find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm.
8. Find the Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.



9. Implement Bellman Ford algorithm as per the given input and output

A B C D E

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Input: Graph and a source vertex

Output: Shortest distance to all vertices from the source. If there is a negative weight cycle, then shortest distances are not calculated, negative weight cycle is reported.

10. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm

DBMS PROGRAMS:

1. Creation of a tables using create command and writing SQL queries to retrieve information from the tables.
2. Implement data definition languages (Create, Alter, Drop, Truncate, and Rename) & data manipulation languages (Insert, Update, and Delete) for updating and viewing records.
3. Implement SELECT command with different clauses (where clause, having clause, group by clause, order by clause).
4. Implement Single Row function (character, numeric, data functions).
5. To implement Group function (AVG, MIN, MAX, SUM).
6. Implement various types of integrity constraints (NOT NULL Constraint, DEFAULT Constraint, UNIQUE Constraint, PRIMARY Key, FOREIGN Key, CHECK Constraint).
7. Creation of Views, Synonyms, Sequence, Indexes, Save point.
8. Creating relationship between tables.
9. Implementation of PL/SQL block.
10. Write a PL/SQL block to satisfy some conditions by accepting input from the user.
11. Write a PL/SQL block that handles all types of exceptions.

IDSE PAPERS:

Course Code	CSC306A
Course Name	NETWORK AND INTERNET TECHNOLOGIES
Category	IDSE course
Prerequisite	Basic Mathematics

IDSE-Paper-CSC306A**Network and Internet Technologies****UNIT-I: 10hrs**

Computer Networks: Introduction to computer network, datacommunication, components of data communication, data transmission mode, data communication measurement, LAN, MAN, WAN, wireless LAN, internet, intranet,extranet.

Network Models: Client/ server network and Peer-to-peer network, OSI, TCP/IP, layersandfunctionalities.

UNIT-II: 10hrs

Transmission Media: Introduction, Guided Media: Twisted pair, Coaxial cable, Opticalfiber. Unguided media: Microwave, Radio frequency propagation,Satellite.**LAN Topologies:** Ring, bus, star, mesh and treetopologies.**Network Devices:** NIC, repeaters, hub, bridge, switch, gateway androuter.**Internet Terms:** Web page, Home page, website, internet browsers, URL, Hypertext, ISP, Web server, download and upload, online andoffline.

UNIT-III: 10hrs

Introduction to Web Design: Introduction to hypertext markup language (html) Document type definition, creating web pages, lists, hyperlinks, tables, web forms, inserting images, frames, hosting options and domain name registration.

UNIT-IV: 10hrs

Style Sheets: CSS-Introduction to Cascading Style Sheets-Features-Core Syntax-StyleSheets and HTML Style Rule Cascading and Inheritance-Text Properties-Box Model-Normal Flow Box Layout-Beyond the Normal Flow-Other Properties-Case Study.

Client-Side Programming: The JavaScript Language-History and Versions Introduction to JavaScript in Perspective-Syntax-Variables and Data Types-Statements-Operators-Literals-Functions-Objects-Arrays-Built-in Objects-JavaScript Debuggers.

Text Book:

1.J. A. Ramalho, Learn Advanced HTML 4.0 with DHTML, BPB Publications,2007

Reference Books:

1.B. A. Forouzan, Data Communication and Networking ,5th Edition, Tata McGrawHill, 2008.

- 2.D.R. Brooks, An Introduction to HTML and Javascript for Scientists and Engineers, 1stEdition, Springer, 2007.
- 3.Wendy Willard, HTML A Beginner's Guide, 4th Edition, Tata McGraw-Hill Education.
- 4.J. A. Ramalho, Learn Advanced HTML 4.0 with DHTML, 1st Edition, BPB Publications

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Understand the fundamental concepts of Computer networks with architecture.
CO2	Basic Concept of various Network Devices
CO3	Understand the basic concept of transmission media, LAN topology.
CO4	Understand Fundamentals of Web Design
CO5	Develop Web Applications using Web Technologies

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS1	PS2	PS3
CO1	2	2	2	1	2	1	1	2	2	1
CO2	2	2	2	1	2	1	2	2	2	1
CO3	2	2	2	2	2	1	2	2	2	1
CO4	2	2	2	1	2	1	2	2	2	2
CO5	2	2	2	1	2	1	3	2	2	2

Course Code	CSC306B
Course Name	FUNDAMENTALS OF COMPUTER
Category	IDSE course
Prerequisite	Basic Mathematics

IDSE Paper-CSC306B	
FUNDAMENTALS OF COMPUTER	
UNIT-I:	10hrs
Computer Basics: Simple model of computer, Problem solving using computer(flowchart, program, working of a computer, hardware and software). Data Representation: Character representation, representation of integers and fractions, Decimal to Binary conversion. Input / Output Units.	
UNIT-II:	10hrs
Memory System : Basics concepts (RAM, ROM, Speed, Size and Cost) Cache Memory concepts, Cache Memory mapping technique, Virtual Memory concepts, Secondary Storage, Processor: Structure of Instructions, Description of a processor, Machine Language program, Algorithm to simulate the hypothetical computer.	
UNIT-III:	10hrs
Binary Arithmetic: Addition, Subtraction, Signed numbers, Two's complement representation of numbers, Addition/ Subtraction of numbers in 2's complement notation, binary multiplication, binary division, floating point representation of numbers, arithmetic operation with normalized floating point numbers.	
UNIT-IV:	10hrs
Logic circuit: Switching circuits, AND, OR, NOT operation, Boolean functions, canonical forms of Boolean function, Logic circuits, Computer Architecture : Interconnection of Units, Processor to Memory communication, I/O devices to processor communication, Bus Architecture of personal Computers. Introduction to Programming Language, Operating System.	
Text Books:	
1. V.Rajaraman and N.Adabala, Fundamental of Computers, PHI, 2014 2. A.Goel, Computer Fundamentals, Pearson Education, 2010	
Reference Books:	
1. P.Aksoy, L.DeNardis, Introduction to Information Technology, Cengage Learning, 2006. 2. P.K.Sinha, P.Sinha, Fundamental of Computers, 8 th Edition ,BPB Publishers, 2007.	

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Describe the basic of computer.
CO2	Classify the architectural level of the system
CO3	Explain the memory and its related concepts of the system.
CO4	Evaluates the complements of the numbers both for positive and negative numbers.
CO5	Discuss the concepts of Programming languages and its basic classifications.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS1	PS2	PS3
CO1	2	1	1	1	2	1	1	1	1	1
CO2	2	1	1	1	2	1	1	1	1	1
CO3	2	1	1	1	2	1	1	1	1	1
CO4	2	1	1	1	2	1	1	1	1	1
CO5	2	2	2	1	2	1	2	2	2	2

Course Code	CSC306C
Course Name	INTRODUCTION TO PROGRAMMING USING PYTHON
Category	IDSE course
Prerequisite	Basic analytical and logical understanding including basic knowledge and usage of computers is required for this course. Prior experience with any other programming language will be beneficial.

IDSE Paper-CSC306C	
INTRODUCTION TO PROGRAMMING USING PYTHON	
UNIT-I:	10hrs
Introduction: Installation, First python Program: Interactive Mode Programming, Script Mode Programming, Identifiers, Reserved words, Lines and Indentation, Multi-Line Statements, Quotation & Comments,; Assigning values to Variables, Multiple Assignment.	
UNIT-II:	10hrs
Standard Data Types: Numbers, Strings, Lists, Tuples, Dictionary; Data type conversion; Basic Operators: Arithmetic, Comparison, Assignment, Bitwise; Operators: Logical, Membership, Identity; Operators Precedence; Python Numbers & Mathematical functions. Data type conversion: Basic operators: Arithmetic, Comparison, Assignment, Bitwise; Basic Operators, Python Numbers & Mathematical functions, Python Strings.	
UNIT-III:	12hrs
Python Statement and Loops: if, if-else, while, for loop, break, continue, pass, python function; Files I/O. Functions: Definition, call, positional and keyword parameter, Default parameters, variable number of arguments, Modules – import mechanisms, Functional programming – map, filter, reduce, max, min, lambda function – list comprehension.	
UNIT-IV:	08hrs
Object Oriented Programming : classes and objects, Inheritance –Polymorphism overloading, Error handling and Exceptions – try, except and raise- exception propagation File Processing : reading and writing files.	
Text Books:	
1. Nischay Kumar Hegde ,Python Programming Fundamentals – A Beginner’s Handbook, 1 st Edition, Educreation Publishing.	
Reference Books:	
1. Martin C. Brown ,The Complete Reference :Python.	

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Operate the installation of the software and its operation.
CO2	Memorize the programming elements of the Python language.
CO3	Break down the real world problems and model them using the data structures available in Python.
CO4	Design the programs using conditional and loop structures used in Python.
CO5	Explore the reusable structures in Python and compare this language with other languages to see its benefits.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3				1		1	1	1	1
CO2	3		2	1	1		1	2	1	2
CO3	3		3	2	2		2	3	2	3
CO4	3		3	3	2		3	3	2	3
CO5	3		3	3	2		3	3	3	3

Course Code	CSC 306D
Course Name:	ARTIFICIAL INTELLIGENCE
Category:	IDSE Course
Prerequisite:	Linear Algebra, Programming Language

Paper-CSC306D	
Artificial Intelligence	
UNIT-I:	10hrs
Introduction to Artificial Intelligence, AI Problems, AI Techniques, Problems, Problem Space and Search, Defining the problem as a state space search, Production system, Problem characteristics, Heuristic search Technologies: Generate and Test, Hill Climbing, Best First Search, Problem Reduction, means-end-analysis, optimal and A*, AND-OR Graphs, AO* Algorithms.	
UNIT-II:	10hrs
Representation Knowledge using Predicate Logic, Representing simple facts in logic, Representing Instance and ISA relationships, Computable functions and Predicates, Resolution, Representing Knowledge using Rules, Forward Vs Backward Reasoning, Matching, Control Knowledge, Weak slot and Filter structures, Semantic nets, Frames	
UNIT-III:	10hrs
Strong slot and Filter structures, Conceptual Dependencies, Scripts. Introduction to Non monotonic reasoning, Logics for Non monotonic reasoning, Implementation: Depth First Search, Dependency-Directed Back Tracking, Justification based Truth Maintenance Logic based Truth Maintenance systems, Statistical Reasoning, Probability and Bayes Theorem, Certainty factors, Rule based Systems, Bayesian Networks, Dempster-Shaffer Theory	
UNIT-IV:	10hrs
Minimax search, alpha-beta cutoffs, Planning system, Goal stack planning, Hierarchical Planning, Natural Language Processing., Syntactic Analysis, Semantic Analysis, Discourse and Pragmatic Processing. Introduction and Fundamentals of Artificial Neural Networks, Biological Prototype, Artificial Neuron, Single Layer Artificial Neural Networks, Multilayer Artificial Neural Networks, Training of Artificial Neural Networks, Genetic Algorithms	
Text Books:	
1. Elaine Rich, Kevin Knight, & Shivashankar B Nair, Artificial Intelligence, 3 rd Edition, McGraw Hill, 2009. 2. Wasserman, Neural Computing: Theory and Practice.	
Reference Books:	
1. George F. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, 6 th Edition, Pearson Education 2. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 3 rd Edition, Pearson Education, 2010. 3. Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, PHI. 4. Simon Haykin, Neural Networks: A Comprehensive Foundation, 2 nd Edition, Pearson Education.	

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Explore agents, environments, and search goal state using uninformed techniques in a state space.
CO2	Interpret logic, inference rules for decision making, and represent knowledge using semantic nets & frames.
CO3	Apply planning and reasoning to handle uncertainty in real life problems.
CO4	Design expert systems. to solve complex real-life problems.
CO5	Apply neural network and genetic algorithm to solve various mathematical and engineering problems.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3		2		2			1	1	1
CO2	3		3		3			3	3	3
CO3	3		3		3			3	3	3
CO4	3		3		3			3	3	3
CO5	3		3		3			3	3	3

Semester-IV

Course Code:	CSC401
Course Name:	MACHINE LEARNING
Category:	Programme Core Course
Prerequisite:	Basic knowledge of Mathematics

Paper-CSC401

Machine Learning

UNIT-I: **10hrs**

Introduction to machine Learning ((Supervised, Unsupervised and Reinforcement learning), Learning Models (Classification, Regression, Clustering).
Cluster Analysis, Partitioning Methods (k-Means, k-Medoids), Hierarchical Methods, Density-Based Methods, Evaluation of Clustering.

UNIT-II: **10hrs**

Conditional Probability, Bayes' Theorem, Naïve Bayes Classifier, K-nearest neighbour, Multiple linear regression, Shrinkage method, Ridge regression, Logistic regression, Linear Discriminant Analysis.

UNIT-III: **10hrs**

Neural Networks - Introduction, McP Neural Network, Perceptron Learning, Neural Networks - Backpropagation, Neural Networks - Initialization, Training & Validation. Decision Tree, Decision Tree Induction, Attribute Selection Measures, Information Gain, Gain Ratio, ID3, C4.5, Gini Index, CART.

UNIT-IV: **10hrs**

Support Vector Machine for linearly separable data, Kernel function, Support Vector Machine for linearly non-separable data.
Dimensionality reduction, Feature selection, Feature extraction, Principal Component Analysis. Model Cross-validation, Performance of Classification algorithms (Confusion Matrix, Precision and Recall).

Text Books:

1. T. Hastie, R. Tibshirani, and J. Friedman, The Elements of Statistical Learning-Data Mining, Inference, and Prediction, 2nd Edition, Springer Verlag, 2009.
2. S. Haykin, Neural Networks and Learning Machines, 3rd Edition, Pearson Education, 2009.

Reference Books:

1. Y. G. James, D. Witten, T. Hastie and R. Tibshirani, An introduction to Statistical learning with Applications in R, Springer, 2013.
2. C. M. Bishop, Pattern Recognition and Machine Learning, Springer, 2006.

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Explain the concepts of supervised machine learning and its functionalities.
CO2	Perform classification using Bayes classifier, SVM, Decision Tree, and Random Forest.
CO3	Reduce dimension of feature space using feature selection and feature extraction.
CO4	Explain the concepts of unsupervised machine learning and its functionalities.
CO5	Apply supervised and unsupervised machine learning methods to solve real life problems.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3		3		3			3	3	3
CO2	3		3		3			3	3	3
CO3	3		3		3			3	3	3
CO4	3		3		3			3	3	3
CO5	3		3		3			3	3	3

Course Code	CSC402
Course Name	SOFTWARE ENGINEERING AND OOAD
Category	Programme Core Course
Prerequisite	Knowledge of software, object oriented concept and databases

Paper-CSC402	
Software Engineering and OOAD	
UNIT-I:	10 hrs
Introduction to Software and Software Engineering: Basic concepts about software and program, the nature of software, Evolution of Software Engineering, Stakeholders in software engineering, Software quality, Software engineering projects, Activities common to software projects, Basic concepts on process and life cycle models. Models: Waterfall, Prototype, Evolutionary, Incremental, Spiral, Agile, V-model	
UNIT-II:	08hrs
Requirement Analysis: System and software requirements, Types of software requirements, Functional and non-functional requirements, Domain requirements, User requirement Elicitation and analysis of requirements, Overview of requirement techniques, Viewpoints, Interviewing, Scenario, Requirement validation, Requirement specification, Software requirement Specification (SRS)Structure and contents, SRS format.	
UNIT-III:	10hrs
Introduction to Object Oriented Technology: Development and OO Modelling History, Modelling Concepts. Object Oriented Analysis: Identifying Use-Cases, Complexity in Object Oriented Analysis, Business Process Modelling and Business Object Analysis, Use-Case Driven Object-Oriented Analysis, Use-Case Model.	

Class Modelling: Object and class concepts, link and association, Generalization and Inheritance, Advanced class modelling- aggregation, state diagram, state diagram behaviour, Relation of Class and State models. Interaction Modelling: Sequence models, Activity Diagrams.

UNIT-IV:

12hrs

Software Project Management: Overview of Project Management, Responsibilities of Project Manager, Project Planning, Metrics for Project Size Estimation, Factors Influencing Project Management, Project Estimation Techniques, COCOMO Model, Scheduling, Work Breakdown Structures (WBS), Activity Network, Critical Path Method (CPM), Program Evaluation and Review Technique (PERT), GANTT Chart, Risk Management.

Software Testing: Testing overview, concepts, Scope of Testing, Testing Constraints, Testing Life Cycle, Levels of Testing, System Testing, Blackbox Testing, Whitebox Testing, Integration Testing, Acceptance Testing, Performance Testing (Load testing, Stress testing, Scalability Testing, Stability Testing, Volume Testing, Smoke Testing). Basic Concepts of Regression Testing (Need of Regression Testing, How to perform Regression Testing, Testing Tools).

Text Books:

- 1.R. Mall, Fundamentals of Software Engineering, 5th Edition, PHI, 2019.
- 2.R.S. Pressman, Software Engineering, A Practitioner’s Approach, 7th Edition, McGraw-Hill, 2009
- 3.Timothy C. Lethbridge, Robert Laganière, Object-Oriented Software Engineering Practical Software development using UML and Java, 2nd Edition, McGraw-Hill.

Reference Books:

- 1.Sommerville, Software Engineering, 9th Edition, Addison Wesley.

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Define software terminologies, and generic view of the software engineering process.
CO2	Describe the SDLC phases and apply suitable life-cycle model in building of software products based on their characteristics.
CO3	Apply object oriented analysis and design to build a software system.
CO4	Explain the scheduling, project management tasks and design artefacts.
CO5	Summarize different testing strategies and implement them appropriately.

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	1	2	3	2	1			2		1
CO2	2	1		2		2			2	
CO3	2	3	2		3			3		2
CO4	1	3	1	1			3		1	
CO5	3	3	3		2	1		3		3

Course Code	CSC403
Course Name	CLOUD COMPUTING
Category	Programme Core Course
Prerequisite	Computer Networks and Operating Systems

Paper-CSC403	
Cloud Computing	
UNIT-I:	8hrs
Distributed System Models and Enabling Technologies: scalable computing over the Internet, technologies for network-based systems, system models for distributed and cloud computing, software environments for distributed systems and clouds, performance, security, and energy efficiency.	
UNIT-II:	8hrs
Virtual Machines and Virtualization of Clusters and Data Centers: implementation levels of virtualization, virtualization structures/tools and mechanisms, virtualization of CPU, memory and I/O devices, virtual clusters and resource management, virtualization of data-center automation.	
UNIT-III:	10hrs
Cloud Platform Architecture over Virtualized Data Centers: cloud computing and service models, data-center design and interconnection networks, architecture design of compute and storage clouds, public cloud platforms: GAE, AWS (EC2 and S3) and Azure, inter-cloud resource management, cloud security and trust management.	
UNIT-IV:	14hrs
Cloud Programming and Software Environments: features of cloud and grid platforms, parallel and distributed programming paradigms, programming support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, emerging cloud software environments	
Advanced Topics in Cloud Computing and Applications: Energy efficiency in clouds, market-based management of clouds, federated clouds/intercloud, third-party cloud services, scientific applications: healthcare, biology, geoscience and business and consumer applications.	
Text Books:	
1.Kai Hwang, Geoffery C. Fox and Jack J. Dongarra, Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet”, 1 st Edition, Morgan Kaufman Publisher, an imprint of Elsevier, 2012.	
2.RajkumarBuyya, Christian Vecchiola and S. ThamaraiSelvi, “Mastering Cloud Computing: Foundations and Applications Programming, MK Publisher, Elsevier, 2013	
Reference Books:	
1.Tom White, HadoopThe Definitive Guide, 4 th Edition. O’Reilly, 2009.	
2.Ian Foster, Carl Kesselman,The Grid: Blueprint for a New Computing Infrastructure, 2 nd Edition, Morgan Kaufmann.	

3..P. K. Pattnaik, M. R. Kabat and S. Pal, Fundamentals of Cloud Computing, Vikas Publishing House Pvt. Ltd., 2015

	COURSE OUTCOMES: After completion of this course successfully, the students will be able to-
CO1	Ability to understand various service delivery models of a cloud computing architecture
CO2	Describe the concepts of service-oriented architecture
CO3	Analyze the different workflows of service-oriented architecture
CO4	Ability to understand the security challenges and address the challenges
CO5	Understand the ways in which the cloud can be programmed and deployed

Mapping of COs to POs (1: Low, 2: Medium, 3: High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	1	2	2	2		1	3	3	3
CO2	3	3	1	1	3		2	2	2	2
CO3	2	2	3	3	1		2	3	2	1
CO4	1	2	1	2	2		3	2	3	3
CO5	2	1	2	1	3		2	2	1	2

Paper-CSC404

Project Work Report and VIVA VOCE

Web-development project: Students must follow software engineering principles to make the project.

Research project: Students can take a research work, review the related literatures, then propose a method or implement an existing one.

MOOCs-1/MOOCs-2

Students are required to complete any **two** of the following MOOCs courses to earn a maximum of 6 credits duration anytime during his/her entire two years of MSc. Computer Science from <https://swayam.gov.in>. as well as <https://nptel.ac.in>. The course completion certificate of below said courses need to be submitted in the final year at the time of Project Viva.

1.An Introduction to Coding Theory	2.Big Data Computing
3. Computer Graphics	4. Applied Natural Language Processing
5.An Introduction to Artificial Intelligence	6.Google Cloud Computing Foundations
7. AI: Knowledge Representation and Reasoning	8.Probability for Computer Science
9. R	10.Computer Application in Business
11.Peer to Peer Networks	12.Animations
13. Parallel Algorithms	14. Distributed Computing systems
15.Pattern Recognition	16.Real Time Systems
17.Blockchain Architecture Design and use cases	18.Computational Complexity Theory
19.Deep learning	20.Data Analytics with Python
21.Embedded System Design	22.Android app using Kotlin
23.Introduction to Haskell programming	24. Human-Computer Interaction
25.Arduino	26.Software Project Management
27.Introduction to Soft computing	28.Computer Vision
29.Switching Circuits and Logic Design	30.Virtual Reality

Apart from the above courses if any student wishes to do any course from <https://swayam.gov.in>. as well as <https://nptel.ac.in> (but it should not be taught in their course curriculum of 1st, 2nd, 3rd, 4th Semesters) they are allowed to do so with a prior approval of HOD, Computer Science.

COURSES OF STUDIES

FOR

M.A. IN EDUCATION

(CBCS Syllabus)

Session –2023-2024



**SCHOOL OF EDUCATION
GANGADHAR MEHER UNIVERSITY
AMRUTA VIHAR, SAMBALPUR,
ODISHA, 768004**

Programme Outcomes (POs)

Programme Outcomes of M.A. programme of Gangadhar Meher University are as follows.

PO1. Knowledge and Comprehension about Theories and Practice in Education: Demonstrate (i) in-depth knowledge and understanding about fundamental concepts, theories, Models of other inter-related social and behavioral sciences (Philosophy, psychology, sociology, Management, history, economics etc.), and their implications in the field of Education for educational policy formulation; designing teaching-learning process; educational management, curriculum construction; teaching and learning, assessing student's learning. (ii) Knowledge and understanding of different schools of philosophy and their implications on different aspects of education; schools of psychology for understanding psychological attributes and designing teaching learning as per their attributes; sociological phenomena and their implications on child's socialization process, instructional designing; present innovations in field of teaching-learning process, policy, examination system.

PO2. Critical Thinking Abilities: Demonstrate critical thinking abilities to analyze effectiveness of existing policies and pedagogical practices to address educational issues like Access, equity, excellence, retention, dropout, stagnation, under achievement, maladjustment etc. Critically evaluate current issues, trends in the practices of classroom instruction, curriculum development process and apply that knowledge appropriately in the development of curricula and instructional strategies.

PO3. Applications: Design appropriate and effective curricula and instructional strategies with reference to current theories of learning and pedagogy, including meeting the needs of diverse learners.

PO4. Use of Modern Tools and Technique: Select and effectively utilize modern technologies for designing and delivery of instruction for enhancing student learning and address the problem of access to education.

PO5. Conducting Research in Academic field: Conduct good quality research by scientifically identification of problem based upon research gap and socially relevance, formulating research questions or hypothesis, collecting appropriate data by the use of standardized or self-developed tools, analyzing data qualitatively or quantitatively and draw reasonable conclusions and offer offer sound recommendations based on those conclusions.

PO6. Establishing link between School and Society: Developing the sense that both these agencies are mutually interdependent, socially problems have a root in ineffective educational system and vice versa and education is a powerful medium of positive social change.

PO7. Competency to Pursue Higher Education: Integration of theoretical knowledge with practical experience to conduct research in various aspects of education will create opportunities for pursuing higher education, like Ph.D.

Programme Specific Outcomes (POs)

Programme Outcomes of M.A. (Education) programme of Gangadhar Meher University are as follows.

PO1. *Disciplinary Knowledge in Education:* Demonstrate (i) in-depth knowledge and understanding about fundamental concepts, theories, Models of other inter-related social and behavioral sciences (Philosophy, psychology, sociology, Management, history, economics etc.), and their implications in the field of Education for educational policy formulation; designing teaching-learning process; educational management, curriculum construction; teaching and learning, assessing student's learning. (ii) Knowledge and understanding of different schools of philosophy and their implications on different aspects of education; schools of psychology for understanding psychological attributes and designing teaching learning as per their attributes; sociological phenomena and their implications on child's socialization process, instructional designing present innovations in field of teaching-learning process, policy, examination system.

PO2. *Critical Thinking Abilities in Education:* Demonstrate critical thinking abilities to analyze effectiveness of existing policies and pedagogical practices to address educational issues like Access, equity, excellence, retention, dropout, stagnation, under achievement, maladjustment etc. Critically evaluate current issues, trends in the practices of classroom instruction, curriculum development process and apply that knowledge appropriately in the development of curricula and instructional strategies.

PO3. *Applications of theories in Education:* Design appropriate and effective curricula and instructional strategies with reference to current theories of learning and pedagogy, including meeting the needs of diverse learners.

PO4. *Use of Modern Tools and Technique in Educational research:* Select and effectively utilize modern technologies for designing and delivery of instruction for enhancing student learning and address the problem of access to education.

PO5. *Conducting Research in Academic field:* Conduct good quality research in education by scientific identification of problem based upon research gap in educational fields and socially relevance, formulating research questions or hypothesis, collecting appropriate data by the use of standardized or self-developed tools, analyzing data qualitatively or quantitatively and draw reasonable conclusions and recommend for appropriate educational policies for providing quality education.

PO6 *Establishing link between School and Society:* Developing the sense that both these agencies are mutually interdependent, socially problems have a root in ineffective educational system and vice versa and education is a powerful medium of positive social change.

