

Course Code: AN-SA.C.403 (4 CH)

Prerequisite: None

Course Name: Dissertation and Viva Voce

Corequisite: Compulsory

### Programme Education Objectives

PEO1	Understand the nature and basic concepts of Dissertation and Viva Voce Relating to the MA Degree in Anthropology
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

The dissertation shall be based on the data collected by the candidate in the course of a month-long fieldwork conducted during the third semester. The dissertation is to be prepared by the student under the supervision of the concerned teacher. The student is required to submit the dissertation through the supervising teacher to the Head of the Department for its evaluation at least fifteen days in advance of the date notified for examination. The dissertation shall be evaluated by an external examiner in consultation with the internal examiner (Supervisor).

### Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of Presenting the study objectives in the form of a Dissertation
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

**Note:** The candidate shall be awarded grades both by the internal and external examiners on the basis of his/her dissertation and performances in the viva-voce.



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**P-405 Dissertation / Project 100 marks**

Dissertation: - 50 Marks

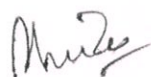
Presentation: - 30 Marks

Viva Voce : - 20 Marks



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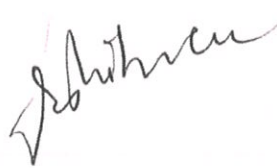
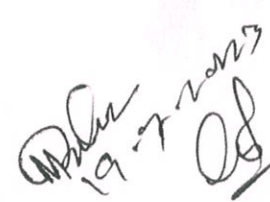
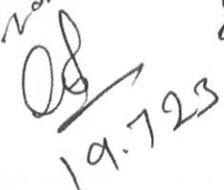
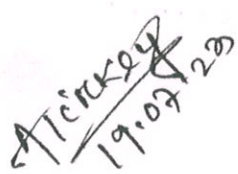
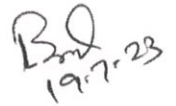
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**DISSERTATION**

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

  
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PAPER 405

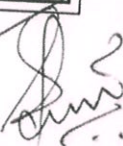
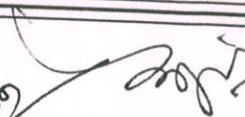
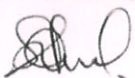
**RESEARCH DISSERTATION AND VIVA**

Division of Marks

Semester wise work and distribution of marks in % for project			
III Semester (20% Evaluation of Interim Report of the Project Work)			
Back ground of the problem (5%)	Review of Literature (5%)	Objectives (5%)	Methodology (5%)
III Semester (20% Evaluation of Interim Report of the Project Work)			
Project Work (50%)		Viva (30%)	



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**Prerequisite Course / Knowledge (If any):**

Basic idea of research methods.

**Aim of the Course:**

is to provide essential research skills to the students in order to take cutting-edge research of any problem in real world (up to regional scale at this education stage).

**Course Learning Outcomes:**

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

- I. Design a research project for any topic of choice (OBE level to be achieved – Analyse)
- II. Use understanding developed in different course to identify the methods to be used in designed research (OBE level to be achieved – Evaluate)
- III. Manage data and perform analyses under designed research (OBE level to be achieved – Evaluate)
- IV. Design and write report on the outcome and explain the limitations and future prospect of the research carried out (OBE level to be achieved – Create)
- V. Summarise and represent the research outcomes to audiences (OBE level to be achieved – Create).

**Course Contents:**

**Unit 5. Dissertation**

Time-line in phases

- i. 0-4 Weeks – Identification of the problem; literature review and conceptual model of research
- ii. 5-10 Weeks – Finalizing methods; data collection
- iii. 11-16 Weeks – Data analyses and results
- iv. 16- 20 weeks –Report writing; submission at the end of working day of 20<sup>th</sup> Week.

Note: Research progress should be reported at the end of each phase.

General Guide Lines:

→ The final report should cover the following structure:

- i. Introduction to the problem with Aim and objectives of the study
- ii. Literature review (aim and objective of study could also come here if not in previous section)
- iii. Material and Methods
- iv. Results
- v. Discussion
- vi. Conclusions
- vii. References/Bibliography

→ Report should be typed with 1.5 Line Spacing, Arial/ Times New Roman/ Calibri Font, and 12Font Size (Table and Figure captions 11 Font Size).

→ The list of references should be given at the end in the API or Harvard format.

→ Every table, figure, photograph should have a caption and source (if any).

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→ The total word should not exceed 10,000 in number (maximum 50 including text, figures, tables, photographs, references and appendices.

Note: Computer typed Report duly endorsed by the Supervisor(s) is to be produced individually by the students. A soft copy should be submitted to department along with dissertation.

**(Covers OBE level – Remember, Understand, Apply, Analyse, Evaluate and Create)**

**Unit 6. Seminar and Viva**

The students will

- Present the research carried out in the departmental seminar.
- Face a Viva Voce based on their research.

**(Covers OBE level – Remember, Understand, Apply, Analyse, Evaluate and Create)**

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पाठ्यक्रम संख्या: P-404

अंक- 100


पाठ्यक्रम : परियोजना कार्य (अंक विभाजन 100(लघु शोध प्रबंध(50) मौखिक(30) प्रस्तुतिकरण(20))

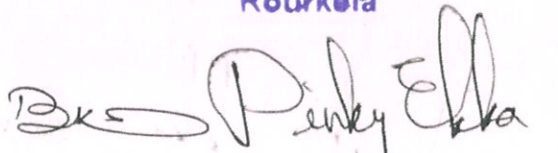
किसी एक विषयवस्तु पर लघु शोध प्रबंध पृष्ठ (50)

- > किसी एक साहित्यकार पर आलोचना
- > विमर्श पर (स्त्री विमर्श)
- > अनुवाद
- > मिडिया लेखन

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**PAPER-404**  
**Dissertation & Viva**

**PAPER-405**  
**Cultural History of India**  
**Literature**

**Course Objectives:**

The objectives of this course are to provide a broader knowledge on the important literary works in India.

**Course Outcome:**

On completion of this course the student will have better understanding on the important literatures of India which will help to develop a fair idea regarding the trend of literary writings during the past.

**Unit-I**

The Vedas—Classification, Social Life of the Rig Vedic Aryans ,Epic Literature—Ramayana and Mahabharata ,The Puranas —Silent Features ,Classification.

**UnitII**

The Upanishads , Megasthenes' Indica ,Arthashastra of Kautilya , Sangam Literature , Manusmriti.

**Unit-III**

Kalidasa :Raghuvamsham ,Abhijnan Shakuntalam , Banabhatta:Kadambari.

**UnitIV**

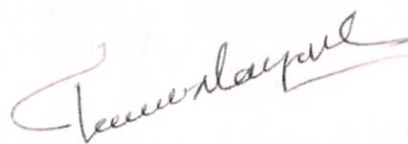
Origin of Modern Indian Languages— General Survey ,Bankim Chandra.,Prem Chand.

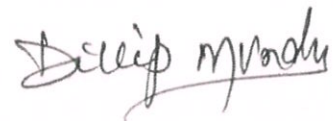
**BOOKSRECOMMENDED**

1. M.Winternitz.1963-67. *History of Indian Literature*. Vol.I-III, Motilal Banarsidass Delhi.
2. A.A. Macdonell, 1900.*A History of Sanskrit Literature*, D.Appleton and Company, NewYork.
3. *The cultural Heritage of India*,Vol.I,II,IV&V:The Ramakrishna Mission Institute of Culture, Calcutta.
4. A.D. Pusalker,1951. *Studies in the Epics and Puranas*, Bombay.
5. S.C.De, 1976.*Historicity of Ramayana*, Delhi.
6. A.K.Warder, 1972-74.*Indian Kavya Literature*. Volumes-II.Delhi.
7. U.N. Ghoshal, 1959.*A History of Political Ideas*, Bombay.
8. S.K.Das,1993. *A History of Indian Literature* (Relevant Volumes),Kendriya Sahitya Academy, Delhi.




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**Unit-II:** Study of different foods & food products: Cereals & cereal products, pulses, Fruits & Vegetables, Nut & oils seeds, Milk and milk products, Eggs, Meat, Poultry, Fish and other Flesh products, Fats & oils, Sugar & Confectionary, Condiments and spices. Food fortification, Functional foods, Antioxidants, Need for convenience foods, New trends in Foods.

**Unit-III:** Nutrition Science: Definitions, Recommended dietary Allowances-Factors affecting RDA, General principles of deriving RDA, Determination of RDA of different nutrients, Requirements and practical applications of RDA, Energy balance-Units, Direct & Indirect Calorimetry, Determination of energy value of food, Relation between oxygen required and calorimeter value. Total Energy Requirement. Basal Metabolic Rate(BMR):Measurement of Basal Metabolism-Direct, calorimetry and Indirect calorimetry, Resting energy expenditure, Factors effecting Physical activity, Factors affecting Basal metabolic Rate, Factors Affecting the Thermic Effect of Food.

**Unit IV:** Nutritional Requirements: Macro nutrients (Carbohydrates, Protein, Fat) and Micro nutrients (Vitamins & Minerals)-their classification, function, sources, recommended dietary allowances and effect of deficiency, Importance of water and roughage in diet. Water & electrolytes balance. Emerging Concepts in Human Nutrition, Ongoing nutrition transition and its implications. Changing trends in life style patterns in population groups and their implications.

**Books Recommended**

1. Normal and Therapeutic Nutrition – C.H. Robinson, Oxford & IBH Publishing Co. Calcutta.
2. Essentials of Food and Nutrition – M. Swaminathan, vol. I & II, The Bangalore printing and Publishing Co. Ltd.
3. Human Nutrition and Dietetics – Davidson, Passmore, East wood, English Language Book Society (ELBS).
4. Nutrition and Dietetics – S.A.Joshi; Tata Mc Graw-Hill Publishing Company Limited, New Delhi.
5. Dietetics – B.Srilakshmi; New age International (P) Limited, New Delhi.
6. Nutrient Requirements and Recommended Dietary Allowances for Indians – Indian Council of Medical Research, National Institute of Nutrition, Hyderabad.
7. Text Book of Human Nutrition – Mahtab. S. Bamji; N.Pralhad rao & Vinodini Reddy, Oxford & IBH Publishing Co. Pvt.Ltd.
8. Nutrition Science-B.Srilakshmi, New Age International Publication-2012.
9. Food Science and Nutrition-Sunetra Roday-Oxford University Press-2016.
10. A Textbook of Food Nutrition & Dietetics- Rehana Begum Sterling publications Pvt Ltd-2015

**Course No: HSC. 404 Dissertation,**

**4 CH**

Each student has to submit a research proposal in the 3<sup>rd</sup> semester and they must carry out independent / group research on a topic decided in consultation with the supervisor, to the head of the department.

Each student has to carry out the dissertation work immediately after registration in the Third Semester and submit the final dissertation containing Introduction, Literature review, objectives, Hypothesis, Methodology, Result & discussion, summary, conclusion, recommendation references etc for evaluation by one internal & one external examiner in the end of Fourth Semester. Appropriate field work/lab work will be done for the dissertation. The candidate has to submit two hard copies and a soft copy of the final dissertation to the head of the department. The H.O.D will forward the dissertation to the examiner for evaluation. The valuation of dissertation shall be followed by an open Viva voce. In the final dissertation evaluation (4 CH), 50% weight age shall be given to continuous evaluation during the dissertation work/ project report, 30% to the evaluation of content and rest 20% to seminar presentation & viva voce by the examiner.

**Course No: HSC. 405 Seminar and field work**

**2 CH**

**Course No: HSC. 406 Practical**

**2 CH**

1. Report writing on market survey
2. Prepare food by using any cooking methods baking, shallow fat frying, deep fat frying
3. Weight and measure of raw and cooked food (any four)
4. Prepare a chart on RDA for different stages of development

Jayashree Mishra  
Resmita Panda  
Dandini Uthas,  
Principal  
Govt (Auto) College  
Rourkela





## PAPER - 403 (Special Paper)

ସ୍ଵାଧୀନୋତ୍ତର ଓଡ଼ିଆ କବିତା

୧. ପାଶ୍ଚାତ ପ୍ରଭାବ ପୁଷ୍ଟ ଆଧୁନିକ ଓଡ଼ିଆ କବିତା
୨. ଚିତ୍ରକଳ୍ପ, ପ୍ରତୀକ, ମେଟାଫର ଓ ଆର୍କିଟାଇପ୍ ଓ ମିଥ୍ ପ୍ରୟୋଗ ଧାରା
୩. ବିଭିନ୍ନ ବାଦର ପ୍ରୟୋଗ
୪. ସାଂପ୍ରତିକ ଓଡ଼ିଆ କବିତା ଓ ଓଡ଼ିଆ ଜୀବନଧାରା

## PAPER - 404

### ପ୍ରକଳ୍ପ ପ୍ରସ୍ତୁତି ଓ ମୌଖିକ ପରୀକ୍ଷା

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ :

- \* ଆଧୁନିକ କବିତାର ଦିଗ୍‌ଦର୍ଶନ - ଅପୂର୍ବ ରଞ୍ଜନ ରାୟ
- \* ମୋ ଦୃଷ୍ଟିରେ ସାଂପ୍ରତିକ ସାହିତ୍ୟ - ସଂ ପରୀକ୍ଷିତ ନନ୍ଦ
- \* ମୋ ମନ ପସନ୍ଦର କବି ଓ ଅନ୍ୟାନ୍ୟ ନିବନ୍ଧ - ଆଦିକନ୍ଦ ସାହୁ
- \* ବିବିଧ ପ୍ରସ୍ତାବ - ଦାଶରଥ ଦାସ
- \* ପାଠକୀୟ ମନ୍ତବ୍ୟ - କୁମୁଦ ରଞ୍ଜନ ପାଣିଗ୍ରାହୀ
- \* ଚିହ୍ନାମାଟି ଅଚିହ୍ନା ଆକାଶ - ଦାଶରଥ ଦାସ
- \* ଉତ୍ତର ଆଧୁନିକ ଓଡ଼ିଆ କବିତା - ପ୍ରତିଭା ଶତପଥୀ
- \* ରୂପାନ୍ୱେଷୀ କବି ମାନସିଂହ - ପ୍ରଭାତୀ ରଥ
- \* ଶବ୍ଦ ସବୁ ସରିଗଲେ - ସୌରାନ୍ତ ବାରିକ
- \* କବିତା ୧୯୬୨ (ମୁଖବନ୍ଧ) - ସଚ୍ଚିଦାନନ୍ଦ ରାଉତରାୟ
- \* ଆଧୁନିକ କବିତାରେ ରୂପତତ୍ତ୍ଵ - ପ୍ରଭାତୀ ରଥ

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3. Ohodsich: The United Nations
4. Ohodsich: The nature and Functions on International Organization
5. Chase: The United Nations in Action

**PSC-403 RESEARCH METHODOLOGY IN POLITICAL SCIENCE**

**Course Objective:**

The Paper contains the various signification in the context of research. It gives a broad idea to the theoretical dimension of research and contains the Research tools and Methodology. It Introduces the dimension the different steps of doing research.

**Course Outcome:**

The student gets a brief idea of the significance and importance of Research. The students get knowledge of how to conduct a research study, and thus helps in all his future endeavors. The paper gives a broad framework to analyses the different topic of interest in the perspective of his/her understanding. For student pursuing higher studies, like Ph.D, this paper become most important.

**UNIT-I**

- (i) **Scientific Method:** The Nature of Scientific Method and its application to Social Research; Problem of Objectivity.
- (ii) **The Research Process:** Ethical Consideration in Social Research.

**UNIT-II**

- (i) **The Research Problem:** Review of literature, Formulating Research Problem.
- (ii) **Hypothesis:** Meaning, Importance and Role of Hypothesis in Social Research; Type of Hypothesis.

**UNIT-III**

- (i) **Method of Data Collection:** Observation: Participant and Non-Participant; Case Study.
- (ii) **Contest Analysis:** Interview Method, Participatory Rural Appraisal (PRA).

**UNIT-IV**

- (i) **Tools of Research:** Construction of Schedule & Questionnaire; Mailed Questionnaire, Report-building; Pre-testing & Pilot Study.
- (ii) **Data Analysis & Report Writing:** Quantitative Data Analysis; Preparation of

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Research Report, Steps in Report-Writing.