PO7. *Competency to Pursue Higher Education:* Integrate theoretical knowledge of education with practical experience in real life context to conduct research in various aspects of education to create opportunities for pursuing higher education, like Ph.D. and post-doctoral degrees.

Programme Structure at a Glance

M.A. in EDUCATION Programme comprising two years, will be divided into 4 (four) semesters, each of six months duration, total 88 credits and 2200 marks.

Year	Semester	Credit	Marks
1 st	I	20	500
	II	24	600
2 nd	III	24	600
	IV	20	500
Total		88	2200

Detailed Course Structure and Distributions of Marks

1st Year: Semester-I

Courses		Distributions of Marks		Total Marks	Credit
Course No	Title	Mid Term	End Term		
101	Philosophical Foundation of Education	20	80	100	4
102	Sociological Foundation of Education	20	80	100	4
103	Psychological Foundation of Education	20	80	100	4
104	Recent Trends and Issues in Education	20	80	100	4
105	Practicum	c-101	100	100	4
		c-102			
		c-103			
		c-104			
Total				500	20

1st Year: Semester-II

Courses		Distributions of Marks		Total Marks	Credit
Course No	Title	Mid Term	End Term		
201	Educational Measurement and Evaluation	20	80	100	4
202	Educational Management	20	80	100	4
203	Curriculum Development	20	80	100	4
204	Pedagogical Trend and Issues	20	80	100	4
205	Practicum	c-201	100	100	4
		c-202			
		c-203			
		c-204			
DSE Papers*					

206(A)	Open and Distance Learning	20	80	100	4
206(B)	Environmental Education and Sustainable Development	20	80	100	4
206(C)	Early Childhood Care and Education	20	80	100	4
206(D)	Comparative Education	20	80	100	4
Total				600	24

**Discipline Specific Elective Paper. Any one paper can be opted by students of this Department. Minimum student's strength to run the course in each elective paper should be 8.*

2nd Year: Semester-III

Courses		Distribution of Marks		Total Marks	Credit
Course No	Title of Course	Mid Term	End Term		
301	Research Methodology in Education	20	80	100	4
302	Advanced Educational Statistics	20	80	100	4
303	Advanced Educational Technology	20	80	100	4
304	Development of Education in India	20	80	100	4
305	Practicum	c-301(a)	-	100	100
		c-301(b)			
		c-302			
IDSE Papers*					
306(A)	Philosophical Foundation of Education	20	80	100	4
306(B)	Sociological Foundation of Education	20	80	100	4
306(C)	Psychological Foundation of Education	20	80	100	4
306(D)	Economics of Education	20	80	100	4
Total				600	24

**Inter Discipline Specific Elective Paper. Any one paper can be opted by students from other Departments.*

2nd Year: Semester-IV

Courses		Distributions of Marks		Total Marks	Credit
Course No	Title	Mid Term	End Term		
401	Higher Education in India	20	80	100	4
402	Teacher Education	20	80	100	4
403	Guidance and Counseling in Education	20	80	100	4
404	Inclusive Education	20	80	100	4
405	Dissertation (Practical)		100	100	4
	Total			500	20
22 Papers	Grand Total			2200	88

N.B.: -

There will be two elective groups namely:

- Discipline Specific Elective in Sem-II
- Inter Disciplinary Elective in Sem-III.

A student has to select one of the DSE course in Sem-II and one of the courses in Sem-III as offered by the respective Department at the beginning of the semester II and semester-III respectively.

1. Each course will be of 100 marks out of which 80 marks shall be allocated for Term End examination and 20 marks for internal assessment (Mid Term Examination).
2. There will be four lecture hours of teaching per week for each Course and total numbers of classes are given in the detailed syllabus section.
3. Duration of examination for each course hall is three hours.

4. Pass Percentage:

- The minimum marks required to pass any course shall be 40 percentages in each course and 40 percentages in aggregate of a semester.
No students will be allowed to avail more than three (3) chances to pass in any course inclusive of first attempt.

FIRST SEMESTER

EDN-101

Philosophical Foundations of Education

Course Outcomes

On completion of this course, the students shall be able to

- CO1** Define and describe about different Western and Indian philosophical thoughts in the light of Metaphysic, Epistemology, Axiology and their educational implications.
- CO2** Compare (similarities and differences) between different philosophical thought in the light of above dimensions.
- CO3** Critically analyze the present educational practices in the philosophical context.
- CO4** Describe the contributions of Western and Indian thinkers in education.
- CO5** Elaborate philosophical outlook to relate and analyze the context and problems of education.

Unit –I Western Schools of Philosophy

No. of classes 12

- Idealism, Realism, Naturalism, Pragmatism, Existentialism, Marxism, Logical Positivism with special reference to Metaphysic, Epistemology, Axiology and their educational implications for aims, curriculum, method of teaching, role of teacher and students and discipline.

Unit- II Indian Schools of Philosophy

No. of classes 12

- Jainism, Buddhism, Samkhya, Vedanta with special reference to Metaphysic, Epistemology, Axiology and their educational implication of aims, curriculum, method of teaching, role of teacher and students and discipline.

Unit-III Contribution of Western Thinkers to Educational Theories and Practice

No. of classes 08

- J.J. Rousseau, John Dewey, Ivan Illich, Paul Freire.

Unit-IV Contribution of Indian Thinkers to Educational Theories and Practice

No of classes 08

- Shri Aurobindo, Vivekananda, R.N. Tagore. M.K. Gandhi.

Mode of transaction

Lecture-cum-Discussion, Blended learning, Seminar, Workshop.

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	1	1	2	2	2	1	1	1	3	1	1	2	1
CO2	1	1	3	2	1	2	2	1	1	1	3	3	1	1
CO3	2	2	1	1	2	2	2	1	1	3	1	1	1	1
CO4	1	1	1	1	1	2	1	1	1	1	1	2	1	1
CO5	3	2	2	2	3	2	2	2	2	1	1	1	2	1

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

Suggested Readings

Agrwal, J.C.(2010).*Teacher and education in a developing society*. Delhi: Vikash Publishing House.

Ayer, A.J.(1959).*Logical positivism*. New York: The Free Press. Ayer,

A.J.(1936). *Language, truth and logic*. U.S.A.: Penguin Books.

Arulsarmy, S. (2011).*Philosophical and sociological perspectives on education*.New Delhi: Neelkamal Publication Pvt. Ltd.

Bhatia,K.K.(2011). *Philosophical and sociological foundation of education*. New Delhi: Kalyani Publishers.

Brubacher, J.S. (1939). *Modern philosophies of education*. New York, USA: McGraw.

Butler,J.D.(1959). *Four philosophies and their practices in education and religion*. New York: Harper.

Chaube, S.P. & Chaube, A. (2009). *Foundation of education*. New Dehli: Vikash Publishing House Pvt.Ltd.

Kneller F.(1971). *Introduction to philosophy of education*. New York, USA: Macmillan.

Masih, Y. (2017). *A critical history of western philosophy*. New Delhi: Motilal Banarsidass.

Ross, J. S. (1960). *Ground work of educational theory*. London. U.K: George G.

Harrap & Co.

Rusk, R. R. (1992). *Philosophical bases of education*. London, U.K: Oxford University of London Press Ltd.

Sharma.C.D.(2016). *A critical survey of Indian philosophy*. New Delhi:Motilal Banarsidass

Wingo, G.M. (1974). *Philosophies of education*. New Delhi: Sterling Publishers

EDN- 102

SOCIOLOGICAL FOUNDATION OF EDUCATION

Course Outcomes

On completion of this course, the students shall be able to

- CO1 Identify different issues about inequality in Indian society.
- CO2 Relate different social situation and practices of education.
- CO3 Explain concept of social stratification, social change and social mobility.
- CO4 Critically analyze the social phenomenon in the context of Indian society.

Unit-I Introduction to Educational Sociology No. of classes 11

- Concept of Sociology of education, Approaches of sociology of education: Symbolic interaction, Structural Functionalism and Conflict theory.
- Relationship between sociology and Education
- Concept and types of social institutions and their functions: family, school and Society.

Unit-II Education and Social Change No. of classes 09

- Education and social change: meaning, nature and types of social change, role of education in social change
- Social mobility: meaning and types, Role of education in Social mobility
Theories of social change and their educational implication – Evolutionary theory, Functional theory, Cyclical theory and Conflict theory.

Unit- III Process of social change No. of classes 11

- Concept of social movements and theories: Relative Deprivation, Resource mobilization and Political Process theory, New social movement theory
- Education in current Social Context: Westernization, Urbanization and Sanskritization

Unit –IV Social stratification and issues in Indian society No. of classes 09

- Illiteracy, Casteism, Gender discrimination, Unemployment, Drug addiction,

Wastage and Stagnation

- Concept of equality and equity, social values as enshrined in the constitution- Socialism, secularism, justice, liberty, freedom, democracy and equality.

Mode of transaction

Lecture-cum-discussion, Blended learning, Seminar, Workshop.

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	3	1	1	1	1	1	2	1	1	3	1
CO2	2	3	2	2	2	1	1	1	1	1	1	1	1	1
CO3	2	2	3	2	1	2	2	1	2	2	2	2	1	1
CO4	2	3	1	2	2	2	2	2	2	1	2	1	1	2

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READINGS:

Abraham, M.F. (2008). *Contemporary sociology*. New Delhi: Oxford University Press.

Agrwal, J.C. (2010). *Teacher and education in a developing society*. Delhi: Vikash Publishing House.

Arulsarmy, S. (2011). *Philosophical and sociological perspectives on education*. New Delhi: Neelkamal Publication Pvt.Ltd.

Bhatia, K.K. (2011). *Philosophical and sociological foundation of education*. New Delhi: Kalyani Publishers.

Brown, F.J. (1954). *Educational sociology*. New York: Prentice Hall.

Chaube, S.P. & Chaube, A. (2009). *Foundation of education*. New Delhi: Vikash Publishing House Pvt.Ltd.

Clark, P. (2001). *Teaching and learning: The culture of pedagogy*. New Delhi: Sage Publication.

Dewey, J. (1916). *Democracy and education*. New York: MacMillan.

Dewey, J. (1973). *The school and society*. Chicago: University of Chicago Press.

Mathur, S.S. (1966). *A sociological approach to Indian education*. Agra: Vinod Pustak Mandir.

Pathak, R.P. (2012). *Philosophical and sociological principls of education*. Delhi:Pearson.

Ottaway, A.K.C. (1966). *Education and society*. London: Routledge and KeganPaul.

Safaya, R.N. & Shaida, B. D. (2010). *Modern theory and orinciples of education*.New Delhi: Dhanpati Publishing Company Pvt. Ltd.

Srinivas, M.N. (1986). *Social change in modern India*. Bombay: Allied Publishers.

Rusk, Robert R. (1996). *Philosophical bases of education*. London, U.K: Oxford University of London Press Ltd.

EDN-103

PSYCHOLOGICAL FOUNDATION OF EDUCATION

Course Outcomes

On completion of this course, the students the students shall be able to

- CO1** Describe different theories and approaches of Psychology: learning, motivation, intelligence, creativity and personality.
- CO2** Compare among different psychological perspectives on student behavior, learning process and adjustment.
- CO3** Critically analyze different approaches of learning.
- CO4** Administer and interpret different psychological test to measure psychological traits.

Unit-I Education and School of Psychology

No. of classes 08

- Schools of psychology and their contribution towards education- Behaviorism, Psychoanalysis, Gestalt and Constructivism,

Unit-II Learning and Motivation

No. of classes 12

- Learning theories and process- Conditioning theory (Classical conditioning, Operant conditioning), Modelling theory (Bandura's Social theory) and Humanism theory (Carl Rogers theory of learning).
- Tolman's theory of learning, Kurt Lewin' field theory, Bloom's mastery learning, Ausubel's meaningful learning and Gagne's hierarchical learning.
- Theories of motivation and their educational implication: McClelland's need for achievement, Vroom's expectancy theory, Maslow's Hierarchical theory of needs.

Unit- III Intelligence and Creativity

No. of classes 12

- Concept and theories of intelligence
- Intelligence theories and their educational implications- Structure theories (Uni factor, Two factor, Multi factor, Structure of intelligence, Triarchic theory of intelligence (Sternberg), Cattell's theory of intelligence, Multiple theory of intelligence (Gardner), Measurement and types of intelligence test.
- Creativity – concept and theories of creativity, Stages of creative thinking, Fostering creativity talents among students through education, Measurement and types of creativity test.

Unit- IV Personality and Adjustment Mechanism

No. of classes 08

- Personality- concept and types, Type and Trait theories of personality, Type-cum-trait theories, Measurement of personality,
- Mental health and hygiene, Process of adjustment, conflicts and defense mechanism.

Mode of transaction

Lecture-cum-discussion, Blended learning, Seminar, Workshop, Small group discussion.

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	1	1	2	1	1	1	1	2	1	3	2
CO2	2	3	2	2	2	2	1	1	2	2	1	2	1	2
CO3	2	2	3	2	1	1	1	2	2	2	2	2	2	1
CO4	2	3	1	2	1	2	1	2	1	3	1	2	3	2

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READINGS:

Anastasi, A. (2016). *Psychological testing*. New Delhi: Pearson.

Block, J.H. (1971). *Mastery learning: Theory and practice*. New York: Holt Rinehart and Winston.

Bloom, B.S. (1976). *Human characteristics and school learning*. New York: McGraw Hill.

Bruner, J.S. (1973). *Beyond the information given: Studies in psychology of knowing*. New York: W W Norton and Company Incorporation.

Chauhan, S.S.(2007).*Advanced educational psychology*. New Delhi: Vikas Publishing House.

Dash, M. & Dash, N.(2016). *Fundamentals of educational psychology*. New Delhi: Atlentic.

Freeman, F.S.(1962).*Theory and practice of psychological testing*. New Delhi: Oxford & IBH.

Gagne, R.M.(1985). *The conditions of learning and theory of instruction*.USA: Harcourt Brace College.

Klausmeier, H.J.(1984).*Educational psychology*. New York: Harpercollins College Div.

Pass, S.(2004). *Parrel paths to constructivism: Jean Piaget and Lev Vygotsky*.Nprth Carolina: Information Age Pub.

Piaget, J.(1969).*The psychology of child*. New York: Basic Books.

Piaget, J.(1999).*The psychology of intelligence*. New York: Taylor and Francis.

Santrock,J.W.(2011).*Educational psychology*. Chennai: McGraw Hill.

Sternberg, R.J. and Sternberg, K.(2011).*Cognitive psychology*. California: Wadsworth Publishing Co Inc.

Vygotsky, L.S.(1978).*Mind in society*. Cambridge: Harvard University Press.

Vygotsky, L.S.(1986). *Thought and language*. Columbia: MIT Press.

Wolkfolk, A.(2014).*Educacational psychology*. New Delhi: Pearson.

EDN-104

RECENT TRENDS AND ISSUES IN EDUCATION

Course Outcomes

On completion of this course, the students shall be able to

- CO1** Identify recent trends and issues in education from global and Indian context.
- CO2** Explain the constitutional and educational policies for primary, secondary, Higher education and inclusive education.
- CO3** Critically analyze the importance and the functions of different regulatory and statutory bodies of education.
- CO4** Explain the role of different agencies for quality assessment and assurance in higher education.

Unit -1 Regulations and Acts in Education

No. of classes 08

- Constitutional Provision in education; National policies on education during post – independence period;
- Right of Children to Free and Compulsory Education (RCFCE-2009);
- The Rights of Persons with Disabilities Act (RPWD Act- 2016).

Unit- II Global Trends in Education

No. of classes 08

- Globalization, Liberalization and Privatization- Concept, importance and their impact on education
- Education for international harmony and peace;
- Women empowerment and education; Education for socially marginalized sections.

Unit- III Role of Autonomous bodies and recent Schemes /programme in Education

No. of classes 12

- Role and function of UGC, NCERT, NCTE, MHRD
- Autonomy: full autonomy and graded autonomy;
- Choice Based Credit System (CBCS); Grading system, Open book examination system
- Rashtriya Uchchar Shiksha Abhiyan (RUSA); Samagra Shiksha Abhiyan
- Study Webs of Active- learning for Young Aspiring Minds (SWAYAM), Massive Open Online Courses (MOOCs).

Unit-IV Quality Assessment and Assurance

No. of classes 12

- Quality assessment and assurance in higher education- concept, need and importance, problems and issues;

- National Assessment and Accreditation Council (NAAC) and its role;
- National Institutional Ranking Framework (NIRF) and its role;
- Shanghai Reports.

Mode of transaction

Lecture-cum-discussion, Blended learning, Seminar, Workshop.

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	2	1	2	1	1	1	3	2	2	2	1
CO2	2	3	2	2	2	2	3	2	2	3	3	3	3	3
CO3	2	2	3	1	2	2	2	1	1	3	1	2	1	4
CO4	2	3	1	2	2	3	2	1	2	3	2	3	2	2

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READINGS

MHRD.(1986). *National policy on education*. New Delhi: Govt. of India.

MHRD.(2013).*Rashtriya uchchatar shiksha abhiyan*. New Delhi: Govt. of India.

Ministry of Law and Justice.(2009). *The right of children to free and compulsory education act-2009*. New Delhi: Govt. of India.

MSJE. (2016). *Person with disabilities act*. New Delhi: Govt. of India.

Saranghi, H. & Barik, P.(2018). *College autonomy and quality in higher education*. New Delhi: Pacific Books International.

EDUCATION- 105

Practicum

- **Practicum- I** Students will present a Seminar paper on any topic from Educational Philosophy.
No. of classes 04
- **Practicum- II** Students will submit a report by collecting data on any one social issues from their locality (Illiteracy, Gender discrimination, Child labor or any other issue).
No. of classes 04
- **Practicum- III** Administer and interpret any psychological tests: Personality test, Intelligence test and Creativity test.
No. of classes 04
- **Practicum- IV** Submission of one term paper from any topic (Recent trends in education, existing statutory policies for education, quality management process in education).
No. of classes 04

SECOND SEMESTER

EDN-201

EDUCATIONAL MEASUREMENT AND EVALUATION

COURSE OUTCOMES

On completion of this course, the students shall be able to

- CO1** Describe and differentiate about the various concept like Test, Measurement Assessment and Evaluation.
- CO2** Explain the conceptual framework of educational Measurement, Assessment and Evaluation.
- CO3** Calculate the Psychometric properties of the test.
- CO4** Explain the quality of good test.
- CO5** Construct and standardized of an Achievement test and prepare different types of test items.
- CO6** Critically evaluate the various Models of Evaluation.

Unit-1 Test, Measurement, Assessment and Evaluation

No . of classes- 09

- Meaning, nature, process and importance of Test, Measurement, Assessment and Evaluation.
- Types of evaluation – Placement, Formative, Diagnostic, Summative; Criterion- Referenced and Norm- referenced evaluation; power vs speed test.
- Approaches of Assessment – Assessment of learning, Assessment for learning, Assessment as learning.
- Scales of Measurement- Nominal, Ordinal, Interval and Ratio.

Unit-II Construction and Standardization of Achievement Test

No. of classes- 13

- Process of test construction – Planning, Preparation, Tryout and Evaluation.
- Types of Achievement Test – Teacher-Made, Standardized test
- Types of test items – objective types (Recognition and Supply), Subjective types (Extended and Restricted), Reflective types, Interpretive types
- Item Analysis: Items discrimination, Items difficulties, Plausibility of distractor.
- Attitude scale: Concept and types - Thurstone, Likert Scale, Semantic differential.

Unit-III Characteristics of good Test

No. of classes- 14

- Reliability – Concept, types, method of computation and factors affecting Reliability.
- Validity – Concept, types, Approaches of Validity and factors affecting Validity
- Objectivity: Concept
- Usability: Concept
- Interpretation of test scores. Standard Scores- Z-Score, T-Score, Stanine, Percentile, Percentile Rank and Grading (Absolute grading and Relative grading)

Unit-IV Models of Educational Evaluation and Assessment

No. of classes- 12

- Goal attainment model
- Judgmental model
- Decision facilitation model
- Naturalistic model
- Continuous Comprehensive Evaluation.
- Portfolio, Rubric, Hot Potato, Self -Evaluation, Peer-Group Evaluation

MODES OF TRANSACTION: Lecture cum Discussion method, Observational Design, New approaches of Teaching providing Self-learning instructional Materials, Blended learning, Seminar, Workshop.

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	1	2	2	1	1	2	1	1	2	1	1	2
CO2	2	3	2	1	2	1	2	1	2	2	3	1	3	2
CO3	2	2	3	2	1	2	2	1	1	3	2	1	1	1
CO4	2	3	1	2	2	1	2	2	2	3	2	2	2	2
CO5	2	1	1	3	2	2	2	3	3	3	3	2	1	1
CO6	1	2	2	2	2	1	1	2	1	3	2	1	2	3

2. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READING SOURCES:

Anastasi,A.(1976). *Psychological testing*. New York: Macmillan Publishing Co.

Anderson, L.W. (2003). *Classroom assessment: Enhancing the quality of teacher decision making*. Mahwah, New Jersey: Lawrence Erlbaum Associates.

Burke, K. (2005). *How to assess authentic learning*. Thousand Oaks, CA: Corwin.

Cooper, D. (2007). *Talk about assessment: Strategies and tools to improve learning*. Toronto, Ontario: Thomson Nelson.

Ebel, R.L. & Frisbie,D.A.(1991). *Essential of educational measurement*. New Delhi: PrenticeHall of India Ltd.

Freeman, F.S. (1962). *Theory and practice of psychological testing*. Oxford IBH Publishing: New Delhi.

Garrett, H.E.(1973). *Statistics in psychology and education*. Bombay: Vakils, Feffers & Simon.

Gronlund, N.E.& Linn,R.L.(2009). *Measurement and assessment in teaching*. Upper Saddle River, NJ: Pearson Education, Inc.

- Newman, F.M. (1996). *Authentic achievement: Restructuring schools for intellectual quality*. San Francisco, CA: Jossey-Bass.
- Nitko, A.J. (2001). *Educational assessment of students*. Upper Saddle River, NJ: Prentice Hall.
- Popham, W.J. (1993). *Modern educational measurement*. Englewood Cliffs, N.J.:Prentice Hall.
- Popham, W.J. (2010). *Classroom assessment: What teachers need to know*. New York: Prentice Hall.
- Stanley, J.C. and Hopkins, K.D. (1990). *Educational and psychological measurement and evaluation*. New Jersey: Prentice Hall of India Ltd.

EDN-202

EDUCATIONAL MANAGEMENT

COURSE OUTCOMES

On completion of this course, the students shall be able to

- CO1.** Describe and differentiate among concept of Administration, Management, Leadership.
- CO2 .** Explain the concept, theories and styles of leadership in Educational Management.
- CO3.** Illustrate the concept of leadership and different leadership styles in Education
- CO4** Compare between the Educational Management and Educational Administration
- CO5.** Describe the concept, principles of Total Quality Management approach in education.
- CO6.** Critically Evaluate the conceptual framework of Educational Management, Administration and Leadership.
- CO7.** Analyze different models of Leadership and their application in the field of Education.
- CO8.** Explain the role of various Quality Assurances agencies in Education.

Unit-I Educational Management and Administration

No. of classes- 12

- Educational Management and Administration – Meaning, Principles, Functions and importance, Institutional building, POSDCORB, CPM, PERT
- Management as a system, SWOT analysis, Taylorism, Administration as a process, Administration as a bureaucracy.
- Human relations approach to Administration, Organizational compliance, Organizational development, Organizational climate, Organizational Effectiveness.

Unit-II Leadership in Educational Administration**No. of classes- 12**

- Leadership in Educational Administration: Meaning and Nature,
- Approaches to leadership: Trait, Transformational, Transactional, Value based, Cultural, Psychodynamic and Charismatic,
- Models of Leadership (Blake and Mouton's Managerial Grid, Fiedler's Contingency Model, Tri-dimensional Model, Hersey and Blanchard's Model, Leader-Member Exchange Theory)

Unit-III Quality in Educational Management**No. of classes- 08**

- Concept of Quality and Quality in Education: Indian and International perspective
- Evolution of Quality: Inspection, Quality Control, Quality Assurance
- Total Quality Management (TQM), Six sigma,
- Quality Gurus: Walter Shewart, Edward Deming, C.K Pralhad
- Role of SMC and SMDC in institutional Management

Unit-IV Modern Techniques and Change Management**No. of classes- 15**

- Change Management: Meaning, Need for Planned change, Three Step-Model of Change (Unfreezing, Moving, Refreezing)
- The Japanese Models of Change: Just-in-Time, Poka yoke
- Cost of Quality: Appraisal Costs, Failure costs and Preventable costs, Cost Benefit Analysis, Cost Effective Analysis
- Indian and International Quality Assurance Agencies: Objectives, Functions, Roles and Initiatives (National Assessment Accreditation Council [NAAC],
- Performance Indicators, Quality Council of India [QCI]
- International Network for Quality Assurance Agencies in Higher Education [INQAAHE)
- Planning Programme and Budgeting System (PPBS)
- Appraisal of the Educational Organization -UGC, NCTE, AICTE.

MODES OF TRANSACTION: Lecture cum Discussion method, Observational Design, New approaches of Teaching providing Self-learning instructional Materials, Blended leaning, Seminar, Workshop,

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	3	2	1	1	2	1	2	1	2	2	3
CO2	2	3	2	1	3	2	1	3	2	3	2	3	1	3
CO3	1	2	3	2	3	2	3	2	3	3	2	2	1	1
CO4	2	3	1	2	2	2	2	2	2	3	2	2	2	2
CO5	3	2	2	1	2	2	2	2	2	2	3	3	3	3
CO6	2	1	2	2	3	2	3	2	2	3	2	2	3	2
CO7	2	3	2	3	2	3	2	3	2	3	2	3	2	3
CO8	1	2	2	2	2	2	2	3	2	2	2	2	1	2

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READINGS

- Bhatnagar, R. P. & Aggrawal, V. (2015). *Educational administration*. Meerut: Loyal Book Depot,
- Buch, T. (1980). *Approaches to school management*. London: Harper and Row.
- Chalam, K.S. (2003). *Introduction to educational planning and management*.
New Delhi, Anmol Publications Pvt. Ltd.
- Chandrasekharan P. (1997). *Educational planning and management*. New Delhi: Sterling Publishers Pvt. Ltd.
- Deshmukh, A.V. & Naik, A.P. (2010). *School administration and management*.
Mumbai.
- Glasser, W. (1990). *The quality school*. New York, NY: Harper Collins Publishers, Inc.
- Government of India (1986/92). *National policy on education*. New Delhi: MHRD.
- Gupta, S.K. & Gupta, S. (1991). *Educational administration and management*.
Indore: Manorama Prakashan.
- Hallak, J. (1990). *Investing in the future: Setting educational priorities in the developing world*. Paris: UNESCO.
- Kalra, Alka (1977). *Efficient school management and role of principals*. New Delhi: APH Publishing Corporation.
- Kochar, S.K. (2011). *School administration and management*. New Delhi: Sterling
- Mukharjee, S.N. (1970). *Administration of education, planning and finance*.
Baroda: Acharya Book Depot.
- Mukherjee, P.N. (2006). *Total quality management*. New Delhi: PHI Learning Pvt. Ltd.
- Mukhopadhyay, M. (2001). *Total quality management in education*. New Delhi: NIEPA.
- Shaeffer, S. (1991). *Collaborating for educational change: The role of parents and the community in school improvement*. Paris: UNESCO.
- Tyagi R.S. & Mahapatra P.C. (2000). *Educational Administration in Orissa*. New Delhi, National Institute of Educational Planning and Administration (NIEPA)
- Vashist, Savita (ed.) (1998). *Encyclopaedia of school education and management*.
New Delhi: Kamal Publishing House.

EDN-203

CURRICULUM DEVELOPMENT

COURSE OUTCOMES

On completion of this course, the students shall be able to

- CO1** Illustrate the concept of Curriculum Development and various stages of Curriculum Development
- CO2** Compare among different types and models of curriculum development and their importance.
- CO3** Explain the process of curriculum development and curriculum implementations.
- CO4** Critically evaluate different Models of curriculum Evaluation
- CO5** Critically analyze the Models of curriculum development and their practical relevance in Indian context.
- CO6** Explain various factors affecting Curriculum

Unit-I Introduction to Curriculum

No. of classes- 12

- Concept and Principles of Curriculum, Component of curriculum Design
- Strategies of Curriculum Development, Stages in the Process of Curriculum development,
- Foundations of Curriculum Planning - Philosophical Bases (National, Democratic), Sociological basis (Socio cultural reconstruction), Psychological Bases (learner's needs and interests),
- Bench marking and Role of National level Statutory Bodies - UGC, NCTE and University in Curriculum Development

Unit-II Models of Curriculum Design:

No. of classes- 12

- Traditional and Contemporary Models (Academic / Discipline Based Model, Competency Based Model, Social Functions / Activities Model [Social Reconstruction],
- Individual Needs & Interests Model, Outcome Based Integrative Model, Intervention Model, C I P P Model (Context, Input, Process, Product Model)
- Content Analysis
- System analysis

Unit-III Curriculum Instructional Techniques and Evaluation

No. of classes- 16

- Instructional System, Instructional Media,
- Instructional Techniques and Material in enhancing curriculum Transaction,
- Approaches to Evaluation of Curriculum: Approaches to Curriculum and Instruction (Academic and Competency Based Approaches),
- Models of Curriculum Evaluation: Tyler's Model, Scriven's Model, Kirkpatrick's Model
- Scientific models (Metfesssl- Michael evaluation and Provu's Discrepantly)
- Humanistic models (Stakes responsive evaluation models, and paclett and Hamilton's model)

Unit-IV Curriculum change

No. of classes- 08

- Meaning and types of Curriculum change
- Factors affecting curriculum change,
- Approaches to curriculum change, Role of students, Role teachers and educational administrators in curriculum change and improvement,
- Scope of curriculum research and Types of Research in Curriculum Studies

MODES OF TRANSACTION: Lecture cum Discussion method, Observational Design ,New approaches of Teaching providing Self-learning instructional Materials , Blended leaning, Seminar, Workshop,

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	3	2	2	3	2	2	1	2	2	2	2	4
CO2	2	3	2	2	2	2	2	2	2	3	2	2	3	2
CO3	2	2	3	2	3	2	2	3	2	3	2	2	3	1
CO4	2	3	1	2	2	2	2	3	2	3	2	3	2	3
CO5	2	3	1	2	2	3	2	2	2	3	2	3	2	2
CO6	2	3	1	2	2	2	2	3	3	3	1	2	3	2

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READINGS

Beane, J.A. ,Conrad, E.P. Jr. & Samuel, J.A. (1986). *Curriculum planning and development*.

Boston: Allyn & Bacon.

Brady, L. (1995). *Curriculum development*. New Delhi: Prentice Hall. Doll, R.C. (1996).*Curriculum development: Decesion-making and process*.

Boston: Allyn & Bacon.

Krug, E.A.(1956). *Curriculum planning*. New York: Harper and Row Publishers.Ornstein, A.C. & Hunkins, E (1998). *Curriculum. Foundations, Principles and*

Issues. Boston: Allyn & Bacon, Boston.

Oliva, P.F. (2001). *Developing the curriculum* (Fifth Ed.). New York, NY: Longman.

Pratt, D.(1980). *Curriculum design and development*. New York: MacmillanPublishing Co. Inc.

Saylor, J.G., Alexander, W.M. & Lewis, A.J.(1981). *Curriculum planning for better teaching and learning*. New York: Holt Rienehart & Winston.

Taba, H. (1962). *Curriculum development-theory and practice*. New York:Harcourt Brace, Jovanoich.

Tanner, D. and Tanner, L.(1975). *Curriculum development- theory and practice*. New York: Macmillan Publishing Co. Inc.

EDN-204

PEDAGOGICAL TRENDS AND ISSUES

COURSE OUTCOMES

On completion of this course, the students shall be able to

- CO1** Describe the process and importance of communication in teaching learning process.
- CO2** Explain the use of traditional pedagogy in present teaching learning environment.
- CO3** Categories pedagogical trends from behavioristic to Constructivist prospective.
- CO4** Differentiate the modern pedagogical trends strategies from Traditional pedagogical designs.
- CO5** Evaluate various pedagogical issues in present scenario
- CO6** Critically analyze the pedagogical issues and challenges from classroom, institutional point of view.
- CO7** Critically analyze the various Issues and challenges of Teacher Education Institution

Unit-I Teaching, Learning and Communications

No. of classes- 10

- Concept, characteristics and principles of teaching & learning.
- Modalities of teaching- Teaching and instruction; Conditioning and Training.
- Stages of Teaching- Pre-active, Interactive and Post active.
- Levels of Teaching - Memory, Understanding and Reflective.
- Communication process- Concept, principles, modes and barriers.

Unit-II Traditional Pedagogy

No. of classes- 08

- Deductive, Inductive, Analytic, Synthetic, Lecture, Team teaching, Discussion, Panel discussion, Seminar, tutorials and problem solving.

Unit-III Modern Pedagogical Trends

No. of classes- 08

- Behavioristic pedagogy- Herbartian teaching strategy and Bloom's Mastery learning
- Constructivist pedagogy-5'E Model and ICON Instruction design model.

Unit-IV Pedagogical Issues and Challenges

No. of classes- 08

- Issues and challenges at grassroot levels-classroom and school levels.
- Issues and challenges at Teacher Education Institution-DIETs, ISC-CT, B. Ed and M.ED.
- Issues and challenges at macro levels- NCERT, NCTE, UGC and SCERT.

MODES OF TRANSACTION: Lecture cum Discussion method, Observational Design, New approaches of Teaching, Blended learning, Seminar, Workshop, Policies document analysis, Action research.

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	2	2	3	1	2	1	2	1	2	2	3
CO2	2	3	2	1	2	3	2	3	2	2	3	2	3	2
CO3	2	2	3	2	1	2	2	2	2	3	2	2	2	2
CO4	2	3	1	2	3	2	2	2	2	3	3	2	3	2
CO5	2	1	2	2	2	2	5	2	2	2	1	3	3	2
CO6	1	2	2	2	3	2	2	2	3	2	3	2	3	2
CO7	2	3	2	3	2	2	2	2	1	2	3	3	2	3

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READINGS:

Bigge, M.L. & Shermis, S.S. (1992). *Learning theories for teachers*. New York:Harper Collins.

Bruner, J.S.(1966).*Toward a theory of instruction*. Cambridge: Belknap Press of Harvard University.

Bruner, J.S.(1973). *Beyond the information given: Studies in the psychology of knowing*. New York: W W Norton and Company Incorporated.

Clarke, P. (2001). *Teaching and learning: The culture of pedagogy*. New Delhi: SagePublication

Malone, J. and Taylor, P. (eds) (1993). *Constructivist interpretations of teaching and learning general science*. Perth: Curtin University of Technology

NCERT (2005). *National curriculum framework 2005*. New Delhi: NCERT
 Piaget,J.(1969).*The psychology of child*. New York: Basic Books

Vygotsky, L.S.(1978).*Mind in society*. Cambridge: Harvard University Press.

EDN-205 (Marks 100)
PRACTICUM

Practicum -I (CC- 201)

No. of classes- 08

Construction of an Achievement Test on School Subject and calculating Reliability and Validity.

Practicum -II (CC-202)

No. of classes- 08

Visit a School and make a report on Institutional Management and Administration.

Practicum -III (CC-203)

No. of classes- 08

Prepare a report on Administration and Evaluation of any curriculum Model in Educational Institution.

Practicum -IV (CC-204)

No. of classes- 08

Develop and deliver 5 lesson plans by using 5E Model /Icon Model.

DISCIPLINE SPECIFIC ELECTIVE (DSE)

Any one paper can be opted by students of this Department. Minimum student strength to run the course in each elective paper should be 8.

EDN-206(A)

OPEN AND DISTANCE LEARNING

COURSE OUTCOMES

On completion of this course, the students shall be able to

CO1 Describe the meaning, nature and need of Distance Education in the present situation.

CO2 Explain various kinds of information and communication Technologies used by (ICT and enable them to be familiar with their use in teaching-learning process of distance educational institutions)

CO3 Describe and explain various modes of Student Support Services (SSS) and develop in them skills to manage such services for various kinds of programs through Distance Education.

CO4 Evaluate programs of Distance Education and to develop the ability to enhance the quality and standards of different D. E. Programs.

Unit I: Distance Education and its Development

No. of classes- 06

- Definitions and Teaching learning components
- Correspondence course, Distance education, Open learning
- Need and characteristic features of Distance Education
- Growth of Distance Education
- Distance Teaching –learning systems in India.

Unit II: Intervention Strategies at Distance Education

No. of classes- 08

- Information and Communication Technologies and their application in Distance Education.
- Designing and preparing self-instructional material
- Electronic media (T.V.) for Education
- Print media

Unit III: Learning at a Distance

No. of classes- 08

- Student-support services in Distance Education and their Management
- Technical and vocational programs through Distance Education
- Programs for women through Distance education
- Distance Education and Rural Development

Unit IV: Quality Enhancement and Program Evaluation

No. of classes- 06

- Quality Assurance of Distance Education
- Mechanisms for maintenance of standards in Distance Education
- Programme evaluation

- Cost analysis in D. E. – concept need and process
- New Dimensions in Distance Education – promises for the future.

MODES OF TRANSACTION: Lecture cum Discussion method ,Case study ,New approaches of Teaching analyzing Self-learning instructional Materials , Blended leaning, Seminar, Workshop,

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	2	1	2	1	2	1	2	2	1	2	2
CO2	2	3	2	2	2	1	2	1	2	2	1	2	2	2
CO3	2	2	3	1	1	2	2	2	2	3	3	2	3	2
CO4	2	3	1	2	2	2	2	2	3	3	3	3	3	1

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READINGS:

Anderson,T.(2004). *The theory and practice of online learning*. Canada: AUPress.

Keegan,D.(2013). *Foundations of distance education*. New York: Routledge Tayler&Francis Group.S

Moore, M.G.(2012). *Handbook of distance education*. New Delhi: RoutledgeChampan& Hall.

Moore, M.G. & Kearsley,G.(2011). *Distance education: A systems view of online learning*. United State: Cengage Learning.

Murphy,D., Evans,T., & Haughey,M.(2007). *International handbppk of distance education*. England: Emerald Group Publishing Ltd.

Pandey, U.C.(2014). *Optimizing open and distance learning in higher education institutions*. New Delhi: IGNOU.

Pandey, V.C.(2005). *Technology and development if distance education*. TamilNadu:Isha Books.

Ramanujam,P.R.(2005). *Globalization, education and open distance learning*.New Delhi: Shipra Publications.

Satyanareayana,P. & Seshartnam,C.(2018). *Open distance education in India*. New Delhi: Shipra Publications.

Sharma,A.(2011). *Distance education*. New Deldi: Global Publications.

Umesha,U.,Mudho, M.V, & Khan,K.M.(2004). *A handbook on distanceeducation*. New Deldi: Ess Publications

EDN-206(B)

ENVIRONMENTAL EDUCATION AND SUSTAINABLE DEVELOPMENT

COURSE OUTCOMES

The students will be able to

CO1 Describe the concept, importance scope and aspect of environmental Education

CO2 Explain the possible environmental hazards and create awareness about pollutions of environment

CO3 Explain the attitude towards protection of environment.

CO4 Differentiate various methods and strategies for realizing the objectives of environmental education

Unit-I Introduction to Environmental Studies

No. of classes- 06

- Introduction to Environment- Concept, nature, scope and importance
- People and environment interaction
- Concept of sustainability and sustainable development
- Environmental Education-Concept, nature, scope, importance and functions

Unit-II Environmental Hazards

No. of classes- 08

- Environmental Pollutions- Types, sources, causes, effects and control with reference to Air, Water, Soil and Noise pollutions.
- Solid waste management- control, measures of urban and Industrial waste
- Nuclear Hazards and Human health risk
- Climate change, Global warning, Ozon layer depletion, Acid rain and impact on human communities.

Unit-III Environmental Policies and Practices

No. of classes- 08

- Environmental Protection Act
- Air prevention and control Act
- Water prevention and protection Act
- Wildlife protection Act
- Forest conservation Act.

Unit-IV Human Communities and the Environment

No. of classes- 06

- Human population growth- Impact on environment, human health and welfare
- Curriculum for Environmental education; strategies for

Teaching environmental education

- Environmental movement- Chipko movement and Silent Valley

MODES OF TRANSACTION: Lecture cum Discussion method, Observational Design, Debate, Blended learning, Seminar, Workshop,

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	2	2	2	1	1	3	3	3	2	2	2
CO2	2	3	2	2	2	3	2	3	2	2	2	2	3	3
CO3	2	2	3	2	1	2	2	2	3	3	2	3	2	2
CO4	2	3	1	2	3	3	3	2	2	3	2	2	2	2

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READINGS:

Carson, R. (2002). *Silent spring*. Houghton: Mifflin Harcourt.

Gadgil, M. & Guha, R. (1993). *This fissured land: An ecological history of India*. USA:University of California Press.

Gleeson, B. and Low, N. (1999). *Global ethics and environment*. London: Routledge.

Gleick, P. H. (1993). *Water in crisis*. Stockholm Environmental Institute: Oxford Univ.Press.

McNeill, John R. (2000). *Something new under the sun: An environmental history of the twentieth Century*.

Odum, E.P., Odum, H.T. & Andrews, J. (1971). *Fundamentals of ecology*. Philadelphia: Saunders.

Pepper, I.L., Gerba, C.P. & Brusseau, M.L. (2011). *Environmental and pollution science*. Academic Press. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. (2012). *Environment*.

John Wiley & Sons. Sengupta, R. 2003. *Ecology and economics: An approach to sustainable development*. OUP.

Singh, J.S., Singh, S.P. and Gupta, S.R. (2014). *Ecology, environmental science and conservation*. New Delhi : S. Chand Publishing.

EDN-206(C)

**EARLY CHILDHOOD CARE
AND EDUCATION**

COURSE OUTCOMES

The students will be able to

- CO1** Describe the concept of early childhood care and education.
- CO2** Identify the common types of diseases at early childhood stage.
- CO3** Analyze the curriculum at pre-school stage.
- CO4** Evaluate the recommendations given by various organizations on ECCE.

Unit-I Introduction to Early Childhood Care and Education No. of classes- 10

- Concept of pre-school education
- Aims and objectives of pre-school education
- Integrated child development services scheme (ICDS)
- Early childhood care and education (ECCE) scheme
- Contribution of Froebel and Montessori to pre-school education

Unit-II Identification, Prevention and Remediation of Diseases in Early Childhood

No. of classes- 08

- Early childhood health care programmes
- Common ailments and diseases in early childhood
- Identification, prevention and remediation of common diseases in early childhood
- Concept and need of balanced diet

Unit -III Curriculum at Pre-School Stage

No. of classes- 10

- Types of pre-school centers
- Capacity building of personnel in ECCE
- Curriculum and activities at pre-school stage
- Strategies for transaction of curriculum and role of teacher
- Status of pre-school education in India

**Unit -IV Recommendation of Various National and International
Organizational Child Development**

No. of classes- 10

- Recommendation of NPE-1986
- Indian Education Commission on pre-school education
- Role of UNICEF, WHO, and CARE for child development
- Role of Government and Non- Government organization in organizing ECCE
- Problems and issues in ECCE

MODES OF TRANSACTION: Lecture cum Discussion method, Observational Design ,New approaches of Teaching, Project , Blended leaning, Seminar, Workshop,

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	2	2	2	3	2	1	2	2	2	3	2
CO2	2	3	2	2	2	2	2	1	3	1	2	1	3	2
CO3	2	2	3	3	2	1	2	2	3	3	2	3	2	2
CO4	2	3	1	2	2	2	3	2	2	3	3	1	2	3

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READINGS

Agrawal, J.C. & Gupta, S. (2007). *Early childhood care and education:Principles andpractices.* New Delhi: Shipra Publication.

Brewer, J. A. (1995). *Introduction to early childhood education.* Boston: Allyn andBacon.

Gupta, M. S. (2009). *Early childhood care and education.* New Delhi: Prentice HallIndia Learning Pvt Ltd.

Henniger, M. L. (2009). *Teaching young children: An introduction.* New Delhi:Pearson.

Mohanty, B. & Mohanty, J. (2007). *Early childhood care and education.* New Delhi:Delhi Book House

EDN-206 (D)
COMPARATIVE EDUCATION

Course Outcomes

On completion of this course, the students shall be

CO1 Explain the concept of comparative education and the factors affecting the educational systems.

CO2 Critically analyze the development and approaches of comparative education.

CO3 Compare the educational system and educational structure of different countries.

CO4 Explain the vocationalization of secondary education.

UNIT-I Introduction to Comparative Education

No of classes 09

- Concept and aims of Comparative Education
- Need and scope of Comparative Education
- Factors influencing the Education System

UNIT-II History of Comparative Education

No of classes 13

- Historical Development of Comparative Education
- Approaches of Comparative Education – Historical, Philosophical, Sociological and Problem approach
- Salient features of Education system of U.S.A., U.K, Japan. & India

UNIT-III Comparative Education at Pre-Primary and Primary Education

No of classes 14

- Pre-Primary Education in U.S.A., U.K, Japan. & India
- Primary Education in U.S.A., U.K, Japan. & India (Aims, Content, Methods of Instruction and Evaluation System)
- Issues and challenges of primary education

UNIT-IV Comparative Education at Secondary Education

No of classes 11

- Secondary Education in U.K., U.S.A, Japan. & India
- Vocalization of Secondary Education in U.K., U.S.A, Japan. & India
- Issues and challenges of secondary education

Mode of Transaction:**Lecture-cum Discussion, Blended learning, Seminar and Workshop****PO-PSO-CO MAPPING MATRIX**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	2	1	1	2	2	2	1	2	1	2	2	3
CO2	2	3	2	1	2	2	2	2	2	1	2	1	2	3
CO3	2	2	3	2	1	2	2	2	2	3	3	2	3	3
CO4	2	3	1	2	2	3	2	3	1	1	1	2	3	2

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SELECTED READINGS:

Andrey, A. & Howard N. (1978). Developing curriculum: A Practical Guide. London:George Allen and Unwin.

Baradey, G.Z.F. (1964). Comparative methods in education. New Delhi: Oxford and IBHPublishing Co.

Cramer, I.F. & Brown, G.S. (1965). Contemporary education: A comparative study ofNational System. New York: Harcourt Brace & Company.

Dent, H.C. (1981). Educational system of England. London: George Allen and Unwon.

Denis, L. (1986). School curriculum planning. London: Hodder ad Stoughton.

Edward, A. K. (1960). The secondary school's curriculum. New York: Harper and RowPublishers.

Hans, N. (1961). Comparative education. London: Routledge and Kegan Paul.

Harold A. & Elsic, J. A. (1957). The curriculum. New York: The MacMillan Company.

International encyclopedia of the curriculum. (1991) London: Pergamon Oxford.

Sodhi T.S. (1988). A textbook of comparative education New Delhi: Association ofIndian Universities, IGNOU.

Kandel, I.L. (1963). Studies in comparative education. New York: George Harrup.
Parmaji, S, (1984). Distance education, New Delhi: Sterling Publishers Pvt. Ltd.,
Reddy, R. G. (1988). Studies in Distance Education Association of Indian Universities, Delhi New: IGNOU.

William, M. A. (1966). Planning curriculum for schools. New York: Holt, Rinehart and Winston.

THIRD SEMESTER

EDN-301

RESEARCH METHODOLOGY IN EDUCATION

COURSE OUTCOMES

On completion of this course, the students the students shall be able to

CO1 Describe about evolutionary prospective of knowledge construction process .

CO2 Describe the nature, scope and needs of Educational Research.

CO3 Explain different approaches and designs of educational research.

CO4 Identify and formulate research problem and state the hypothesis.

CO5 Differentiate between Probability and Non-probability sampling techniques.

CO6 Select and develop different types of data collection tools.

CO7 Prepare the research proposal and report

UNIT-I Introduction to Educational Research

No. of classes- 10

- Evolution of scientific knowledge construction process.
- Meaning and steps of Scientific Method, Characteristics of Scientific Method (Replicability, precision, Falsifiability and Parsimony).
- Types of Scientific Method (Exploratory, Explanatory and Descriptive).
- Aims of research as a Scientific activity: Problem solving, Theory building and Prediction
- Meaning, nature, scope and needs of Educational research.
- Types of Educational research- Fundamental, Applied and Action research.
- Approaches to Educational Research -Qualitative, Quantitative and Mixed.

UNIT-II Research Process

No. of classes- 11

- Research Problem- Criteria, Sources of identifying problem and Statement of the Problem.
- Types of Variables (Independent, Dependent, Extraneous, Intervening and Moderator).
- Review of Related Literature- Meaning and Sources.
- Hypothesis and Research Question - Meaning, Characteristics, Types, Sources and Testing of hypothesis.
- Concept of Population and Sample.
- Techniques of Sampling (Probability and Non-probability), Estimate size of sample.
- Tools and Techniques of data collection (Rating scale, Attitude scale, Questionnaire, Aptitude test, Interview, Observation and Inventory).
- Identification, selection and development of tools

UNIT-III Designs of Educational Research

No. of classes- 10

- Historical research- Concept, features and process.
- Descriptive research- Concept, importance, types (Case study, Survey research, Phenomenological, Ethnographic, Naturalistic inquiry and developmental) and process
- Co relational research- Concept, features and process
- Experimental research- Concept, Characteristics, Design, Internal and External validity and Process
- Ex-post facto research- Concept, features and process

UNIT-IV Research Report

No. of classes- 12

- Writing proposal- format and style
- Writing Thesis/ Dissertation- format and style
- Writing Article for Journal
- Writing paper for seminar and conference
- Writing reference, Bibliography and citation
- Research ethics and concept of plagiarism & it's protection

MODE OF TRANSACTION

Lecture cum Discussion method, Problem solving, Blended learning, Seminar, Workshop

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	3	1	1	2	3	3	2	2	3	2	3	2
CO2	2	3	2	2	2	3	2	3	2	3	1	3	1	3
CO3	2	2	3	2	3	2	3	2	1	1	1	2	3	2
CO4	2	3	1	2	2	2	2	3	3	3	2	3	3	3
CO5	2	3	2	1	3	2	1	1	2	3	2	2	3	2
CO6	2	2	3	2	1	2	2	3	2	3	3	2	1	3
CO7	2	3	1	2	2	3	2	3	2	1	2	1	2	1

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READING SOURCES:

Ary, D. & Jacobs, L. (2002). *Introduction to research in education*. Belmont-USA:WadsworthThomason Learning.

Best, J.W.(1986). *Research in education*. New Delhi: Prentice Hall of India.

Borg, W.R. & Gall, M.D. (1989). *Educational research: An introduction*.New York: Longman.

Campbell, W.G. & Ballou, S.V. (1974). *Form and style: Theses, reports, term papers*. Boston :Houghton Mifflin.

Creswell, J.W. (2014). *Educational research*. Delhi: PHI learning private limited.

Creswell, J.W. (2007). *Qualitative inquiry and research design: choosing among five approaches*. London: Sage Publications.

Edwards, A.L.(1984). *Experimental design in psychological research*. New York:HarperCollins College Div. Publication.

Gay, L.R. & Airsian, P. (2000). *Educational research: competencies for analysis and application*. New York: Macmillan.

Kerlinger, F.N.(2018). *Foundation of behavioural research*. Delhi: SurjeetPublication.

Koul, L.(1988). *Methodology of educational research*. New Delhi: Vikash Publishing House.

McMillan, J.H. & Schumacher, S. (1989). *Research in education: A conceptual introduction*. New York: Harper Collins.

EDN-302

ADVANCED EDUCATIONAL STATISTICS

COURSE OUTCOMES

On completion of this course, the students shall be able to

CO1 Describe the concept, importance and use of Descriptive and inferential statistics in Research.

CO2 Describe the concept, assumptions and use of Parametric and non-parametric statistics.

CO3 Differentiate between the Parametric and Non-parametric statistics in terms of their use in different contexts.

CO4 Compute and use various statistical measures of Co-efficient Of correlation, Variability, Regression and Prediction.

CO5 Demonstrate the skill of computation of various type of Parametric and Non-parametric statistics by use of SPSS.

Unit-I Introduction to Educational Statistics

No. of classes- 12

- Descriptive and Inferential Statistics- concept, importance, differences and uses
- Parametric and Non-parametric Statistics- concept, assumption, differences and uses
- Testing of hypothesis, Levels of significance, Types of error (Type-I and Type-II)
- One- Tailed test and Two- Tailed test

Unit-II Co-efficient of Correlation

No. of classes- 08

- Biserial correlation
- Point Biserial correlation
- Tetrachoric correlation
- Phi-Coefficient correlation
- Partial correlation
- Multiple correlation

Unit-III Parametric Statistics

No. of classes- 14

- Significance of difference between Means (t test)
- Analysis of Variance (ANOVA)- Importance, uses, assumption and types (One-way, Two-way and Three-way),
- MANOVA and ANCOVA

- Post-hoc test
- Regression and Prediction

Unit-IV Non-Parametric Statistics

No. of classes- 06

- Chi-square test- importance, assumption, uses and types (Independence, and Contingency)
- Median test
- Mann-Whitney test

MODE OF TRANSACTION

Lecture cum Discussion method, Problem solving, Blended learning, Seminar, Workshop, Small group teaching, Home assignment.