**Book Recommended:**

1. Goode & Hatt, :Method of Social Research.
2. P.V.Young :Social Surety & Social Research
3. Lundberg : Social Research
4. Milden Parten : Survey Tools & Sampling
5. A.R.Bajpai :Methods of Social Survey

**PSC-404 PROJECT**

**Project-50 (Project Work-50, Viva Voice-30, Presentation-20)**

**PSC-405 INDIAN ADMINISTRATION**

**Course Objectives:**

This course based on Indian Administration is a practical significance to every citizen in the contemporary society to learn about the essentiality of the subject as per its working system and procedures.

**Course Outcomes:**

After the completion of the course the students would; be able to understand the basic concepts of Indian Administration and respond efficiently to diverse public needs. Gain organised knowledge about governmental structure and administrative process to its contribution in nation-building and creative citizens. Develop a critical analysis and understanding various issue and conflict areas of administration.

**UNIT-I**

- (i) Indian Administration: Evolution in ancient and Mughal Period, Change and

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- continuity in Indian Administration from colonial period and Post- Colonial period
- (ii) Structure of Indian Administration: Centre, State and District

### UNIT-II

- (i) Local Governance: 73<sup>rd</sup> and 74<sup>th</sup> Constitutional Amendment Act, PESA Act, 1996, Challenges to local and Urban Governance.
- (ii) Globalization and Indian Administration: Impact of Liberalization and Privatization, Role of Civil Society.

### UNIT-III

- (i) Commissions in India: Union Public Services Commission, Planning Commission, Election Commission, Finance Commission, National Human Rights Commission.
- (ii) Public Sector Reforms in India: Public Sector in Modern India, Forms of Public Sector Understanding, Problems of Autonomy and Accountability in control.

### UNIT-IV

- (i) Issue areas in Administration: Political and Permanent Executive, Integrity in Administration, Lokpal and Lokayukta, People's Participation in Administration.
- (ii) Public Policy and Administration: Policy making Process, Policy formulation, Implementation and Evaluation.

### Suggested Readings:

1. Maheshwari S.R., 2001, Indian Administration, New Delhi, Kitab Mahal.
2. Arora Ramesh K 1996, Indian Public Administration: Institutions and Issues, New Delhi, Vishwa Prakashan
3. Singh Hoshiar, 2001, Indian Administration, New Delhi, Kitab Mahal
4. Prasad Kamala, 2006, Indian Administration: Politics, Policies and Prospects, Delhi, Dorling Kindersley India Pvt Ltd.
5. Debroy Bibek (ed.), 2004, Agenda for Improving Governance, New Delhi, Academic Foundation.
6. Jain L.C. (ed.), 2005, Decentralisation and Local Governance, New Delhi, Orient Longman
7. Kapur Devesh and Pratap Bhanu Mehta (eds.) 2005, Public Institutions in India,

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**PAPER-PSY - 404**

**DISSERTATION/ RESEARCH PROJECT**

Project / Dissertation work of 4<sup>th</sup> Semester will be assigned to the students (jointly or individually) at the end of the 3<sup>rd</sup> Semester and will be completed in the 4<sup>th</sup> Semester. The distribution of the Marks will be given below.

Semester wise work and distribution of marks in % for Project/Dissertation			
3 <sup>rd</sup> Semester (20%) Evaluation of interim Report of the Project/Dissertation work			
Back ground of the problem (5%)	Review of Related Literature (5%)	Objectives (5%)	Methodology (5%)
4 <sup>th</sup> Semester (80%) Evaluation of Final Report of the Project/Dissertation			
Project/Dissertation (50%)		Viva (30%)	

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MPA-404

Project-50 (Project Work-50, Viva Voice-30, Presentation-20)

MPA-405

### PUBLIC PERSONNEL ADMINISTRATION IN INDIA

#### Course Objective:

This has been a universal fact that human resource is the foundation to institute any kind of organization. In fact, in cases of public personnel though legality became the base to hold authority but their role assumed to serve the moral concern of society. In this context the knowledge on Public Personnel Administration in India requires to be relevant. Here the students need to be aware on the concept and its philosophical ground to study civil service system in India.

#### Learning Outcome:

Useful outcomes of learning Public personnel Administration capacitates students framing philosophical grounds and rationale for civil services system and their personal attributes holding any capacity to deliver better results with a motive of welfare.

#### Unit-I:

Public Personnel Administration: Concept, Scope, Significance and Objective Problems of Public Personnel Administration

#### Unit-II:

Civil Services in India: Recruitment, Training, Promotion, Classification, Union Public Service Commission, State Public Service Commission

#### Unit-III:

Civil Services in India: Code of Conduct, Discipline, Performance Appraisal, Pay and Service



### References Readings

1. Kumar, (2012). Industrial Sociology, Laxkshmi Narain Agarwal, Agra, 8<sup>th</sup> Edition.
2. Ramaswamy, E.A & Ramaswamy U. 1973 Industry and labour: An Introduction, Delhi : Macmillan
3. Ramaswamy, E.A & Ramaswamy U. 1978 Industrial Relation in India ,Delhi : Macmillan
4. Schneider , E.V (1957) Industrial Sociology , New York : Mc Graw
5. Smelser , N.J Social change on Industrial Revolution , London ; Rotledge and Kegan Paul

### Seminar and Field Work

#### Paper-405

**Dissertation/Project  
(Project Work (50) +Viva  
(30)+Presentation (20))**

#### Paper-406



## Paper- 405: Project Management

### Objectives:

The basic purpose of this course is to understand the framework for evaluating capital expenditure proposals, their planning and management in the review of the projects undertaken.

### Course Contents:

Unit I: Project and Economic Development, Project Management- An Overview, Capital Investment: Importance & Difficulties; Generation and Screening of project idea.

Unit II: Capital expenditure; importance and difficulties; market & demand Analysis, Situational analysis, Technical Analysis; Financial Analysis.

Unit-III: Capital Budgeting Decisions; Analysis of Project Risk; Firm Risk and Market Risk; Social Cost Benefit Analysis; UNIDO Approach, Little-Mirrless Approach.

Unit-IV: Network techniques for project management; PERT Model, CPM Model, Project review and administrative aspects.

Unit-V: Multiple Projects and Constraints; Financing of Projects, Financing Infrastructure Projects, Project financing in India; Project Feasibility Report.

### Suggested Readings:

1. Ahuja, G.K. & Gupta, Ravi, Systematic Approach to Income Tax, Allahabad, Bharat Law House, 1997.
2. Bhalla, V.K. Modern Working Capital Management, New Delhi, Anmol, 1997.
3. Bhalla, V.K. Financial Management and Policy, 2nd ed. New Delhi, Anmol, 1998.
4. Chandra, Prasanna, Project: Preparation, Appraisal, Budgeting and Implementation, 3rd ed., New Delhi, Tata McGraw Hill, 1987.
5. Dhankar, Raj S. Financial Management of Public Sector Undertakings, New Delhi, Westville, 1995.

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polluting industries (Paper Mills, Sugar industry, Iron and steel and Textile) and their health effects, Water quality standard : Drinking water quality standard, Irrigation water standard and effluent standard, methods of treatment of industrial waste water: Preliminary treatment, primary treatment, (Sedimentation, equalization and neutralization etc.), secondary treatment (Activated sludge technique and Trickling filter) tertiary treatment methods for waste water treatment (Evaporation, Ion exchange, Adsorption, Electrodialysis, Electrolytic recovery, reverse osmosis).

**UNIT-IV*****Industrial Solid Wastes***

Classifications and types of Industrial solid wastes, Generation, disposal and management of industrial solid wastes with special reference to fly ash, red mud, heavy metals (Mercury, Lead, Arsenic, Cadmium), other organic solid wastes and radio-active wastes. Industrial sources of noise, Loudness on Decibel scale, noise levels in decibel scale, effect of noise on human health, prevention and control of industrial noise pollution.

**TEXT BOOKS**

1. *Industrial Pollution and Management* by Arvind Kumar, APH Publishing Corporation, New Delhi.
2. *Industrial Pollution and its Management* by P.C. Trivedi, Avishkar Publishers & Distributors, Jaipur
3. *Pollution Control in Process Industries* by S.P. Mahajan, Tata McGraw Hill Publishing Company, New Delhi
4. *Environmental Engineering* by G Kiely, Tata McGraw Hill Publishing, Company, New Delhi.

**REFERENCE BOOKS**

1. *Environmental Pollution and Control*, 4th ed. by J. Jeffrey Peirce, P. Aarne Vesilind, Ruth F. Weiner, Elsevier Publication

**P-405****PROJECT****4 credits**

Each student shall carry out project work in industries/institutions. The findings of the project work should be submitted in the form of a dissertation for evaluation by a Board of Examiners.

**Elective Papers***(The student has to opt any two papers)***P-403A  
UNIT-I****INDUSTRIAL PROCESSES****4 credits*****Petroleum and Coal Based Chemicals***

Composition of petroleum, cracking processes, Commercial production of ethylene, acetylene, polymerization mechanisms, Addition, condensation, step growth, chain growth, method of polymerization, Distillation of coal.[10]

**UNIT-II*****Oil Based Industries & Surface-Active Agents***

Oils and fats: Solvent extraction of oils, hydrogenation of oil, use of oil in the manufacturing of soap, paints and varnishes.

Classification of surface-active agents and manufacturing of detergents used for cleansing purpose.

**UNIT-III*****Fermentation Industries***

A general discussion on fermentation conditions, manufacturing of penicillin, Alcoholic beverages, ethanol from molasses and starchy material

**UNIT-IV*****Pesticides and Pharmaceutical Industries***

DDT manufacture, BHC manufacture, 2,4-D manufacture, parathion manufacture, pharmaceutical industry

**TEXT BOOKS:**

1. *Outlines of Chemical Technology* by M. Gopala Rao and Marshall Sittig, Affiliated East-West Press Pvt. Ltd.
2. *Industrial Chemistry* by B. K. Sharma

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**FOURTH SEMESTER**  
**Course Title: Lab on Web Technology**  
**Course Code: MSC404**  
*No. of Credits - 2*

**Programme Education Objectives**

PEO1	Understand the nature and basic concepts of LAB ON WEB TECHNOLOGY
PEO2	Analyze the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

**Course Outcomes**

CO1	Remember and understand the basic concepts/Principles of LAB ON WEB TECHNOLOGY
CO2	Analyze the Various Concepts to understand them through practical
CO3	Apply the knowledge in understanding practical problems
CO4	Execute/Create the Project or field assignment as per the knowledge gained in the course

**FOURTH SEMESTER**  
**Course Title: Lab on Computer Graphics**  
**Course Code: MSC405**  
*No. of Credits - 2*

**Programme Education Objectives**

PEO1	Understand the nature and basic concepts of LAB ON COMPUTER GRAPHICS Relating to the M.Sc. Degree in Computer Sciences
PEO2	Analyze the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

**Course Outcomes**

CO1	Remember and understand the basic concepts/Principles of LAB ON COMPUTER GRAPHICS
CO2	Analyze the Various Concepts to understand them through case studies
CO3	Apply the knowledge in understanding practical problems
CO4	Execute/Create the Project or field assignment as per the knowledge gained in the course

**FOURTH SEMESTER**  
**Course Title: Dissertation/ Project**  
**Course Code: MSC406**  
*No. of Credits - 4*

Project work of 4<sup>th</sup> Semester will be assigned to the student(jointly or individually) at the beginning of the 3<sup>rd</sup> semester and will be completed in the 4<sup>th</sup> semester.

Semester wise work and distribution of marks in % for project			
III Semester (20%) Evaluation of Interim Report of the Project Work			
Background of the Problem (5%)	Review of Literature (5%)	Objectives (5%)	Methodology (5%)
IV Semester (80%) Evaluation of Final Report of the Project Work			
Project work (50%)		Viva (30%)	

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**Expected outcome:** The students can have the knowledge of various environmental laws related to mining of minerals. This knowledge will enable them to deal with issues relating to environmental pollution.

**a) Fossil Fuels, Nuclear Minerals and Mineral Economics**

Origin, migration and entrapment of natural hydrocarbons. Characters of source and reservoir rocks. Structural, stratigraphic and mixed traps. Techniques of exploration. Geographical and geological distributions of onshore and offshore petroliferous basins of India. Coal and its properties: Different varieties and ranks of coal. Origin of coal. Coalification process and its causes. Lithotypes, microlithotypes and macerals: their physical, chemical and optical properties. Mode of occurrence, genesis and Indian distribution of Coal. Mode of occurrence, genesis and Indian distribution of Nuclear Minerals. Need and methods of resource evaluation and reserve calculation of economic mineral deposits. National Mineral policy.

**b) Mineral Economics**

Strategic, critical and essential minerals. India's status in mineral production vis a vis world scenario, Changing patterns of mineral consumption. UNFC classification, National Mineral Policy. Mineral Concession Rules. Marine mineral resources and Laws of Sea.

**Books Recommended:**

1. Krishnaswamy, S. (1988) Mineral Resources of India, Oxford & IBH, 1988 -Mines and mineral resources, page no. 1-613.
2. Banerjee, D. K. (1998) Mineral Resources of India, Calcutta: World Press Private Limited, 6<sup>th</sup> Edition, page no. 1-415.
3. Deb, S. (1980) Industrial Minerals and Rocks of India, Allied Publishers, page no. 1-603.
4. Chandra, D., Singh, R. M. and Singh, M. P. (2000) Textbook of Coal (Indian context), Tara Book Agency
5. Francis, W. (1961) Coal-its formation and composition, Edward Arnold, page no. 1-806.
6. Levorsen. A, I. (2004) Geology of Petroleum, CBS Publishers & Distributors Pvt. Ltd., second edition.

**P- 403 (4 CH)**

**Elective (any one)**

- i) Geoinformatics
- ii) Digital image processing and Geographic information system
- iii) Coal Geology
- iv) Isotope Geology
- v) Surface and sub-surface water resource management
- vi) Environmental Geology
- vii) Applied Micropaleontology
- viii) Ore Genesis:
- ix) Clay Mineralogy & Soil Geology
- x) Management of Mineral Resources

**P- 404 (4 CH) Project**

**P- 405 (2 CH)**


**Practical Corresponding to P- 401 and P- 402**


Determination of pH, Temperature, TDS and other parameters for ground water quality assessment. Graphical representation of supplied ground water quality data. Resistivity survey for ground water.


Engineering geological problems. Viva, Practical record

**P- 406 (2 CH)**

**Practical Corresponding to Course P 403 and Field Report.**

  
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**PROJECT/DISSERTATION (WITH VIVA VOCE)**

**PAPER: 404**

**Full Marks: 100( Project Work 50+ Vive 30+Presentation 20)**



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**PHY - 404 : Research Project**

Every student will have to work under the supervision of a faculty for a project and deliver a seminar talk on the findings.

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## PROJECT AND VIVA VOCE

MSC- 404

4 CH

The Project Work will be taken in the final semester and spread over the whole semester. A project may be undertaken by a group of students. However, the project report shall be submitted by each member of the group separately. A project report shall clearly state the problem addressed, the methodology adopted, the assumptions and the hypotheses formulated, any previous reference to the study undertaken, statistical analyses performed and the broad conclusion drawn. The evaluation will be based on the total 100 marks assigned to the project, 60 marks will be assigned on the evaluation of the project work and 40 marks will be assigned jointly by the examiners on the oral presentation and viva – voce.

### LABORATORY USING R/SPSS/PYTHON

MSC- 405

2 CH

**Objective:** To understand the concept of R and/or SPSS and/or PYTHON for data management and as a cutting edge technology tool. To enable to identify data sources, processing and imparting knowledge tools to analyze sets of data to gain useful business and health related issues for understanding.

CO-1	Remember and understand the basic concepts/Principles of R/ SPSS / PYTHON
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

#### Problem Solving using R and/or SPSS and/or PYTHON:

Using of R/ SPSS/ PYTHON software packages to gain the knowledge of software package and applications of Software for data analysis in the areas of MSC 401 and MSE 402(\*)

Examination: Practical (80%) and Record & Viva Voce (20%).

### LABORATORY USING R/SPSS/PYTHON

MSC- 406

2 CH

**Objective:** To understand the concept of R/SPSS/PYTHON for data management and as a cutting edge technology tool. To enable to identify data sources, processing and imparting knowledge tools to analyze sets of data to gain useful business and health related issues for understanding.