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	2	1	2	1	2	3	1	3	3	1	2	3
CO2	2	3	2	2	3	2	3	2	3	2	1	1	3	2
CO3	2	2	3	2	1	2	2	2	3	2	1	1	2	3
CO4	2	3	1	2	2	3	2	1	1	2	3	2	3	3
CO5	2	3	1	2	2	3	3	3	3	3	1	1	1	1

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READING SOURCES

- Aggarwal, Y.P. (1988). *Statistical methods-Concepts, application and computation*. New Delhi: Streling.
- Edwards, A.L. (1959). *Experimental design in psychological research*. New York: Rinehart & Company, Inc.
- Enhance, D.N., Elhance, V., & Aggaewal, B.M. (2014). *Fundamentals of statistics*. Allahabad: Kitab Mahal.
- Ferguson, G.A. (1976). *Statistical analysis in psychology and education*. New York: McGraw Hill.
- Fisher, R. A. (2017). *Statistical methods for research workers*. New Delhi: Kalpaz Publications.
- Garrett, H. E. (1973). *Statistics in Psychology and Education*. Bombay: Vakils, Feffer and Simon.
- Guilford, J.P. (1978). *Fundamental statistics in psychology and education*. New York: McGraw Hill.
- Guilford, J.P. (1954). *Psychometric methods*. New York: McGraw Hill.
- Mangal, S.K. (2008). *Statistics in education and psychology*. New Delhi: Prentice Hall.
- Segal, S. and Castellan, N.J. (1988). *Non parametric statistics for behavioural science*. Singapore: McGraw Hill.

EDN-303

ADVANCED EDUCATIONAL TECHNOLOGY

COURSE OUTCOMES

On completion of this course, the students shall be able to

CO1 Describe the concept and nature of Educational Technology, ICT in education and Instructional Technology.

CO2 Explain the models of Instructional Design.

CO3 Explain the various application of Computer in education.

CO4 Describe the concept and approaches of e-learning and Social learning.

CO5 Relate various Learning Theories with corresponding Instructional Strategies.

CO6 Distinguish among different types of Instructional model.

CO7 Apply the knowledge of Educational Technology, ICT and Instructional Technology to search information on different Open Educational Resources.

Unit-I Introduction to Educational Technology

No. of classes- 10

- Concept of Educational Technology (ET) as a discipline
- Information Technology, Communication Technology & Information and Communication Technology (ICT) and Instructional Technology.
- Aspects of Education Technology- Hardware, Software, Courseware and Human ware
- Applications of Educational Technology in Formal, Non-formal (Open and Distance Learning), Informal and Inclusive education system.
- Meaning, nature and scope of ICT in education

Unit-II System Approach to Instructional Design and Behavior Modification

No. of classes- 10

- Concept of Teaching, Instruction and Learning
- Concept of System Approach to instructional design
- Models of development of Instructional design (ADDIE, ASSURE, Dick and Carey Model Mason's)
- Models of teaching: Basic Teaching Model of Robert Glaser, Concept Attainment Model of J. S. Bruner, Bloom's Mastery Learning, Robert Gagne's Information Processing Model
- Micro Teaching and FIAS

Unit-III Instructional System and Strategies

No. of classes- 08

- Application of Computers in Education: CAI, CAL, CBT, CLM

- Programme instruction (Linear and Branching)
- Gagne’s Nine Events of instruction and Five E’s of Constructivism
- Nine Elements of Constructivist instructional Design

Unit-IV Emerging Trends in E- learning

No. of classes- 12

- Concept of E-learning, Approaches to e-learning (Offline, Online, Synchronous, Asynchronous, Blended learning, mobile learning).
- Social learning (concept, use of web 2.0 tools for learning, social networking sites, blogs, chats, video conferencing, discussion forum)
- Open Education Resources (Creative Common, Massive Open Online Courses; Concept and application).
- Flipped learning
- Blended Learning
- Recommendations of NEP 2020

MODE OF TRANSACTION

Lecture cum Discussion method, Blended learning, Seminar, Workshop, Debate.

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	1	2	1	2	1	2	1	2	2	3	2	3
CO2	2	3	2	1	2	1	3	2	2	2	3	3	2	1
CO3	2	2	3	1	1	2	2	2	1	3	2	1	2	1
CO4	2	3	1	2	2	2	1	2	1	3	1	2	2	1
CO5	2	3	2	1	2	1	2	1	2	2	2	1	2	1
CO6	2	2	3	2	1	2	2	2	1	2	1	2	3	3
CO7	2	3	1	2	3	3	3	1	1	3	1	2	2	3

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READING SOURCES:

NCERT (2006). *National Curriculum Framework 2005 Position Paper National Focus Group on Educational Technology*. New Delhi: Author.

Senapaty, H.K. (2009). *ICT Integrated Learning Materials on Basic School Subjects from Constructivist Perspectives*. Bhubaneswar: Regional Institute of Education, NCERT (Monograph).

Senapaty, H.K. (2011). *Pedagogy-Technology Integration for the Professional Development of Teacher Educators*. Bhubaneswar: Regional Institute of Education, NCERT (Monograph).

Singh, L. C. (Ed.) (2010). *Educational Technology for Teachers and Educators*. New Delhi: Vasunandi Publication.

UNESCO (2002). *Information and communication technology in education: A curriculum for schools and programme of teacher development*. Paris: UNESCO.

UNESCO (2008). *Capacity Building for ICT Integration in Education*. Retrieved from <http://portal.unesco>.

UNESCO (2008). *ICT Competency Standards for Teachers: Policy Framework*. Retrieved from <http://portal.unesco>.

Mishra, P. and Koehler, M. (2007). Technological pedagogical content knowledge (TPCK): Confronting the wicked problems of teaching with technology. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference 2007*. Chesapeake, VA: Association for the Advancement of Computing in Education. (pp. 2214-2226).

Mishra, P. and Koehler, M.J. (2006). Technological pedagogical content knowledge: A framework for integrating technology in teacher knowledge. *Teachers College Record*, 108 (6), 1017-1054.

Mishra, S. (2008). Developing E-Learning Materials: Some Pedagogical Concerns. *Indian Journal of Open Learning*, 17 (2).

Resta, P. (Ed.) (2002). *Information and Communication Technologies in Teacher Education: A Planning Guide*. Paris: UNESCO.

Roblyer, M.D. (2008). *Integrating educational technology into teaching*. New Delhi: Pearson.

Stodel, E.J. et al. (2006) Learners' Perspectives on What is Missing from Online Learning: Interpretations through the Community of Inquiry Framework. *The International Review of Research in Open and Distance Learning*, 7(3).

<http://www.irrodl.org/index.php/irrodl/article/view/325/743>.

Retrieved on 19 Feb., 2007.

UNESCO (2002). *Information and Communication Technologies in Teacher Education A Planning Guide*. Paris: Author

UNESCO (2005). *How ICT can create new, open learning environments: Information and communication technologies in schools: A handbook for teachers*. Paris: UNESCO.

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EDN-304

DEVELOPMENT OF EDUCATION IN INDIA

COURSE OUTCOMES

On completion of this course, the students shall be able to

- CO1** Provide a broad sketch about the development of education in India from Pre-independence period to till date.
- CO2** Explain level wise major schemes for quantity and quality expansion of Education.
- CO3** Compare the educational structure, provisions among three major Policies on Education
- CO4** Critically evaluate the Background, Objectives and recommendations of various Committees, Commissions and policies on Education.

Unit-I Education during British Period

No. of classes- 08

- Charter Act and Macaulay's Minute
- Wood Despatch
- Hunter Commission
- Calcutta University Commission
- Wardha Scheme of Education

Unit-II Committees and Commissions on Education in post-Independence India with reference to Background, Objectives and major Recommendations

No. of classes- 08

- University Education Commission (1948)
- Secondary Education Commission (1954)
- Kothari Commission (1964-66)

Unit-III Policies on Education

No. of classes- 12

- NPE-1968
- NPE- 1986
- Programme of Action, 1992
- RMSA, 2009
- RTE Act, 2009

- RUSA, 2013

Unit-IV National Education Policy, 2020

No. of classes- 12

- NEP- 2020
- Structure, Curriculum and Pedagogy of School Education
- Structure, Pattern and Vision of Higher Education
- Equity and Inclusion in Higher Education
- Vocational Education

MODE OF TRANSACTION

Lecture cum Discussion method, Blended learning, Seminar, Workshop

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	2	2	2	2	3	1	3	2	3	2	3
CO2	2	3	2	2	2	3	2	3	2	2	3	2	2	1
CO3	2	2	3	2	1	2	2	2	3	3	2	3	2	2
CO4	2	3	1	2	2	3	2	3	2	3	2	3	2	2

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READING SOURCES:

Aggrawal, J.C.(2010). *Landmarks in the history of modern Indian education*. New Delhi: Vikash Publishing Pvt Ltd.

Das, K.K. (1993). *Development of education in India*. New Delhi: Kalyani Publishers.

Dash, B.N. (1911). *Development of education in India*. New Delhi: Ajanta Prakashan.

Govt. of India (1986). *National policy on education*. New Delhi: MHRD. Govt. of India. (1992, 1998). *National policy on education, 1986 (Asmodified in 1992)*.

Retrieved from http://mhrd.gov.in/sites/upload_files/mhrd/files/NPE86-mod92.pdf

Keay, F.E. & Mitra, Sukumar (1978). *A history of education in India*. New Delhi: Oxford University Press.

Ministry of Education (1966). *Education and national development*. New Delhi: Ministry of Education, Government of India.

Mukherji, S.M., (1966). *History of education in India*. Vadodara: Acharya Book Depot.

Naik, J.P. and Syed, N., (1974). *A student's history of education in India*. New Delhi: MacMillan.

NCERT (2005). *National curriculum framework 2005*. New Delhi: National Council of Educational Research and Training.

Rawat, P.L.(1989). *History of Indian education*. New Delhi: Ram Prasad &

Sons. Website, www.mhrd.gov.in

EDN-305
PRACTICE
Term End- 100

Practicum-C-301(a)

RESEARCH PAPER REVIEW (25 MARKS)

No. of classes- 08

Each student will submit a review report based on their selected research problem from at least 10 research papers (Web of Science/Scopus).

Practicum –C-301(b)

DEVELOPMENT OF RESEARCH PROPOSAL

50 MARKS

No. of classes- 12

Each student shall have to choose a topic in consultation with his/her supervisor and deliver a seminar on the topic in the Department. The seminar topic shall be research oriented and the seminar paper is basically a proposal. After presentation of the paper, candidate's performance shall be valued jointly by both internal and external examiner. Distribution of marks for presentation of paper and participation in seminar discussion shall be as follows.

Presentation of paper : 40 Marks

Clarification of Points and discussion : 10 Marks

Practicum –C-302

(25 MARKS)

ANALYSIS AND INTERPRETATION OF QUANTITATIVE DATA USING SPSS.

Students have to analyse the data for calculation of Central tendency, Variability, Correlation, Regression by use of SPSS.

No. of classes- 08

**INTER DISCIPLINARY
SPECIFIC ELECTIVE (IDSE)**

Any one paper can be opted by students of other departments.

EDN-306 (A)

Philosophical Foundations of Education

Course Outcomes

On completion of this course, the students shall be able to

- CO1** Explain about different Western and Indian philosophical thoughts in the light of Metaphysics, Epistemology, Axiology and their educational implications.
- CO2** Compare (similarities and differences) between different philosophical thoughts in the light of above dimensions.
- CO3** Critically analyze the present educational practices in the philosophical context.
- CO4** Explain the contributions of Western and Indian thinkers in education.
- CO5** Explain philosophical outlook to relate and analyze the context and problems of education.

Unit –I Western Schools of Philosophy

No. of classes 12

- Idealism, Realism, Naturalism, Pragmatism, Existentialism, Marxism, Logical Positivism with special reference to Metaphysics, Epistemology, Axiology and their educational implications for aims, curriculum, method of teaching, role of teacher and students and discipline.

Unit- II Indian Schools of Philosophy

No. of classes 12

- Jainism, Buddhism, Samkhya, Vedanta with special reference to Metaphysics, Epistemology, Axiology and their educational implications for aims, curriculum, method of teaching, role of teacher and students and discipline.

Unit-III Contribution of Western Thinkers to Educational Theories and Practice

No. of classes 08

- J.J. Rousseau, John Dewey, Ivan Illich, Paul Freire.

Unit- IV Contribution of Indian Thinkers to Educational Theories and Practice

No. of classes 08

- Shri Aurobindo, Vivekananda, R.N. Tagore. M.K. Gandhi.

Mode of transaction

Lecture-cum-Discussion, Blended learning, Seminar, Workshop.
PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	2	1	2	1	3	1	3	1	2	3	1	2
CO2	2	3	2	1	2	1	3	1	3	1	2	3	3	1
CO3	2	2	3	2	1	2	2	2	3	2	3	2	2	2
CO4	2	3	1	2	2	2	2	3	2	2	1	2	3	2
CO5	2	3	1	2	2	3	2	3	2	3	2	2	1	2

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

Suggested Readings

Agrwal, J.C.(2010).*Teacher and education in a developing society*. Delhi: Vikash Publishing House.

Ayer, A.J.(1959).*Logical positivism*. New York: The Free Press. Ayer,

A.J.(1936). *Language, truth and logic*. U.S.A.: Penguin Books.

Arulsarmy, S. (2011).*Philosophical and sociological perspectives on education*.New Delhi: Neelkamal Publication Pvt. Ltd.

Bhatia,K.K.(2011). *Philosophical and sociological foundation of education*. New Delhi: Kalyani Publishers.

Brubacher, J.S. (1939). *Modern philosophies of education*. New York, USA: McGraw.

Butler,J.D.(1959). *Four philosophies and their practices in education and religion*. New York: Harper.

Chaube, S.P. & Chaube, A. (2009). *Foundation of education*. New Dehli: Vikash Publishing House Pvt.Ltd.

Kneller F.(1971). *Introduction to philosophy of education*. New York, USA:

Macmillan.

Masih, Y. (2017). *A critical history of western philosophy*. New Delhi: Motilal Banarsidass.

Ross, J. S. (1960). *Ground work of educational theory*. London. U.K: George G. Harrap & Co.

Rusk, R. R. (1992). *Philosophical bases of education*. London, U.K: Oxford University of London Press Ltd.

Sharma.C.D.(2016). *A critical survey of Indian philosophy*. New Delhi:Motilal Banarsidass

Wingo, G.M. (1974). *Philosophies of education*. New Delhi: Sterling Publishers

EDN- 306 (B)

SOCIOLOGICAL FOUNDATION OF EDUCATION

Course Outcomes

On completion of this course, the students the students shall be able to

- CO1** Identify different issues about inequality in Indian society.
- CO2** Relate different social situation and practices of education.
- CO3** Explain concept of social stratification, social change and social mobility.
- CO4** Critically analyze the social phenomenon in the context of Indian society.

Unit-I Introduction to Educational Sociology

No. of classes 11

- Concept of Sociology of education, Approaches of sociology of education: Symbolic interaction, Structural Functionalism and Conflict theory.
- Relationship between sociology and Education
- Concept and types of social institutions and their functions: family, school and Society.

Unit-II Education and Social Change

No. of classes 09

- Education and social change: meaning, nature and types of social change, role of education in social change
- Social mobility: meaning and types, Role of education in Social mobility Theories of social change and their educational implication – Evolutionary theory, Functional theory, Cyclical theory and Conflict theory.

Unit- III Process of social change

No. of classes 11

- Concept of social movements and theories: Relative Deprivation, Resource mobilization and Political Process theory, New social movement theory

- Education in current Social Context: Westernization, Urbanization and Sanskritization

Unit –IV Social stratification and issues in Indian society No. of classes 09

- Illiteracy, Casteism, Gender discrimination, Unemployment, Drug addiction, Wastage and Stagnation
- Concept of equality and equity, social values as enshrined in the constitution- Socialism, secularism, justice, liberty, freedom, democracy and equality.

Mode of transaction

Lecture-cum-discussion, Blended learning, Seminar, Workshop.

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	2	1	2	2	3	2	3	2	1	3	2
CO2	2	3	2	2	2	2	3	3	2	1	1	3	3	2
CO3	2	2	3	2	1	2	2	2	2	3	2	2	2	2
CO4	2	3	1	2	2	3	2	1	2	3	2	2	2	3

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READINGS:

Abraham, M.F. (2008). *Contemporary sociology*. New Delhi: Oxford University Press.

Agrwal, J.C. (2010). *Teacher and education in a developing society*. Delhi: Vikash Publishing House.

Arulsamy, S. (2011). *Philosophical and sociological perspectives on education*. New Delhi: Neelkamal Publication Pvt.Ltd.

Bhatia, K.K. (2011). *Philosophical and sociological foundation of education*. New Delhi: Kalyani Publishers.

Brown, F.J. (1954). *Educational sociology*. New York: Prentice Hall.

Chaube, S.P. & Chaube, A. (2009). *Foundation of education*. New Delhi: Vikash Publishing House Pvt.Ltd.

Clark, P. (2001). *Teaching and learning: The culture of pedagogy*. New Delhi: Sage Publication.

Dewey, J. (1916). *Democracy and education*. New York: MacMillan.

Dewey, J. (1973). *The school and society*. Chicago: University of Chicago Press.

Mathur, S.S. (1966). *A sociological approach to Indian education*. Agra: Vinod Pustak Mandir.

Pathak, R.P. (2012). *Philosophical and sociological principles of education*. Delhi: Pearson.

Ottaway, A.K.C. (1966). *Education and society*. London: Routledge and KeganPaul.

Safaya, R.N. & Shaida, B. D. (2010). *Modern theory and orinciples of education*. New Delhi: Dhanpati Publishing Company Pvt. Ltd.

Srinivas, M.N. (1986). *Social change in modern India*. Bombay: Allied Publishers.

Rusk, Robert R. (1996). *Philosophical bases of education*. London, U.K: Oxford University of London Press Ltd.

EDN-306 (C)

PSYCHOLOGICAL FOUNDATION OF EDUCATION

Course Outcomes

On completion of this course, the students the students shall be able to

- CO1** Describe different theories and approaches of Psychology: learning, motivation, intelligence, creativity and personality.
- CO2** Compare among different psychological perspectives on student behavior, learning process and adjustment.
- CO3** Critically analyze different approaches of learning.
- CO4** Administer and interpret different psychological test to measure psychological traits.

Unit-I Education and School of Psychology

No. of classes 08

- Schools of psychology and their contribution towards education- Behaviorism, Psychoanalysis, Gestalt and Constructivism,

Unit-II Learning and Motivation

No. of classes 12

- Learning theories and process- Conditioning theory (Classical conditioning, Operant conditioning), Modelling theory (Bandura's Social theory) and Humanism theory (Carl Rogers theory of learning).
- Tolman's theory of learning, Kurt Lewin' field theory, Bloom's mastery learning, Ausubel's meaningful learning and Gagne's hierarchical learning.
- Theories of motivation and their educational implication: McClelland's need for achievement, Vroom's expectancy theory, Maslow's Hierarchical theory ofneeds.

Unit- III Intelligence and Creativity

No. of classes 12

- Concept and theories of intelligence
- Intelligence theories and their educational implications- Structure theories (Uni factor,

Two factor, Multi factor, Structure of intelligence, Triarchic theory of intelligence (Sternberg), Cattell's theory of intelligence, Multiple theory of intelligence (Gardner), Measurement and types of intelligence test.

- Creativity – concept and theories of creativity, Stages of creative thinking, Fostering creativity talents among students through education, Measurement and types of creativity test.

Unit- IV Personality and Adjustment Mechanism

No of classes 08

- Personality- concept and types, Type and Trait theories of personality, Type-cum-trait theories, Measurement of personality,
- Mental health and hygiene, Process of adjustment, conflicts and defense mechanism.

Mode of transaction

Lecture-cum-discussion, Blended learning, Seminar, Workshop, Small group discussion.

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	2	2	3	2	1	1	2	1	3	3	2
CO2	2	3	2	2	3	2	3	2	2	2	2	2	3	2
CO3	2	2	3	2	1	2	2	2	2	3	2	2	3	3
CO4	2	3	1	2	2	3	2	2	1	2	3	3	2	3

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READINGS:

Anastasi,A.(2016).*Psychological testing*. New Delhi: Pearson.

Block, J.H.(1971). *Mastery learning: Theory and practice*. New York: Holt Rinehart and Winston.

Bloom, B.S.(1976). *Human characteristics and school learning*. New York: McGraw Hill.

Bruner, J.S. (1973). *Beyond the information given: Studies in psychology of knowing*. New York: W W Norton and Company Incorporation.

Chauhan, S.S.(2007).*Advanced educational psychology*. New Delhi: Vikas Publishing House.

Dash, M. & Dash, N.(2016). *Fundamentals of educational psychology*. New Delhi: Atlentic.

Freeman, F.S.(1962).*Theory and practice of psychological testing*. New Delhi: Oxford & IBH.

Gagne, R.M.(1985). *The conditions of learning and theory of instruction*.USA: Harcourt Brace College.

Klausmeier, H.J.(1984).*Educational psychology*. New York: Harpercollins College Div.

Pass, S.(2004). *Parrel paths to constructivism: Jean Piaget and Lev Vygotsky*.Nprth Carolina: Information Age Pub.

Piaget, J.(1969).*The psychology of child*. New York: Basic Books.

Piaget, J.(1999).*The psychology of intelligence*. New York: Taylor and Francis.

Santrock,J.W.(2011).*Educational psychology*. Chennai: McGraw Hill.

Sternberg, R.J. and Sternberg, K.(2011).*Cognitive psychology*. California: Wadsworth Publishing Co Inc.

Vygotsky, L.S.(1978).*Mind in society*. Cambridge: Harvard University Press.

Vygotsky, L.S.(1986). *Thought and language*. Columbia: MIT Press.

Wolkfolk, A.(2014).*Educacational psychology*. New Delhi: Pearson.

EDN- 306(D)

Economics of Education

Course Objectives

On completion of this course, the students shall be

- CO1. Explain the concept of planning, financing and cost of education.
- CO2. State the types of educational costs.
- CO3. State the link between the educational system and economic development.
- CO4. Elaborate on the sources of finances for education.
- CO5. Critically examine the process of budget preparation for educational institutions.

Unit I: Economics of Education

No of classes- 10

- Concept, scope and importance of economics of education.
- The relationship between education and the economic system. The role of the economic system in (i) financing of education, and (ii) absorbing the educated manpower.

- Education as an industry
- Education as consumption and education as individual, social and national investment.

Unit-II: Cost-Benefit Analysis and Financing in Education

No of classes-14

- Cost-benefit analysis: Meaning, purpose and problems
- Cost-Effectiveness Analysis in Education
- Difference between Cost-benefit and Cost–Cost-effectiveness analysis.
- Concept of Cost Consciousness in Education.
- Estimation of cost of Education: Its applications to different levels (Primary, Secondary and highersecondary)
- External and Internal Efficiency of Education

UNIT-III: Sources of Fund and Budgetary Allocation

No of classes 13

- Pricing of Education: Micro and Macro aspects of pricing of education (Theoretical Study);Problem of capitation fees.
- Financing of Education: Sources of finance for education: private, public, fees, donations; Endowments and grants: Grant-in-aid principles and practices with special reference to higher education; Government’s role in financing education at different levels with specialreference to higher education.
- Budgetary Provision: Concept of budget. Annual grants; developmental grants and maintenance grants. Allocation of funds to education in the 5 year plans (particularly, twelfth five-year plan).

UNIT-IV Relationship between Education and National Development:

No of classes 08

- Education as a means of human development
- National development and indicators of national development
- Relationship between education, poverty and inequality

Mode of Transaction:

Lecture-cum Discussion, Blended learning, Seminar and Workshop

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	1	2	1	2	1	1	2	2	1	2	1	1
CO2	2	3	2	2	2	2	2	2	2	2	2	3	1	2
CO3	2	2	3	2	3	2	2	1	1	3	2	2	3	2
CO4	2	3	1	2	2	3	3	2	2	3	2	2	2	2
CO5	2	3	1	2	2	2	2	2	2	3	3	2	2	2

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READINGS:

- Adam Smith. The Wealth of Nations, "Inequalities Arising from the Nature of Employments Themselves". pp. 100-102.
- Althusser, L. 1971. 'Ideology and ideological state apparatuses', in L. Althusser. 'Lenin and Philosophy' and Other Essays. London: New Left Review.
- Apple, M. 2004. *Ideology and Curriculum*. New York: Routledge Falmer.
- Banerjee, S. Cole, E. Duflo and L. Linden. 2003. "Improving the Quality of Education in India: Evidence from Three Randomized Experiments," NBER mimeo.
- Blaug, Mark. 1972. *An Introduction to Economics of Education*. London: Penguin Belfield. Clive. 2000. *Economic Principles for Education*. Edward Elgar.
- Chattopadhyay, Saumen. 2012. *Education and Economics*. Oxford
- Clarke, S. 2005. 'The Neoliberal Theory of Society,' in A. Saad-Filho & D. Johnston (eds.,)
- *Neoliberalism: A Critical Reader*. Ann Arbor, MI: Pluto Press, 50-59.
- Coombs, P.H. 1969. *What is Educational Planning?* Paris: International Institute of Educational Planning (IIEP).
- Henry Levin, 1987. "Education as a Public and Private Good". *Journal of Policy Analysis and Management*, Summer.
- Milton Friedman, *Capitalism and Freedom*, Ch. 6, "The Role of the Government in Education". Naik, J.P. 1975. *Equality, Quality and Quantity. The Elusive Triangle in Indian Education*. Allied: Bombay. Prakash, Ved and K. Biswal. 2008. *Perspectives on Education and Development*, NUEPA: Delhi.
- Saad-Filho, A. & D. Johnston. (eds.) 2005. *Neoliberalism: A Critical Reader*. Ann Arbor, MI: Pluto Press
- Schultz, T.W. 1961. *Investment in Human Capital*, *American Economic Review*.
- Sen, Amartya and Dreze. 1996. *India: Economic Development and Social Opportunity*. Oxford University Press.
- Tilak, Jandhyala B. G. 2002. "Education and Poverty". 3 (2) *Journal of Human Development* (New York: UNDP). July. 191-207.
- Tilak, Jandhyala B.G. 2006. "Economics of Human Capital in India". *Indian Economic Journal* (89th IEA Annual Conference Volume): 3-20.

FOURTH SEMESTER

EDN-401

HIGHER EDUCATION IN INDIA

Course Outcomes

On completion of this course, the student the students shall be able to

- CO1** Analyze various policies and their recommendations on various aspects of higher education.
- CO2** Evaluate the functions and importance of different Higher education institutions.
- CO3** Examine the problems in implementation of the policies of higher education in India.
- CO4** Explore the problems and reforms in higher education in India.
- CO5** Analyze role of various agencies of higher education in India.

Unit-I Development of Higher Education in India

No. of classes- 10

- Development of Higher Education in India during the Pre- Independence period- a brief history
- Development of Higher Education in India during the Post-Independence period with special reference to recommendation of UEC(1948), IEC (1964-66), and NPE(1986)NEP(2020)

Unit-II Higher Education Institutions

No. of classes- 12

- Types of Universities (Central, State, Deemed and private): Establishment, management and functions.
- Institutes of National Importance: AIIMS, IIMs, IITs, IISERs, IITs and NITs
- Types of Universities in NEP 2020: Teaching-Intensive Universities, Research Intensive Universities and Autonomous Degree-Granting Colleges
- Open University, Institute of National importance: IIT, IIM, IISe and AIMS.

Unit-III Management of Higher Education

No. of classes- 10

- Ministry of Human Resources Development (MHRD)- Role and functions
- State Department of Higher Education- Role and functions
- University Grant Commission (UGC)- Role, management and functions
- All India Council for Technical Education (AICTE)-Role, management and functions.

Unit-IV Reforms in Higher Education

No. of classes- 08

- Human Resources Development Centre- Role and functions

- Academic Credit Bank in NEP 2020
- Multiple Entry-Exit Options in Academic Programmes
- Holistic and Multidisciplinary Education
- Higher Education Commission of India (HECI)
- National Scholarship Portal
- National Educational Technology Forum (NEFT)

MODE OF TRANSACTION

Lecture cum Discussion method, Blended learning, Seminar, Workshop, Small group discussion.

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	2	3	2	2	2	1	2	2	1	2	2
CO2	2	3	2	2	2	2	2	2	2	2	2	2	2	2
CO3	2	2	3	2	1	2	2	3	2	3	1	2	3	2
CO4	2	3	1	2	2	3	2	1	2	3	2	2	3	3
CO5	2	2	3	1	2	2	2	2	2	3	2	3	2	3

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READINGS

Rao, K.Sudha (Ed.) (2002). *Educational policies in India: Analysis and review of promise and performance*. New Delhi: NUEPA.

Ministry of Human Resource Development (2011). *Indian Institutes of development*. New Delhi: Government of India

Cheney, G. R., Ruzzi B. B. and Muralidharan, K. (2005). *India education report*. New Delhi: NCEE (National Center on Education and the Economy).

MHRD(2020). *National Education Policy 2020*. Ministry of Human Resource Development, Government of India.

https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf.

UCG (University Grants Commission) (2008). *Higher education in India: Issues*

related to expansion, inclusiveness, quality and finance. New Delhi: University Grants Commission.

Veena, B. (1998). *Accountability and Autonomy in higher Education.* New Delhi: AIU.

UNESCO (1998). *Higher education in India: Vision & action.* New Delhi: UNESCO.

Department of Secondary and Higher Education (2001). *Committee on autonomy of higher education institutions.* New Delhi: Government of India.

EDN-402

TEACHER EDUCATION

Course Outcomes

On completion of this course, the student the students shall be able to

- CO1** Describe the concept, scope and importance of teacher education.
- CO2** Analyze various policies recommendations for teacher education in India
- CO3** Critically evaluate professional ethics, autonomy and accountability of teachers in their profession
- CO4** Identify the problems in implementation of the policies for teacher education
- CO5** Analyze the role and functions of different agencies of teacher Education in quality development of teacher education.

Unit-I Introduction to Teacher Education

No. of classes- 10

- Teacher education- concept, objectives, scope and importance.
- Types of teacher education- In-service teacher education and Pre-service teacher education.
- Organization of Components of Pre-service Teacher Education
- Transactional Approaches (for foundation courses) Expository, Collaborative and Experiential learning
- Agencies and Institutions of In-service Teacher Education at District, State and National Levels (SCERT, NCERT, NCTE and UGC)

Unit-II Development of Teacher Education in India

No. of classes- 08

- Teacher education- Historical perspective.
- The Education Commission (1964-66)
- National Commission on Teacher-National Policy on Education (1986)
- NCFTE-2009
- NCTE Regulation Act-2014

Unit-III Teaching as a Profession

No. of classes- 12

- Teaching as a profession and its characteristics
- Professional growth of teacher- Meaning, purpose and strategies

- Teacher Effectiveness- Meaning, criteria for assessment and modification of teacher behavior.
- Characteristics of good teacher, professional ethics, autonomy and accountability of teacher
- Evaluation of teacher at different levels-
 - Evaluation by authority
 - Evaluation by students
 - Self-evaluation/Personal appraisal
 - Peer evaluation
- Importance of teacher evaluation
- Tools and techniques for teacher evaluation

Unit-IV Models of Teacher Education

No. of classes- 10

- Knowledge base of Teacher Education from the view point of Schulman, Deng and Luke & Habermas
- Meaning of Reflective Teaching and Strategies for Promoting Reflective Teaching
- Models of Teacher Education - Behavioristic, Competency-based and Inquiry Oriented Teacher Education Models

MODE OF TRANSACTION

Lecture cum Discussion method, Blended learning, Seminar, Workshop

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	2	3	2	1	2	1	2	2	1	2	1
CO2	2	3	2	2	2	2	2	2	2	2	1	2	1	2
CO3	2	2	3	2	1	2	3	2	1	1	2	1	2	3
CO4	2	3	1	2	2	3	2	1	2	3	2	1	3	3
CO5	2	3	2	1	2	2	3	2	2	1	2	3	3	4

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READINGS

Aggrawal, J.C.(1996). *The progress of education in free India*. New Delhi: AryaBook Depot.

Balram,R.(1993). *In service education and training of teachers*. Paris: OECD.

Hopkins, D. & Reid, M. (1993). *Professional development of teacher*. London: Kogan Page.

Joshi, J.N. (1997). *Teacher education: pre-service and in-service*. New Delhi: NCERT.

NCTE (2009). *National Curriculum Framework for Teacher Education*. National Council for Teacher

Education.

https://ncte.gov.in/website/PDF/NCFTE_2009.pdf.

Nehru, S. & Suryanarayana, N.V.S. (2012). *Teacher education*. New Delhi: APH Publishing

Pany, S.(2013). *Teacher education in India*. New Delhi: Shipra Publication.

Raggett, M. & Clarkson, M.(2012). *Changing pattern of teacher education*. New Delhi: Routledge.

Sahoo, P.K., Yadav, D. and Das, B.C.(2010). *Professionalism in teacher education: Contemporary Perspectives*. New Delhi: Uppal.

Singh, U.K. & Sudarshan, K.N.(1996). *Teacher education*. New Delhi: Discovery Publication House Pvt. Ltd.

Srivastava, R.C.(1997). *Teacher education in India: Issues and perspective*. New Delhi: Regency Publication.

EDN-403

GUIDANCE AND COUNSELING IN EDUCATION

Course Outcomes

On completion of this course, the student-teacher shall be able to

- CO1** Summarize the concept, need, principles and bases of guidance.
- CO2** Apply various tools and techniques of guidance in appropriate contexts.
- CO3** Identify the role of school in organizing different guidance programmes.
- CO4** Illustrate the concept, scope and type of counseling.
- CO5** Extract the process, tools and techniques of counseling.
- CO6** Design different types of guidance services.

Unit-I Introduction to Guidance and Counseling

No. of classes- 08

- Guidance and Counseling- Concept, Principles, Needs and Types (Educational, Vocational & Personal).
- Counseling- Concept, Types (Directive, Non-directive and Eclectic)
- Bases of Guidance- Psychological, Sociological and Educational.

Unit-II Tools and Techniques of Guidance

No. of classes- 10

- Test and their significance in guidance programmes- various types of standardized test
- Non-Testing devices and their significance in guidance programmes with special reference to Questionnaire, Interview schedules, Socio-metric approach and Cumulative Record Cards

Unit-III Approaches and Theories of Counselling

No. of classes- 12

- Cognitive- Behavioral (Albert Ellis – REBT)
- Humanistic

- Person- centered Counselling (Carl Rogers)
- Theories of Counselling (Behavioristic, Rational, Emotive and Reality)

Unit-IV Organization of Guidance Services

No. of classes- 10

- Placement Service
- Occupational Information Service
- Counseling Service
- Follow-up Service
- Testing Service

MODE OF TRANSACTION

Lecture cum Discussion method, Blended learning, Seminar, Workshop, Small group discussion.

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	2	1	2	3	2	1	2	2-	2	1	2	3
CO2	2	3	2	1	1	1	1	2	2	2	2	2	2	2
CO3	2	2	3	3	2	2	2	2	2	3	3	3	1	2
CO4	2	3	1	2	2	2	1	3	1	3	1	1	2	1
CO5	2	3	2	1	1	2	1	2	2	2	1	2	2	2
CO6	2	2	3	2	1	2	2	2	2	3	2	2	2	2

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READINGS

- Bhatnagar, A. & Gupta, N. (1999). *Guidance and counseling: A theoretical perspective(Vol.I)*. New Delhi: Vikas.
- Bhatnagar, A. and Gupta, N. (1999). *Guidance and counseling: A practical approach(Vol.II)*. New Delhi: Vikas.
- Dave, I. (1984). *The basic essentials of counseling*. New Delhi: Sterling Pvt. Ltd.
- Gazda,G. R.M.(1989). *Group counseling: A development approach*. London: Allynand Bacon.
- Gibson, R.L. & Mitchell, M.H. (1986). *Introduction to guidance*. New York:McMillan.
- Nugent, F. A. (1990). *An Introduction to the profession of counseling*. Columbus: Merrill publishing Co.
- Pietrofesa, J.J., Bernstein, B., & Stanford,S.(1980). *Guidance: An introduction*. Chicago: Rand McNally.

Rao, S.N. (1981). *Counseling psychology*. New Delhi: Tata McGraw Hill.
Saraswat, R.K. & Gaur, J.S.(1994). *Manual for guidance counselors*. New Delhi: NCERT.

EDN-404

INCLUSIVE EDUCATION

Course Outcomes

On completion of this course, the student-teacher shall be able to

- CO1** Describe historical background of inclusive education.
- CO2** Summarize concept, nature, and scope of inclusive education.
- CO3** Categorize types of inclusive education.
- CO4** Illustrate the types, characteristics of physically and sensory handicapped.
- CO5** Identify characteristics, etiology and prevention of physically and sensory handicapped.
- CO6** Categorize and summarize the types, characteristics, etiology and prevention of mentally handicapped.

Unit-I Introduction to Inclusive Education

No. of classes- 14

- Concept of Impairment, Disability and Handicap and Inclusive Education
- Legal Provisions for their Education
- Persons with Disabilities Act 1995
- National Policy of Disabilities 2006
- National Curriculum Framework 2005
- RPWD Act 2016
- UNCRPD (United Nations Convention on the Rights of Persons with Disabilities)

Unit-II Support Needs of Students with Disabilities

No. of classes- 08

- Types and degree of impairment, Characteristics, Etiology and prevention, educational programs of OH, HI, VI, MR, LD.
- Support needs of orthopedically handicapped, Hearing Impaired, Visually Impaired, Mentally Retarded and Learning-Disabled Students -Types of handicapped, Characteristics, Educational programs.

Unit-III Planning and Management of Inclusive Classrooms**No. of classes- 10**

- Infrastructure: Removing Architectural Barriers
- Human Resource and Instructional Practices
- Curriculum and Curricular Adaptations for Diverse Learners
- Assistive and Adaptive Technology for Diverse learners
- Product (Aids and Appliances) and Process
- Individualized Education Plan
- Remedial Teaching)
- Parent Professional Partnership

Unit-IV Research Trends of Inclusive Education in India**No. of classes- 08**

- Barriers and Facilitators of Inclusive Education
- Attitude, Social and Educational
- Current Status and Ethical Issues of inclusive education in India
- Research Trends of Inclusive Education in India

MODE OF TRANSACTION

Lecture cum Discussion method, Blended learning, Seminar, Workshop, Small group discussion

PO-PSO-CO MAPPING MATRIX

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	2	1	2	3	2	1	2	2-	2	1	2	3
CO2	2	3	2	1	1	1	1	2	2	2	2	2	2	2
CO3	2	2	3	3	2	2	2	2	2	3	3	3	1	2
CO4	2	3	1	2	2	2	1	3	1	3	1	1	2	1
CO5	2	3	2	1	1	2	1	2	2	2	1	2	2	2
CO6	2	2	3	2	1	2	2	2	2	3	2	2	2	2

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

SUGGESTED READINGS

Bateman,D.F & Cline, J.L.(2016). *A teacher's guide to special education*. United State: ASCD.

Dash,M. & Dash,N.(2005). *Essentials exceptionality and special education*. NewDelhi: Atlantic.

Hallahan,D.P., Kaceffan,J.M., & Pullen,P.C.(2011). *Exceptional learners: An introduction to special education*. New Delhi: Pearson Education.

Kirk, S., Gallagher, J.J.& Coleman, M.R.(2014). *Educating Exceptional children*.New Delhi: Cengage Learning.

Mangal,S.K.(2007). *Educating exceptional children: An introduction to special education*. New Delhi: Prentice Hall India Pvt. Ltd.

Panda, K.C.(1997). *Education of exceptional children*. New delhi: Bookman.

Sarangi, H. (2018). *Cognitive development of hearing impair children*. New Delhi: Pacific book International.

Sharma, R.A.(2016). *Fundamental of special education*. New delhi: Bookman.

Werts, M.G., Culatta, R.A. & Tompkins, J.R.(2015). *Fundamental of special education: What every teacher needs to know*. New Delhi: Pearson

EDN-405

DISSERTATION

Each M.A. (Education) student of Semester IV is compulsory required to select a problem on any area of education, carry out intensive research work and prepare a dissertation under the guidance of a teacher of the department. He/she is required to submit the complete dissertation to the Department 15 days before the practical examination. The evaluation of research work shall be jointly made by both external examiner and the internal examiner.

The mark shall be distributed as follows

Dissertation: 50 Marks

Viva- Voce: 50 marks

SEMESTER SYSTEM OF P. G. STATISTICS

P. G. SEMESTER EXAMINATION REGULATIONS

CHAPTER - I

REGULATION OF GENERAL ACADEMIC MATTERS

The Departments shall follow Semester System of teaching and Examination based on continuous evaluation internally as well as externally subject to moderation of question papers. The system of evaluations of the students shall be based on Course Credit System.

Academic Year

The Academic Year of the department shall ordinarily be from JUNE to MAY. It may however be modified by the Staff Council from time to time.

Semester

The academic year shall have two semesters, each of which shall be of 6 months duration.

Minimum working days in a Semester

A Semester shall have a minimum of 90 working/instructional days excluding examination days/Sundays/Holidays etc. The minimum number of classes in a semester shall not fall short of the number of classes as mentioned below.

1. One Credit hour courses = 10 classes minimum
2. Two Credit hour courses = 20 classes minimum
3. Three Credit hour courses = 30 classes minimum
4. Four Credit hour courses = 40 classes minimum

Credit hours

One credit shall signify the quantum of teaching imparted corresponding to one hour of theory class and two hours of laboratory/project work and two hours of seminar per week during a semester in respect of a particular course. Each teaching hour of theory class will be of 60 minutes and practical classes/project work will be of 120 minutes duration and seminar will be of 120 minutes duration. For field study outside headquarters, one working day will be considered as two teaching hours. However, the field study should not exceed 30 days (including Sundays) in one semester.

The P. G. Syllabus may be so designed that the total of credit hours for all four semesters shall be 88 spread equally over all semesters as far as practicable, tutorials and proctorials shall be treated as non-credit components.

Course

A course is a Unit of instruction under any discipline carrying a specific number of credit hours describing its weightage. Those courses, which a student must take as compulsory requirement, are, called Core Courses. Those courses, which a student opts out of a list of specialized courses offered by the department, are called Elective Courses.

Grade

The grade awarded to a student in any particular course shall be based on his/her performance in all the tests conducted during a semester and shall be awarded at the end of the semester. The grade in each course is expressed in numerical value in 10.00 scale. The marks of a student shall be converted to 10.00 scale and the points scored thereby shall be called the "Grade Point" in the course. Respective "Grade Point Average" (GPA) and "Overall Grade Point Average" (OGPA) shall be awarded at the end of each semester and all semester respectively.

A 3.0 Grade Point is required for passing in individual paper and 4.0 GPA to pass any semester examination. The G.P. shall be rounded to one decimal point and GPA to two decimal points.

Grade Point Average (G.P.A.)

Grade Point Average (G.P.A.) of a semester shall be calculated as:

$$\text{GPA} = \frac{\text{Summation of } \{(\text{Credits in each course}) \times (\text{Grade point in that course})\}}{\text{Total No. of Credits in that Semester}}$$

Where the summation is taken over all courses in a given semester, G.P.A. shall be rounded up to 2 decimal points.

O.G.P.A. (Overall Grade Point Average)

It is the average of accumulated grade points of a student, worked out by dividing the cumulative total of grade points by the cumulative total of credit hours of all the courses covered and completed by a student during all the Semesters. For the first semester of the programme the GPA and OGPA shall be the same.

$$\text{OGPA} = \frac{\sum A \times B}{C}, \text{ where } A = \text{Credits in each semester, } B = \text{Total Grade Point in that semester} \text{ \& } C = \text{Total No. of Credits in that Semester}$$

The summation is taken over all semesters in a given programme. OGPA shall be rounded up to 2 decimal points. For merit lists, in case of equality, the OGPA shall be calculated beyond two decimal places if necessary.

Conversion of grades to marks and classification of results under course credit system
The OGPA can be converted to percentage of marks in the following manner: Percentage of Marks = (OGPA) × 10

A student after successful completion of all the semesters, Degree shall be awarded in the following manner:

O.G.P.A. ≥ 6.0	: FIRST CLASS
O.G.P.A. ≥ 5.0 - < 6.0	: SECOND CLASS
O.G.P.A. 4.0 - < 5.0	: THIRD CLASS
O.G.P.A. < 4.0	: FAIL

Academic Calendar

The Examination Section and the academic section shall finalize the schedule of

semester registration and other academic activities at the start of academic session. The Academic Calendar shall be prepared by the Academic Committee of the University in consultation with examination section.

The broad format for academic calendar for P. G. with regard to admission, registration and commencement of classes shall be as follows:

Admission and Registration and Commencement of Classes for 1 st Semester	JULY
1 st Semester Examination	DECEMBER
Commencement of Classes for 2 nd Semester	JANUARY-MAY
2 nd Semester Examination	JUNE
Commencement of 3 rd Semester Classes	JULY-
NOVEMBER	
3 rd Semester Examination	DECEMBER
Commencement of 4 th Semester Classes	JANUARY-
APRIL	
4 th Semester Examination	APRIL & MAY
Final Results to be published in the month of	JUNE

Requirement of award of degree

The minimum credit hour requirement for the Master Degree shall be 88 (Eighty Eight) credits and the residence required for Master Degree shall be continuous four semesters from the first date of registration and the maximum time allowed to complete the Master Degree shall be 8 (eight) semesters.

Requirement for attendance

A candidate shall be required to attend 75% lectures, tutorials and practical classes separately during the semester (For late admitted students' attendance to be calculated from the date of admission). Condonation may be granted by the staff council only to the extent of 15% in exceptional cases. (Illness, accident, mishap in the family, deputation by University/Department). When a candidate has been deputed by the University to represent the University/state for any activity, the lectures delivered during his/her absence for the purpose shall not be counted towards the calculation of attendance provided the student submits a certificate to that effect from the appropriate authority.

Registration in a semester

A student has to register his/her name at the beginning of every semester in the prescribed form, for the course he/she wants to take in that semester. Examination Section (General) shall notify the registration dates and the list of registered students for the semester shall be given to the Head of the Department within two weeks of the commencement of the Semester.

CHAPTER - II

REGULATIONS ON EXAMINATION MATTERS

Mid Term Examination

In each Semester there shall be one Mid Term Assessment examination of 60 minutes duration. The Mid Term examination shall be conducted by COE like that of End Term examination. The answer scripts shall be evaluated by the external and internal examiners and the marks along with answer scripts shall be

retained in COE.

Semester Examination

After the end of each semester there shall be an examination of each theory paper of 2 hours duration and of each practical paper of 4 hours duration, which shall be called Term End / "Semester Examination". The maximum marks for each theory paper shall be 50 out of which 40 marks for term end and 10 marks for Mid Term. The classes shall remain suspended 10 (ten) days (including Sundays and holidays, if any) before the date of commencement of semester test for preparation by the students.

Results of Examinations

The results shall be declared ordinarily within four weeks of completion of the examinations. A student who seeks re-addition of his/her marks in a course shall be allowed to do so by submitting an application to Registrar along with a required fees in the fee counter of the University. All such cases/complaints if any shall be disposed of by the Examination Section in a prefixed day and necessary corrections if any shall be reflected in the mark/grade sheet. The candidates shall have to appear in all the Units of a semester examination to be eligible to be a declared 'pass' provided he/she secures minimum pass marks/grade.

Promotion to the next semester

A student shall be admitted to the next semester only when he/she appears in all the papers of the concerned semester examination. However, a student failing to appear semester examination in some or of all papers due to some reasons as mentioned in 2.5 may be admitted to the next semester. Such a student shall produce sufficient proof in favour of his/her reason for not being able to appear in some or all papers of the Semester Examination on the next academic session in the corresponding semesters.

Absence from Examination

If a student is unable to appear a semester examination in some or all papers the Registrar shall consider his/her case for admission into the next higher semester only the following cases:

- (a) When he/she is hospitalized.
- (b) When he/she is not be able to appear in the examination due to serious illness or death of parents, brothers, sisters, spouse or children.
- (c) When he/she met an accident of serious nature.
- (d) When the department/University or any official directive deposes him/her

Procedure for Repeat/Improvement

A student who wants to sit for the semester examination of first and/or second semester in the subsequent academic session (for repeat or improvement) he/she shall have to apply to the Registrar in plain paper before fifteen days of the commencement of the said examination. If allowed by the Registrar, he/she shall deposit the required fees for each paper with center charge and produce the proof to the teacher in-charge examination with permission letter from the Registrar.

In a semester to appear improvement examination the candidates must have passed the semester examination. A candidate can appear repeat examination of papers in which he/she has failed or not appeared for reasons mentioned in 2.5.

The Master Degree student seeking to appear/improvement examination in any course(s) shall get 3 chances for 1st and 2nd semester within 8 semesters. Candidates appearing in repeat/improvement examination shall not be considered in the merit list and it shall be reflected in the Provisional Certificate cum Mark sheet (PCM) but not in the final degree certificate.

Award of Degree Certificate, Grade/Marksheet

A Degree certificate under the official seal of the university and signed by the Vice - Chancellor shall be presented at the Convocation or in absentia to each of the successful students of particular degree. The Controller of Examinations shall issue the mark/grade sheet of each semester to the candidates in the sheet of each semester to the candidates in the prescribed format by depositing the required fees for marks/Grade Sheet to be deposited in the University counter.

Guideline for filling up of Forms for PG Classes (IMP/Repeat)

A student shall repeat all the theory and practical papers in which he/she failed in the semester examination within a period of eight semesters from the date of first registration. Such students shall have to apply to the Head of the Department/Registrar in plain paper during the filling up of form for the ensuing semester examination. If allowed, he/she shall deposit the fees as prescribed by the University.

If a candidate secures less than 3.0 Grade point in a paper(s) and less than 4.0 Grade point average in a Semester examination he/she has to appear all the papers in that Semester.

If a candidate secures less than 3.0 Grade Point in a paper(s) and a minimum 4.0 Grade point average in a semester examination, he/she has to appear only the paper(s) in which he/she secured less than 3.0 Grade point.

A candidate is eligible to sit for improvement in a paper(s) only when he/she has passed the semester examination concerned. Further, he/she can improve in a maximum of EIGHT paper(s) in the entire course. The Master Degree students seeking to take improvement examination in any course(s) shall get chances within 8 semesters from the year of admission to the course. The candidates taking this advantage (improvement) will be examined on the basis of current syllabus and the higher marks shall be retained during computation of result.

If a candidate fails to appear in any paper of the said examination and marked ABSENT his/her results will be declared only when he/she clears that paper/those papers.

Disciplines in the Examination

- (A) Late Comers: A student arriving in the examination hall/room fifteen minutes after the commencement of the examination shall not be ordinarily allowed to sit for the examination. No examinee shall be allowed to go out of the examination hall within one hour of commencement of examination. The invigilators shall keep a record of temporary absence of students from the examination hall/room during the examination.
- (B) Adoption of unfair means in the Examination:
Possession of unauthorized materials and using it, copying from scripts of other students or from any other source, showing his/her answer script to others during the examination, creating disturbance or acting in a manner so as to cause inconvenience to other students in the examination hall or near about shall be treated as adoption of unfair means or mal practice.

SEMESTER SYSTEM OF P. G. STATISTICS

Paper Code	Paper Title	Marks	Credits Hours
SEMESTER- I			
ST-101	Mathematical Analysis and Linear Algebra	20+80	4
ST-102	Statistical Methods	20+80	4
ST-103	Probability Theory -I	20+80	4
ST-104	Statistical Inference-I	20+80	4
ST-105	Statistical Computing-I using SPSS	100	4
	Total	500	20
SEMESTER- II			
ST-201	Probability Theory -II	20+80	4
ST-202	Statistical Inference-II	20+80	4
ST-203	Survey Sampling Methods	20+80	4
ST-204	Operations Research	20+80	4
ST-205	Statistical Computing-II: C Programming	100	4
ST-206	Elective (DSE): Demography & Vital Statistics	20+80	4
	Total	600	24
SEMESTER- III			
ST-301	Multivariate Analysis	20+80	4
ST-302	Design and Analysis of Experiments	20+80	4
ST-303	Stochastic Processes	20+80	4
ST-304	Non-Parametric Methods	20+80	
ST-305	Statistical Computing-III: R Programming	100	4
ST-306	Elective (IDSE): Statistical Methodology	20+80	4
	Total	600	24
SEMESTER- IV			
ST-401	Linear Model and Regression Analysis	20+80	4
ST-402	Any one paper out of the following papers: 1. <i>Econometrics</i> 2. Advanced Survey Sampling Methods 3. Advanced Design and Analysis of Experiments 4. Advanced Operations Research	20+80	4
ST-403	Any one paper out of the following papers: 1. <i>Time Series Analysis and Statistical Quality Control</i> 2. Reliability Theory	20+80	4
ST-404	<u>Any one</u> paper out of the following papers: 1. <i>Official Statistics</i> 2. Actuarial Statistics 3. Quantitative Epidemiology 4. Survival Analysis& Clinical Trials 5. Big Data Analytic Techniques	20+80	4
ST-405	Project Work and Seminar Presentation	100	4
	Total	500	10
	Grand Total	2200	88

NB: *Departmental Specific Elective: Open Elective (DSE) Operations Research (ST - 206), Inter Disciplinary Specific Elective: Open Elective (IDSE) Biostatistics (ST-306), Mid-term 20 & End term 80*

PROGRAMME OBJECTIVES

The objectives of 2 years (4 Semester) M.A/M.Sc. Statistics Programme is:

1. To inculcate and develop aptitude to apply statistical tools at a number of data generating fields in real life problems.
2. To train students to handle large data sets and carry out data analysis using software and programming language.
3. To teach wide range of statistical skills, including problem-solving, project work and presentation so as to enable students to take prominent roles in a wide spectrum of employment and research.