CO-1	Remember and understand the basic concepts/Principles of R/SPSS/PYTHON
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

#### Problem Solving using R/SPSS/PYTHON:

Using of R/SPSS/PYTHON software packages to gain the knowledge of software package and applications of Software for data analysis in the areas of and MSE 403(\*)

Examination: Practical (80%) and Record & Viva Voce (20%).

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**PAPER: ZOL-404****PROJECT REPORT**

100 marks (80+20)

4CH

**Objectives:** The objectives of this course are to develop research aptitude, scientific temper and critical analysis among students.

**Learning Outcome:** Students are expected to gain the basic skill in project handling and writing of their project report, which will be helpful for them to be an independent scientist.

**Plan and Execution:** Project work of IV<sup>th</sup> semester will be assigned to the students at the beginning of IIIrd semester and will be completed in the IV<sup>th</sup> semester. The students will plan and carryout projects with self- involvement through understanding and learning of different research tool and techniques. During their research tenure the students learn the skill of writing theses, articles and project for their future benefits.

**Project Report/Dissertation:** At the end of the project, theses have be written giving full details about their project. Project report should include introduction, background of the problem, Review of literature, objectives, methodology, results, discussion and references. Evaluation of the project report and viva voce will be open defense type through power point presentation and evaluated by both external and internal examiner.

**Distribution of Mark/work:**

SEMESTER WISE WORK AND DISTRIBUTION OF MARKS IN % FOR PROJECT				
IIIrd SEMESTER (20%) EVALUATION OF INTERIM REPORT OF THE PROJECT WORK				
Background of the problem (5%) (5 marks)	Review of Literatre (5%) (5 mark)	Objectives (5%) (5 marks)	Methodology (5%) (5 marks)	Total (20%) 20 marks
4 <sup>th</sup> SEMESTER (80%) EVALUATION OF FINAL REPORT OF THE PROJECT WORK				
Project work (50%) – 50 marks		Viva(30%) = 30 marks		Total(80%) - 80 marks
<b>GRAND TOTAL</b>		<b>4CH</b>		<b>100 MARKS</b>

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population; Demography of Indian tribal and non-tribal groups; Anthropological determinants of population growth; Impact of urbanization on the migration of tribal groups.

**Unit IV:** National policies; National Population Policy; National Health Policy; National Policy on Reproductive Health Care.

### Practical

A student will collect and compile demographic data from different secondary sources on any given topic by the concerned teacher and a project report will be submitted for its evaluation.

### Text book recommended:

1. Bhende A. and Kanitkar, T. (2010) *Principles of Population Studies*. Himalaya Publishing House. Mumbai (All Units, It covers most topics)
2. Sinha V C and Zacharia E, (2010). *Elements of Demography*, 2nd Ed. New Delhi: Allied Publishers

### Suggested Readings


1. Caldwell J.C. (2006). *Demographic Transition Theory*. Springer.
2. Census of India (2001,2011), SRS bulletin (2013), NFHS (2006 ), CRS, NSSO ( Can be seen from browsing net)
3. Howell N. (1986) Demographic Anthropology. *Ann. Rev. Anthropol.* 15: 219-246
4. Kshatriya G.K. (2000). Ecology and health with special reference to Indian tribes. *Human Ecology special volume 9:229-245*.
5. Kshatriya G.K., Rajesh,G. and Kapoor , A.K. (2010) Population Characteristics of Desert Ecology.VDM Verlag Dr. Muller Gmbh and Co., Germany.
6. Misra BD (1982). *An introduction to the study of population*. South Asia publ. ltd. New Delhi.
7. Park K. (2000) *Text book of Preventive and Social Medicine*. BanarsidasBhanot, Jabalpur.
8. Riley N.E. and Mc Carthy, J. (2003) *Demography in the Age of the Postmodern*. Cambridge University press. UK. Pages 1-13 and 32-98
9. Sharma A.K. (1979) Demographic transition: A Determinant of Urbanization. *Social Change* 9: 13-14. Srivastava O.S. (1996) *Demographic and Population Studies*. Vikas Publishing House, India
10. Zubrow E.B.W. (1976) *Demographic anthropology. Quantitative approaches*. University of New Mexico Press, Albuquerque.

## SEMESTER - VI

### DSE-:4- MUSEUM AND MUSEOLOGY

### DSE-:4- MUSEUM AND MUSEOLOGY



  
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A report will be prepared by visiting an Anthropological Museum and doing empirical study on ethnographic specimens of material cultures of tribal, rural communities of Odisha . The museum visit is to be conducted for a minimum period of 10 days in semester V<sup>th</sup> under the guidance of a teacher or teachers. Two copies of report are to be submitted for examination on the basis of museum visit. The Examination of Report shall be conducted by an internal and an external examiner.

**Mid- term Examination** (Each student has to answer one elective question of **15 marks** from the two units On Museum and Museology given below for the Mid Term Examination)=15 marks

**End - term Examination=85 marks**

Report\* on 10 days Museum visit of anthropological /tribal/cultural museums=**60 marks**

Practical Record on ethnographic Specimens of material culture = **15 marks**

Viva- Voce = **10 marks**

\*The Report\* on 10 days Museum visit of an Anthropological Museum has to be submitted by the student positively before the end semester examination. The Report\* will be evaluated both by the internal and external examiners.

**MUSEOLOGY:** The students are to be taught on the following aspects **Museum and of Museology** pertaining to perspectives of Museology and the basic principles of museum:

**Unit - I : Museums :** Meaning and scope; History and development of museums in India;  
Types of Museums in India; Role of Anthropological museums in education.

**Unit -II: Museology and Basic Principles of Museum:** Modes and ways of acquisition of museum specimens; Principles of display and arrangement in museum; Basic principles of museum, Documentation , labeling, display of the museum specimens of material cultures of tribal and rural people.

Each student has to answer one elective question of **15 marks** from the above aspects of Museum and Museology in the Mid Term Examination.

The students are required to learn the basic principles of museum, documentation, labelling and display of the museum specimens of material cultures of tribal and rural people. Each student has to apply the above methods, whichever is applicable , on specimens of following materials.

- a. Plant remains: Wood, Bamboo
- b. Fibre remains: Cloth/ Linen
- c. Metal remains: iron,brass, copper, silvers.
- d. Animal remains: Bone, antler, horn, leather/hide

Maintaining proper **Laboratory Record** is compulsory . Each student has to submit a proper and complete Laboratory Record is compulsory. Each student has to submit a proper and complete laboratory record duly signed by the teacher who is assigned to teach this aspect. The students are required to submit their Laboratory Records at least five days before the conduct of practical examination. Defaulters of the same are neither allowed to appear the practical examination nor entitled to get the marks assigned to Practical Records.

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**Books Recommended:**

1. Basa K.K., Md. Rehan, R.K. Gupta 2007, *Museology A Comprehensive Bibliography and Webliography*, Serial Publications, New Delhi.
2. Behera B.K. and S.K. Mohanty, 2007 *Museology and Museum Management in India*, Mayur Publications, Bhubaneswar, Odisha
3. Bhatnagar, A. 1999, *Museum, Museology and new Museology*, Sandeep Prakashan, New Delhi.

**Suggested Readings:**

1. Aiyappan, A. and S.T. Satyamurti (Ed), 1960, *Handbook of Museum Technique*, Government Museum, Madras.
2. Diwvedi, V.P. and G.N Pant (Ed) 1980, *Museum and Museology :New Horizon*, Agam Kala Prakashan, New Delhi.
3. Ghoshmaulik, and S.K Mishra 1987, *Practical Anthropology*, SAAS, Orissa.
4. Ghoshmaulik, S.K and K.K Basa (Ed) 2001, *Understanding Heritage ;Role of Museum*, Academic staff college, Utkal University, Bhubaneswar, India.
5. Nair, S.M., *Bio-Deteriorations of Museum Materials*, Agam Kala Prakashan, New Delhi.
6. Nigam, M.L. 1985 *Fundamentals of Museology*, Deva Publications, Hyderabad.
7. Renfrew, C. and P. Bahn *Archaeology; Theories, Methods and Practice*
8. Shankalia, H.D. *Stone Age Tools and Techniques*, Deccan college Poona, India

**GENERIC ELECTIVE-1****Introduction to Biological Anthropology****Theory**

**Unit I:** History of Physical Anthropology and development of Modern Biological anthropology, aim, scope and its relationship with allied disciplines; Difference in the approaches of modern and traditional Biological Anthropology.

**Unit II:** History and development of understanding human evolution (pre-19th and post-19th Century); Theories of evolution: Lamarckism, Darwinism, Synthetic theory, and Mutation theory.

**Unit III:** Primates: General Characteristics, Distribution and Classification of Non human living primates. Comparative anatomy and behaviour of human and non-human primates.

**Unit IV:** Structure and function of an animal cell; cell theory and cell division (Mitosis and Meiosis), Mendel's Laws of inheritance and its application to man.

**Practical****Osteology**

Introduction to Anthropology Laboratory: Dry Lab and Wet Lab, Calibration and Standardization of Instruments, Demonstration of Instruments: Anthropometry, Spreading

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This course provides a perspective to our intellectual history, development of economic thought and helps relate this thought to the current thinking. It introduces the students to the philosophers and economists who developed economic reasoning and modeling of economic activities. It also helps create critical abilities and attitudes.

### **UNIT I: Introduction and Early Economic Thought**

Mercantilism-main characteristics, Thomas Mur's views ; Physiocracy- main features, Tableau Economique, taxation; Early Classicism: Adam Smith- Theory of Value, Division of labour, capital accumulation, distribution, views on trade and economic progress; David Ricardo-theory of value, theory of rent, distribution, ideas on international trade and development.

### **UNIT II: Classicism Vs Marxism**

Thomas Malthus- population theory, glut theory; Karl Marx-dynamic of social change, theory of value, surplus value, theory of profit, crisis of capitalism, Johns Stuart Mill- ideas on value, distribution, views as a synthesizer.

### **UNIT III: The Marginalists' Revolution**

Economic ideas of Jevons, Walras and Menger, Bohm-Bowerk, Wicksell ; Marshall – Role of time element in price determination, ideas on consumer surplus, Marshal as a synthesizer.

### **UNIT IV: Indian Economic Thought**

Main themes of Kautilya's Arthasashtra; Modern Economic Ideas: Dada Bhai Naoroji, M.K. Gandhi, village swaraj, non-violence, machines and labour, cottage industries; Comparison of Indian Economic thought with western Economic thought.

#### **Text Book**

- Gide, Charles and Rist, Charles (1973): A History of Economic Doctrines, Oxford University Press.
- Dasgupta, A K (1986): Epochs of Economic Theory, Oxford University Press, New Delhi.

#### **Reference Book:**

- O'Brien, D P (1975): Classical Economists, Oxford, Clarendon Press.
- Ekelund, Robert B. and Robert F. Hebert (1990): A History of Economic Theory and Method, third edition, New York: McGraw Hill.
- Henry W. Spiegel (1991): The Growth of Economic Thought, 3rd ed. Durham: Duke University Press.
- Tom Bottomore (1980): Dictionary of Marxist Thought, Basic Blackwell Publishers.
- Roll, Eric, History of Economic Thought, Faber and Faber Ltd.
- L N Rangarajan (1992): Kautilya: The Arthasastra, edited, rearranged, translated and introduced; Penguin books, New Delhi.

**DSE Paper -4**

**DISSERTATION / RESEARCH PROJECT**

(College can give this choice only for students with above 60% aggregate marks)



**Introduction :** The project is intended to establish the connection between Economics as confined to the text books and class rooms and Economics at play in the ground. It is expected to give an empirical content to the subject. Economics is defined as the study of mankind in the ordinary business of life. It studies individual as well as group behavior.

Project work at the undergraduate level is an in-depth study on a topic chosen by the student. The objective of the project work for the students at undergraduate level is to expose students to the social and real world contexts in which the subjects taught in the classroom have applications. Therefore, the topic must be related to the field of study the student is enrolled. It is undertaken with the guidance of a faculty supervisor, and involves a prolonged period of investigation and writing. The supervisor is supposed to help the student and mentor him/her throughout, from selection of the topic to submission of the project report.

The project output will be a project report written on the topic, chosen by the student and approved by the guide, in about 10000 words.

The process of project preparation typically comprises of an investigation of a particular topic, based on the application of philosophical and theoretical knowledge available in the already existing scientific literature and other published sources of information. The student may use already available data (texts, documents, artworks or existing data sets) or she may go for collection of data from the field. The final report should ideally have the following sections.

- (1) Abstract (in about 500 words) containing a summary of the entire report.
- (2) Introduction of the topic, arguments for choosing such a topic and the key investigation propositions.
- (3) A review of the existing knowledge on the topic
- (4) Information on the data and data treatment tools used in the study
- (5) An analysis of data and findings
- (6) Conclusions
- (7) References

A good research project requires sincere efforts and honest dedication from students. Moreover, it requires an engagement of the student with an issue under probe for a fairly long period of time compared to their preparations of subjects for the examination.

A successful completion of the project report has several positive learning outcomes for the student. It empowers the student with the life skill of patience and persistence. It also helps the student to locate her theoretical understandings in the context of socio-economic and political realities.

## Generic Elective Paper I

### INDIAN ECONOMY



- Gore, M.C. (2004) . *Successful Inclusion Strategies for Secondary and Middle School Teachers*, Corwin Press, Sage Publications.
- Hegarthy, S. & Alur, M. (2002). *Education of Children with Special Needs: from Segregation to Inclusion*. Corwin Press, Sage Publishers.
- Karant, P., & Rozario, J. ((2003). *Learning Disabilities in India*. Sage Publications.
- Karten, T. J. (2007). *More Inclusion Strategies that Work*. Corwin Press, Sage Publications.
- King□Sears, M. (1994). *Curriculum□Based Assessment in Special Edcuation*. California: Singular Publications.
- Kluth, P. (2009). *The autism checklist: A practical reference for parents and teachers*. San Francisco, CA: Jossey-Bass.
- Lewis, R. B., & Doorlag, D. (1995). *Teaching Special Students in the Mainstream*. 4th Ed. New Jersey: Pearson.
- Rayner, S. (2007). *Managing Special and Inclusive Education*, Sage Publications.
- Rose, D. A., Meyer, A. & Hitchcock, C. (2005). *The Universally Designed Classroom: Accessible Curriculum and Digital Technologies*. Cambridge, MA: Harvard Education Press.
- Ryandak, D. L. & Alper, S. (1996). *Curriculum Content for Students with Moderate and Severe Disabilities in Inclusive Setting*. Boston, Allyn and Bacon.
- Thousand, J., Villa, R., & Nevin, A. (2007). *Differentiating instruction: Collaborative planning and teaching for universally designed learning*. Thousand Oaks, CA: Corwin Press.
- Turnbull, A., Turnbull, R., Turnbull, M., & Shank, D.L. (1995). *Exceptional Lives: Special Education in Today's Schools*. 2nd Ed. New Jersey: Prentice□Hall.Inc
- Udvari-Solner, A. & Kluth, P. (2008). *Joyful Learning: Active and collaborative learning in inclusive classrooms*. Thousand Oaks, CA: Corwin Press.

**DSE Paper – IV**

**DISSERTATION/ RESEARCH PROJECT**

(College can give this choice only for students with above 60% aggregate marks)

The students will select a research project on any Educational issue or problem or topic and prepare a report. The project will be prepared based on proposal already developed in Semester-III, Core-6.

Distribution of Marks will be as follows:

Item	Total
Report	75
Viva-voce	25
<b>Total</b>	<b>100</b>

The assessment of students' performance will be made jointly by the external and





- (i) Email, Blogs, Social networking
- (ii) Internet Journalism

### Reference Books

- Rangaswamy Parthasarathy, *Journalism in India: From the earliest times to the present day*, Sterling.
- S V Parasher, *Indian English: Functions and Form*, Bahri Publications.
- Stephen McLaren, *Easy Writer*
- A R Parhi, *Indian English through Newspapers*, Concept Publications.
- G L Labru, *Indian Newspaper English*, B R Publishing House.
- Vinod Dubey, *Newspaper English in India*, Bahri Publications.
- Kachru, Braj: *from Indianization of English*
- Dutta and Parhi, 'Prospect of Electronic Media as Curriculum in Non-Native Contexts', *I-Manager's Journal on English Language Teaching*. (2014)
- Aijaz Ahmed: 'Disciplinary English: Third-Worldism and Literature'.
- Narasimhaih; C.D. (ed.): *Awakened Consciousness: Studies in Commonwealth Literature*, New Delhi: Sterling.
- Omkar N. Koul: *English in India: Theoretical and Applied Issues*. New Delhi: Creative Publishers.