DETAILED SYLLABUS

SEMESTER - I

ST-101: MATHEMATICAL ANALYSIS AND LINEAR ALGEBRA 4 CREDITS

Course Objectives: The learning objectives include:

1. Introduction to the fundamental concept of real analysis such as sequence, series of real numbers and their convergence, continuity, differentiability of real valued functions.
2. Enhancement to learn the basic ideas of abstract algebra and techniques with proof in pure mathematics and further, it can be used in many other courses.

Course Outcomes (CO): After completing this course, students will be able to develop a clear understanding of

1. Fundamental properties of the real numbers that lead to the formal development of real analysis.
2. Comprehension of rigorous argument developing the theory underpinning real analysis.
3. Limits and how they are used in sequences, series, differentiation and integration. Construct rigorous mathematical proofs of basic results in real analysis.
4. Abstract ideas and rigorous methods in mathematical analysis to solve practical problems.
5. The concept of metric space.
6. Using the basic concepts of vector and matrix algebra, including linear dependence / independence, basis and dimension of a subspace, rank and nullity, for analysis of matrices and systems of linear equations.
7. The characteristic polynomial to compute the eigen values and eigenvectors of a square matrix and use them to diagonalizable matrices when this is possible.

UNIT-I

Sequence and series, convergence, Bolzano-Weirstrass theorem, Heine Borel theorem. Real valued function, continuous functions, Uniform continuity, sequences and series of functions, Uniform convergence. Differentiation, maxima-minima of functions.

UNIT-II

Functions of several variables, partial and total differentials, maxima-minima of functions, multiple integrals, change of variables in multiple integration, Improper Integrals, Convergence of improper integrals of first and second kinds.

UNIT-III

Metric space - limits and metric space, continuous functions in metric spaces, connectedness, completeness and compactness. Normed linear Spaces. Spaces of continuous functions as examples.

UNIT-IV

Vector spaces, linear dependence and independence, Dimension and basis, orthonormal basis, Matrix: Characteristic roots and vectors, Cayley-Hamilton theorem, minimal polynomial, similar matrices, spectral decomposition of a real symmetric matrix, Hermitian matrix. Real quadratic forms, reduction and classification of quadratic forms.

Books Recommended

1. Ruddin, Walter: Principles of Mathematical Analysis, McGraw-Hill.
2. Goldberg, R.R.: Methods of Real Analysis, Oxford & IBH Publication
3. Apostol, T.M.: Mathematical Analysis, Narosa Publishing House
4. Graybill, F.E.: Matrices with Applications in Statistics, 2nd ed., Wadsworth
5. Searle, S.R.: Matrix Algebra Useful for Statistics, John Wiley & Sons
6. Strang, G. (1980). Linear Algebra and its Application, 2nd edition, Academic Press, London-New York

ST-102: STATISTICAL METHODS

4 CREDITS

Course Objectives: The learning objectives include:

1. Introduction to Statistics.
2. Understanding the nature of data with the help of various statistical tools.
3. Understanding the concept of Probability and probability distributions.

Course Outcomes (CO): After completing this course, students will have clear understanding of-

1. The fundamental concepts of statistics
2. Measures of location and dispersion

3. Bivariate data, Significance of various coefficients of correlation
4. Fitting of linear and nonlinear curve
5. Introduction of variables and their pmf, pdf and cdf
6. Discrete and Continuous Probability distributions and its applications
7. Order statistics and their distributions and properties

UNIT-I

Descriptive Statistics: Measures of central tendency, dispersion, skewness and kurtosis for the study of nature of data. Idea of correlation and regression for two and three variables; correlation coefficient, correlation ratio, multiple and partial correlations.

UNIT-II

Some discrete statistical distributions: Binomial, Poisson, hypergeometric, negative binomial and multinomial distributions. Some continuous distributions (Normal, Uniform, Exponential, Cauchy, Pareto, Weibull, lognormal), Bivariate normal and bivariate exponential family of distributions and their properties.

UNIT-III

Functions of random variables and their distributions using Jacobian and other tools, convolution and compound distributions, truncated and mixture distributions, Sampling distributions from normal population, Chi-square, t and F distributions and Non-central chi-square, t and F distributions.

UNIT-IV

Order statistics and their distributions and properties. Joint and marginal distributions of order statistics. Extreme values and their asymptotic distribution (statement only) with applications, Asymptotic distribution of median, distribution of quantiles.

Books Recommended

1. Hogg, R.V. and Craig, A.L. (1978). Introduction to Mathematical Statistics, MacMillan, New York.
2. Mood, A.M., Graybiel, F.A. and Boes, D.C. (2001). Introduction to Theory of Statistics, Tata McGraw Hill, New Delhi.
3. Ross, Sheldon M (2004) Introduction to Probability and Statistics for Engineers and Scientist, Third Edition, Elsevier Academic Press, USA.
4. Rohatgi V.K. and Saleh, A.K. Md. E. (2001). An Introduction to Probability and Statistics (Second Edition), John Wiley and Sons (Asia), Singapore.
5. Dudewicz, E.J. and Mishra, S.N. (1988). Modern Mathematical Statistics, John Wiley, New York.
6. Johnson, S and Kotz, S. (1970). Continuous univariate Distributions I and II John Wiley, New York.
7. David, W.S. (2003): Order Statistics (Second Edition). John Wiley and Sons, New York.

Course Objectives: The learning objectives include:

1. The introduction of set, series, sequence, limit, field, probability measures & Properties.
2. The concept of random variables (RV), functions of RVs, Joint pdf, pmf and cdf, conditional and marginal, use of Jacobian of transformation, moments, expectations, mgf, chf, and some inequalities.
3. Understanding of convergence, strong law and weak law of large numbers

Course Outcomes (CO): After completing this course, students will be able to develop a clear understanding of:

1. The fundamental concepts of probability and their applications in day today life
2. Application of inequalities.
3. Limiting approach and different laws, Markov and Chebychev's inequality
4. Statement and applications of WLLN and SLLN.
5. Central limit theorem (CLT) for i.i.d. variates, and its applications

UNIT-I

General Probability space, Various definitions of probability, probability axioms, properties of probability, conditional probability, Bayes' theorem and its applications.

UNIT-II

Concept of random variables, cumulative distribution function and probability density function, joint, marginal and conditional distribution. Brief review of joint, marginal and conditional probability density function, functions of random variables and their distributions using Jacobian of transformation.

UNIT-III

Mathematical expectation, moments, conditional expectation, moment generating functions, cumulative generating functions and their applications, Characteristic function, uniqueness theorem, Levy's continuity theorem (statement only). Probability inequalities and their applications: Chebyshev, Markov and-Jenson.

UNIT-IV

Convergence in probability and convergence in distribution, weak law of large numbers, Sequence of events and random variables: Zero one law of Borel and Kolmogorov, almost sure convergence in mean squares, Khintchin's weak law of large numbers, Kolmogorov inequality, and strong law of large numbers.

Books Recommended

1. P.G. Hoel, S.C. Port and C.J. Stone, Introduction to

- probability Universal Book Stall, New Delhi, 1998.
2. Sheldon Ross, A first course in Probability, 8th Edition, Prentice Hall, 2009.
 3. Loeve (1996): Probability Theory Affiliated East-West Press Pvt. Ltd. New Delhi.
 4. Bhatt, B.R. (2000): Probability, New Age International India.
 5. Feller, W. (1971): Introduction to Probability Theory and its applications, Vol. I and II. Wiley, Eastern-Ltd.
 6. Rohatgi, V.K(1984): An Introduction to Probability Theory and Mathematical Statistics, Wiley Eastern.
 7. Billingsley, P. (1986): Probability and Measure, John Wiley Publications.

ST-104: STATISTICAL INFERENCE-I

4 Credits

Course Objectives: The learning objectives include:

1. Concept of point and interval estimation.
2. Concept of properties of estimators and their estimation.
3. Concept of large sample properties of estimators
4. Analysis and interpretation of the unbiasedness and MVUE and related theorems.

Course Outcomes (CO): After completing this course, students will be able to develop the skills concerning:

1. Parameter, statistic, standard error, sampling distribution of a statistic etc.
2. Characteristics of a good estimator, different methods of estimation.
3. Use of inferential techniques in data analysis.

UNIT I

Point Estimation, Properties of estimators, Unbiasedness, Consistency, Sufficiency, Neyman Factorization Criterion, Minimal sufficient statistic, Invariance properties of sufficiency, Completeness.

UNIT II

Mean Square Error, Unbiasedness and minimum variance, Minimum Variance Unbiased estimator (MVUE), C-R inequality, Cramer Rao lower bound, Rao-Blackwell Theorem, Chapman-Robbins Inequality, Lehmann-Scheffe Theorem, Necessary and sufficient conditions for MVUE.

UNIT III

Consistent estimators, Sufficient condition for consistency, Efficient estimators, Methods of estimation: Method of Maximum Likelihood (MLE) and its properties, Method of Moments, Method of Least squares, Method of Minimum Chi-Square and Modified Minimum Chi-Square, Method of Percentiles. Consistent Asymptotic Normal (CAN) estimators, Properties of CAN estimators.

UNIT - IV

Interval estimation – confidence level, construction of confidence intervals, shortest confidence intervals, uniformly most accurate one -sided confidence intervals, unbiased confidence intervals, confidence coefficient.

Books Recommended:

1. E.L. Lehmann (1998): Theory of Point Estimation, John Wiley and Sons.
2. Rohatgi V.K. and Saleh, A.K. Md. E. (2001). An Introduction to Probability and Statistics (Second Edition), John Wiley and Sons (Asia), Singapore.
3. B.K. Kale (1999) A First Course in Parametric Inference, Naros a Publishing Company.
4. Robert C.P. and Casella, G (1999) Monte-Carlo Statistical Methods, Springer Verlag.
5. Mukhopadhyay, P (1999) Mathematical Statistics, New Central Book Agency Pvt. Ltd.
6. Hogg, R.V. and Craig, A.T. (1971): Introduction to Mathematical Statistics, Princeton University Press.

ST- 105: STATISTICAL COMPUTING-I USING SPSS 4 CREDITS

Course Objectives: To understand the basic concepts of SPSS:

1. Define a variety of statistical variables
2. Enter basic data into SPSS
3. Carry out a statistical analysis that can test hypotheses of small and large samples and fitting of distributions.

Course Outcomes (CO):

1. After completing the course students can able to construct frequency distribution and calculate different statistical measures like measures of central tendency, measures of dispersion skew and kurtosis, can present data in graphical form and interpret the data.
2. Student can Correlation and regression analysis and perform testing of hypothesis for small sample and large sample tests.
3. Students can fit Binomial, Poisson, Normal distribution and test the goodness of fit.

Data analysis using SPSS.

- I. Frequency distribution, measures of central tendency, dispersion, moments, skewness and kurtosis
- II. Correlation, regression, rank correlation
- III. Test of hypothesis - t and F tests, chi-square test, z test
- IV. Fitting of distributions.

Books Recommended

1. Rajaraman,V, “Fundamentals of Computers”, PHI
2. Norton , Peter (2001), “Introduction to Computers”, 4th Ed., TMH.
3. Berk, K.N. & Carey, P. (2000): Data Analysis with Microsoft Excel, Duxbury Press

Marks Distribution

PART-A: Computer application and Data Processing - 20 marks

PART- B: Data analysis using Excel and SPSS - 60 marks

VIVA-VOCE + RECORDS - 20 MARKS

SEMESTER - II

ST- 201: PROBABILITY THEORY- II

4 CREDITS

Course Objectives: The learning objectives of this paper deal with:

1. Introduction of non-central probability distributions.
2. Concept of convergence on a probability space in distributions and some inequalities.
3. Understanding the concept of characteristic function and their related theorems.
4. Concept of convergence, strong law and weak law of large numbers.

Course Learning Outcomes: After completing this course, students will have clear understanding of-

1. The fundamental concepts of non-central chi-square, t and F distributions and their applications.
2. An idea about convergence in probability and distributions along with their relationship, characteristic functions and applications on the basis of inequalities.
3. Limiting approach and different laws.

UNIT-I

Field, sigma field, minimal sigma field, Borel sigma field, set functions. Measure and its properties, measurable functions and inverse functions.

UNIT-II

Product sigma-fields, Borel sigma-field on Euclidean spaces. Extensions of measures, Caratheodory's theorem (statement). Lebesgue measure on \mathbb{R} and \mathbb{R}^k : construction, properties. Convergence on a probability space – convergence in distribution (law), convergence in probability, convergence in r -th mean, convergence almost surely and their relationships.

UNIT-III

Integration: simple, nonnegative, general measurable functions, integrability, Monotone Convergence Theorem, Dominated Convergence Theorem, Fatou's lemma. Change of variables. L_p spaces, Holder's and Minkowski's inequalities.

UNIT-IV

Laws of large numbers –Bernoulli's laws of large numbers. Hajek-Reni inequalities. Central limit theorem – Lindberg –Levy and Liapounov forms with proofs and applications. Lindberg-Feller form (without proof).

Books Recommended:

1. Rohatgi, V.K. and Ehsanes Saleh, A.K.M.: An Introduction to Probability and Statistics, 2nd ed., Wiley-Inter Science
2. Bhat, B.R.: Modern Probability Theory, 3rd Edition, New Age International.
3. Gun, A.M., Gupta, M.K. and Das Gupta, B.: An Outline of Statistical Theory, Vol-I (4thed.), World Press
4. Ash, R.B. and Doleans-Dade, C.A.: Probability and Measure Theory. Elsevier.
5. Billingsley, P: Probability and Measure. John Wiley.
6. Sen, A. K: Measure and Probability. Narosa Publishing House.
7. Feller, W: An Introduction to Probability Theory and its Applications, Vol I John Wiley.

ST- 202: STATISTICAL INFERENCE-II**4 CREDITS**

Course Objectives: The learning objectives include:

1. Understanding of hypothesis testing and its applications. Concept of Likelihood ratio tests and its development of critical region and testing of hypothesis.
2. Concept of SPRT, OC and ASN functions and their usefulness for different probability distributions.
3. Techniques of non-parametric inferences and their uses in data analysis

Course Outcomes (CO): After completing this course, students will be able to develop the skills concerning:

1. The construction and development of MP tests, UMP tests under simple and composite hypothesis.
2. Construction of similar regions and unbiased tests. They will also acquire the skill of testing hypothesis relating to parameters of normal distribution using LR methods
3. Perform hypothesis testing and selection of sample applying the rules of SPRT
4. Differentiate between parametric and non-parametric tests, non-parametric alternatives of the parametric tests.
5. Analyse the data using non-parametric methods and valid statistical inference.

UNIT-I

Tests of hypothesis, concepts of critical regions, two kinds of errors, power function, MP and UMP test, Neyman-Pearson Lemma, MP test for simple null against simple alternative hypothesis. UMP tests for simple null hypothesis against composite alternative.

UNIT-II

Type A and type A1 tests, similar tests, tests having Neyman structure, The Likelihood Ratio Test (LRT), One-tailed and two-tailed likelihood ratio tests for mean and variance of normal populations, Asymptotic property of LRT and

applications, Monotone Likelihood Ratio Test and applications

UNIT-III

Wald's sequential probability ratio test and its properties, OC and ASN function, derivation of OC and ASN functions, Efficiency of SPRT, SPRT for a Composite Hypothesis.

UNIT-IV

Non-parametric inference: Goodness of fit tests- Chi square test and Kolmogorov Smirnov test for one and two sample problems, Sign test, Signed rank test, Wald-Wolfowitz run test, Median test, Man-Whitney U-test, Non-parametric confidence intervals, Bootstrapping confidence intervals, P-P Plot and Q-Q plot, Tests for independence and homogeneity.

Books Recommended

1. Kale, B.K.: A First Course on Parametric Inference, Narosa Publishing House
2. Rohatgi, V.K. and Ehsanes Saleh, A.K.M.: An Introduction to Probability and Statistics, 2nd ed., Wiley-Inter science.
3. Gun, A.M., Gupta, M.K. and Dasgupta, B.: An Outline of Statistical Theory, Vol. II, (4th ed.), World Press.
4. Lehmann E. L & Romano, J.P. (2005): Testing Statistical Hypotheses. Springer.
5. Gibbons, J.D. & Chakraborti, S. (2003): Nonparametric Inference, McGraw- Hill.

ST- 203: SURVEY SAMPLING METHODS

4 CREDITS

Course Objectives: The learning objectives include:

1. This course introduces participants to what survey sampling is, why it is important, and how it is implemented.
2. Types of samples (probability versus non-probability) and estimation techniques

Course Learning Outcomes: After completing this course, students will have clear understanding of-

1. Participants will achieve an awareness of the critical issues in introductory survey sampling which can then be used to assess existing surveys or aid in creating new ones.
2. How to construct a 'sampling frame' Types of probability samples (e.g., simple random, systematic, stratified, multi-stage clustered, unequal probabilities of selection)
3. Concept on methods of estimation in sampling e.g., ratio, product, difference and regression.

4. What 'sampling error' is, the role of sampling error in confidence intervals.
5. How to determine sample size and the effects of different types of sample designs on confidence intervals

UNIT-I

Basic concepts of finite population and sampling techniques, Errors in surveys. Simple random sampling with and without replacement. Determination of sample size. Probability proportional to size sampling with replacement, the Hansen-Hurwitz and the Horvitz-Thompson estimators.

-

UNIT-II

Stratified random sampling – estimation of population mean/total with standard error and its estimate, problems of allocations, comparison with unrestricted sampling.

Systematic sampling – method of selection, estimation of population mean/total, sampling variance, comparison with simple random sampling and stratified sampling, efficiency for structural populations.

UNIT-III

Cluster sampling – equal size, estimation of population mean/total, standard error and its estimation, comparison with mean per unit estimator.

Two-stage sampling with equal first stage units, estimation of population mean/total, standard error and its estimation, comparison with single-stage sampling, Three-stage sampling.

UNIT-IV

Use of auxiliary information in sample surveys, Methods of estimation – ratio, product, difference and regression methods, sampling variance and efficiency of the estimators, Double sampling.

Books Recommended:

1. Cochran, W.G.: Sampling Techniques, 3rd ed., Wiley
2. Sukhatme, P.V., Sukhatme, B.V., Sukhatme, S. and Asok, C.: Sampling Theory of Surveys With Applications, Indian Soc. of Agric. Stat., New Delhi
3. Swain, A.K.P.C.: Finite Population Sampling – Theory & Methods, South Asian Publishers
4. Sampath, S: Sampling Theory and Methods. Narosa Publishing House.
5. Mukhopadhyay, Parimal: Theory and Methods of Survey Sampling. PrenticeHall.
6. Murthy, M. N: Sampling Theory and Methods. Statistical Publishing Society.

Course Objectives: The learning objectives of this paper deal with:

1. Definition & scope of operations research in management of Scarce resources.
2. Importance of inventory management, determination of economic order quantity (EOQ) and models formulation
3. Concept of game and determination of optimal strategies.

Course Learning Outcomes: After completing this course, students will have clear understanding of:

1. Formulation of LPP and its optimum solution through simplex method, developing economic interpretation of duality
2. Formulation of the transport problem and optimize their cost by different methods.
3. Formulation of nonlinear programming problems and its optimum solution through Kuhn-Tucker, Wolfe's and Beale's algorithms.
4. Formulation, optimum solutions of general inventory models with shortages, models with probabilistic and random demands.
5. Network scheduling through CPM and PERT.
6. Solution of two-person zero sum game by simplex method, Simulation techniques and application of uncertainty through Fuzzy sets.

UNIT-I

Definition and Scope of Operations Research: Phases in Operation Research, models. Solving LPP by Simplex method and solutions to LPP by applying duality theorem, economic interpretation of duality, Karmakar interior point algorithm.

UNIT - II

Transportation, Assignment and Transshipment problems, Travelling salesman's problem, Non-linear programming – constrained optimization and Kuhn-Tucker conditions, Wolfe's and Beale's algorithm.

UNIT-III

Analytical structure of inventory problems, Harris EOQ formula, its sensitivity analysis, extension allowing quantity discounts and shortages, multi-item inventory models, probabilistic inventory problems, Models with random demand, the static risk model. P and Q-systems with constant and random lead times. Network scheduling by PERT/CPM.

UNIT-IV

Game theory: Two-person Zero sum game, Maximin-Minimax principle, Games without saddle points, $2 \times n$, $n \times 2$ and $m \times n$ games, Dominance property, Simulation model, Monte-Carlo simulation, Introduction to fuzzy sets, fuzzy measures, fuzzy relations, fuzzy set theory and applications.

Books Recommended:

1. Taha, H.A. (1992): Operational Research: An Introduction, Mc. Millan.

2. Kanti Swarup, Gupta, P.K. and Man Mohan (2007): Operations Research, Sultan Chand & Sons.
3. Ravindran, A., Phillips, D.T. and Solberg, J.J. (2009): Operations Research: Principles and Practice, Wiley-India.
4. Zimmermann, H.J. (2001): Fuzzy Set Theory and its Applications, 2nd ed., Allied Publishers.
5. Lee, K.H. (2006): Fuzzy logic and Its Applications, Springer.

ST- 205: STATISTICAL COMPUTING-II: C PROGRAMMING 4 CREDITS

Course Objectives: The learning objectives of this paper deal with-

1. To understand computer programming and its roles in problem solving.
2. To develop programming skills using the fundamentals and basics of C language.
3. To enable effective usage of arrays, functions and pointers.

Course Outcomes (CO): After completing this course, students will have clear understanding of-

1. The fundamental concepts of C programming language.
2. Various data types, operators, library functions, Input/Output operations.
3. Decision making and branching and looping.
4. Arrays.
5. User defined functions, recursion functions.
6. Storage class of Variables.

UNIT-I

Introduction: Introduction to C programming, Keywords and Identifiers, Constants, variables, Input and Output Operations, Compilation and Pre-Processing, **Data types:** Different data types, Data types qualifier, modifiers, Memory representation, size and range, **Operators:** Operators (Arithmetic, relational, logical, assignment, increment/decrement, Bitwise, Assignment & Compound assignment, Conditional). Operator types (unary, binary, ternary). Expressions, Order of expression (Precedence and associativity), Decision making and branching - if...else, nesting of if...else, else if ladder, switch, conditional operator.

UNIT-II

Looping in C: for, nested for, while, do...while, jumps in and out of loops. **Arrays:** Declaration and initialization of one-dim and two-dim arrays. Character arrays, **Pointers:** Concept of Pointer (null pointer, wild pointer, dangling pointer, generic pointer), Pointer expressions, Accessing the address of a Variable, Declaring Pointer Variables, Initializations of Pointer

Variable, Accessing a Variable through its pointer, Pointer arithmetic.
Strings: Declaring and initializing string variables, reading and writing strings from Terminal (using scanf and printf only).

UNIT-III

Storage class: Types (auto, register, static, extern), scope rules, declaration and definition. **Function:** Function & types (User- defined functions, library function), Function Definition, Declaration, Function Calls, Header file and library, Function Arguments, String handling function (strlen, strcmp, strcpy, strncpy, strcat, strstr), Function recursion, Functions Returning Pointers, Pointers to Functions, Command line arguments, Application of Pointer (dynamic memory allocation).

UNIT-IV

Structure and Union: Defining, Declaring, Accessing, Initialization Structure, nested structure, self-referential structure, bit-field, Arrays of Structure, Structures and Functions, Unions, difference between structure and union, active data member, structure within union.

File: File Management in C, Defining and Operating a File, File opening modes (read, write, append), Closing a File operations, file and stream, Error Handling During I/O Operations, Sequential and random access file, low level and high level file.

Books Recommended:

1. E. Balaguruswamy, "Programming in ANSI C", 4/e, (TMH)
2. B. Kernighan & Dennis Ritchie, "The C Programming Language", 2/e PHI
3. Paul Deitel, Havery Deitel, " C: How to Program", 8/e, Prentice Hall.

Marks Distribution:

Programming	- 80 marks
Viva-voce + Records	- 20 marks

ST- 206: (DSE) DEMOGRAPHY& VITAL STATISTICS

4 CREDITS

Course Objectives:

The learning objectives include:

1. To collect valid Demographic data using different methods.
2. To learn basic measures of Mortality, Fertility and Population Growth.
3. To construct life tables.

Course Outcomes (CO): After completing this course, students will have clear understanding of

1. Distinction between Vital Statistics and Demography.
2. Errors in Demographic data.
3. To check the completeness of registration data using Chandrasekaran-Deming formula.

4. Use of Myer's and UN indices in evaluating age data.
5. Use of Balancing Equations.
6. Population Composition and Dependency Ratio.
7. Sources of data collection on Vital Statistics and errors therein.
8. Measurement of Population.
9. Distinction between Rate and Ratio.
10. Basic measures of Mortality.
11. Concepts of Stable and Stationary Populations.
12. Concept of Life Tables, their construction and uses.
13. Basic measures of Fertility.
14. Measures of Population Growth.
15. Migration Models

UNIT-I

Coverage and errors in demographic data, Chandrasekharan Deming formula. Adjustment of age data, Whipples, Mayers and UN indices. Population projection methods: Component & Growth Models, Leslie Matrix, Population distribution: Lorenz curve and Gini concentration ratio, Population pyramid.

UNIT-II

Measures of fertility (period and cohort), Coales fertility index, Measures of reproduction, Calculation of PPR, Model age patterns of fertility: Brass Polynomial model & Coale-Trussell model. Nuptiality rate, Net Nuptiality table, Proportion Single and Singulate. Mean age at marriage, Hajnal's method of estimating SMAM, Mean duration of fertile union.