**DSE Paper – IV: Dissertation/ Research Project (College can give this choice only for students with above 60% aggregate marks)**


## DISSERTATION/ RESEARCH PROJECT

### Introduction and Outcome

A project is an individual or collaborative activity that is carefully planned to achieve a particular aim.

An undergraduate project is individual research by students to i. understand in-depth a particular topic or fact in their field of study, and ii. Strengthen their understanding of research processes and methods.

Undergraduate research is inquiry-based learning that involves practical work, and not just listening to classroom teaching and personal reading. Students learn to apply what they study in their courses to appreciate different aspects of their field better by working independently on the projects. At the same time, they contribute something original to the courses they study.

  
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An undergraduate research project is expected to explore specific topics within the field of study of the students. The project should make an original contribution to the discipline in some manner. The results of quality undergraduate research can be presented in seminars and conferences, and published in research journals dedicated specifically to such work or in traditional academic journals with the student as a co-author.

There are many benefits of undergraduate research including, but not limited to, real world applications, research and professional experience, and better relationships between faculty and students. Relating coursework to out-of-class experiences, students train to work and think independently, take responsibility for their own learning, and take initiative to solve problems on their own rather than relying on experts for answers. They also learn to work in collaboration in interdisciplinary research. Most of all, projects help students learn a variety of skill sets to make them confident and competent in their future career.

### **The research process**

Typically, all research answer three questions: *what*, *why* and *how*.

The *what* states the research question to be investigated in a project.

The *why* explains the purpose of the research and also every step undertaken to conduct the research.

The *how* describes the stages of the research procedure.

To understand the process of research and to practically conduct any requires a good background in research methodology. Students may study research methodology before undertaking their projects.

## **Pattern of examination**


### **MID-SEMESTER ASSESSMENT**

Presentation of the project synopsis

Synopsis to include:

- i. Research statement/question and its rationale
- ii. Review of literature stating the validity of the project
- iii. Discussion of the research steps
- iv. Possible conclusion/s
- v. Contribution of the project to the existing body of research
- vi. References

**Semester final examination**



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### DSE - III: Urban Geography

**Unit - I:** Urban geography: Introduction, nature and scope; history of urbanization, Trends and Patterns of Urbanization in developed, developing countries, world and India.

**Unit - II:** Functional classification of cities: Quantitative and Qualitative Methods, Christaller Theory, Morphology of Urban Settlements & Urban Sphere of Influence and umland, concept of CBD, rural-urban fringe.

**Unit-III:** Theories of urban growth, Urban Issues: problems of housing, slums, civic amenities (water and transport), Air Pollution and Noise Pollution,

**Unit -IV:** Case studies of Delhi, Mumbai, Kolkata, Bhubaneswar and Chandigarh with reference to city planning and Urban Issues.

#### Practical

1. Functional classification of towns
2. Projection of urban population
3. Delimitation of C.B.D and umland
4. Gravity and population potential model.
5. Practical Record and Viva-Voce (10 marks)

#### Text books

1. Ramachandran R (1989): Urbanisation and Urban Systems of India, Oxford University Press, New Delhi

#### Reading List:

- Fyfe N. R. and Kenny J. T., 2005: *The Urban Geography Reader*, Routledge.
- Graham S. and Marvin S., 2001: *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition*, Routledge.
- Hall T., 2006: *Urban Geography*, Taylor and Francis.
- Kaplan D. H., Wheeler J. O. and Holloway S. R., 2008: *Urban Geography*, John Wiley.
- Knox P. L. & McCarthy L., 2005: *Urbanization: An Introduction to Urban Geography*, Prentice Hall NY.
- Sassen S., 2001: *The Global City: New York, London and Tokyo*, Princeton University Press.
- Ramachandran R (1989): Urbanisation and Urban Systems of India, Oxford University Press, New Delhi
- Ramachandran, R., 1992: *The Study of Urbanisation*, Oxford University Press, Delhi
- Singh, R.B. (Eds.) (2001) Urban Sustainability in the Context of Global Change, Science Pub., Inc., Enfield (NH), USA and Oxford & IBH Pub., New Delhi.
- Singh, R.B. (Ed.) (2015) Urban development, challenges, risks and resilience in Asian megacities. Advances in Geographical and Environmental Studies, Springer

### GEOGRAPHY – DSE – IV

#### FIELD WORK AND RESEARCH METHODOLOGY

#### Aim of the Course


To introduce research aptitude among young geographers.

#### Objectives of the Course

- \* To enable students to develop a general understanding of the methodology of research in geography.
- \* To strengthen the need of interdisciplinary research.
- \* To inculcate the role of Case Study analysis in the methodology of geography.
- \* To understand the value of Field Work and Primary Data in geographical research.

#### Unit – I : Fundamentals of Research Literacy



  
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- a) Meaning and objectives of research; types of research (Historical, Case Study, Descriptive and Experimental),
- b) Significance of Research, Ethics in Research and Plagiarism,
- c) Role and Utility of Fieldwork in Geography,
- d) Sources & Types of Data Collection (Reconnaissance, Primary & Secondary)

**Unit – II : Approaches to Research**

- a) Approach and Methods of Geographic Research,
- b) Ex-post facto, Laboratory Experiments,
- c) Field Study and Experiments, Field Survey Research,
- d) Evaluation Research and Action Research.

**Unit – III : Methods and Field Techniques**

- a) Field Techniques in Geography, Selection of Appropriate Technique, Observation (Participant / Non Participant),
- b) Preparation of Questionnaires and Schedules (Open/ Closed / Structured / Non-Structured);
- c) Participatory Rapid Appraisal and Focus Group Discussion
- d) Content Analysis

**Unit – IV : Preparation of a Research Report**

- a) Designing the Research Report (Documentation Structure, Layout, Fonts, Setting of Maps, Diagrams, Tables, Appendices, Bibliography and Reference)
- b) Review of Literature and Different Methods of In-text and End of Paper Citation,
- c) Style of Citation in Science and Social Science Research (Books, Journals, Reports, Thesis, News Items, Web Sources)

**Practical for DSE – IV**

**Field Work and Research Methodology**

- a) Preparation of an Observation Schedule (Participant / Non Participant) and Questionnaire (Open/ Closed / Structured / Non-Structured);
  - b) Preparation of a Guide Line for Focus Group Discussion and PRA
- c) Field Testing of Questionnaire and FGD-PRA guidelines on a village level socio-economic study.
  - d) Preparation of a Research Report
  - e) Viva Voce

**Note:**

- i) Each student will prepare an individual report based on primary and secondary data collected during field work.
  - ii) Duration of the field work should not exceed one week
- iii) The word count of the report should be around 5000 excluding figures, tables, photographs, maps, references and appendices.
- iv) One copy of the report on A 4 size paper should be submitted in soft binding.

**Main Books**

1. Majid Hussain (1994), Methodology of Geography, Anmol Publication, New Delhi.
2. K.L.Narasimha Murthy (1999), Geographical Research, Concept Publishing Company, New Delhi

**Reference Books**



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3. Research Methodology - Methods and Techniques, Revised Edited by C.R. Kothari (2004), New Age International Publishers, New Delhi.
4. Quantitative Social Research Methods by Kultar Singh (2007), Sage Publication.
5. Social Survey Methods by Paul Nicholas (2009), Oxfarm Publishers Delhi.

OR

### Geography DISSERTATION/ PROJECT WORK

A project report may be given in view of discipline specific papers. It is considered as a special course involving application of knowledge solving and exploring a real life situation and difficult problem.

#### GENERIC ELECTIVE

#### GE - I: Geography of India

- Unit I:** Physiographic Divisions of India, soil and vegetation, climate (characteristics and classification)  
**Unit II:** Population: Distribution and growth, Demographic structure, Distribution of population by race, religion, language and tribes, urbanisation  
**Unit III:** Mineral and power resources: distribution and utilisation of iron ore, coal, Petroleum, Natural gas, Nuclear Minerals: Irrigation, Cropping pattern, Production & distribution of rice, wheat, Tea, Coffee  
**Unit IV:** Industrial development: Iron and steel, Aluminium, Automobile and Information technology  
 Transport in India: Road, Rail and Airways, Waterways

#### Practical

1. Study and interpretation of topographic Maps
2. Cartograms – Pair-Bar diagram, complex bar, wheel diagram
3. Maps drawing – Simple dot maps, Multiple dot maps
4. Practical record and viva-voce

#### Text Book

1. Sharma, T.C. (2013) Economic Geography of India. Rawat Publication, Jaipur
2. Khullar, D. R. India: A Comprehensive Geography

#### Reading List:

1. Deshpand C. D., 1992: India: A Regional Interpretation, ICSSR, New Delhi
2. Johnson, B. L.C., ed. 2001. Geographical Dictionary of India, Vision Books, New Delhi
4. Sdyasuk Galina and P. Sengupta (1967): Economic Regionalisation of India, Census of India

#### GE II: Geography of Odisha

- Unit I:** Physiography of Odisha: Coastal Plains, Middle Mountainous Region, Western Plateau, River System, Climate, Soil, Natural Vegetation  
**Unit II:** Types of Irrigation, Agriculture: Production and Distribution of Rice, Pulses, Oil seeds, Agricultural Problems and Prospects  
**Unit III:** Minerals and power recourses: (a) Distribution of Iron Ore, Bauxite, Coal & Chromite  
 Iron and steel industry, Aluminum Industry, Cotton Textile  
**Unit IV:** (a) Population: Distribution and Growth, Urbanisation, (b) Transport: Roadways & Railways

#### Practical

1. Drawing of isopleths maps using rainfall / temperature data
2. Drawing Population Density map of Odisha by Choropleth method



**DSE - V**

**परियोजना कार्य**

परियोजना कार्य / लघु शोध प्रबंध - संभावित पृष्ठ संख्या ४० से ५० पृष्ठों के बीच हो / निम्नलिखित विषयों पर आलोचनामूलक / शोधात्मक कार्य किया जा सकता है।

- क) अनुवाद
- ख) पुस्तक समीक्षा
- ग) किसी जटिल अथवा गहन विषय को हल करने की दिशा में,  
अथवा
- घ) किसी साहित्यिक मान्यता की स्थापना / पुनः स्थापना हेतु किया गया मौलिक कार्य।



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5. N.K. Sahu, Buddhism in Orissa.

**Discipline Specific Elective Paper-IV (Optional/Project)**

**History of Contemporary Odisha (1947-1980)**

**Unit I: Political Developments**

1. Second Congress Ministry (1946-1950):
  - a) Integration of Princely States with Odisha
  - b) New Capital
  - c) Hirakud Dam Project
2. Years of Uncertainties (1950-1980)
  - a) Third Congress Ministry and Abolition of Zamindari System
  - b) Biju Patnaik's First Ministry Achievements

**Unit II: United Political Initiatives**

1. Coalition Politics-Achievements and Challenges
  - a) R.N. Singdeo,
  - b) Sadasiba Tripathy
2. Panchayati Raj Institutions-Its Working and Impacts.
  - a) Rural Stages
  - b) Urban Stages

**Unit III: Economic Development**

- a) Growth of Industries- Roulkela Steel Plant and Odisha Sponge Iron Ltd.
- b) Irrigation and Agricultural Infrastructure
- c) Development in Transport and State communication- National and State High Ways in Odisha

**Unit IV: Social Developments and Problems**

- a) Government Community Development Programmes- Its Impact
- b) Peasant Movements: Causes and Effects
- c) Growth of Art and Craft: Raghunathpur, Pipli and Bargarh

**Suggested Text Books:**

1. Hemant K. Mohapatra, Odisara Etihasha (Odia), Friends Publishers, Cuttack, 2019.
2. Sukadeva Nanda, Coalition Politics in Odisha, Sterling Publishers, Delhi.

**Reference Reading:**

1. Sunit Ghosh, Orissa in Turmoil: A Study in Political Developments, Bookland International, Bhubaneswar, 1991.
2. Basant Das, Odisha Rajanitira Gopan Katha (Odia), Anusandhan Publication, Bhubaneswar, 2001.
3. B.B. Jena & J.K. Baral (eds), Government and Politics in Orissa, Print House (India), Lucknow, 1988.
4. Chittaranjan Das, Nabakrushna Chaudhury, NBT, New Delhi.
5. Dasarathi Bhuyan, Orissa Politics: From 1936 to Contemporary Politics, Mangalam Publishers, New Delhi, 2010.



**OR**

**Project Report**

The Students may be allotted topics of their interest in the beginning of 5<sup>th</sup> Semester Classes. They may write the Project Reports on local History and Culture, local personalities with their significant contribution to change the Society and economy with historical perspective containing up to 50 double spaced typed pages. The students may consult the sources like local archaeology, manuscripts, community documents, oral traditions, oral narratives, local biographies and family sources for writing the project dissertation. The Teachers will guide the students to complete their Project assignments. The students may be allowed to fill up their forms after their submission of the projects assigned to them. The student has to secure fifty percent of marks from the evaluation of the project and fifty percent of the marks in the viva voce test which are compulsory.

**Generic Elective Paper I  
History of India - I (Early Times to 1750)**

**Unit – I : Reconstructing Ancient Indian History**

- 1.Sources of Historical Writings.
- 2.Vedic Age : Society, Polity and Culture
- 3.Buddhism and Jainism : Principles and Impact

**Unit – II : Polity and Administration**

- 1.The Mauryan Empire : Conquest and Administration
- 2.Gupta Society : Land Grants, Peasantry and beginning of Feudal Society
- 3.Gupta Polity : Conquests and Administration
- 4.Harshavardhan : Achievements

**Unit – III: Early Medieval Society, Economy and Culture**

- 1.Post Gupta Trade and Commerce
- 2.Delhi Sultanate : Conquests and Administration
- 3.Bhakti and Sufi Movements in India
- 4.Development of Regional Language and Literature

**Unit – IV: India on the Eve of the Advent of the Mughals**

- 1.Sher Shah : Administration and Reforms
- 2.Mughal Administrative Institutions : Zabti, Mansab and Jagir
- 3.Religious Tolerance Sulh-i- Kul
- 4.Mughal Art and Architecture

**Suggested Text Books:**

- 1.Upinder Singh, History of Ancient & Early Medieval India.
2. Romila Thappar, The Early India

**Reference Reading:**






**FIELD WORK DISSERTATION AND VIVA VOCE**  
**DSE-IV**

**Full marks-100**

The students are required to undertake at least one field visits to Industries/labour welfare centres under the supervision of a field work instructor. Students are required to submit a detailed report on the basis of their visits.

Joint evaluation of the field work report and Viva-Voce shall be conducted after the theory.

Examination is over by internal and external examiners at the examination centre.



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OR

Course Code: DSE-04

**PROJECT**

- Project Paper : 30 Pages (50 Marks)
- Presentation: (30 Marks)
- Viva Voce : (20 Marks)

*Dash* *[Signature]*

*Itanaka Piyush*

*19.7.23*

*J. Pandey*

*[Signature]*

*[Signature]*

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## DSC PASS- IV

### RESEARCH METHODOLOGY

#### UNIT-I FUNDAMENTAL CONCEPT OF RESEARCH

- (i) Research: Definition & Scope
- (ii) Research: Types of Research & its merits
- (iii) Research: Need & Usefulness
- (iv) Research: Types of Data & its use
- (v) Research: Problem identification & formulation

#### UNIT- II RESEARCH METHODS & DATA COLLECTION

- (i) Research Methods: Types
- (ii) Scientific method & its utility in research
- (iii) Data Collection: Methods
- (iv) Sampling method
- (v) Data Analysis

#### UNIT –III RESEARCH DESIGN & HYPOTHESIS

- (i) Research Design: Concepts & Importance
- (ii) Features of a good research design, Types of research design
- (iii) Research Design: Need of Research
- (iv) Hypothesis: Scope & Need
- (v) Qualities of a good Hypothesis

#### UNIT –IV RESEARCH PRESENTATIONS

- (i) Research: Report Writing, Scope
- (ii) Research: Layout of a Research report
- (iii) Research: Qualities of Good Research Report Writing
- (iv) Technical Writing
- (v) Synopsis

#### Text Books

1. Best, John W and Kahn James, V. (1999). Research in Education. 2nd ed. New Delhi: Prentice Hall of India.
2. Busha, Charles H and Harter, Stephen H (1988). Research Methods in Librarianship: Techniques and Interpretations. New York: Academic Press.
3. Ghosh B N (1984). Scientific Method and Social Research. 2nd ed. Delhi: Sterling.
4. Krishan Kumar (1999). Research Methods in Library and Information Science. Edn.2 New Delhi: Har- Anand Publications.
5. Young, P V (1984). Scientific Social Surveys and Research. New Delhi: Prentice Hall of India

#### Reference Books

1. De Vaus, David (2001). Research Design in Social Research. New Delhi: Sage Publications.
2. Encyclopedia of Library and Information Science (1978). Ed. by Allen Kent [et al.] Research Methodology. V. 25. New York: Marcell Dekker.

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3. Goode, William J and Hart, Paul K (1981). Methods of Social Research. London: McGraw Hill.
4. Kerlington, Fred. Ed.(1964). Foundations of Behavioural Research, Educational and Psychological Inquiry. New York: Rinehart and Winston.
5. Hawkins, Clifford and Sorgi, Marco. How to Plan, Speak and Write about it?
6. Thakur, Devendra (1988). Research Methodology in Social Sciences. New Delhi: Deep and Deep Publications.
7. Trochim, William M (2003). 2nd ed. Research Methods. New Delhi: Biztantra.

## **DSE- PASS-I**

### **INTERNET NETWORKING**

#### **UNIT-I NETWORKING**

- (i) Networking: Components
- (ii) Types of Network
- (iii) Networking Technology
- (iv) Data Networks
- (v) Network Software

#### **UNIT-II LIBRARY & INFORMATION NETWORK**

- (I) Resource Sharing
- (ii) Resource Sharing Technology
- (iii) Overview of Library & Information Networks
- (iv) Management of Library & Information Networks
- (v) Network Based Information Services

#### **UNIT-III INTERNET TECHNOLOGY**

- (i) Components of Internet
- (ii) Basic Requirement of Internet
- (iii) Internet Technology
- (iv) Internet Services
- (v) Intranet, Extranet, Internet

#### **UNIT-IV INTERNET RESOURCES**


- (i) Types of Resources
- (ii) Meta Resources
- (iii) Internet Information Resources
- (iv) Evaluation of Internet Information Resources
- (v) Usefulness of Internet for Assessment of Resources

#### **Text Books**

1. Mahapatra, M. & Ramesh, D.B., Ed.(2004), Information technology application in libraries: A text book for Beginners, Bhubaneswar , Reprint.
2. Rajaramanna, V (1990), Fundamentals of computer, New Delhi, willey Eastern

#### **Reference Books**



  
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ତିନୋଟି ସମାଲୋଚନା – ବାଉରାବନ୍ଧୁ କର, ଫ୍ରେଣ୍ଡ୍‌ସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୪ର୍ଥ ଏକକ : ଉପନ୍ୟାସ - ମାଟିର ମଣିଷ - କାଳିନ୍ଦୀ ଚରଣ ପାଣିଗ୍ରାହୀ

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ :

୧. ଓଡ଼ିଆ ଉପନ୍ୟାସ ସାହିତ୍ୟର ପରିଚୟ, ସଂ ପଠାଣୀ ପଟ୍ଟନାୟକ ଓ ଭୋଳାନାଥ ରାଉତ, ଓଡ଼ିଶା ବୁକ୍ ଷ୍ଟୋର, କଟକ
୨. କାଳିନ୍ଦୀ ଚରଣଙ୍କ କଥାସାହିତ୍ୟ – ବିଷୁପ୍ରିୟା ଓତା, ଫ୍ରେଣ୍ଡ୍‌ସ୍ ପବ୍ଲିଶର୍ସ, କଟକ
୩. ଓଡ଼ିଆ ପ୍ରବନ୍ଧ ସାହିତ୍ୟ - ବାଉରାବନ୍ଧୁ କର
୪. ଓଡ଼ିଆ ସମାଲୋଚନା ସାହିତ୍ୟ - ଓଡ଼ିଶା ସାହିତ୍ୟ ଏକାଡେମୀ
୫. ମାଟିର ମଣିଷ - କାଳିନ୍ଦୀ ଚରଣ ପାଣିଗ୍ରାହୀ

ପାଠ୍ୟ-୪/ **Course – 4 : ପ୍ରବନ୍ଧ ପ୍ରସ୍ତୁତି ଓ ଉପସ୍ଥାପନା (Pass)**

ସମ୍ବର୍ଦ୍ଧ ଲିଖନ - ୮୦ + ମୌଖିକ - ୨୦ = ୧୦୦

ଅନୁବାଦ ବା ସଂପାଦନା ବା ଓଡ଼ିଆ ସଂସ୍କୃତି ଉପରେ ଅନୁଧ୍ୟାନ ୫୦ ପୃଷ୍ଠା ମଧ୍ୟରେ ନିବନ୍ଧ ପ୍ରସ୍ତୁତି କିମ୍ବା

(ସମାଲୋଚନା, ଅନୁବାଦ, ସମ୍ପାଦନା, ଗବେଷଣା)

୧. ପ୍ରଥମ ଏକକ : ସମାଲୋଚନାର ସଂଜ୍ଞା, ସ୍ୱରୂପ ଓ ପ୍ରକାରଭେଦ
୨. ଦ୍ୱିତୀୟ ଏକକ : ଅନୁବାଦର ସଂଜ୍ଞା, ସ୍ୱରୂପ ଓ ପ୍ରକାରଭେଦ
୩. ତୃତୀୟ ଏକକ : ସମ୍ପାଦନା ବିଧି
୪. ଚତୁର୍ଥ ଏକକ : ଗବେଷଣା ପ୍ରବିଧି

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ

୧. ଗବେଷଣା ଅନୁବାଦ ସମ୍ପାଦନା କଳା – ସଂ ନାରାୟଣ ସାହୁ, ସତ୍ୟନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର, କଟକ
୨. ଗବେଷଣା ପ୍ରବିଧି - ଡ. ସୁବୋଧ ଚାଟ୍ଟାର୍ଜୀ, ବିଦ୍ୟାପୁରୀ, କଟକ
୩. ଗବେଷଣା ପ୍ରକରଣ: ସଂପାଦନା ଓ ଅନୁବାଦ ପ୍ରବିଧି - କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ ଓ ନିର୍ମଳା କୁମାରୀ ରାଉତ

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2. Mahatma Gandhi- R.R. Diwakar

#### **DSE-IV: RECENT WESTERN PHILOSOPHY**

**Unit-1: Arther, Schopenhauer:** The world as representation. The world as will, theory of perception, Ethics

**Unit-2: Nietzsche:** Critique of enlightenment Perspectivism, Appollonian and Dyonysian will to power, concept of superman

**Unit-3: Sartre, J.P.:** Concept of Freedom, Bad-faith, Humanism

**Unit-4: William James:** Meaning & Truth, Varieties of Religious experience

#### **Recommended Text**

1. B.A.G Fuller & McMurrin , A History of Philosophy
2. D.M.Dutta Chief Currents of Contemporary Philosophy
3. Frank Thilly, History of Western Philosophy

#### **Reference Book**


1. M.K. Bhadra, A critical Survey of Phenomenology & Existentialism
2. H.J. Blackham, Six Existential Thinkers
3. W.Mc. Neil& K.S. Feldman, Continental Philosophy: An Anthology

#### **Project (Optional)**

**Eligibility:** Students who have scored more than 60% marks in Semester –I, II, III &IV are eligible to opt for project paper. The student has to prepare a project of his own selecting a topic from philosophical perspective (For example-some broad themes are given below). The dissertation carries 60 marks which will be evaluated by an external examiner and he / she will face a viva-voice test of 40 marks by an external examiner along with his / her supervisor of the concerned project.

1. Philosophy, value and culture
2. Existentialism and Phenomenology
3. Philosophy of religion
4. Philosophy of Language
5. Socio-Political Philosophy
6. Indian Philosophy/Contemporary Indian Philosophy
7. Ethics/Applied ethics
8. Philosophy of Mind



  
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- P. Swaminathan, (2012) 'Introduction', in *Women and Work*, Hyderabad: Orient Blackswan.
- R. Kapur, (2012) 'Hecklers to Power? The Waning of Liberal Rights and Challenges to Feminism in India', in A. Loomba *South Asian Feminisms*, Durham and London: Duke University Press.
- U. Chakravarti, (2003) *Gendering Caste through a Feminist Lens*, Kolkata, Stree publications.
- V. Bryson, (1992) *Feminist Political Theory*, London: Palgrave-MacMillan.

## DSE Paper – IV

### DISSERTATION / RESEARCH PROJECT

(College can give this choice only for students with above 60% aggregate marks)

#### Project Paper- Development Process and Social Movements in Contemporary India (DSE-II)

##### **Introduction:**

The research experience of students is greatly enriched by early exposure to conducting research. There are numerous benefits of undergraduate students who get involved in research. They are better off in understanding published works, determine an area of interest, can discover their passion for research and may start their career as a researcher. Further students will be able to develop ability for scientific inquiry and critical thinking, ability in the knowledge base and communication. This course is included to promote above mentioned abilities among the students.

##### **Learning Objectives:**

- To help students to learn how to develop scientific research designs in the study of public administration.
- To guide students to understand the previous research in their field of interest and review them to arrive at a research problem
- To encourage the students to learn ways to describe and evaluate public policy implementation.
- To help students understand the logic of hypothesis testing in both quantitative and qualitative research.
- To make students to learn the methods of writing a research report.

##### **Expected outcomes: Students will be able to**

- Independently prepare a research design to carry out a research project
- Review the related research papers to find out a research problem and relevant hypotheses
- Understand the dynamics of citizen – administrative interface and administrative behaviours.
- Learn the use of statistical techniques for interpretation of data.
- Learn the APA style of reporting a research project.

**Unit I** A student is required to carry out a project on an issue of interest to him / her under the guidance and supervision of a teacher. In order to do so s/he must have the knowledge in research methodology and of steps in planning and conducting a research. The supervisors

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may help the students to go on field study / study tour relevant to their work. Thirty hours of class may be arranged in the routine to help students understand research methodology, and planning, conduction and reporting on the research. An external examiner with the supervisor as the internal examiner will evaluate the research project on the basis of scientific methodology in writing the report, and presentation skill and performance in the viva.

• **Format**

- **Abstract** – 150 words including problem, method and results.
- **Introduction** – Theoretical considerations leading to the logic and rationale for the present research
- **Review-** Explaining current knowledge including substantive findings and theoretical and methodological contributions to the topic, objectives and hypotheses of the present research
- **Method** – Design, Sample, Methods of data collection, Procedure
- **Results-** Quantitative analysis of group data-- (Raw data should not be attached in Appendix) Graphical representation of data wherever required. Qualitative analysis wherever done should indicate the method of qualitative analysis.
- **Discussion**
- **References (APA Style) & Appendices**
- Project should be in Soft binding. It should be typed in Times New Roman 14 letter size with 1.5 spacing on one sides of the paper. Total text should not exceed 50 pages (References & Appendices extra).
- Two copies of the project should be submitted to the College.
- **Project - American Psychological Association (APA) – Publication Manual 2006 to be followed for project writing**

**Mark distribution for dissertation / Research project**

Identification of problem	Review of Literature	Methodology	Analysis	Findings	Viva-voce	Total
10	10	10	25	20	25	100

**Broad areas identified for Project:** Social Movements: Environment, Women, Dalit, Peasant, Social Development, Political Development in Odisha, Political Socialization, Political Participation, Political Modernization and Communication, Decentralized democracy: Rural and Urban Local Self Governance, Functionary of Gram Sabha, Empowerment of Women and other marginals in PRIs, Development, Displacement, Rehabilitation, Resettlement in Odisha, Role of NGOs in Development, Regional Development and Regional Imbalances, Implementation of ORTPS- 2012, RTE-2009, Food Security Act, 2013, FRA, 2007.

**Generic Elective Paper I**

**FEMINISM: THEORY AND PRACTICE**

**Introduction:** The aim of the course is to introduce students to contemporary debates on feminism



  
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- Ghai, A. (2015). Rethinking Disability in India. India: Routledge. Ghai, A. (2010). Psychology of Disabled in G.Misra (Ed.) Psychology in India: Advances in research. New Delhi: Pearson education. Ghai, A. (2006 [2003]) (Dis)Embodied Form: Issues of Disabled Women. New Delhi: Shakti Books.
- Goodley. D & Lawthom. R. (2006). Disability and Psychology: Critical Introductions and Reflections. Palgrave Macmillan.

### **Discipline Specific Elective Paper-IV DISSERTATION / RESEARCH PROJECT**

**Introduction:** The research experience of students is greatly enriched by early exposure to conducting research. There are numerous benefits of undergraduate students who get involved in research. They are better off in understanding published works, determine an area of interest, can discover their passion for research and may start their career as a researcher. Further, students will be able develop ability for scientific inquiry and critical thinking, ability in the knowledge base and communication of psychology. This course is included to promote above mentioned abilities among the students.

#### **Learning Objectives:**

- To help students to learn how to develop scientific research designs in the study of psychology.
- To guide students to understand the previous research in their field of interest and review them to arrive at a research problem
- To encourage the students to learn ways to describe and measure human behavior.
- To help students understand the logic of hypothesis testing and application of appropriate statistical analysis.
- To make students to learn the methods of writing a research report.

#### **Expected outcomes: Students will be able to**

- Independently prepare a research design to carry out a research project
- Review the related research papers to find out a research problem and relevant hypotheses
- Understand the administration, scoring and interpretation of the appropriate instrument for measurement of desired behavior
- Learn the use of statistical techniques for interpretation of data.
- Learn the APA style of reporting a research project.

#### **Unit I**

A student is required to carry out a project on an issue of interest to him / her under the guidance and supervision of a teacher. In order to do so s/he must have the knowledge in research methodology and of steps in planning and conducting a research. The supervisors may help the students to go on field study / study tour relevant to their work. Thirty hours of class may be arranged in the routine to help students understand research methodology, and planning, conduction and reporting on the research. An external examiner with the supervisor as the

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internal examiner will evaluate the research project on the basis of scientific methodology in writing the report, and presentation skill and performance in the viva.

• **Format**

- **Abstract** – 150 words including problem, method and results.
- **Introduction** – Theoretical considerations leading to the logic and rationale for the present research
- **Review**- Explaining current knowledge including substantive findings and theoretical and methodological contributions to the topic, objectives and hypotheses of the present research
- **Method** – Design, Sample, Measures, Procedure
- **Results**- Quantitative analysis of group data (Raw data should not be attached in Appendix) Graphical representation of data wherever required. Qualitative analysis wherever done should indicate the method of qualitative analysis.
- **Discussion**
- **References (APA Style) & Appendices**
- Project should be in Soft binding. It should be typed in Times New Roman 14 letter size with 1.5 spacing on one sides of the paper. Total text should not exceed 50 pages (References & Appendices extra).
- Two copies of the project should be submitted to the College.
- **Project - American Psychological Association (APA) – Publication Manual 2006 to be followed for project writing**

Mark distribution for dissertation / Research project						
Identification of problem	Review of Literature	Methodology	Analysis	Findings	Viva-voce	Total
10	10	10	25	20	25	100

Or

**DSE Paper-IV /Alternative to dissertation  
PSYCHOLOGY OF CRIME**


**Introduction:** This course provides an introduction to psychology of crime and criminal behavior. The topics covered in this paper include meaning, nature and theories of criminal behavior; crime prevention and control; and about the trauma of some victims of crime.

**Learning Objectives:**

- To provide students with an overall knowledge of psychology of crime.
- To help students understand the psychosocial perspectives of crime.
- To make students aware about the processes of crime prevention and control.
- To help students understand the trauma of victims of some types of crime.
- 

**Expected outcomes: Students will be able to**



  
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- Define criminal behavior and explain the psychosocial factors of crime and criminal behavior.
- Discuss the social and psychological theories of crime and criminal behavior.
- Describe how crimes are prevented and controlled by police and other agencies.
- Describe the behavior and mental health of the victims of crimes.