UNIT-III

Measures of mortality, comparative mortality index, Lexis Diagram and IMR, life table functions, Construction of Reed Merrell, Greville life table, UN and Coale-Demeny model life tables, multiple decrement life table, Age decomposition of differences in life expectancies at birth, Model age patterns of mortality, Fitting Gompertz law, Estimation of Child mortality (Brass method)

UNIT-IV

Measures of internal migration & international migration methods of estimation, Migration models. Models of population growth: A simple Birth and Death process, Immigration process, Emigration process, Birth-Emigration process, Immigration-Emigration process. Stationary and stable population models, Simplified example of stable population, Lotka's demonstration of conditions producing a stable population . The equations characterizing a stable Population, Identification of the intrinsic growth rate, Construction of a stable equivalent population, Momentum of population growth and its estimation.

Books Recommended

1. Pathak, K.B. and Ram, F.: Techniques of Demography Analysis, HimalayanPublishers

2. Srinivasan, K.: Basic Demographic Techniques and Applications, SagePublishers
3. Ramkumar, R.: Technical Demography, Wiley Eastern.
4. S.H. Preston, P.Heuveline& M. Guillot, Blackwell, 2003_-Demography
5. Applied Mathematical Demography by Nathan Keyfitz, Springer Verl

ST-301: MULTIVARIATE ANALYSIS

4 CREDITS

Course Objectives: The learning objectives include:

1. To learn and develop scientific view to deal with multidimensional data sets and its uses in the analysis of research data.
2. To understand the extensions of univariate techniques to multivariate frameworks and learn to apply dimension reduction techniques used in the data analysis.

Course Outcomes (CO): After completing this course, students will have clear understanding of

1. Understand multivariate normal distribution and their real life applications.
2. Understand Wishart distribution, Hotelling T^2 and Mahalanobis D^2 statistic.
3. Implement dimension reduction techniques using software on real life problems.
4. Demonstrate knowledge and understanding of the basic ideas behind discriminant and clustering analysis, factor analysis and principal component analysis techniques with applications.

UNIT-I

Multivariate normal distribution – distribution of linear combination of normally distributed variables, marginal and conditional distributions, distribution of quadratic forms. Maximum likelihood estimators of parameters, distributions of sample mean vector and matrix of corrected sum of squares and cross products.

UNIT-II

Estimation of partial and multiple correlation coefficients and their sampling distributions (null case only). Hotelling's T^2 statistic – properties, distribution and uses, tests on mean vector for one and more multivariate normal populations and also on equality of the components of a mean vector in a multivariate normal population. Mahalanobis – D^2 statistic and its use.

UNIT-III

Classification and discrimination procedures – discrimination between two multivariate normal populations, sample discriminant function, tests

associated with discriminant functions, probabilities of misclassification and their estimation, classification into more than two multivariate normal populations. Fisher's discriminant function.

UNIT-IV

Cluster Analysis, Factor Analysis, Wishart matrix – distribution and properties, characteristic function, reproductive property, marginal and conditional distributions. Distribution of sample generalized variance. Principal components: definition, MLE of principal components and their variances. Canonical variables and canonical correlations – definition, use, estimation and computation.

Books Recommended:

1. Anderson, T.W.: An Introduction to Multivariate Statistical Analysis, 2nd ed., Wiley
2. Morrison, D.F.: Multivariate Statistical Methods, 2nd ed., McGraw-Hill
3. Giri, N.C: Multivariate Statistical Inference. Academic Press, NY
4. Rao, C.R: Linear Statistical Inference and Its Application. John Wiley.
5. Sharma, S: Applied Multivariate Techniques, John Wiley.

ST-302: DESIGN & ANALYSIS OF EXPERIMENTS 4 CREDITS

Course Objectives: The learning objectives include:

1. To learn the basic principles of design of experiments like randomization, replication, general design models various designs and multiple comparison tests are studied.

Course Outcomes (CO): After completing this course, students will have clear understanding of

1. After completing this course, students will acquire the knowledge of field experiments in agriculture, medicine, marketing, finance and insurance fields.

UNIT-I

Analysis of variance – components and models, analysis of variance of one-way and two-way fixed and random effect models, variance component estimation and study of various methods, tests for variance components. Analysis of unbalanced data. Principles of designs of experiment, experimental error and data interpretation.

UNIT-II

Complete block designs - completely randomized designs, randomized block designs, latin square designs, Graeco-Latin square designs, cross-over designs. Missing plot techniques – general theory and applications.

UNIT-III

Analysis of covariance. General factorial experiments, factorial effects, best

estimates and testing the significance of factorial effects, study of 2^n , 3^2 , 3^3 factorial experiments in randomized blocks. Confounding in 2^n , 3^2 and 3^3 factorial experiments - complete and partial confounding, advantages and disadvantages, construction and analysis, fractional replication for symmetric factorials.

UNIT-IV

Incomplete block designs – balanced incomplete block design, parametric equality and inequality, intra-block analysis, analysis with recovery of inter-block information. Split plot and strip plot designs – models and analysis.

Books Recommended:

1. Das, M.N. and Giri, N.C.: Designs of Experiments, New Age International.
2. Kempthorne, O.: Design and Analysis of Experiments, Wiley Eastern.
3. Gun, A.M., Gupta, M.K. and Dasgupta, B.: An Outline of Statistical Theory, Vol.II, (4th ed.), World Press.Dey, Alok: Theory of Block Designs. New Age International.
4. Dean, Angela and Voss, Daniel: Design and Analysis of Experiments. NewAge International.
5. Chakrabarty, M.C.: Mathematics of Design of Experiments. Asian pub.House.
6. Montgomery, C.D.: Design and Analysis of Experiments. John Wiley, NewYork.

ST-303: STOCHASTIC PROCESSES

4 CREDITS

Course Objectives: The learning objectives include:

1. To learn and to understand stochastic processes predictive approach.
2. To develop an ability to analyze and apply some basic stochastic process for solving real life situations.

Course Outcomes (CO): After completing this course, students will have clear understanding of

1. Understand the stochastic processes, Markov chains, Transition probability matrix and various types of states.
2. Explain Random walk, Gambler ruins problem and apply Poisson process in real life situations.
3. Formulate and solve problems which involve setting up stochastic models.
4. Understand renewal theory and branching processes with applications

UNIT-I

Markov Chains: Definition, Examples and classification, Discrete renewal equation and basic limit theorem, Absorption probabilities, Criteria for recurrence.

UNIT-II

Continuous time Markov chains, Examples, General pure birth process, Poisson process, Birth and death process, Finite state continuous time Markov chains.

UNIT-III

Galton-Watson branching processes, Generating function, Extinction probabilities, Continuous time branching processes, Extinction probabilities, Branching processes with general variable life time.

UNIT-IV

Renewal equation, Renewal theorem, Applications, Generalizations and variations of renewal processes, Applications of renewal theory, Brownian motion.

Books Recommended:

1. Karlin, S. and Taylor, H.M. (1975) A first Course in Stochastic Processes, second edition, Academic Press.
2. Bhat, B.R. (2002) Stochastic Processes, second edition, New Age Publication.
3. Cox, D.R. (1962) Renewal Theory, Methuen.
4. Ross, S. (1996) Stochastic Processes, Second edition, John Wiley.
5. Medhi, J. (1994) Stochastic Processes, Second edition, Wiley Eastern.
6. Basu, A.K. (2002) Elements of Stochastic Processes, Narosa Publications.

ST-304

NON-PARAMETRIC METHODS

4 CREDITS

Course Objectives: The learning objectives include:

1. Introduction of the concept of Non normal data and non-parametric distributions.
2. Various non parametric alternatives of the parametric methods and their characteristics.

Course Outcomes (CO): After completing this course, students will have clear understanding of

1. Handling data sets which do not have parametric information.
2. Analysing categorical, socio economic, medical and educational data using statistical software package and draw valid statistical inference.

UNIT-I

Empirical distribution function, Gilvenko Cantelli Theorem, Kolmogorov Goodness of fit test.

UNIT-II

One sample U-statistics, kernel and symmetric kernel, two sample U-statistics, asymptotic distribution of U statistics. UMVUE property of U-statistics,

asymptotic distribution of linear function of order statistics.

UNIT-III

Rank tests, locally most powerful rank tests, linear rank statistics and their distributional properties under null hypothesis, Pitman's asymptotic relative efficiency.

UNIT-IV

One sample location problem, sign test and signed rank test, two sample Kolmogorov Smirnov tests, two sample location and scale problems. Wilcoxon-Mann-Whitney test, normal score test, ARE of various tests based on linear rank statistics. Kruskal-Wallis K sample test. Cox's proportional hazards model, rank test (partial likelihood) for regression coefficients, Concepts of jackknifing method of Queenouille for reducing bias, Bootstrap methods.

Books Recommended:

1. Davison, A.C. and Hinkley, D.V. (1997): Bootstrap Methods and Their Application, Cambridge University Press.
2. Gibbons, J.D. (1985): Non-Parametric Statistical Inference, 2nd ed. Marcel Dekker, Inc.
3. Randles, R.H. and Woffe, D.A. (1979): Introduction to the Theory of Non-Parametric Statistics, John Wiley & Sons, Inc.
4. Fraser, D.A.S. (1957): Nonparametric Methods in Statistics, John Wiley & Sons, Inc.
5. Hajek, J. and Sodal, Z. (1967): Theory of Rank Tests, Academic Press.
6. Puri, M.L. and Sen, P.K. (1971): Nonparametric Methods of Multivariate Analysis, John Wiley & Sons, Inc.
7. Cox, D.R. and Oakes, D. (1983): Survival Analysis, Chapman and Hall.

ST-305: STATISTICAL COMPUTING - III: R PROGRAMMING 4 CREDITS

Course Objectives: The learning objectives include:

1. To understand R and its roles in problem solving.
2. To understand data handling and its analysis
3. Learning the basic statistical software will help students to easily switch over to any other statistical software in future.

Course Outcomes (CO): After completing this course, students will have clear understanding of

1. Understand the basic workings of R, and perform basic statistical analyses.
2. To perform descriptive statistics and graphics, and basic inferential statistics for comparisons and correlations using R.
3. Importing data, Code editing in R. This course will review topics in probability and statistics studied in core for data analysis. Introduction to R for statistical computing, analysis and graphical interpretation would be

done using software skills. The following problems can be done on any one of the statistical software to enhance data analysis skills using software.

UNIT -I

Data types in R: numeric, character, logical; real, integer, complex, strings and the paste command, matrices, data frames, lists, setwd, read.table, read.csv, write.matrix, write.csv, creation of new variables, categorisation, cut, factor; round, apply, creation of patterned variables, saving output to a file; source; print, saving workspace/history.

Basic Statistics: Frequency distribution, Dot and Bar plot of the given data, Construction of a box plot for the given data. Measures of central tendency, Dispersion.

UNIT-II

Exact Sampling Distributions: Chi-square, t, F, Z.

UNIT-III

Generating function and law of large numbers: Expectation, Test the convergence in probability for given data, central limit theorem and its histogram, test the divergence in probability for given data. Test the convergence in probability for exponential distribution.

UNIT-IV

Survey Sampling: Simple random sampling, Systematic sampling, Ratio & Regression estimation, PPS sampling.

Marks Distribution:

Programming marks	- 80
Viva-voce + Records marks	- 20

Books Recommended

1. Verzani, John. Using R for Introductory Statistics. Taylor & Francis.
2. Yosef Cohen and Jeremiah Y. Cohen. Statistics and Data with R: An Applied Approach Through Examples. Wiley Publication.

ST-306: STATISTICAL METHODOLOGY 4 CREDITS
Open Elective (IDSE)

Course Objectives: The learning objectives include:

1. Introduction to Statistics.
2. Understanding the nature of data with the help of various statistical tools.
3. Understanding the concept of Probability and probability distributions.

Course Outcomes (CO): After completing this course, students will have clear understanding of

1. The fundamental concepts of statistics

2. Measures of location and dispersion
3. Bivariate data, Significance of various coefficients of correlation
4. Fitting of linear and nonlinear curve
5. Introduction of variables and their pmf, pdf and cdf
6. Discrete and Continuous Probability distributions and its applications
7. Order statistics and their distributions and properties.

UNIT-I

Descriptive Statistics: Measures of central tendency, dispersion, skewness and kurtosis for the study of nature of data. Idea of correlation and regression for two and three variables; correlation coefficient, correlation ratio, multiple and partial correlations.

UNIT-II

Some discrete statistical distributions: Binomial, Poisson, hypergeometric, negative binomial and multinomial distributions. Some continuous distributions (Normal, Uniform, Exponential, Cauchy, Pareto, Weibull, lognormal), Bivariate normal and bivariate exponential distributions and their properties.

UNIT-III

Functions of random variables and their distributions using Jacobian and other tools, convolution and compound distributions, truncated and mixture distributions, Sampling distributions from normal population central and non-central Chi-square, t and F distributions.

UNIT-IV

Order statistics and their distributions and properties. Joint and marginal distributions of order statistics. Extreme values and their asymptotic distribution (statement only) with applications, Asymptotic distribution of median, distribution of quantiles.

Books Recommended:

1. Hogg, R.V. and Craig, A.L. (1978). Introduction to Mathematical Statistics, MacMillan, New York.
2. Mood, A.M., Graybiel, F.A. and Boes, D.C. (2001). Introduction to Theory of Statistics, Tata McGraw Hill, New Delhi.
3. Ross, Sheldon M (2004) Introduction to Probability and Statistics for Engineers and Scientist, Third Edition, Elsevier Academic Press, USA.
4. Rohatgi V.K. and Saleh, A.K.Md. E. (2001). An Introduction to Probability and Statistics (Second Edition), John Wiley and Sons (Asia), Singapore.
5. Dudewicz, E.J. and Mishra, S.N. (1988). Modern Mathematical Statistics, John Wiley, New York.
6. Johnson, S and Kotz, S. (1970). Continuous univariate

- Distributions I and II John Wiley, New York.
7. David, W. S.(2003). Order Statistics (Second Edition). John Wiley and Sons, New York.

ST- 401: LINEAR MODELS AND REGRESSION ANALYSIS 4 CREDITS

Course Objectives: The learning objectives include:

1. To develop a deeper understanding of the linear and non-linear regression model and its limitations.
2. To learn how to develop regression model and apply for the specific perspective data appropriate manner.

Course Outcomes (CO): After completing this course, students will

1. Apply simple linear regression model to real life examples.
2. Understand multiple linear regression models with applications and concept of Multicollinearity and autocorrelation.
3. Compute multiple and partial correlation and checking residual diagnostic to validate model.
4. Apply Logistic and Non-linear regression models and its implementation in real life situation.

UNIT-I

Regression on the full rank model - methods of estimation and their consequences, distributional properties, general linear hypothesis, testing of common hypothesis and reduced models.

UNIT-II

Regression on dummy variables - regression on allocated codes, regression on dummy (0,1) variables, use of dummy variables on multiple regression.

UNIT-III

Regression models (not of full rank) - consequences and distributional properties. Estimable functions - properties, testing for estimability, general linear hypothesis.

UNIT-IV

Selecting the 'best' regression equation - all possible regressions, backward and forward elimination procedures, step-wise regression procedures. Multiple regression applied to analysis of variance problems - one way and two-way classifications using the models.

Books Recommended

1. Searle, S.R.: Linear Models, John Wiley & Sons
2. Draper, N.R. and Smith, H.: Applied Regression Analysis, John Wiley & Sons.
3. Rao, C.R: Linear Statistical Inference and its Applications, Wiley Eastern Ltd.
4. Kshirsagar, A M: A Course in Linear Models. Marcel Dekker, N. Y.

5. Joshi, D D: Linear Estimation and Design of Experiments. New Age International Publication.
6. Weisberg, S. Applied Linear Regression. Wiley.
7. Chatterjee, S. and Price, B: Regression Analysis by Example. John Wiley, New York.

ST-402: ECONOMETRICS

4 CREDITS

Course Objectives: The aim of this course is:

1. To judge the validity of the economic theories
2. To carry out evaluation of economic theories in numerical terms.
3. To extract useful information about important economic policy issues from the available data.

Course Outcomes (CO): After completing this course, students will have clear understanding of

1. The fundamental concepts of econometrics.
2. Specification of the model.
3. Simple Linear Regression & Multiple Linear Regression with their uses.
4. Multicollinearity, Heteroscedasticity and their applications.

UNIT-I

Nature of econometrics, ordinary least squares (OLS) estimation and prediction, Multicollinearity- detection, consequences and remedial measures.

UNIT-II

The general linear model (GLM) and its extensions, generalized least squares (GLS) estimation (Aitken estimators) and prediction, heteroscedastic disturbances-nature, OLS estimators in the presence of heteroscedasticity, detection, consequences and remedial measures.

UNIT-III

Simultaneous equation models – examples, the simultaneous-equation bias. Identification problem – concepts and definitions, under, just or exact and over identifications, rules for identification, test of simultaneity, restrictions on structural parameters, rank and order conditions.

UNIT -IV

Simultaneous equation methods – approaches to estimation, recursive systems, method of indirect least squares (ILS), method of two-stage least squares (2SLS), full information maximum likelihood method, prediction and simultaneous confidence intervals.

Books Recommended

1. Johnston, J.: Econometric Methods, McGraw-Hill
2. Gujarati, D.: Basic Econometrics, McGraw-Hill.
3. Theil, H.: Introduction to the Theory and Practice of Econometrics, JohnWiley.
4. Apte, P.G.: Text Book of Econometrics, Tata McGraw-Hill.
5. Cramer, J.S.: Empirical Econometrics, North Holland.
6. Maddala, G.S.: Econometrics, McGraw-Hill.

OR

**ADVANCED SURVEY SAMPLING
METHODS**

UNIT-I

Unequal probability sampling with replacement – probability proportional to size with replacement sampling, estimation of mean/total, method of selection, standard error of estimate and it's estimation, comparison with SRSWR, gain due to PPSWR sampling, optimum size measure, estimator based on distinct units in PPSWR sampling

UNIT-II

Unequal probability sampling without replacement – Des Raj's ordered estimator, Murthy's unordered estimator, Horvitz-Thompson estimator and it's optimal properties. Midzuno, Narain, Brewer, Durbin, Sampford, and Rao-Hartly-Cochransampling procedures, systematic sampling with varying probabilities.

UNIT-III

Multi-phase Sampling – double sampling for ratio and regression methods, stratification and PPS sampling. Sampling on two and more occasions.

UNIT-IV

Errors in surveys – types of errors, mathematical models for measurement error. Problems of non-response – Hansen and Hurwitz technique, Politz-Simon technique. Randomized response techniques – Warner's model and unrelated question model. Variance estimation – methods of random groups, the Jack knife, balanced half sample, and the bootstrap. Small area estimation – direct, synthetic and composite estimators.

Books Recommended

1. Sukhatme, P.V., Sukhatme, B.V., Sukhatme, S. and Asok, C.: Sampling Theory of Surveys with Applications, Indian Soc. of Agric. Stat., New Delhi
2. Cochran, W. G: Sampling Techniques. Wiley Eastern.
3. Murthy, M. N: Sampling Theory and Methods. Statistical Publishing Society.
4. Mukhopadhyay, Parimal: Small Area Estimation in Survey Sampling. Narosa Publising House.

Or

ADVANCED DESIGN & ANALYSIS OF EXPERIMENT

UNIT-II

Analysis of fixed effects model: Estimation of model parameters, Unbalanced data, Model adequacy checking, Practical interpretation of results, determination of sample size.

UNIT-III

Factorial experiments with mixed levels: Factors at two and Three levels, factors at two and four levels, Constructing Fractional Factorial Designs using an Optimal design tool.

UNIT-IV

Response surface designs – linear response surface designs, second order response surface designs. Experimental designs for fitting response surfaces, Mixture experiments. Robust Design: Introduction, Crossed array designs and analysis, Combined array designs and the response model approach, Choice of designs

Books Recommended:

1. Montgomery, D.C. (2014): Design and Analysis of Experiments, Eighth edition, Wiley, NY
2. Dey, A.: Theory of Incomplete Block Designs, Wiley Eastern.
3. Das, M.N. and Giri, N.: Design and Analysis of Experiments, New Age International.
4. Kempthorne, O. (1952): The Design and Analysis of Experiments, Wiley, NY.
5. Chakrabarty, M.C.: Mathematics of Design of Experiments. Asian pub. House.
6. Khuri, A. and Cornell, M.: Response Surface Methodology. Marcel Dekker.

Or

ADVANCED OPERATIONS RESEARCH

UNIT-I

Dynamic programming: Basic concepts, development of dynamic programming, continuous state dynamic programming, multiple state variables, Goal programming: categorization, formulation, graphical goal attainment method, simplex method.

UNIT - II

Fuzzy logic: Fuzzy relations, fuzzy systems, defuzzification methods, Non-Linear programming: Unconstrained optimization, constrained optimization: Equality constraints and inequality constraints.

UNIT-III

Simulation Modeling: examples, pseudo-random numbers, techniques for generating for random deviates, simulation languages, advanced concepts in simulation analysis: Design of simulation experiments, variance reduction techniques, statistical analysis of simulation output, optimization of simulation parameters.

UNIT-IV

Integer programming: Pure and mixed integer programming problem, Gomory's all integer programming problem, Gomory's constraints, fractional cut method: all integer and mixed integer, Branch and Bound algorithm.

Network routing problems: Minimal spanning tree, shortest route algorithm, maximal flow problems, minimum cost flow, Resource analysis in network scheduling: Project cost, time cost optimization algorithm, linear programming formulation, updating, resource allocation and scheduling.

Books Recommended:

1. Hardy, G. (1964): Non-linear and Dynamic Programming, AddisonWesley
2. Wagner, H.M. (1969): Principles of Operations Research with Applications to Managerial Decisions, Prentice Hall
3. Ravindran, A., Phillips, D.T. and Solberg, J.J. (2009): Operations Research: Principles and Practice, Wiley-India.
4. Zimmermann, H.J. (2001): Fuzzy Set Theory and its Applications, 2nd ed., Allied Publishers.
5. Lee, K.H. (2006): Fuzzy logic and Its Applications, Springer.
6. Rajasekharan, S. and Pai, G.A.V. (2006): Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI.

ST-403: TIME SERIES AND STATISTICAL QUALITY CONTROL 4 CREDITS

Course Objectives: The learning objectives include:

1. The main purpose is to teach the time series modelling and the concept of forecasting and future planning.
2. To help students understand the concepts underlying statistical quality control and to develop their ability to apply those concepts to the design and management of quality control processes in industries.

Course Outcomes (CO): After completing this course,

1. Students will be acquainted with different time series models such as MA, AR, ARMA and ARIMA models.
2. They will learn of models for forecasting purpose. The emphasis will be

on ensuring that the students gain both a broad perspective of quality control as well as the technical skills necessary to implement quality control in any industrial setting.

UNIT-I

Time series as discrete parameter stochastic process. Auto covariance and autocorrelation function and their properties. Exploratory Time Series Analysis, Tests for trend and Seasonality. Exponential and Moving Average Smoothing, Holt and Winters smoothing. Forecasting based on smoothing, Adaptive smoothing.

UNIT-II

Detailed study of the stationary processes: (1) moving average (MA), (2) Autoregressive (AR), (3) ARMA and (4) AR integrated MA (ARIMA) models, Box Jenkins models, Discussion (without proof) of estimation of mean, auto covariance and autocorrelation functions under large sample theory, Choice of AR and MA periods. Estimation of ARIMA model parameters.

UNIT-III

Industrial statistics \bar{x} , statistical quality control, need for statistical quality control, control charts in general, random and assignable causes, purpose of control charts, process control, control charts for measurements, charts for averages, attributes, defectives and defects, CUSUM chart, V-Mask technique, economic design of Charts.

UNIT-IV

Acceptance sampling plans – single and double sampling plans for attributes, Five curves and their importance, producer's and consumer's risk, variable sampling plans, sequential sampling plans. Sequential probability ratio test- OC and ASN functions, sequential tests for testing means of normal and binomial populations. Tolerance and Specification limits, Capability indices. Estimation, confidence intervals and tests of hypotheses relating to capability indices for normally distributed characteristics.

Books Recommended:

1. Box, G.E.P., Jenkins, G. M. and Reinsel, G. C.: Time Series Analysis, Pearson Edition
2. Burr, I.W.: Engineering Statistics and Quality Control, McGraw-Hill
3. Grant, E.L. and Leavenworth, R.S.: Statistical Quality Control, McGraw-Hill.
4. Anderson, T.W. (1971). The Statistical Analysis of Time Series, Wiley, N.V.
5. Montgomery, D.C. (1985) Introduction to Statistical Quality Control: Wiley
6. Wetherill, G.B. and Brown, D.W. Statistical Process Control. Theory and Practice: Chapman and Hall

OR
RELIABILITY THEORY

Unit-I

Reliability concepts and measures; components and systems; coherent systems; Reliability of coherent system; cuts and paths; modular decomposition; bounds on system reliability; structural and reliability importance of components.

UNIT-II

Life distributions; reliability function; hazard rate; common life distributions – exponential, Weibull, gamma, normal, bivariate exponential, etc.; Estimation of parameters and tests in these models.

UNIT-III

Notions of aging; IFR; IFRA; NBU; DMRL and NBUE classes and their duals; loss of memory property of the exponential distribution; closures of these classes under formation of coherent systems; partial ordering of life distributions, convolution and mixtures.

UNIT-IV

Reliability estimation based on failure times from variously censored life-tests data for parametric families, stress-strength reliability and its estimation. Kaplan – Meier estimation of reliability curve, Greenwood formula, Non – parametric methods for comparison of several reliability curves, Log rank tests. Regression models in reliability, Cox PH and Accelerated failure time models; Estimation of parameters and diagnostics.

Books Recommended:

1. Barlow, R.E. and Proschan, F. (1985): Statistical Theory of Reliability and Life Testing; Holt, Rinehart and Winston.
2. Lawless, J.F. (1982): Statistical Models and Methods of Life Time Data; John Wiley.
3. Nelson, W. (1982): Applied life Data Analysis; John Wiley.
4. Zacks, S.: Reliability Theory; Springer
5. Bain, L. J. and Engelhardt (1991): Statistical Analysis of Reliability and Life Testing Models; Marcel Dekker.
6. Kalbfleisch, J.D. & Prentice R.L.: The Statistical Analysis of Failure time data, 2nd ed.
7. Lai, C.D. & Xie, M.: Stochastic Ageing and Dependence for Reliability

8. Gertsbakh, I.B.: Reliability Theory with Applications to preventivemaintenance

ST-404: OFFICIAL STATISTICS

4 CREDITS

Course Objectives:

Basic concepts of Statistics, Role of statistics in Science, Society, and for National Development, Descriptive statistics. Scope of population census of India, System of collection of Agricultural Statistics.