#### **UNIT-I: Introduction to crime**

- (i) Definition, meaning, and nature of criminal behavior; Factors of criminal behavior: Antisocial values; Peer influence; Antisocial personality; Dysfunctional family; Substance abuse  
 (ii) Major types of crimes: Homicide; Robbery, Sexual offences; Cybercrimes.

#### **UNIT- II: Theories of Criminal Behavior**

- (i) Social disorganization theory; Rational choice theory; Strain theory  
 (ii) Social learning theory; Social control theory, Labeling theory; Genetic theory

#### **UNIT –III: Crime prevention and Control**

- (i) Crime prevention models: Primary prevention, Secondary prevention; Tertiary prevention  
 (ii) Crime control: Crime control model and Due process model

#### **UNIT –IV: Special Victims**

- (i) Rape and sexual assault; Domestic violence; Bullying and school violence  
 (ii) Workplace violence, Victims of terrorism

#### **Practical:**

- (i) **Guilt quotient:** Test your subject's Guilt Quotient Using Chattopadhyay's "What is your guilt quotient?" scale.  
 (ii) **Domestic Violence:** Using the "Domestic Violence Scale (Michale, 2008)" assess your subject's attitude towards domestic violence.

#### **Text Books:**

- Counseling Crime Victims: Practical Strategies for Mental Health Professionals; Laurence Miller, Springer Publishing Company, USA.
- Criminal Psychology; Nabin Kumar; LexisNexis, USA

#### **Reference Books:**


- Inside the Criminal Mind, S. E. Samenow; BDWY/ Newyork

### **Generic Elective Paper-I INTRODUCTORY PSYCHOLOGY**

**Introduction:** The course is designed to provide the students a basic understanding of the psychology of human behavior. The students will be given exposure to concepts, terminology, principles, and theories that comprise an introductory course in psychology.

#### **Learning Objectives:**



  
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### Unit 3: Issues of Tribal Development

- (i) Displacement, Rehabilitation and resettlement; Empowerment of Tribal women
- (ii) Migration: Issues and challenges, Trafficking of tribal Girl child, Climate change and its impact on tribal livelihood, Political process and tribals

### Unit 4.: Major Public Policies for Tribal Development

- (i) Panchayat Extension to Scheduled Areas Act, 1996: Issues and challenges, Tribal Women's participation in Grass root democracy
- (ii) Forest Rights Act, 2006, Joint Forest Management : Problems and prospects; Food Security Act and Tribals

#### Text Books:

- S.N.Tripathi, (2007), *Tribal Development: Issues and Policy Options*, Anmol Publishers.
- Govinda Chandra Rath, (ed.) (2008), *Tribal Development in India: The Contemporary Debate*, Sage publications

#### Reference Books:

- Dr. Taradatt, (2002), *Tribal Development in India*, Gyan Publishing house
- Nupur Tiwari, (2016), *Tribal Self-Governance: PESA and Its Implementation*, Rawat Publications
- Dr. Akula Kishan & Prof. Dr. V.R.C. Krishnaiah (2017), *Forest Rights Act, 2006*, Asia Law House
- L.K.Mahapatra, (1994), *Tribal Development in India: Myth and Reality*, Vikas Publishing House.

### DSE Paper – IV: Dissertation/ Research Project (College can give this choice only for students with above 60% aggregate marks)

#### DISSERTATION / RESEARCH PROJECT

**Introduction:** The research experience of students is greatly enriched by early exposure to conducting research. There are numerous benefits of undergraduate students who get involved in research. They are better off in understanding published works, determine an area of interest, can discover their passion for research and may start their career as a researcher. Further students will be able to develop ability for scientific inquiry and critical thinking, ability in the knowledge base and communication. This course is included to promote above mentioned abilities among the students.

#### Learning Objectives:

- To help students to learn how to develop scientific research designs in the study of public administration.
- To guide students to understand the previous research in their field of interest and review them to arrive at a research problem
- To encourage the students to learn ways to describe and evaluate public policy implementation.
- To help students understand the logic of hypothesis testing in both quantitative and qualitative research.
- To make students to learn the methods of writing a research report.





**Expected outcomes: Students will be able to**

- Independently prepare a research design to carry out a research project
- Review the related research papers to find out a research problem and relevant hypotheses
- Understand the dynamics of citizen – administrative interface and administrative behaviours.
- Learn the use of statistical techniques for interpretation of data.
- Learn the APA style of reporting a research project.

A student is required to carry out a project on an issue of interest to him / her under the guidance and supervision of a teacher. In order to do so s/he must have the knowledge in research methodology and of steps in planning and conducting a research. The supervisors may help the students to go on field study / study tour relevant to their work. Thirty hours of class may be arranged in the routine to help students understand research methodology, and planning, conduction and reporting on the research. An external examiner with the supervisor as the internal examiner will evaluate the research project on the basis of scientific methodology in writing the report, and presentation skill and performance in the viva.

**Format**

- **Abstract** – 150 words including problem, method and results.
  - **Introduction** – Theoretical considerations leading to the logic and rationale for the present research
  - **Review**- Explaining current knowledge including substantive findings and theoretical and methodological contributions to the topic, objectives and hypotheses of the present research
  - **Method** – Design, Sample, Methods of data collection,, Procedure
  - **Results**- Quantitative analysis of group data (Raw data should not be attached in Appendix) Graphical representation of data wherever required. Qualitative analysis wherever done should indicate the method of qualitative analysis.
  - **Discussion**
  - **References (APA Style) & Appendices**
- Project should be in Soft binding. It should be typed in Times New Roman 14 letter size with 1.5 spacing on one sides of the paper. Total text should not exceed 50 pages (References & Appendices extra).
  - Two copies of the project should be submitted to the College.
  - **Project - American Psychological Association (APA) – Publication Manual 2006 to be followed for project writing**

**Mark distribution for dissertation / Research project**

Identification of problem	Review of Literature	Methodology	Analysis	Findings	Viva-voce	Total
10	10	10	25	20	25	100

**Broad areas identified for Project:** Rural and urban governance in Odisha, E-governance initiatives in Odisha, Social welfare administration in Odisha, Disaster Management in Odisha, Implementation of ORTPS, 2012, RTE, 2009, Food Security Act, 2013, FRA, 2007 and rehabilitation of displaced in Odisha

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**Core Readings:**

1. Samskrta Vyakaranadarpana, Odisha Text Book Bureau, Bhubaneswar
2. Samskrta Nibandha Satakam, Kapildev Dwivedi, Chawkhamba Publication, Banaras

**Suggested Readings:**

1. Brht Anuvada Shiksa, Chakradhara Hansa Nautiyal, MLBD, New Delhi
2. Samskrta- nibandhadarsah, Rammurti Sharma, Sahitya Niketan, Kanpur

**Discipline Specific Elective Paper-IV  
INDIAN PHILOSOPHY: GENERAL IDEAS**

**1. Ástika****2. Nástika****1. Astika****Unit – I: Samkhya and Yoga**

Twenty – five elements of Sámkhya, satkáryaváda and Astángayoga of Yogadarśana.

**Unit – II: Nyayavaiśesika**

Asatkáryaváda, Saptapadárthas, Arambhaváda, Paramánuváda.

**Unit – III: Vedanta Mimamsa**

Śaktidvaya of Mâyá in vedanta, Vivartaváda, Netiváda and karma in Mímamsa, Svatapramányaváda.

**Unit IV: Nástikas, Cárvák Jaina & Bouddha**

Yadrecháváda and Nairátmyaváda of Cárvák, Sapta-bhanga-naya, Syádváda of Jaina, Áryasatyas, Ksanikaváda & Moksa.

**Core Readings:**

1. Bharatiya Darsana (Odia), Gouranga Charana Nayak, The Odisha State Bureau of Text Book Preparation and Production, Bhubaneswar.

**Suggested Readings:**

1. History of Indian Philosophy, S.N. Dasgupta, MLBD, New Delhi.
2. Indian Philosophy, S. Radhakrishnan, George Allen and Unwin Ltd., New York.
3. A Critical Survey of Indian Philosophy, C. D. Sharma, MLBD, New Delhi.
4. Outlines of Indian Philosophy, M. Hiriyana, MLBD, New Delhi.


OR

**Discipline Specific Elective-IV  
PREPARATION AND PRESENTATION OF PROJECT**

**Project and Presentation**

(The Project work should be done preferably on Creative writings and Translation works of Sanskrit Language.)



  
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## DISCIPLINE SPECIFIC ELECTIVES, PAPER-4

### FIELD WORK AND DISSERTATION

(College can give this choice only for students with above 60% aggregate marks)

**Objectives:** This paper is designed

- To provide a basic exposure to the student to the fields and to acquaint him/her with the research process.
- To equip them with the capacity to browse secondary literature from right sources and with a process of reviewing relevant literature.
- To promote in them an ability to capture the right type of data and put them into documentation format.

**(Dissertation: 80 marks and Viva-voce: 20 marks)**

- Dissertation may be written on any social institution, problem or may be an evaluative study.
- It should be based on empirical study.
- Size of the dissertation should be around 5000 words.
- Dissertation paper will be examined jointly by one Internal and one External Examiner to be appointed by the University. Marks will be awarded jointly by the Internal and External Examiners on the basis of the written Dissertation and Viva-voce.

OR

### TRIBES OF INDIA

**Objectives:** The present paper aims

- To provide a fair stock of knowledge to the students on the tribes and tribal life.
- To enable the students to understand the problems faced by the tribes
- To give impression and knowledge on the tribal development plans, policies and programmes.

**Learning outcomes:** After going through this paper it is expected that the students will gain fair idea about the Indian tribes, their demography and distribution. They will be sensitized about tribal situations and the challenges faced by them today. Finally, they can get an account of the safeguards created for them through the Constitution, legislations and programmes and the changes noted in the tribal society of the country today.

**Unit-1: Tribes: Their Distribution and Demography**

1.1 Tribe: definitions, characteristics and demography

1.2 Geographical distribution of the tribes

1.3 N.K.Guha's Classification on Tribes

1.4 Caste and Tribe

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**Unit-2: Social Organisation of the Tribes**

- 2.1 Tribal economic system
- 2.2 Tribal political system
- 2.3 Tribal religion
- 2.4 Women in Tribal Society

**Unit-3: Challenges Faced by the Tribes**

- 3.1 Land alienation, Migration
- 3.2 Alcoholism and Indebtedness
- 3.3 Tribal Displacement
- 3.4 Tribal health and Sanitation

**Unit-4: Changes and Upliftment of the Tribes**

- 4.1 Constitutional safeguards for the tribes
- 4.2 Legal provisions for tribes
- 4.3 Flagship programmes of the Government for the tribes
- 4.4 Recent Changes in Tribal Life


**Suggested Text Books:**

1. Hasnain, Nadeem, Indian Anthropology, New Royal Book Co 2011
2. Majumdar, D.N. and T.N.Madan, An Introduction To Social Anthropology, Asia Pub. House, 2010

**Reference Readings:**

1. Hasnain Nadeem Tribal India, New Royal Book Company, 2017 edition
2. Joshi Vidyut and Chandrakant Upadhyaya (eds), Tribal Situation in India: Issues and Development ,Rawat Publications,2017
3. Rath Govind Chandra,edt. Tribal Development in India:The Contemporary Debate, Sage Publications,2006
4. Paul Mitra, Kakali Development Programmes And Tribals Some Emerging Issues, Kalpaz Publications,2004
5. Munshi, Indra The Adivasi Question, Orient Blackswan Private Limited,2018
6. Mohanty,P.K. \_Development of Primitive Tribal Groups in India, Kalpaz Publications,2003



  
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DSE-4

Semester – VI

**Business Research Methods and Project Work**

**Objective:** This course aims at providing the general understanding of business research and the methods of business research. The course will impart learning about how to collect, analyze, present and interpret data.

**Section A: Business Research Methods 50 Marks**

**Unit-I**

**Introduction:** Meaning of research; Scope of Business Research; Purpose of Research – Exploration, Description, Explanation; Unit of Analysis – Individual, Organization, Groups, and Data Series; Conception, Construct, Attributes, Variables, and Hypotheses.

**Unit-II**

**Research Process:** An Overview; Problem Identification and Definition; Selection of Basic Research Methods- Field Study, Laboratory Study, Survey Method, Observational Method Existing Data Based Research, Longitudinal Studies, Panel Studies

**Unit-III**

**Measurement:** Definition; Designing and writing items; Uni-dimensional and Multi-dimensional scales; Measurement Scales- Nominal, Ordinal, Interval, Ratio; Ratings and Ranking Scale, Thurstone, Likert and Semantic Differential scaling, Paired Comparison; Sampling –Steps, Types, Sample Size Decision; Secondary data sources

Hypothesis Testing: Tests concerning means and proportions; ANOVA, Chi-square test and other Non-parametric tests; testing the assumptions of Classical Normal Linear Regression.

**Section B – Project Report Marks (30 + 20)**

**Unit-IV Report Preparation:** Meaning, types and layout of research report; Steps in report writing; Citations, Bibliography and Annexure in report; JEL Classification

**Note:**

1. There shall be a written examination of 50% Marks on the basis of Unit I to III.
2. The student will write a project report under the supervision of a faculty member assigned by the college/institution based on field work. The Project Report carries 50% Marks and will be evaluated by University appointed examiners.


**Learning Outcome:** After completion of this paper, the students will be able to assess and apply a range of research method on a practical project.

**Text Books Recommended**

Mishra Business Research Methods , Oxford University Press.  
Business Research Methods and Project work, Priyaranjan Dash, Vrinda Publications (P)

Ltd



  
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**Exploratory Data Analysis:** Essential exploratory techniques for summarizing data, applied before formal modeling commences, eliminating or sharpening potential hypotheses about the world that can be addressed by the data, common multivariate statistical techniques used to visualize high-dimensional data.

### Text Books

1. Rachel Schutt, Cathy O'Neil, "Doing Data Science: Straight Talk from the Frontline" by Schroff /O'Reilly, 2013.

### Reference Books:

1. Foster Provost, Tom Fawcett, "Data Science for Business" What You Need to Know About Data Mining and Data-Analytic Thinking by O'Reilly, 2013.
2. John W. Foreman, "Data Smart: Using data Science to Transform Information into Insight" by John Wiley & Sons, 2013.
3. Eric Segel, "Predictive Analytics: The Power to Predict who Will Click, Buy, Lie, or Die", 1<sup>st</sup> Edition, by Wiley, 2013.

### DSE-3 Practical: Data Science Lab

1. Write a program that prints "Hello World" to the screen.
2. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n
3. Write a program that prints a multiplication table for numbers up to 12.
4. Write a function that returns the largest element in a list.
5. Write a function that computes the running total of a list.
6. Write a function that tests whether a string is a palindrome.
7. Implement linear search.
8. Implement binary search.
9. Implement matrices addition, subtraction and Multiplication.
10. Fifteen students were enrolled in a course. Their ages were:

20 20 20 20 20 21 21 21 22 22 22 22 23 23 23

- i. Find the median age of all students under 22 years.
- ii. Find the median age of all students.
- iii. Find the mean age of all students.
- iv. Find the modal age for all students.
- v. Two more students enter the class. The age of both students is 23. What is now mean, mode and median?


### DSE-4: PROJECT WORK / E-COMMERCE

#### DSE-4: E-COMMERCE

#### OBJECTIVES

- To introduce the concepts of electronic commerce.



  
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- To make the user understand how electronic commerce is affecting business enterprises, governments, consumers and people in general.

### Unit-1

**Introduction to E-Commerce:** Definition and scope of E-Commerce and M-Commerce, E-Commerce trade cycle, Electronic Markets, Internet Commerce, Benefits and Impacts of E-Commerce.

**Elements of E-Commerce:** Various elements, e-visibility, e-shops, Delivery of goods and services, Online payments, after- sales services, Internet E-Commerce security.

### Unit-2

**EDI and Electronic Payment Systems:** Introduction and definition of EDI, EDI layered Architecture, EDI technology and standards, EDI communications and transactions, Benefits and applications of EDI with example, Electronic Payment Systems: credit/debit/smart cards, e-credit accounts, e-money.

### Unit-3

**Introduction to EC models:** Inter-organization and intra-organization E-Commerce, E-Commerce Models: B2B, B2C, C2B, C2C, G2C and C2G

**E-Business:** Introduction to Internet bookshops, Grocery Suppliers, Software Supplies and support, Electronic newspapers, Virtual auctions, Online share dealing, e-diversity.

### Unit-4

**E-Security and Legal Issues:** Security concerns in E-Commerce, Privacy, integrity, authenticity, non-repudiation, confidentiality, SSL, Digital Signatures and fire walls, IT Act 2000, Cyber-crimes and cyber laws

**Mobile Commerce and Future of E-Commerce:** Introduction to Mobile Commerce, Benefits of Mobile Commerce, Impediments of M-Commerce, M-Commerce framework, Emerging and future trends.

### Text Books:

1. G.S.V.Murthy, E-Commerce Concepts, Models, Strategies, Himalaya Publishing House.
2. Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, "E-Commerce Fundamentals and Applications, Wiley Student Edition.

### Reference Books:

1. Gray P. Schneider , Electronic commerce, International Student Edition.

### DSE-4 Practical: E-Commerce Tutorial

## SECC – 1: PYTHON PROGRAMMING

### OBJECTIVES:

- To enable the students to understand the basic principles of the Python Language.

## Unit II

Pathogenesis, symptoms, laboratory diagnosis, preventive measures and chemotherapy caused by gram negative bacteria: *E. coli*, *N. gonorrhoea*, *N. meningitidis*, *S. typhi*, *S. dysenteriae*, *H. influenzae*, *V. cholerae*, *M. pneumoniae*, *Rickettsiaceae*, *Chlamydiae*.

## Unit III

Diseases caused by viruses- Picornavirus, Orthomyxoviruses, Paramyxoviruses, Rhabdoviruses, Reoviruses, Pox virus, Herpes virus, Papova virus, Retro viruses (including HIV/AIDS) and Hepatitis viruses.

## Unit IV

Fungal and Protozoan infections. Dermatophytoses (Trichophyton and Epidermophyton) Subcutaneous infection (Sporothrix, Cryptococcus), systemic infection (Histoplasma, Coccidioides) and opportunistic fungal infections (Candidiasis, Aspergillosis), Gastrointestinal infections (Amoebiasis, Giardiasis), Blood-borne infections (Leishmaniasis, Malaria).

### Practical:

1. Identification of pathogenic bacteria (any two) based on cultural, morphological and biochemical characteristics.
2. Growth curve of a bacterium.
3. To perform antibacterial testing by Kirby-Bauer method.
4. To prepare temporary mounts of Aspergillus and Candida by appropriate staining.
5. Staining methods: Gram's staining permanent slides showing Acid fast staining, Capsule staining and spore staining.

### Text Book:

1. Ananthnarayan ,Paniker, Arti Kapil Ananthanarayan and Paniker's Textbook of Microbiology, Universities Press (India) Private Limited

### Suggested readings

1. Brooks GF, Carroll KC, Butel JS and Morse SA. (2007). Jawetz, Melnick and Adelberg's Medical Microbiology. 24th edition. McGraw Hill Publication.
2. Goering R, Dockrell H, Zuckerman M and Wakelin D. (2007). Mims' Medical Microbiology. 4th edition. Elsevier.
3. Willey JM, Sherwood LM, and Woolverton CJ. (2008). Prescott, Harley and Klein's Microbiology. 7th edition. McGraw Hill Higher Education.

## DISCIPLINE SPECIFIC ELECTIVE 4: Project Reports& Seminar

Credits-6, Project Report: 60 marks, Seminar: 20 marks, Viva: 20 marks&Total: 100 Marks

- A selected Biotechnology based product
- Review articles
- Latest techniques and products of societal impact
- Contribution/discovery of Scientists in the field of Biotechnology
- Instrumentation and applications
- Scale up/ Down stream processing
- Models
- Bioinformatics tools





primitive roots, Euler's criterion, the Legendre symbol, Jacobi symbol and their properties, quadratic reciprocity, quadratic congruences with composite moduli.

#### **UNIT-IV**

Affine ciphers, Hill ciphers, p v g h v g g v ublic key cryptography, RSA encryption and decryption, the equation  $x^2 + y^2 = z^2$ , Fermat's Last Theorem.

#### **BOOKS RECOMMENDED:**

1. David M. Burton, *Elementary Number Theory* (6th Edition), TataMcGraw-Hill Edition, Indian reprint, 2007.

#### **BOOK FOR REFERENCES:**

1. Thomas Koshy, *Elementary Number Theory with Applications* (2<sup>nd</sup> Edition), Academic Press, 2007.

2. Neville Robinns, *Beginning Number Theory* (2nd Edition), Narosa Publishing House Pvt. Limited, Delhi, 2007.

**OR**

**Discipline Specific Elective Paper-IV**

**PROJECT**

#### **Guidelines for +3 (CBCS) Under Graduate(B.A./B.Sc.) Mathematics (Honours) Project**

1. Any student registering for doing project is required to inform the HOD, Mathematics the name of his/her project supervisor(s) at the time of pre-registration.
2. By the last date of add and drop, the student must submit the "Project Registration Form", appended as Annexure-I to this document, to the HOD, Mathematics. This form requires a project title, the signature of the student, signature(s) of the supervisor(s) and the signature of the HOD, Mathematics of the college/university.
3. The project supervisor(s) should normally be a faculty member(s) of the Department of Mathematics and the topic of the project should be relevant to Mathematical Sciences. If a student desires to have a Project Supervisor from another department of the institute, the prior approval for the same should be sought from the HOD, Mathematics.
4. A student may have at the most two Project Supervisors. If a student desires to have two supervisors, at least one of these should be from the Department of Mathematics.
5. The student(s) will be required to submit one progress report and a final report of the Project to the HOD, Mathematics. The progress report is to be submitted in the sixth



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week of the semester in which the project is undertaken. The hard copy and an electronic version of the final report of the project should be submitted two weeks before the end semester examination of the sixth semester. In addition the student will be required to make an oral presentation in front of a committee (Under Graduate (B.A./ B.Sc.) Mathematics (Honours) Project committee of the college in which supervisor is one of the members) constituted for this purpose by the Department of Mathematics of the college.

6. The student is expected to devote about 100 hours. The project will be evaluated by a committee of faculty members at the end of the sixth semester. The committee will be constituted by the Under Graduate (B.A./B.Sc.) Mathematics (Honours) Project committee of the college keeping in mind the areas of project they will cover.
7. In each semester the grade of a student will be awarded by the committee in consultation with his/her project supervisor(s). The project is evaluated on the basis of the following components: First Progress Reports: 20%; second/Final Report: 30%; Presentation: 30%; Viva: 20%.
8. Project progress reports should normally be no longer than 250 words and final report should not be longer than 40 A4 size pages in double spacing. Each final project report need to contain the following: (i) Abstract (ii) Table of contents (iii) Review of literature (iv) Main text(v) List of references. It may be desirable to arrange the main text as an introduction, the main body and conclusions.


### **GUIDELINES FOR STRUCTURING CONTENTS**

#### ***Sequence of Contents:***

The following sequence for the thesis organization should be followed:

- |                   |                                    |
|-------------------|------------------------------------|
| (i) Preliminaries | Title Page                         |
|                   | Certificate                        |
|                   | Abstract/Synopsis                  |
|                   | Acknowledgement and/ or Dedication |
|                   | Table of Contents                  |



  
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List of Figures, Tables, Illustrations,  
Symbols, etc (wherever applicable)

- (ii) Text of Thesis                      Introduction  
The body of the thesis, summary and conclusions
- (iii) Reference Material                List of References, Bibliography
- (iv) Appendices

NOTE:

1. *Synopsis/Abstract* should be self-complete and contain no citations for which the thesis has to be referred.
2. The Text of the Thesis

(a) *Introduction:*

Introduction may be the first chapter or its first major division. In either case, it should contain a brief statement of the problem investigated. It should outline the scope, aim, general character of the research and the reasons for the student's interest in the problem.

(b) *The body of Thesis*


This is the substance of the dissertation inclusive of all divisions, subdivisions, tables, figures, etc.

(c) *Summary and conclusions*

If required, these are given as the last major division (chapter) of the text. A further and final subdivision titled "*Scope for Further Work*" may follow.

(d) *Reference material*



  
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The list of references should appear as a consolidated list with references listed either alphabetically or sequentially as they appear in the text of the thesis.

For referencing an article in a scientific journal the suggested format should contain the following information: authors, title, name of journal, volume number, page numbers and year. For referencing an article published in a book, the suggested format should contain, authors, the title of the book, editors, publisher, year, page number of the article in the book being referred to. For referencing a thesis the suggested format should contain, author, the title of thesis, where thesis was submitted or awarded, year.

**ANNEXURE-I**  
**Department of Mathematics**  
**Project Registration Form**

Name of the college/university:

Name of the student:

Roll No. :

e-mail :

Name of the supervisor(s):

Department(s):

e-mail(s):

Title of the Project:


Signature of the Student:

Signature of supervisor(s): (i)

(ii)

Signature of HOD, Mathematics:



  
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Younger Dryas; Marine isotope stages

### Practical

1. Study of distribution of major climatic regimes of India on map
2. Distribution of major wind patterns on World map
3. Preparation of paleo geographic maps (distribution of land and sea) of India during specific geological time intervals

**Text Book:** Rudiman, W.F., 2001. Earth's climate: past and future. Edition 2, Freeman Publisher.

### Suggested readings:

1. Rohli, R.V., and Vega, A.J., 2007. Climatology. Jones and Bartlett
2. Lutgens, F., Tarbuck, E., and Tasa, D., 2009. The Atmosphere: An Introduction to Meteorology. Pearson Publisher
3. Aguado, E., and Burt, J., 2009. Understanding weather

## DSE-4 Project/ EVOLUTION OF LIFE THROUGH TIME

### Unit I: Origin of life

Possible life sustaining sites in the solar system

Archaean life: Earth's oldest life, Transition from Archean to Proterozoic, the oxygen revolution and radiation of life

Precambrian macrofossils—The garden of Ediacara, The Snow Ball Earth Hypothesis

### Unit II: Life through ages

Fossils and chemical remains of ancient life.

Geological Time Scale with emphasis on major bio events. Biogeochemical cycles

Abundance and diversity of microbes, extremeophiles

Microbes □ mineral interactions, microbial mats

### Unit III: Life in Paleozoic

The Cambrian Explosion. Bio mineralization and skeletalization

Origin of vertebrates and radiation of fishes

Origin of tetrapods Life out of water

Early land plants and impact of land vegetation

### Unit IV: Life in Mesozoic and Cenozoic

Life after the largest (P/T) mass extinction, life in the Jurassic seas Origin of mammals

Rise and fall of dinosaurs

Origin of birds; and spread of flowering plants

Aftermath of end Cretaceous mass extinction—radiation of placental mammals Evolution of modern grasslands and co evolution of hoofed grazers

Rise of modern plants and vegetation

### PRACTICAL

1. Study of modes of fossil preservation
2. Study of fossils from different stratigraphic levels
3. Exercises related to major evolutionary trends in important groups of animals and plants

### SUGGESTED READINGS:

1. Stanley, S.M., 2008 Earth System History
2. Jonathan I. Lumine W.H. Freeman Earth-Evolution of a Habitable World, Cambridge University Press.
3. Canfield, D.E. & Konhauser, K.O., 2012 Fundamentals of Geobiology Blackwell
4. Cowen, R., 2000 History of Life, Blackwell

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**PROJECT WORK (6 Credits): Full marks 100****Preamble of Project Work**

Geology is essentially a field science and a part of the knowledge is gained from study of exposures in the field. The project work has been envisaged to give the students an actual feel of working condition in the field. He/she can have hand son experience in locating himself in the field, study different types of rocks, their texture, structure and interrelationship, find out attitudes of beds, differentiate various geological structures, stratigraphy etc. In the field, the student can acquaint himself with different exploration procedures including drilling and logging of cores. Visit to different opencast and underground mines can provide comprehensive account on occurrence of mineral deposits in nature, requisites of different mining conditions, mineral engineering and ore-dressing practices. The student can receive hands on experience in cutting edge technologies like XRD, Ion chromatography, FESEM-EDAX, XRF from visit to different technological laboratories. Finally, from visit to different mineral-based plants and industries the student can gain knowledge on various extraction processes.

In view of the above, the student can take up project work on any of the above aspects under the supervision of a teacher, in which the theoretical knowledge can be substantially augmented.

**Field study should be treated as the project work.**

Each year the students should go for field study commensurate with the theory subjects under the guidance of one or more teachers. They should map an area and study the petrographic and structural aspect of the rocks. Further they may visit mines, mineral/ rock based industries, engineering projects and areas of palaeontological importance.



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Publishers, New Delhi.

4. W. D. Kingery, H. K. Bowen, D. R. Uhlmann: Introduction to Ceramics, Wiley Publishers, New Delhi.
5. J. A. Kent: Riegel's Handbook of Industrial Chemistry, CBS Publishers, New Delhi.
6. P. C. Jain, M. Jain: Engineering Chemistry, Dhanpat Rai & Sons, Delhi.
7. R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry, Vikas Publications, New Delhi.

**Alternative to DSC CORE PAPER IV**

**Discipline Specific Elective Paper- V**

**DISSERTATION**

A project work is to be carried out by the student in consultation with the teachers of the department. The report of work (dissertation) in a standard format is to be submitted and presented for evaluation.

***Distribution of marks***

- (a) Project Report/Dissertation (Proper documentation of literature, data, discussion etc. and logical flow of work undertaken): 50 Marks
- (b) Seminar/Presentation: 30 marks
- (c) Viva voce: 20 marks

***Brief Guidelines to Project Work:***

1. Students shall undertake the project work (experimental/theoretical) related to any branch of chemistry/Chemical science under the guidance of teacher(s) from the department or jointly with teachers/research personnel of other institutes.
2. The following activities have been outlined as guidelines (not exhaustive):
  - Physiochemical studies (pH, conductivity, turbidity, etc.) of different wetlands (ponds, lakes, river etc.)
  - Analysis of iron in pond / tube well / river water.
  - Analysis of Hardness of water samples.
  - Adulteration detection activities in food stuff and other edible items.
  - Extraction and preliminary characterization of useful chemicals (as far as possible) from plants.
  - Solubility, surface tension, and viscosity measurements of some solution of practical

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relevance, (cough syrup, soap solution, pesticides, fertilizers.. etc.)

- Pollution related activities (Industrial/Agricultural/Municipal etc.)
  - Nutrition related activities, (essential metal detection in food, cereals, pulses, fruits etc.).
  - Small synthetical work (inorganic/Organic/Polymeric compounds)
2. The UG level project work is a group activity, maximum number of students being limited to three. HOD to notify the name of teacher(s) for supervising the project work of each group. A teacher can guide more than one group, if necessary.
  4. No two groups in the same institution are permitted to do project work on the same problem.
  5. Each student shall prepare and submit the project report separately for evaluation. Two copies of project report are required to be submitted in bound form (spiral/paperback).
  6. The project report shall be divided as:
    - Chapter I: Introduction (Introduction on the topic, review of literature, objective and scope of the work)
    - Chapter II: Materials and methods
    - Chapter II: Results and discussion
    - Chapter IV: Conclusions and Scope of future studies
    - Chapter V: References

**Reference Books:**

1. M. A. Malati, An Investigative, Integrated Approach to Practical Project Work; Mid-Kent College of Higher/Further Education, UK (October 1999); Imprint: Woodhead Publishing; ISBN: 978-1-898563-47-1.
2. Dean, J. R., Jones, A. M., Holmes, D., Reed, R., Weyers, J. & Jones, A. (2011) Practical skills in chemistry. 2nd Ed., Prentice-Hall, Harlow.

**Alternative for Discipline Specific Elective (DSE) Papers**

**Discipline Specific Elective Paper-VI**

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2. Nano science and nano technology, K.K. Choudhary (Narosa)-2016

**Reference Books:**

1. Nano Science and nano technology, Sundar Singh (Pragati Prakashan)-2017
2. C.P. Poole, Jr. Frank J. Owens, Introduction to Nanotechnology (Wiley India Pvt. Ltd.)-2007
3. Richard Booker, Earl Boysen, Nanotechnology(John Wiley and Sons)-2005
4. M. Hosokawa, K. Nogi, M. Naita, T. Yokoyama, Nanoparticle Technology Handbook (Elsevier, 2007)
5. K.K. Chattopadhyaya and A. N. Banerjee, Introduction to Nanoscience and Technology (PHI Learning Private Limited)-2009

**Discipline Specific Elective Paper-1V**

**Project**

**OR**

**Basic Instrumentation**

**Basic Instrumentation**


**UNIT-I**

**Basic of Measurement:** Instruments accuracy, precision, sensitivity, resolution range etc. Errors in measurements and loading effects.