Course Outcomes (CO): After successful completion of this course, students are expected to:

1. Acquire knowledge of statistics and its scope and importance in various areas such Agricultural and Social Science, Finance etc.
2. Know information about various Statistical Organizations in India and their functions for societal developments. Knowledge of various types of data, their organization and evaluation of summary measures such as measures of central tendency and dispersion, etc.
3. Insights into preliminary exploration of different types of data.

UNIT-I

Introduction to Indian and International statistical systems, Role, function and activities of Central and State statistical organizations. Organization of large-scale sample surveys. Role of National Sample Survey Office. General and special data dissemination systems.

UNIT-II

Population growth in developed and developing countries, evaluation of performance of family welfare programmes projections of labour force and manpower. Scope and content of population census of India.

UNIT-III

Estimation of national income-product approach, income approach and expenditure approach.

UNIT-IV

System of collection of Agricultural Statistics. Crop forecasting and estimation, Productivity, fragmentation of holdings, support process, buffer stocks, impact of irrigation projects. Statistics related to industries.

Books Recommended:

1. Basic Statistics Relating to the Indian Economy (CSO) 1990.

2. Guide to Official Statistics (CSO) 1999.
3. Statistical System in India (CSO 1995).
4. Principles and accommodation of National Population Censuses, UNESCO.
5. Panse, V.G., Estimation of Crop Yields (FAO)
6. Family Welfare Yearbook. Annual Publications of D/o Family Welfare.
7. Monthly Statistics of foreign Trade in India, DGCIS, Calcutta and other Govt. Publication.

OR

ACTUARIAL STATISTICS

UNIT-I

Mortality – mortality experience, mortality table, graph of L_x , force of mortality, laws of mortality, mortality table as a population model, expectation of life, stationary funds.

UNIT-II

Annuities – pure endowments, annuities, accumulations, assurances, varying annuities and assurances, continuous annuities, family income benefits.

UNIT-III

Policy values – nature of reserve, prospective and retrospective reserves, fractional premiums and fractional duration, modified reserves, continuous reserves, surrender values and paid up policies, industrial assurance, children's deferred assurances, joint life and last survivorship.

UNIT-IV

Contingencies - contingent probabilities, contingent assurances, reversionary annuities, multiple decrement table, forces of decrement, construction of multiple decrement table.

Pension funds – capital sums on retirement and death, widow's pension, sickness benefits, benefits dependent on marriage.

Books Recommended:

1. Dickson, C. M. D. (2005): Insurance Risk and Ruin (International Series On Actuarial Science), Cambridge University Press.
2. Bowers, N. L., Gerber, H. U., Hickman, J. C., Jones, D. A. And Nesbitt, C. J. (1997): Actuarial Mathematics, Society of Actuaries, Itasca, Illinois, U.S.A.

Or
QUANITATIVE EPIDEMIOLOGY

UNIT-I

Introduction to epidemiology, causation, prevention and communicable diseases in epidemiology. Clinical environmental and occupational epidemiology.

UNIT-II

Epidemiologic measures - organizing and presenting epidemiologic data, measures of disease frequencies, relative risk and odd ratio, attributable risk.

UNIT-III

Analysis of epidemiologic studies - adjustment of data without uses of multivariate model, direct and indirect adjustments. Confounding variables in 2X2 tables, confidence limits for adjusted odd ratios, multiple match controls.

UNIT-IV

Regression model, adjustment using multiple regression and multiple logistic models, survival over several intervals, withdrawals, life table for specific causes, comparison of complete survival curves. Product limits, Cox regression. Epidemiology of infectious and chronic diseases, epidemiology and cancer prevention. Environmental epidemiology, molecular and genetic epidemiology.

Books Recommended:

1. K. J. Rothman and S. Greenland (ed.) (1998). Modern Epidemiology, Lippincott-Raven.
2. S. Selvin (1996). Statistical Analysis of Epidemiologic Data, Oxford University Press.
3. D. McNeil (1996). Epidemiological Research Methods. Wiley and Sons.
4. J. F. Jelke, J. G. Elmore, D.L. Katz (1996). Epidemiology, Biostatistics and Preventive Medicine. WB Saunders Co.

OR

SURVIVAL ANALYSIS AND CLINICAL TRIALS

U N I T -I

Concept of time, order, Type I, Type II and progressive or random censoring with biological examples, Functions of survival time, hazard function, survival distributions and their applications viz. exponential, gamma, Weibull, Rayleigh, lognormal, Pareto death density function for a distribution having bath-tub shape hazard function.

UNIT-II

Life tables, mean residual life, Non-parametric methods for estimating survival function and variance of the estimator viz. Actuarial and Kaplan – Meier methods. Estimation under the assumption of IFR/DFR. Two sample problem–Gehan test, log rank test.

UNIT-III

Semi-parametric regression for failure rate– Cox's proportional hazards model with one and several covariates, rank test for the regression coefficient,

Competing risk model. Introduction to clinical trials: the need and ethics of clinical trials, bias and random Error in clinical studies, conduct of clinical trials, overview of Phase I– IV trials, multi-centre trials, Single and double blinding.

UNIT-IV

Design of clinical trials: parallel vs. cross-over designs, cross-sectional vs. Longitudinal designs, review of factorial designs, objectives and endpoints of clinical trials, design of Phase I trials, design of single-stage and multi-stage Phase II trials, design and monitoring of phase III trials with sequential stopping.

Books Recommended:

1. Kalbfleisch J. D. and Prentice R. (1980): The Statistical Analysis of failureTime data, John Wiley.
2. Kleinbaum, D.G. (1996): Survival Analysis, Springer
3. Lee, Elisa, T. (1992). Statistical Methods for Survival Data Analysis, JohnWiley & Sons.
4. Miller, R.G. (1981). Survival Analysis, John Wiley & Sons.
5. Piantadosi. S. (1997): Clinical Trials: A Methodologic Perspective. Wiley andSons.
6. Friedman, L. M. Furburg, C. Demets, D. L. (1998): Fundamentals of Clinical Trials. Springer Verlag.
7. Marubeni. E. and Valsecchi. M. G. (1994): Analyzing Survival Data fromClinical Trials and Observational Studies, Wiley and Sons.

OR

BIG DATA ANALYTIC TECHNIQUES

UNI

T-I

Resampling Techniques: Introduction to Jackknife and Bootstrap-methods for estimating bias, standard error and distribution function based on id random variables, standard examples, Bootstrap confidence intervals.

UNIT-II

Missing data analysis: Informative or non-informative missingness; complete case

/ available case estimation.

UNIT-III

Missing data analysis: Imputation, EM & MCEM algorithms and data augmentation techniques. Standard error estimation.

UNIT-IV

Longitudinal data analysis: Longitudinal regression: Cohort vs longitudinal effect, Weighted least-squares, ML and REML techniques.

Marginal, subject specific and transition models, GEE.

Books Recommended:

1. J.J. Faraway: Linear Models with R
2. J.J. Faraway: Extending the Linear Model with R
3. D. Ruppert et al.: Semiparametric Regression
4. R.J.A. Little & D.B. Rubin: Statistical Analysis with Missing Data
5. C.K. Enders: Applied Missing Data Analysis
6. M.A. Tanner: Tools for Statistical Inference
7. G.J. McLachlan & T. Krishnan: The EM Algorithm and Extensions
8. B. Efron & R.J. Tibshirani: An introduction to bootstrap
9. B. Efron: The jackknife, the bootstrap, and other resampling plans
10. B. Efron: Bootstrap methods – another look at jackknife
11. J. Shao & D. Tu : The Jackknife and Bootstrap
12. P.J. Diggle et. al.: Analysis of Longitudinal Data
(2nd ed).13.

**ST- 405: PROJECT WORK AND SEMINAR PRESENTATION 4
CREDITS**

The supervisors are to be allotted to the students before the end of third semester examination and they have to prepare a seminar paper and also a project paper under his/her guidance.

Internal Examination: 30 Marks

Seminar Presentation: 20 Marks & Project paper Presentation before the Supervisor:10 Marks.

Each student has to give one seminar presentation before the students and faculties on any area of Statistics with his/her interest carrying 20 Marks. This mark will be the average mark given by the faculties of the department attending the presentation.

The project paper is to be presented before the Department Research Committee (DRC) in the presence of their respective supervisor before final presentation and it carries 10 Marks.

Project Evaluation: 70 Marks

Automation of Examination

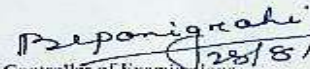
2.5.3 Status of automation of Examination Division along with approved Examination Manual/Ordinance

B. Only Student registration, Admit Card Issue & Result Processing:-

Sl. No.	Automation	Name of the Vendor with contact details	Year of Implementation
1	Online form fillup Using Google Forms	Controller of Examination, G.M. University, Sambalpur	2019
2	Availability of admit cards	M/S- All India Online Pvt. Ltd. Bhubaneswar (https://www.gmuniversity.ac.in/admitcard/)	2020
3	Processing of results	Controller of Examination, G.M. University, Sambalpur	2015
4	Availability of Results & Marksheets	M/S/ All India Online Pvt. Ltd. Bhubaneswar (http://result.gmuniversity.ac.in/)	2020
5	Online Examination Fee Collection	https://eps.eshiksha.ngt/DirectFeesv3/GangadharMeherUniversity/Index	2020
6	Student Verification	Through Email / DigiLocker	2019

File Description

- Screen Shots of Interface



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G.M. University, Sambalpur

6.2.2. Implementation Of e-governance in areas of operations in last 5 years.

Sl. No.	Areas of e-governance	Name of the Vendor with contact details	Year of Implementation
1	Online form fillup Using Google Forms	Controller of Examination, G.M. University, Sambalpur	2019
2	Online Examination	M/S- All India Online Pvt. Ltd. Bhubaneswar (https://exam.gmuniversity.ac.in/)	2020
3	Availability of admit cards	M/S- All India Online Pvt. Ltd. Bhubaneswar (https://www.gmuniversity.ac.in/admitcard/)	2020
4	Processing of results	Controller of Examination, G.M. University, Sambalpur	2015
5	Availability of Results & Marksheets	M/S/ All India Online Pvt. Ltd. Bhubaneswar (http://result.gmuniversity.ac.in/)	2020
6	Availability of Certificates	DigiLocker-NAD (https://nad.digilocker.gov.in/)	2020
7	Uploading of M.Phil & Ph.D Thesis in	Shodhganga@INFLIBNET (https://shodhganga.inflibnet.ac.in/handle/10603/353412)	2021
8	Plagiarism Check	iThenticate; M/s Turnitin India	2018-2019
		Urkund, Inflibnet Center, India	2019-2023
		Drillbit Extreme, India	2023

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Gangadhar Meher University, Sambalpur, Odisha

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Father's Name

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Reg No.

Stream *

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Department Name *

Year *

Select Year

Social Category *

Select Social Category

Gender *

Select Gender

Mobile Number *

Registration for UG / PG / Professional & Diploma Course - I & III Semester Regular Examination- 2021

Last Date of Registration - 12.08.2021
(For any type of clarification please contact your Head of the Department)

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* Indicates required question

Name of The Student (in Capital Letter) *

Your answer

Examination Roll No. - (in Capital Letter) Example. UBC19COM001, UPC19BBA001, UPC19MBA001, UPG20ECO001, UBED19ECO001, UPG20LS001, UBA20ECO001, UBS20BOT001, UBC20COM001, UPC20BBA001, UPC20IST001, UPC20MCA001

Your answer

Date of Birth *

Date

mm/dd/yyyy

Faculty Development Programme On Designing, Developing and Delivering Online / MOOC Courses [August 19 – 21, 2022]

Introduction

A very promising technological and pedagogical model that has received a lot of attention during the last few years and adoption by Stanford, Harvard, Duke and almost 100 of the world's top ranking Universities to teach millions of learners is that of the MOOC. The MOOC is considered on the one hand as a panacea for education and on the other as a defilement of the sanctity of the higher education tradition. Massive Open Online Courses (MOOCs) are gaining traction all over the world to provide unlimited participation and open access to quality education via web. The visitors to the top three MOOCs platforms (Udemy, Coursera and edX) are from the United States, followed by visitors from India. This shows the tangible interest in MOOCs in India with their cost effectiveness and potential to reach a large number of learners. MOOCs provide us the opportunity to broaden the access to quality education at all levels.

The acronym “MOOC” has been in vogue recently, with lots of discussion about organizations like Udacity, Coursera and edX. The acronym stands for “Massive Open Online Course, which is a free Web-based distance learning program that is designed for the participation of large numbers of geographically dispersed students. A MOOC may be patterned on a college or university course or may be less structured. There are many providers globally who offer a wide variety of topics.

SWAYAM or Study Webs of Active-Learning for Young Aspiring Minds programme of Ministry of Human Resource Development, Government of India, professors of centrally funded institutions like IITs, IIMs, and central universities offer online courses to citizens of India. The current version of the (SWAYAM 2.0) runs on a platform built by Google’s Course Builder Platform.

Objectives of the FDP

The FDP would help the participants to

- Understand the Process of Planning, Designing and Delivering Online / MOOC Courses;
- Understanding the Open Educational Resources for Quality Online / MOOC Courses

- Learner Centred Pedagogical Approaches for Quality Online / MOOC Courses
- Developing Interactive Videos & Associated Tools
- Open Educational Resources (OER's) & Creative Commons Licenses
- Adopt Moodle-Platform as an adjunct to face-to-face teaching and to teach in a full online or distance learning context;
- Create better and active communication and collaboration with the students;
- Design contemporary assessment methods.

Resources Required

Laptop/ Desktop with data card / LAN connection for daily use during and beyond workshop times.

Teaching and Learning Activities

Class lectures and learning resources are designed to achieve the course objectives. The participants should read the assigned learning resources before class, complete online assignments on time and actively participate in Discussion Forms. All resources pertaining to the workshop will be available on <http://profksrinivas.in/> before each class. It will contain homework assignments, study material, and other important instructions.

Mode of the Programme

Blended & Online

Programme Methodology

The FDP is designed to facilitate capacity building in Designing, Developing and Delivering Online /MOOC courses. The FDP emphasizes participatory and interactive mode of learning. Besides the lecture discussion, nearly 75 percent of time will be devoted for hands-on-experience sessions on Designing, Developing and Delivering Online /MOOC courses.

Important Things to Consider

- a) The FDP will be offered in Blended Mode with **3 Days Face to Face Interactions** and **30 days extended hand holding support / Online Interaction with Whatsapp and ICT Synchronous Learning Tools** .
- b) Participants should have laptops and Head Phones/ earphones, without which, the hands on sessions during the workshop will not be effective. Participants will have to install all the software required before the start of the workshop per guidelines given below.

During the FDP all the Participants are requested to come prepared with one lecture on any one topic from one of their courses and bring with them

1. Lecture notes for the topic;
2. PowerPoint Presentations/PDFs/URLs, if any;
3. Assessment questions related to the topic;
4. Any other resource that they would like the students to refer;
5. Course contents / Introductory Videos;
6. Reference Books and Journals for the course;
7. Any brief historical or contextual reference to the topic;
8. Applications of the topic if any;
9. Any activity they would like to include regarding the topic; and
10. Anything else that they feel is relevant for enhancing the learning experience;

Professor K Srinivas Learning Portal	Bionote, Photo, Reading Material	http://profksrinivas.in/
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Professor K. Srinivas Learning Portal [<http://profksrinivas.in>]

The screenshot displays the website interface for Professor K. Srinivas. On the left, a 'MAIN MENU' section includes a 'New!' badge, a photo of Prof. K. Srinivas speaking at a podium with a 'NATIONAL INSTITUTE' sign, and a list of menu items: 'Prof K Srinivas - Bio note', 'Concept Paper - UGC Blended Learning', 'ONLINE Workshop - Resources', and 'ONLINE Workshop - Resources'. The central content area lists several key resources: 'UGC - Blended Learning Concept Note', 'Concept Paper - UGC Blended Learning', 'General Information', 'ONLINE Workshop - Resources', 'List of Online Study Material/Resources in Open Access', 'UNESCO - Distance Learning Solutions', 'Online Course - Best Practices Check List', and 'Video & Web Conference Tools'. On the right side, there is a portrait of Albert Einstein and a quote: 'I do not teach anyone I only provide the environment in which they can learn' - Albert Einstein.

Additional Reading Material

Sr.	Topic Name	Link	Video Link
1	Introduction to MOOC	https://youtu.be/_yfRtCu9jEU	
2	Digital Initiatives of GOI / State in Higher Education	https://docs.google.com/presentation/d/1_z0EV3U2PBOaANeqXEeybcbol7bfbAbbpUy_VGi029Y/edit#slide=id.g1047b0e7474_0_0	https://youtu.be/CIVEgAHdEGY
3	OER Repositories & Platforms	https://docs.google.com/presentation/d/1APNLikYGjTlwEXYUZnIs426X0j6m1DQ3qPxS_btX3vQ/edit#slide=id.p	https://youtu.be/cJVqzTgJ0dA
4	Introduction to OER & Creative Commons Licenses	https://docs.google.com/presentation/d/19vMQMKjsnxCpoFQFIKaS1RLyyvvnZmrS8z7_hYXyntw/edit#slide=id.g89874c3817_2_76	https://youtu.be/CnFCtP1pPrM
5	Video Introduction to Creative Commons Licenses	https://youtu.be/4ZvJGV6YF6Y	
6	Data Capturing Format	https://docs.google.com/document/d/1_pC8gkoo2lYvnlRAXnBRryFcYR-rR1I2Tm7_eCarQTc/edit	
7	Sample Project File on MOOC	https://docs.google.com/document/d/1HF4dVej9UIK6Je9kVuXKPTDcsKM0zRi1/edit	https://youtu.be/-bwhR1ZKGRE

Install the Following Software -Users with Laptop & Desktop ONLY

8	Screencastify	https://www.screencastify.com/	https://www.youtube.com/watch?v=v7uScletiPc
9	Nearpod	https://nearpod.com/	https://www.youtube.com/watch?v=XVmkS4nGg5E
10	Edpuzzle	https://edpuzzle.com/	https://www.youtube.com/watch?v=8I0fV0djfJA
11	Gnomio	https://www.gnomio.com/	https://youtu.be/SSdMwn7m0HI

**Faculty Development Programme On
Designing, Developing and Delivering Online / MOOC Courses
[August 19 – 21, 2022]**

	10:00 AM – 11:30 AM	T E A B R E A K L U N C H	11:45 AM - 01:15 PM		2:00 PM – 3:30 PM	T E A B R E A K	3:45 PM – 5:15 PM
Date & Day	1 st Session		2 nd Session		3 rd Session		4 th Session
19.08.2022 Friday	Building Competencies for Teachers in Online Learning/MOOCs		Design, Develop & Deliver Online/MOOCs Courses		Open Educational Resources [OER] for Online/Blended Learning		Open Educational Resources [OER] for Online/Blended Learning
20.08.2022 Saturday	Introduction to Learner - Centric MOOC (LCM) Pedagogical Approach		Interactive Video Development Tools for Blended Learning- - Screencastify - Edpuzzle -Nearpod		Collaborative Learning Tools - Edpuzzle - Nearpod, Mindomo		Collaborative Learning Tools for Blended Learning- - Edpuzzle - Nearpod, Mindomo
21.08.2022 Sunday	Designing Online/Blended Learning Courses with MOODLE- Learning Management System		Designing Online/Blended Learning Courses with MOODLE- Learning Management System		MOODLE - Grades, Assessments & Discussion Forum		MOODLE - Grades, Assessments & Discussion Forum


CERTIFICATE

of Participation

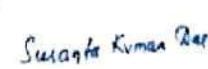


Faculty Development Programme

This is certified that **Dr. Keshab Chandra Ratha** has participated in the Faculty Development Programme on **“Designing, Developing and Delivering Online/MOOCs”** from 19th Aug. to 18th Sept. 2022 organized by the School of Education, Gangadhar Meher University, Amruta Vihar, Sambalpur, Odisha.


Head
School of Education


Director
IQAC


Chairman
PG Council


Vice-Chancellor



Sample certificate of students enrolled to NPTEL Courses



NPTEL Online Certification

(Funded by the MoE, Govt. of India)



This certificate is awarded to
TEJRAJ CHHATAR
for successfully completing the course

Software Project Management

with a consolidated score of **48** %

Online Assignments	17.63/25	Proctored Exam	30/75
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Total number of candidates certified in this course: **836**

Jul-Oct 2022
(12 week course)

Prof. Debjani Chakraborty
Coordinator, NPTEL
IIT Kharagpur

Indian Institute of Technology Kharagpur



122CS107863110128

To verify the certificate



Elite

NPTEL Online Certification

(Funded by the MoE, Govt. of India)



This certificate is awarded to
SUSHOVAN MISHRA
for successfully completing the course

Postmodernism in Literature

with a consolidated score of **69** %

Online Assignments	24.58/25	Proctored Exam	44.63/75
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Total number of candidates certified in this course: **144**

Prof. Devendra Jalihal
Chairperson,
Centre for Outreach and Digital Education, IITM

Jul-Sep 2023
(8 week course)

Prof. Andrew Thangaraj
NPTEL, Coordinator
IIT Madras



Indian Institute of Technology Madras



Roll No: NPTEL23HS108S45180006

To verify the certificate



No. of credits recommended: 2 or 3

Sample certificate of students enrolled to NPTEL Courses



Elite

NPTEL Online Certification

(Funded by the MoE, Govt. of India)



This certificate is awarded to
SONALI SAUMYAPRAVA MOHANTA
for successfully completing the course

Indian Society: Sociological Perspectives

with a consolidated score of **69** %

Online Assignments	23.75/25	Proctored Exam	45/75
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Total number of candidates certified in this course: **126**

Devendra Jalihal

Prof. Devendra Jalihal
Chairperson,
Centre for Outreach and Digital Education, IITM

Jul-Oct 2023

(12 week course)

Andrew Thangaraj

Prof. Andrew Thangaraj
NPTEL, Coordinator
IIT Madras



Indian Institute of Technology Madras



Roll No: NPTEL23HS78S746100142

To verify the certificate



No. of credits recommended: 3 or 4



NPTEL Online Certification

(Funded by the MoE, Govt. of India)



This certificate is awarded to
GAYATRI HOTA
for successfully completing the course

Gender and Literature

with a consolidated score of **50** %

Online Assignments	17.08/25	Proctored Exam	33.19/75
--------------------	----------	----------------	----------

Total number of candidates certified in this course: **546**

Devendra Jalihal

Prof. Devendra Jalihal
Chairperson,
Centre for Outreach and Digital Education, IITM

Aug-Oct 2023

(8 week course)

Andrew Thangaraj

Prof. Andrew Thangaraj
NPTEL, Coordinator
IIT Madras



Indian Institute of Technology Madras



Roll No: NPTEL23HS106S846100351

To verify the certificate



No. of credits recommended: 2 or 3

ICT-enabled facilities

Audio-visual Center

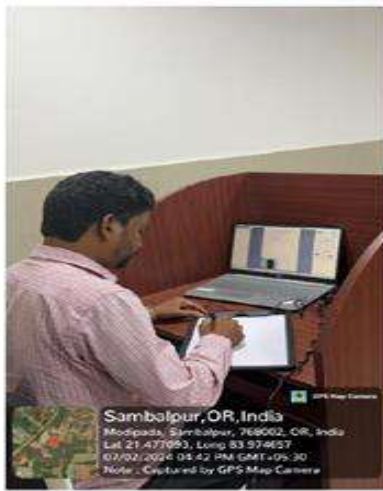


Mixing Equipment and Editing Facilities



ICT-enabled facilities

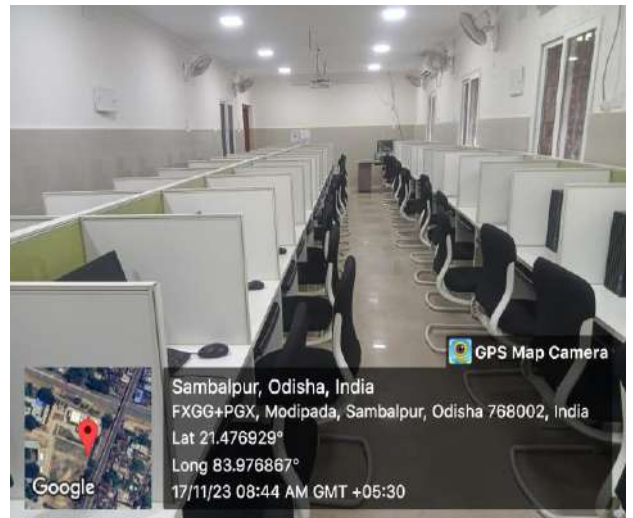
Lecture Capturing System (LCS)



List of software used for this purpose.

1. OBS (Open Broadcaster Software) is free and open-source software for video recording and live streaming. It is also used for video editing.
2. Windows 8 Operating System.
3. Audacity 3.2.0 for Recording audio recording, editing, and adding audio effects
4. Microsoft Office Word document editor.

SMART CLASS ROOMS



Orientation program details

**OFFICE OF THE PG COUNCIL CHAIRMAN
GANGADHAR MEHER UNIVERSITY
AMRUTA VIHAR, SAMBALPUR**



No 3352 /GMU

Date: 19.08.2023

Time table for Induction Programme for freshly admitted UG students
2023 is as follow (Dt-21.08.2023 at LG-I)

Sl no	Topics	Slot 1	Slot 2	Slot 3
		All Science Subjects and IST	Commerce and BBA	All Arts Subjects
1	Inaugural Address by Esteemed V.C sir	11.00-11.05am	12.30-12.35pm	03.00-03.05pm
2	Academics and Disciplinary	11.05-11.10am	12.35-12.40pm	03.05-03.10pm
3	Exam	11.10-11.15am	12.40-12.45pm	03.10-03.15pm
4	NCC	11.15-11.20am	12.45-12.50pm	03.15-03.20pm
5	Library	11.20-11.25am	12.50-12.55pm	03.20-03.25pm
6	MOOCs	11.25-11.30am	12.55-01.00pm	03.25-03.30pm
7	Hostel and Anti Ragging	11.30-11.35am	01.00-01.05pm	03.30-03.35pm
8	NSS	11.35-11.40am	01.05-01.10pm	03.35-03.40pm
9	Anti Harassment	11.40-11.45am	01.10-01.15pm	03.40-03.45pm
10	Sports	11.45-11.50am	01.15-01.20pm	03.45-03.50pm

No 3352 /GMU

Date: 19.08.2023

19.8.23
Chairman PG Council

Copy to All H.O.D/ PA to VC/PA to Registrar/Dy. Registrar /Mrs. Dibyani Sukla for
necessary arrangement in LG-I/System manager Cell for Co-Ordinating programme/Security
Officers for checking Security issues, information and necessary action

19.8.23
Chairman PG Council

Orientation program details