**Multimeter:** Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Specifications of a multimeter and their significance.

**Electronic Voltmeter:** Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity. Principles of voltage, measurement (block diagram only). Specifications of an electronic Voltmeter/ Multimeter and their significance.

**AC mill voltmeter:** Type of AC mill voltmeters: Amplifier- rectifier, and rectifier-amplifier. Block diagram ac mill voltmeter, specifications and their significance.



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## UNIT-II

**Cathode Ray Oscilloscope:** Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only no mathematical treatment), brief discussion on screen phosphor, visual persistence and chemical composition. Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance.

Use of CRO for the measurement of voltage (dc and ac frequency, time period. Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: Block diagram and principle of working.

## UNIT-III

**Signal Generators and Analytical Instruments:** Block diagram, explanation and specifications of low frequency signal generators, pulse generator, and function generator, Brief idea for testing, specifications, Distortion factor meter, wave analysis.

## UNIT-IV


**Digital Instruments:** Principle and working of digital meters, Comparison of analog and digital instruments, Characteristics of a digital meter, Working principles of digital voltmeter.

**Digital Multimeter:** Block diagram and working of a digital multimeter, Working principle of time interval, frequency and period measurement using universal counter/frequency counter, time-base stability, accuracy and resolution.

The test of lab skills will be of the following test items:

1. Use of an oscilloscope.
2. CRO as a versatile measuring device.
3. Circuit tracing of Laboratory electronic equipment,
4. Use of Digital multimeter /VTVM for measuring voltages
5. Circuit tracing of Laboratory electronic equipment,
6. Winding a coil /transformer.



  
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7. Study the layout of receiver circuit.
8. Trouble shooting a circuit
9. Balancing of bridges

**Laboratory Exercises:**

1. To observe the loading effect of a multimeter while measuring voltage across a low resistance and high resistance.
2. To observe the limitations of a multimeter for measuring high frequency voltage and currents.
3. To measure Q of a coil and its dependence on frequency, using a Q-meter.
4. Measurement of voltage, frequency, time period and phase angle using CRO.
5. Measurement of time period, frequency, average period using universal counter/ frequency counter.
6. Measurement of rise, fall and delay times using a CRO.
7. Measurement of distortion of a RF signal generator using distortion factor meter.
8. Measurement of R, L and C using a LCR bridge/universal bridge.

**Open Ended Experiments:**

1. Using a Dual Trace Oscilloscope
2. Converting the range of a given measuring instrument (voltmeter, ammeter)

More emphasis should be given on hands-on experiments.

**Text Books:**


1. A Text Books book of electrical technology-B.L.Theraja and A.K. Theraja (S. Chand Publishing)-2014
2. Digital circuits and systems Venugopal (Tata McGraw Hill)-2011

**Reference Books :**

1. Digital Electronics-Subrata Ghoshal (Cengage Learning)-2017
2. Electronic Devices and circuits - S. Salivahanan and N. S.Kumar (Tata Mc-Graw Hill)-2012
3. Electronic Devices-Thomas L. Floyd (Pearson)-2015

**Additional Reference Books for Practical papers:**

1. An advanced course in Practical Physics- Chattopadhyay, Rakshit-



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**UNIT-II**

Introduction and sources of collecting data on vital statistics, errors in census and registration data. Measurement of population, rate and ratio of vital events. Measurements of Mortality: Crude Death Rate (CDR), Specific Death Rate (SDR), Infant Mortality Rate (IMR) and Standardized Death Rates.

**UNIT-III**

Stationary and Stable population, Central Mortality Rates and Force of Mortality. Life (Mortality) Tables: Assumption, description, construction of Life Tables and Uses of Life Tables.

**UNIT-IV**

Abridged Life Tables; Concept and construction of abridged life tables by Reed-Merrell method, Measurements of Fertility: Crude Birth Rate (CBR), General Fertility Rate (GFR), Specific Fertility Rate (SFR) and Total Fertility Rate (TFR). Measurement of Population Growth: Crude rates of natural increase, Pearl's Vital Index, Gross Reproduction Rate (GRR) and Net Reproduction Rate (NRR).

**TEXT BOOKS:**

1. Pathak, K.B. and Ram, F.: Techniques of Demography Analysis, Himalayan Publishers
2. Gun, A.M., Gupta, M.K. and Dasgupta, B. (2008): Fundamentals of Statistics, Vol. II, 9th Edition, World Press.

**SUGGESTED READINGS:**

1. Mukhopadhyay P. (1999): Applied Statistics, Books and Allied (P) Ltd.
2. Biswas, S. (1988): Stochastic Processes in Demography & Application, Wiley Eastern Ltd.
3. Croxton, Fredrick E., Cowden, Dudley J. and Klein, S. (1973): Applied General Statistics, 3rd Edition. Prentice Hall of India Pvt. Ltd.
4. Keyfitz N., Beckman John A.: Demography through Problems S-Verlag Newyork.

**LIST OF PRACTICALS**

1. To calculate CDR and Age Specific death rate for a given set of data
2. To find Standardized death rate by:- (i) Direct method (ii) Indirect method
3. To construct a complete life table
4. To fill in the missing entries in a life table
5. To calculate probabilities of death at pivotal ages and use it construct a bridged life table
6. To calculate CBR, GFR, SFR, TFR for a given set of data
7. To calculate Crude rate of Natural Increase and Pearle's Vital Index for a given set of data
8. Calculate GRR and NRR for a given set of data and compare them

**DSE-IV**

A student has to opt for any one of the following:

**I. PROJECT WORK****II. ECONOMETRICS****DSE-IV: PROJECT WORK**

*Objective:* The aim of the course is to initiate students to write and present a statistical report, under the supervision of a faculty, on some area of social interest. The project work will provide hands-on training to the students to deal with data emanating from some real-life situation and propel them to do well on some theory or relate it to some theoretical concepts. The project should be prepared basing on the own idea and interpretation of the student. It should not be





copied from anywhere. A student has to consult his / her supervisor for the preparation of the project.

While writing a project, a student has to present two seminars before the faculties / supervisor from the department.

Seminar - I (Based on Introduction and Review of literature, Methodology) - 10 Marks

Seminar - II (Based on Analysis, Interpretation and Conclusion) - 10 Marks

Project Report - 60 Marks

Viva- Voce (after submission of Project Report)- 20 Marks

#### **DSE-IV: ECONOMETRICS**

<b>UNIT-I</b>
Introduction: Objective behind building econometric models, nature of econometrics, model building, role of econometrics, structural and reduced forms. General linear model (GLM). Estimation under linear restrictions.
<b>UNIT-II</b>
Multi collinearity: Introduction and concepts, detection of multicollinearity, consequences, tests and solutions of multicollinearity, specification error.
<b>UNIT-III</b>
Generalized least squares estimation, Aitken estimators. Autocorrelation: concept, consequences of auto correlated disturbances, detection and solution of autocorrelation.
<b>UNIT-IV</b>
Hetero scedastic disturbances: Concepts and efficiency of Aitken estimator with OLS estimator under hetero scedasticity. Autoregressive models, Dummy variables, Qualitative data.

#### **TEXT BOOKS:**

1. Gujarati, D. and Sangeetha, S. (2007): Basic Econometrics, 4th Edition, McGraw Hill Companies.
2. Maddala, G.S. and Lahiri, K. (2009): Introduction to Econometrics, 4th Edition, John Wiley & Sons.

#### **SUGGESTED READINGS:**

1. Johnston, J. (1972): Econometric Methods, 2<sup>nd</sup> Edition, Mc Graw Hill International.
2. Koutsoyiannis, A. (2004): Theory of Econometrics, 2nd Edition, Palgrave Macmillan

#### **DSE-IV(P)**

#### **LIST OF PRACTICALS**

2. Problems based on estimation of General linear model
3. Testing of parameters of General linear model
4. Forecasting of General linear model
5. Problems related to consequences of Multicollinearity
6. Diagnostics of Multicollinearity
7. Problems related to consequences of Autocorrelation (AR(I))
8. Diagnostics of Autocorrelation





- iv. Find the modal age for all students.
- v. Two more students enter the class. The age of both students is 23. What is now mean, mode and median?

## **DSE-4: PROJECT WORK/ DISSERTATION OR DATA MINING**

### **DSE-4: DATA MINING**

#### **OBJECTIVES:**

- To introduce the basic concepts of data warehousing, data mining, Issues, and Implication.
- To learn the core topics like Association rules, Classification & Prediction and Clustering techniques.
- To make a study on the Applications and Trends in Data Mining.

#### **Unit-1**

**Data Warehouse Fundamentals:** Introduction to Data Warehouse, OLTP Systems, OLAP, Differences between OLTP and OLAP, Characteristics of Data Warehouse, Functionality of Data Warehouse, Advantages and Applications of Data Warehouse, Advantages, Applications, Top- Down and Bottom-Up Development Methodology, Tools for Data warehouse development, Data Warehouse Types, Data cubes

#### **Unit-2**

**Introduction to Data Mining:** Data mining, Functionalities, Data Preprocessing: Preprocessing the Data, Data cleaning, Data Integration and Transformation, Data reduction, Discretization and Concept hierarchies.

#### **Unit-3**

**Mining Association Rules:** Basics Concepts – Single Dimensional Boolean Association Rules from Transaction Databases, Multilevel Association Rules from transaction databases, Multi dimension Association Rules from Relational Database and Data Warehouses. Apriori Algorithm, FP-Tree algorithm

#### **Unit-4**

**Classification and Prediction:** Introduction, Issues, Decision Tree Induction, Naïve Bayesian Classification, Classification based on Concepts from Association Rule Mining, Classifier Accuracy.

#### **Text Books:**

1. J. Han and M. Kamber, Data Mining Concepts and Techniques, Elsevier, 2011

#### **Reference Books:**

1. K.P. Soman ,Shyam Diwakar, V.Ajay ,2006, Insight into Data Mining Theory and Practice, Prentice Hall of India Pvt. Ltd - New Delhi.

## SUGGESTED READINGS

1. Woodroffe R., Thirgood, S. and Rabinowitz, A. (2005). People and Wildlife, Conflict or Co-existence? Cambridge University.
2. Bookhout, T.A. (1996). Research and Management Techniques for Wildlife and Habitats, 5 th edition. The Wildlife Society, Allen Press.
3. Sutherland, W.J. (2000). The Conservation Handbook: Research, Management and Policy. Blackwell Sciences.
4. Hunter M.L., Gibbs, J.B. and Sterling, E.J. (2008). Problem-Solving in Conservation Biology and Wildlife Management: Exercises for Class, Field, and Laboratory. Blackwell Publishing.

## Discipline Specific Elective Paper-IV

### Economic Zoology

#### Unit 1: Bee-keeping and Bee Economy (Apiculture)

Varieties of honey bees and Bee pasturage; Setting up an apiary: Langstroth's/Newton's hive, bee veil, brood and storage chambers, iron frames and comb sheets, drone excluder, rearing equipments, handling of bees, artificial diet; Honey extraction techniques; Physico-chemical analysis of honey; Other beneficial products from bee.

#### Unit 2: Silk and Silk Production (Sericulture)

Different types of silk and silk worms in India; Rearing of *Bombyx mori*, Rearing racks and trays, disinfectants, rearing appliances, black boxing, Chawki rearing, bed cleaning, mountages, harvesting of cocoons; Silkworm diseases: Pebrine, Flacherie, Grasserie, Muscardine and Aspergillosis, and their management; Silkworm pests and parasites: Uzi fly, Dermestid beetles and their management; Silk reeling techniques and Quality assessment of silk fibre.

#### Unit 3: Aquaculture

Induced breeding of fish; Management of hatchery of fish; Management of nursery, rearing and stocking ponds; Preparation and maintenance of fish aquarium; Preparation of compound diets for fish; Role of water quality in aquaculture; Fish diseases: Bacterial, viral and parasitic; Preservation and processing of harvested fish; Fishery by-products. Prawn farming; Culture of crab; Pearl culture.

#### Unit 4: Dairy and Poultry Farming

Introduction; Indigenous and exotic breeds; Rearing, housing, feed and rationing; Commercial importance of dairy and poultry farming; Varietal improvement techniques; Diseases and their management; Dairy or poultry farm management and business plan; Visit to any dairy farm or Poultry farm.

## PRACTICAL

1. Submission of report on anyone field visits related to Aquaculture/Apiculture/Sericulture/Poultry/ Dairy farm.
2. Study of different types of bees (Queens, Drones and Worker bees).
3. Study of different types of silk moths.
4. Study of different types of pearls.
5. Study of different types of fish diseases.
6. Identification of different types of scales in fishes.
7. Study of different types of fins.

8. Study of different modified structures of fishes (Saw of sawfish, Hammer of hammer head fish, tail of sharks etc.)
9. Identification of various types of natural silks.

#### TEXT BOOKS

1. Sarkar, Kundu and Chaki. (2014) Introduction to Economic Zoology. NCBA Publisher.
2. T.V.R. Pillay (Author), M.N. Kutty (2011) Aquaculture: Principles and Practices, Wiley India Pvt Ltd; Second edition

#### SUGGESTED READINGS

1. Dhyan Singh Bisht, Apiculture, ICAR Publication.
2. Dunham RA (2004) Aquaculture and Fisheries Biotechnology – Genetic Approaches. CABI publications, U.K.
3. Hafez ESE (1962) Reproduction in Farm Animals. Lea and Fabiger Publishers.
4. Knobil E and Neill JD (2006) The Physiology of Reproduction. Vol.2. Elsevier Publishers, USA.
5. Prost PJ (1962) Apiculture. Oxford and IBH, New Delhi.
6. Singh S. Beekeeping in India, Indian council of Agricultural Research, New Delhi.
7. Srivastava CBL (1999) Fishery Science and Indian Fisheries. Kitab Mahal publications, India.

OR

#### Project Work

Each student has to undertake a project work under the guidance of a teacher and submit the project report in the form of a thesis. There will be a presentation of the project work before an external examiner.

### Generic Elective Paper I

#### Animal Diversity

##### Unit 1: Protista, Porifera, Radiata, Aceolomates and Pseudocoelomates

General characters of Protozoa; Life cycle of *Plasmodium*, General characters and canal system in Porifera, General characters of Cnidarians and polymorphism, General characters of Helminthes; Life cycle of *Taenia solium*, General characters of Nemethelminthes; Parasitic adaptations

##### Unit 2: Coelomate Protostomes, Arthropoda, Mollusca and Coelomate Deuterostomes





## PRACTICAL

1. Principles and functioning of instruments in microbiology laboratory
2. Hands on sterilization techniques and preparation of culture media
3. Screening microorganisms for industrial use.
4. Mycorrhiza, arbuscular mycorrhizal colonization in plant roots
5. Determination of BOD, COD, TDS and TOC of water samples;
6. Microorganisms as indicators of water quality

### Text Books:

1. P. D. Sharma. (2017) Environmental Microbiology. Rastogi Publications, Meerut.

### Suggested Readings

1. Pelzar, M.J. Jr., Chen E.C. S., Krieg, N.R. (2010). Microbiology: An application based approach. Tata McGraw Hill Education Pvt. Ltd., Delhi.
2. Tortora, G.J., Funke, B.R., Case. C.L. (2007). Microbiology. Pearson Benjamin Cummings, San Francisco, U.S.A. 9th edition.
3. Pradipta K. Mohapatra (2008). Text Book of Environmental Microbiology, I. K. International Publishing House, New Delhi
4. A. K. Rath (2018). Industrial and Environmental Microbiology, Kalyani Publishers, New Delhi.

OR

### Discipline Specific Elective Paper-IV

### DISSERTATION / PROJECT WORK

Identification of problem	Review of Literature	Methodology	Findings	Analysis	Viva-Voce	Total
10	10	10	25	25	20	100

\*\* = Students who score more than  $\geq 60\%$  in aggregate are eligible for project work